Introduction

Appendix A contains 216 DoD installation narratives. These narratives summarize environmental restoration activities at operational DoD installations and Formerly Used Defense Sites (FUDS) that are on, or proposed for, the National Priorities List (NPL), and environmental restoration activities at installations slated for closure or realignment as of September 30, 1998. Appendix A fulfills the statutory reporting requirements in CERCLA §120(e)(5) and SARA §211.

The index of Appendix A lists alphabetically, by Component, all of the DoD installations that are on or proposed for the NPL, as well as a majority of the installations slated for closure. Several of the installations slated for closure are affected only by realignment actions that may involve transfer or disposal of one or more parcels of property. The individual installation narratives follow the narrative index.

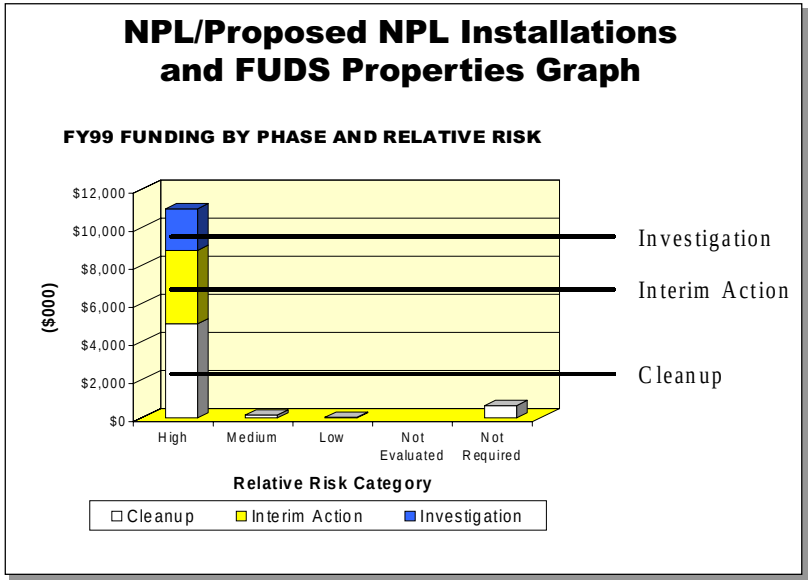
The narratives are in alphabetical order by installation name. Each narrative provides a brief description of the installation's restoration activities, including a history, progress made during FY98, and a summary of the plan of action. Other pertinent information, such as Interagency Agreement (IAG) status and final Remedy in Place (RIP) or Response Complete (RC) date, is provided at the beginning of each narrative. Additional information about site status and program costs for each installation can be found in Appendix B. The following sections provide background information on the program terms found in the installation narratives.

Environmental Restoration at Active Installations and FUDS

Investigative actions and cleanup at contaminated sites are governed primarily by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), although in some cases activities are governed by the Resource Conservation and Recovery Act (RCRA). (For a brief description of RCRA and CERCLA, refer to the Glossary in Appendix G.)

The DoD Environmental Restoration Program carries out the investigation and cleanup or control of past contamination at active and closing installations and FUDS as required by these statutory and regulatory authorities.

NPL/Proposed NPL Installations and FUDS Properties Graph



Each narrative for an active installation (NPL and proposed-NPL) contains a graph depicting FY99 funding by phase (Investigation, Interim Action, and Cleanup) and by relative risk (high, medium, low, not evaluated, or risk assessment not required) as shown in the NPL / Proposed NPL Installations and FUDS Properties Graph.

Environmental Restoration at BRAC Installations

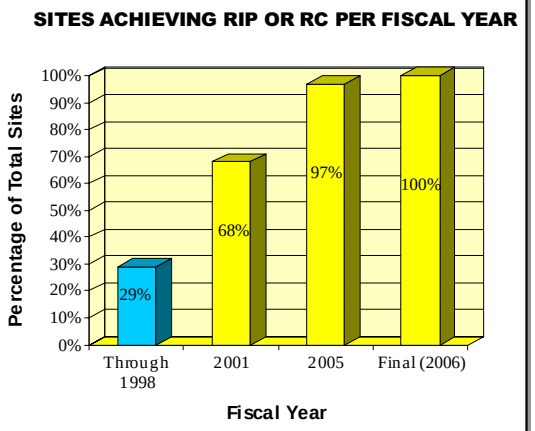
Environmental restoration efforts at Base Realignment and Closure (BRAC) installations are conducted in a manner similar to that used at operational installations; however, the BRAC restoration process also is governed by economic considerations related to reuse and transfer of property.

The BRAC program uses several processes and planning documents that focus cleanup efforts on making property quickly available for transfer. Among these processes and documents are the BRAC Cleanup Plan (BCP), the Environmental Baseline Survey (EBS), the finding of suitability to transfer (FOST), the finding of suitability to lease (FOSL), the restoration advisory board (RAB), the community redevelopment plan, and National Environmental Policy Act (NEPA) analyses. These terms are thoroughly defined in the Glossary in Appendix G.

Each BRAC installation narrative contains a graph showing the percentage of sites at the installation that have a final Remedy in Place or that have attained Response Complete (RC) status as shown below.

BRAC Installation Graph

This graph shows the cumulative percentage of BRAC sites achieving, or expected to achieve, final Remedy in Place (RIP), or Response Complete (RC) status through the end of FY98, FY01, FY05, and the year in which all BRAC sites at the installation are expected to reach (or have reached) RIP or RC status. The darker column indicates the percentage of BRAC sites that have already achieved RIP or RC, and the lighter columns indicate the percentage of BRAC sites that are expected to achieve final RIP or RC in future years.



Status of Installations in Appendix A

Component	NPL	Proposed for NPL	BRAC
Army	36	1	40
Navy	45	2	30
Air Force	37	6	29
Defense Logistics Agency	5	0	3
Formerly Used Defense Sites	19	0	0
Total	**142**	**9**	**102**

Note: Totals reflected do not necessarily match the total number of narrative installations as some installations are both NPL and BRAC.

Aberdeen Proving Ground — Edgewood Area and Michaelsville Landfill — NPL

Size: 72,516 acres
Mission: Develop and test equipment and provide troop training
HRS Score: 31.45 (Michaelsville Landfill); placed on NPL in October 1989
53.57 (Edgewood Area); placed on NPL in February 1990
IAG Status: IAG signed in March 1990
Contaminants: VOCs, SVOCs, metals, PCBs, explosives, petroleum products, pesticides, radiologicals, CWM and their degradation products, UXO, and potential biological warfare material
Media Affected: Groundwater, surface water, sediment, soil, and potential for air release
Funding to Date: $359.2 million
Estimated Cost to Completion (Completion Year): $708.0 million (FY2046)
Final Remedy in Place or Response Complete Date for All Sites: FY2027

Edgewood and Aberdeen, Maryland

Restoration Background

Initial environmental studies from 1976 to 1983 identified numerous areas of contamination, including chemical munitions and manufacturing waste sites. RCRA Facility Assessments completed in FY90 identified 319 solid waste management units, which were combined into 13 study areas. There are 234 sites in the Edgewood Area (EA) and 20 sites in the Aberdeen Area (AA) that have potential or actual contamination. Remedial Investigations (RIs) have identified high levels of organic contaminants in most study areas. Lower levels of contamination have been detected in a few on-post tributaries to the Chesapeake Bay. Major actions completed before 1998 include 74 Removal Actions, 3 Remedial Actions (RAs), and 12 Records of Decision (RODs). Removal Actions completed since FY91, include removal of soil contaminated with polychlorinated biphenyls, petroleum hydrocarbons, trichloroethene, and DDT; removal of underground storage tanks (USTs); removal of unexploded ordnance (UXO) along the Edgewood Area boundary; closure of Nike missile silos, an adamsite vault, and pilot plant sumps; and cleanup of open dump sites.

In FY91, the Army and EPA signed an interim ROD for the Old O-Field Groundwater (treatment facility construction complete FY94) and a ROD for no further action for the White Phosphorous Underwater Munitions Burial Area (WPUMBA). In FY92, a ROD was signed for the closure/capping of the Michaelsville landfill (cap installation completed FY94.) In FY93, the installation installed carbon adsorption units on the Harford County Perryman water supply. In FY95, the Army and regulators signed a ROD for installation of a permeable infiltration unit (PIU) on the Old O-Field landfill. In FY95, the commander converted the technical review committee into a Restoration Advisory Board (RAB). In FY96 the Army and EPA signed RODs for the Building 103 Dump Site; the Building 503 Burn Sites; the J-Field Soil Operable Unit (OU); the former Nike Site, Cluster 1 (groundwater, landfill, and sewer lines); and the Carroll Island OU A (disposal pits). In FY97, the Army completed RODs for three study sites and the investigation and final report on natural attenuation (NA) processes at the West Branch of Canal Creek (CC).

FY98 Restoration Progress

The installation received Nuclear Regulatory Commission release for two radiological Removal Action sites. Remediation of 30 USTs began in the CC Area. The Army completed the site safety submission and Environmental Engineering and Cost Analysis for Lauderick Creek Area and chemical weapons/munitions (CWM) Removal Action. The 95 percent design is complete for a prototype detonation test and destruction facility (PDTDF) for testing portable UXO/CWM containment and destruction technologies and to serve as a CWM destruction facility under the CWM treaty.

The installation did not complete the Feasibility Study (FS) and ROD for the Western Boundary Area because tests detected explosives in the groundwater. The five-year review for the WPUMBA was completed with no further work recommended. In the other Edgewood Area Study, RI/FS sampling identified volatile organic compound (VOC) contamination in groundwater and metals contamination in surface water samples. In the CC Study Area, the Building 503 Burn Site Soil (OU) remedy is in place. Installation of a cap on the 103 dump site continued but was delayed for relocation of personnel from a building on the site. The Focused FS (FFS), Proposed Plan, and public meeting were completed for the CC East Branch Groundwater OU. The NA study and FFS for the CC West Branch were completed.

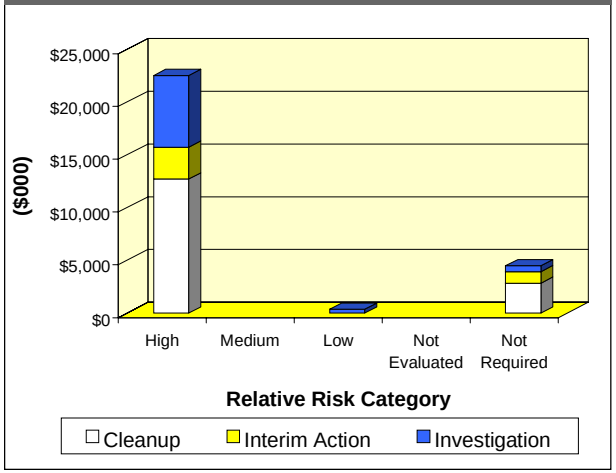
In the J-Field Study Area, the RI and the Ecological and Human Health Risk Assessments were completed, and work began on the FS for all OUs. The RA began for the J-Field Soil OU but will be significantly delayed because of encountered CWM. The J-Field hybrid poplar tree phytoremediation study continued with additional data collection and plantation expansion. Studies indicate that poplar trees are containing the groundwater plume during the growing season. At the Nike site, the installation capped a landfill and completed 90 percent of the groundwater treatment Remedial Design (RD). In the Lauderick Creek Area, the RI continued, two FFSs began, and an NA study concluded. In the Bush River Area, one FFS was completed and one FFS began. At Carroll Island, the Army completed the sitewide RI and 75 percent of the RA. At Graces Quarters, the final RI was completed, the FS continued, and NA study fieldwork was completed. In the Old O-Field Area, the Army completed installation of a PIU at the landfill (source area). The New O-Field FFS was delayed for evaluation of NA and newly discovered potential source areas. In the Westwood Area, the RI continued, and a risk assessment and an FS began. The Army continued implementing several other innovative technologies, including vegetation gas flux chambers for measuring off-gassing of VOCs, honeybee biomonitoring, and fish monitoring.

RAB activities included monthly meetings, site tours, two budget and prioritization meetings, radiological training, and document reviews.

Plan of Action

- Complete 30 Removal Actions in FY99
- Begin the Lauderick Creek subsurface UXO/CWM clearance and Removal Action in FY99
- Complete two FSs, one FFS, four RODs, two RDs, and one RA in FY99

FY99 Funding by Phase and Relative Risk



Adak Naval Air Facility

Size: 76,800 acres
Mission: Provided services and materials to support aviation activities and operating forces of the Navy
HRS Score: 51.37; placed on NPL in May 1994
IAG Status: Federal Facility Agreement signed in November 1993
Contaminants: UXO, heavy metals, PCBs, VOCs, pesticides, and petroleum products
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $128.2 million
Estimated Cost to Completion (Completion Year): $88.8 million (FY2006)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Adak, Alaska

Restoration Background

In September 1995, the BRAC Commission recommended closure of Adak Naval Air Facility. Operational Naval forces departed the island on April 1, 1997, and command functions were assumed by the Engineering Field Activity Northwest. The installation closed in September 1997.

In FY86, an Initial Assessment Study identified 32 sites at the installation. Site types include landfills, unexploded ordnance (UXO) areas, and polychlorinated biphenyl (PCB) spill sites that have released contaminants into groundwater, soil, surface water, and sediment. Twenty sites were recommended for further investigation. Beginning in FY88, RCRA Facility Assessments were conducted that identified 76 solid waste management units (SWMUs), 73 of which are being managed as CERCLA sites under the Federal Facility Agreement (FFA) signed in 1993.

From FY90 to FY95, Interim Actions included disposal of PCB-contaminated water and sludge; bioremediation of 4,500 tons of petroleum-contaminated soil; removal of approximately 30 underground and aboveground storage tanks and associated pipelines; and excavation, removal, and disposal of leaking incendiary (napalm) and cluster bombs. All petroleum-contaminated sites are being evaluated through the cooperative assessment and decision-making approach pursued by the Navy and the State of Alaska.

An interim Record of Decision (ROD) was signed in FY95 for two landfills. In FY96, the installation completed fieldwork for the basewide Remedial Investigation and Feasibility Study and final evaluation reports for 10 SWMUs. Removal Actions and Interim Remedial Actions were completed for a number of SWMUs.

In FY97, the installation completed a Tier Assessment to Risk Assessment at petroleum sites and continued petroleum recovery at SWMU 17. Remedial Design (RD) work was initiated for the areas surrounding SWMU 17. SWMUs 19 and 25 were closed, and a Non-Time-Critical Removal Action at SWMUs 16, 16A, and 67 and a Time-Critical Removal Action (TCRA) at SWMU 27 were completed. Corrective actions at abandoned landfill sites were completed.

The installation completed a community relations plan in early FY90 and revised the plan in FY95. In FY92, it formed a technical review committee, which was converted to a Restoration Advisory Board (RAB) in January 1996. During FY97, a Local Redevelopment Authority and a BRAC cleanup team (BCT) were established. The BCT includes representatives from the Navy, EPA, the State of Alaska, and the U.S. Fish and Wildlife Service. The BCT developed a draft BRAC Cleanup Plan (BCP), which was signed by representatives of the Navy, the State of Alaska, and EPA.

FY98 Restoration Progress

The installation completed RD and Remedial Action (RA) at SWMU 4, the South Davis Road Landfill. A TCRA at SWMU 27, the Lake Leonne Drum Disposal Area, also was completed. The Navy received letters from EPA stating that no further action is required for these sites. Additional sampling to determine the volume of contaminated sediment was performed at SWMU 17.

Operable Unit (OU) B was formed to address UXO issues. The installation completed clearing a WW II minefield at SWMU 2. Investigations concerning UXO in downtown Adak were completed. The data gathered during these investigations are expected to result in a finding of suitability to transfer for this area, which is the primary area targeted for reuse. Investigations of other potential minefield locations were initiated. The Navy proposed, and received approval for, an investigative technique for minefields that will reduce the time and cost associated with determining risk for these areas.

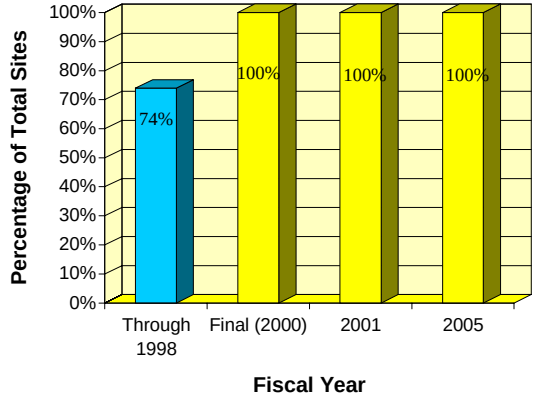
The Navy also developed a proposal for biological monitoring of marine ecosystems, drawing on the expertise of biologists with extensive experience in assessing Aleutian Island ecosystems. Previous monitoring performed by the Navy in cooperation with these biologists disproved any linkage between contaminants at Adak and recent sea otter population declines.

The RAB generally meets monthly. The BCT participated in negotiations with the Navy, EPA, and the State of Alaska to negotiate cleanup levels for Sweeper Creek estuary as part of the SWMU 17 RD process; developed a comprehensive long-term monitoring plan; established schedules for completing work at OU B; and developed a Proposed Plan and draft ROD for OU A.

Plan of Action

- Finalize ROD for OU A and receive regulatory agency signatures in FY99
- Obtain approval from DoD, EPA, and the State of Alaska for UXO investigations
- Initiate comprehensive monitoring plan for OU A and UXO investigations for remaining OU B sites in FY99
- Complete RD and RA at SWMU 17 in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 706 acres
Mission: Manufacture aircraft and associated equipment
HRS Score: 39.92; placed on NPL in August 1990
IAG Status: IAG signed in 1990
Contaminants: Solvents, paint residues, spent process chemicals, PCBs, waste oils and fuels, heavy metals, VOCs, and cyanide
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $48.1 million
Estimated Cost to Completion (Completion Year): $41.4 million (FY2013)
Final Remedy in Place or Response Complete Date for All Sites: FY2000

Fort Worth, Texas

Restoration Background

Air Force Plant No. 4 has served as a primary manufacturer of military aircraft and associated equipment since 1942. Since FY84, studies have identified 30 sites and confirmed groundwater, surface water, and soil contamination. Trichloroethene (TCE) was detected in groundwater beneath six spill sites and four landfills. Groundwater is the primary drinking water source for the city of White Settlement.

A Remedial Investigation and Feasibility Study (RI/FS) began in FY88 and was completed in FY95 with the preparation of the Ecological Risk Assessment. During the RI, 8 of the 30 sites were recommended for no further action. Two Interim Remedial Actions (IRAs) initiated in FY93 included installation of an interim groundwater treatment system to address contamination from two spill sites. In FY94, the installation completed the design and construction of a soil vapor extraction (SVE) system at Building 181, the parts processing plant. Two additional carbon filtration groundwater treatment systems were installed to control the further migration of TCE. The installation also began constructing a vacuum-enhanced pumping system to treat groundwater and soil contamination at Landfill No. 3. The installation undertook the expansion of several treatment systems associated with the large TCE plume. Additional extraction wells were installed at one pump-and-treat system to prevent TCE migration. The SVE pilot plant at Building 181 was expanded to a large-scale, dual-phase SVE system that will treat both groundwater and soil vapors.

In FY96, a Record of Decision (ROD) was signed by the Texas Natural Resource Conservation Committee (TNRCC), the Air Force, and EPA, which proposed actions at the remaining two sites, including groundwater pumping and treatment, enhanced pumping and treatment using surfactants, and SVE. A Memorandum of Agreement was signed by the Air Staff, the Air Force Center for Environmental Excellence (AFCEE), the Air Force Base Conversion Agency, and Headquarters Air Force to integrate the restoration programs for the Carswell Field sites and the Air Force Plant No. 4 groundwater plume. The installation conducts monthly meetings with representatives of EPA, TNRCC, the U.S. Army Corps of Engineers, AFCEE, and the U.S. Geological Survey. In FY97, the installation completed a long-term monitoring plan and a Remedial Design (RD) work plan.

In FY95, the installation converted its technical review committee to a Restoration Advisory Board (RAB). In FY96, the RAB was integrated with the Carswell RAB, and meetings are now held quarterly at JRB Naval Air Station, Fort Worth. In FY97, the RAB sponsored an Earth Day fair to generate community interest.

FY98 Restoration Progress

An emergency plume containment action and a Focused Feasibility Study were initiated at the leading edge of the TCE plume on Carswell field. Tracer testing was used to identify potential areas of source contamination (TCE). Because of the expense of tracer testing and the equally great expense of cleanup with surfactants, the installation is considering dewatering the site and using enhanced SVE on the remaining soil contamination.

The TNRCC, the Texas General Land Office, Texas Parks and Wildlife, the Department of the Interior, and the Air Force are negotiating a MOA in an attempt to integrate the Natural Resource Damage Assessment (NRDA) into the restoration program.

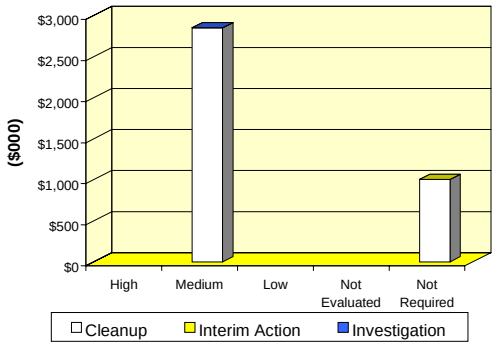
Funding for the surfactant-enhanced Remedial Action (RA) was delayed until FY99 due to delayed confirmation of the source contamination. Complications in fieldwork and the complexity of the groundwater modeling delayed the 60 and 90 percent RD of the pump-and-treat system in the East Parking Lot and the associated RD report.

The RAB participated in the Carswell Air Show, where restoration activities were highlighted.

Plan of Action

- Complete an RA Plan in FY99
- Complete all RD reports in FY99
- Fund and put in place all final RAs by FY00

FY99 Funding by Phase and Relative Risk



Air Force Plant No. 85 — Proposed NPL

Size: 420 acres
Mission: Produced aircraft and aircraft missile components
HRS Score: 50.00; proposed for NPL in January 1994
IAG Status: None
Contaminants: PCBs, petroleum hydrocarbons, VOCs, and metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $3.8 million
Estimated Cost to Completion (Completion Year): $0 (FY2000)
Final Remedy in Place or Response Complete Date for All Sites: FY2000

Columbus, Ohio

Restoration Background

Environmental studies since FY86 have identified 11 sites and 1 area of concern (AOC) at Air Force Plant No. 85. Historical operations at the installation involved use of solvents and petroleum products. Contaminants include polychlorinated biphenyls (PCBs), metals, petroleum hydrocarbons, and volatile organic compounds (VOCs), which have affected groundwater, surface water, sediment, and soil. Decision documents have been prepared for 9 of the 11 sites; however, the Air Force has not received concurrence from regulatory agencies on any of the documents.

In FY94, the installation conducted supplemental investigations of pesticide contamination at the fire training area. In FY95, the installation began to remove soil contaminated with PCBs. In FY96, the AOC was closed under a letter of concurrence from the Ohio EPA, and the installation began a groundwater and surface water investigation. Fieldwork on the investigation was completed in FY97.

In FY97, the Aeronautical Systems Center began using the State of Ohio's Voluntary Action Program rules, which were codified in that year. The restoration of the fire training area was deferred, pending further analyses. The site may be closed after a risk assessment is conducted.

In FY95, the installation formed a Restoration Advisory Board (RAB) and began an educational program for RAB members. A public meeting held in FY97 determined that the continuation of the RAB was not necessary. The public and the installation agreed that information will be provided to the community informally, as needed.

FY98 Restoration Progress

A PCB-contaminated soil site was remediated, and regulator concurrence was obtained. Investigations began under Ohio's Voluntary Action Program. In addition, Air Force Plant No. 85 property was sold, with sales proceeds to be used for environmental restoration.

Plan of Action

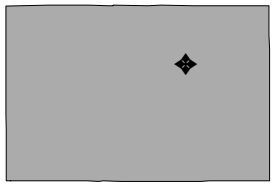
- Use sales proceeds for remediation activities in FY99 and beyond
- Obtain concurrence from regulators on final closure of sites by FY00
- Update community and provide information as needed

FY99 Funding by Phase and Relative Risk

All sites are in the long-term monitoring phase.

Air Force Plant PJKS — NPL

Size: 464 acres
Mission: Research, develop, and assemble missiles and missile components; test engines
HRS Score: 42.93; placed on NPL in November 1989
IAG Status: None
Contaminants: Chlorinated organic solvents, VOCs, nitrate, fuel, and hydrazine
Media Affected: Groundwater and soil
Funding to Date: $21.0 million
Estimated Cost to Completion (Completion Year): $41.0 million (FY2011)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Waterton, Colorado

Restoration Background

Air Force Plant PJKS supports the military by researching, developing, and assembling missiles, missile components, and engines. Past operations have contaminated groundwater beneath the installation with trichloroethene (TCE), hydrazine, vinyl chloride, benzene, other volatile organic compounds (VOCs), and nitrate. Since FY86, environmental studies have identified 59 sites, which were grouped into six operable units (OUs). There are also six areas of concern. Twelve of 14 underground storage tanks have been removed from the installation.

In FY93, field activities began for a supplemental Remedial Investigation and Feasibility Study (RI/FS) at OU1, OU4, and OU6. RI/FS work plans were completed for supplemental investigations at OU2, OU3, and OU5. In FY94, the installation began using new technologies to improve field methods and data management. The installation also sponsored workshops, which included representatives from EPA and the state, to ensure that all technical and regulatory requirements for the supplemental RI/FS would be met. As a result of the workshops, work plans for supplemental RI/FS activities at OU2, OU3, and OU5 were renewed, approved, and made final. In FY95, all fieldwork, sample collection, and sample analysis for the supplemental basewide RI/FS and construction of the monitoring well network were completed.

In FY96, data validation was completed, and an electronic database was established. Technical work groups were formed with EPA, the State of Colorado, USGS, and the U.S. Army Corps of Engineers to support RI site characterization and risk assessment. Site characterization and a Baseline Risk Assessment began. Negotiations on the Interagency Agreement (IAG) also began. In FY97, Relative Risk Site Evaluations were reevaluated and revised to reflect data from the RI/FS. The Aeronautical Systems Center and Lockheed Martin Astronautics agreed to sale terms for the installation, that include environmental liability and cleanup aspects. The installation formed a Restoration Advisory Board (RAB) in FY96, and in FY97 signed a RAB charter.

FY98 Restoration Progress

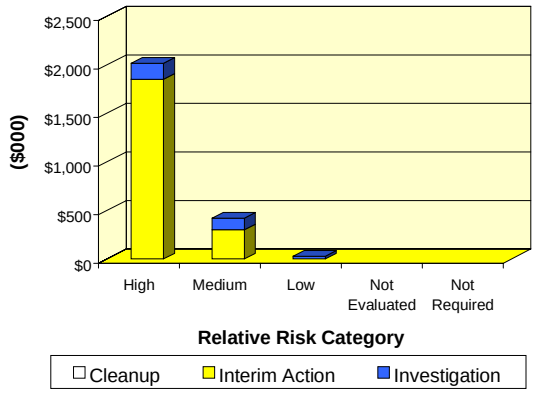
An Engineering Evaluation/Cost Analysis was developed for an early action to address groundwater contamination. Based on favorable analyses, implementation of an early action for groundwater is budgeted for FY99.

Negotiations toward an IAG with EPA Region 8 were halted in deference to a two-party regulatory oversight agreement between Air Force and the State of Colorado. The installation held quarterly RAB meetings to discuss preliminary site characterization data, risk assessments, and community concerns.

Plan of Action

- Complete all basewide RI work for OUs 1 through 6 and submit one final RI report that will include all six OUs
- Implement early action to address groundwater contamination in FY99
- Assess the cost-effectiveness of additional early actions in FY99
- Initiate FS work as needed; complete FS work for OUs 1 through 6 by FY01
- Sign Records of Decision (RODs) as needed; complete RODs for OUs 1 through 6 by FY01

FY99 Funding by Phase and Relative Risk



Size: 2,031 acres
Mission: Provided services and material support for transition of aircraft and tenant commands
HRS Score: NA
IAG Status: None
Contaminants: Asbestos, paint, solvents, petroleum/oil/lubricant liquids and sludges, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $33.3 million
Estimated Cost to Completion (Completion Year): $26.6 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Agana, Guam

Restoration Background

In July 1993, the BRAC Commission recommended that the Agana Naval Air Station be closed. The station was closed on March 31, 1995.

In FY84, an Initial Assessment Study (IAS) identified two potentially contaminated sites. In FY93, a Preliminary Assessment (PA) identified an additional 13 potentially contaminated sites, later identified as points of interest (POIs). After the Environmental Baseline Survey (EBS) was completed in FY94, eight additional POIs were identified. In FY95, an update of the EBS identified six more POIs, bringing the total number of sites identified to 29.

In FY94, the final Site Inspection (SI) report revealed contamination in soil and groundwater at Sites 1 and 2, the two sites identified in the original IAS. An aggressive groundwater investigation to characterize the groundwater regime beneath the base was initiated for Site 29. Fast-track actions were also initiated for the investigation of soil contamination at 17 other sites.

In FY95, one SI was completed for Site 10 and another started for Sites 3 through 9, 11 through 16, and 28. Perimeter fencing was installed at Sites 1 through 5, 7 through 23, and 26 to limit access to the area. As part of the groundwater Remedial Investigation (RI), groundwater monitoring wells, heat pulse flow meters, and pumps were installed. Initial data from the groundwater monitoring wells showed trichloroethene and dichloroethane contamination. Additionally, the Environmental Condition of Property assessment identified four parcels as suitable for reuse. Findings of suitability to lease were completed for three of these parcels with an interim lease and joint use agreement with the Guam International Airport Authority.

In FY96, a Non-Time-Critical Removal Action (NTCRA) was initiated for Sites 1 and 2. RI fieldwork began for Sites 20, 21, and 23. The Navy recommended no further action (NFA) for Sites 3, 5, 6, 8, 9, 11 through 15, and 28. As part of the groundwater characterization study for Site 29, second, third, and fourth quarter groundwater sampling was completed. Additionally, a small-scale dye trace study and the installation of a groundwater treatment system at an on-site production well were under way. During FY97, an RI for the remaining sites was initiated. The Navy and the regulatory agencies agreed that Sites 3, 5, 6, 8, 9, 11, 20, and 21 required NFA, but some sites require use restrictions. All aboveground and underground storage tanks were closed and removed.

The BRAC cleanup team (BCT) was established in FY93, and the BRAC Cleanup Plan (BCP) was completed in FY94. A community relations plan was published in FY92, and three information repositories established. The installation formed a Restoration Advisory Board in FY93, and a partnership agreement was reached with regulatory agencies in FY95.

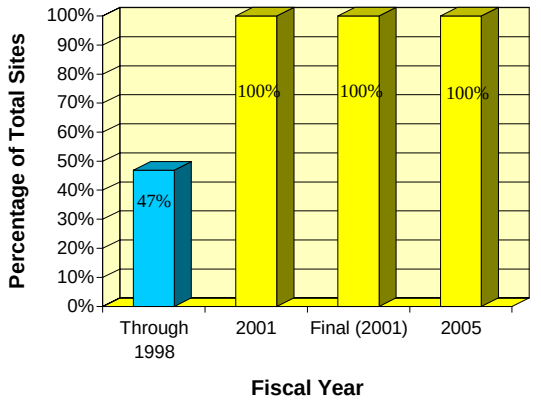
FY98 Restoration Progress

Soil RIs were completed at Sites 2, 19, 20, and 23 and are under way for the remaining six sites. Because the RIs for these six sites did not begin until the mid-FY98, the Action Memorandum recommending NFA was not completed. At Site 29, the installation completed a Time-Critical Removal Action (TCRA), conducted a limited dye trace study, completed a regional groundwater RI, and nearly completed the Feasibility Study. An expanded Ecological Risk Assessment is under way at Site 7. The groundwater activated-carbon treatment system was installed at an on-site production well and began operation. The Navy and regulatory agencies agreed that Sites 2, 10, 12, 13, 14, 15, 25, 27, and 28 require NFA, but some sites require use restrictions. Based on the results of an RI, the Engineering Evaluation and Cost Analysis (EE/CA) planned for seven sites and the Removal Action planned for five sites were deemed unnecessary. The BCP was updated.

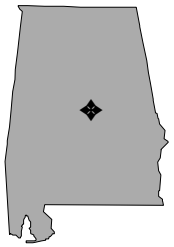
Plan of Action

- Conduct TCRA for metals at two hot spots for Site 23 in FY99
- Conduct NTCRA for the Site 1 landfill using a presumptive remedy in FY99
- Conduct NTCRA for lead at the former pistol range at Site 16 in FY99
- Select and implement a final remedy for the regional groundwater problem for Site 29 in FY99
- Prepare EE/CA for Site 22 and initiate Removal Action in FY99
- Implement long-term monitoring at the on-site production well at Site 29 in late FY99 or early FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,257 acres
Mission: Manufactured explosives
HRS Score: 36.83; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in December 1989
Contaminants: Nitroaromatic compounds, heavy metals, and munitions-related wastes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $57.4 million
Estimated Cost to Completion (Completion Year): $3.1 million (FY2000)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1983



Childersburg, Alabama

Restoration Background

Environmental studies conducted since FY83 at the Alabama Army Ammunition Plant have identified various sites as potential sources of contaminants. Prominent site types include a former ammunition production and burning ground for various explosives; industrial wastewater conveyance systems, ditches, and a red water storage basin; landfills; underground storage tanks; polychlorinated biphenyl (PCB)–containing transformers; and a former coke oven.

Remedial Investigation and Feasibility Study (RI/FS) activities, which began in FY85, are ongoing. The installation was divided into five operable units (OUs): Area A OUs 1 and 2 and Area B OUs 1, 2, and 3. The RI confirmed that groundwater, surface water, sediment, and soil are contaminated with nitroaromatic compounds, heavy metals, and explosives waste.

In FY88, the Army excavated contaminated soil at the burning grounds at Area A and transported the soil to Area B to await a final decision on treatment or disposal. In FY90, the Army and regulators signed a Record of Decision (ROD) for Area B. The ROD incorporated a generic remedy, including on-site incineration of stockpiled contaminated soil.

In FY94, the Army initiated a follow-on installation-wide RI, which included installing monitoring wells and conducting soil borings; resampling existing monitoring wells; and collecting background samples, soil and sediment samples, surface water samples, and ecological samples. The Army also completed incineration of the stockpiled contaminated soil, as prescribed in the ROD, and formed a BRAC cleanup team (BCT).

In FY95, the Army attempted to establish a Restoration Advisory Board (RAB) but received no applications for RAB membership. In addition, in FY95, the Army and regulators approved the Area A RI/FS.

The Army initiated partnership efforts with EPA and the state regulatory agency. These efforts resulted in concurrence on the CERFA report and signing of four interim RODs. Partnership meetings also produced an Installation Management Plan, which establishes the course of action for installation cleanup through FY99.

In FY96, the Army completed a Proposed Plan and a final ROD for Area A. The installation identified an additional OU for Area B (OU4), which includes all remaining lead- and explosives-contaminated soil at the plant. An interim ROD was initiated for Area B OU4. The ROD calls for soil removal, incineration of explosives-contaminated soil, and solidification of lead-contaminated soil.

In FY97, the Army and regulators approved the final ROD for Area A and completed the Remedial Action (RA) for Areas 13 and 14. The BCT began delisting procedures for Area A. Approval for the designation of 1,285 acres as CERFA-uncontaminated was granted by the appropriate regulatory agencies. The Army continued the incineration of explosives-contaminated soil at OU3 and OU4 and constructed an additional disposal cell for the remaining contaminated soil.

FY98 Restoration Progress

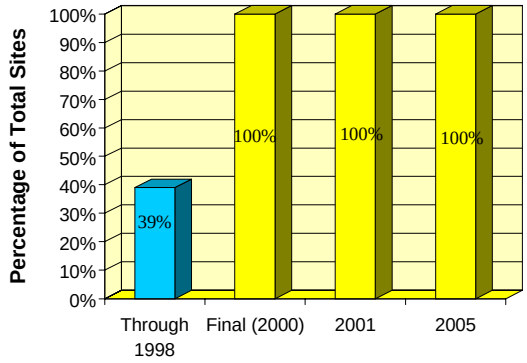
The installation completed RAs for all lead- and explosives-contaminated soil; it incinerated 165,000 tons of explosives-contaminated soil and solidified 50,000 tons of lead-contaminated soil. All equipment was decontaminated, dismantled, and removed from the site. The installation designed the engineered cap for Landfill 22 and obtained regulatory approval for the cap. Completion of the RI at Area B was delayed for gathering of additional groundwater information. The EPA and Alabama Department of Environmental Management approved the closeout report for Area A, and delisting procedures for the area continued.

The Army successfully used electrical tomography to trace explosives-contaminated groundwater conduits through highly fractured/weathered limestone bedrock.

Plan of Action

- Develop a land use control assurance and implementation plan in FY99
- Continue investigation of Area B by conducting quarterly groundwater monitoring, surface water and sediment sampling, a dye trace study, and a pump test in FY99
- Complete the RI/FS for surface soil, sediment, and water for Area B in FY99
- Close 35 existing monitoring wells in FY99
- Complete the engineered cap for Area 22 in FY99
- Complete the closeout report for OU3 and OU4 in FY99
- Complete NPL delisting procedures for Area A in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,675 acres, including about 1,000 offshore acres
Mission: Maintained and operated facilities and provided services and material support for naval aviation activities and operating forces
HRS Score: NA
IAG Status: Federal Facility Site Remediation Agreement under negotiation
Contaminants: BTEX, chlorinated solvents, radium, heavy metals, herbicides, pesticides, methylene chloride, petroleum hydrocarbons, PAHs, PCBs, VOCs, and SVOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $82.9 million
Estimated Cost to Completion (Completion Year): $117.1 million (FY2013)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2007

Alameda, California

Restoration Background

In September 1993, the BRAC Commission recommended closure of Alameda Naval Air Station. The installation was closed in April 1997. Cleanup activities at this installation are being conducted at 25 sites. Prominent site types include landfills, offshore sediment areas, plating and cleaning shops, pesticide control areas, transformer storage areas, and a former oil refinery.

In FY94, the installation removed lead and acid-contaminated soil from Site 13. During FY95, 4 underground storage tanks (USTs) and associated contaminated soil were removed at Site 7, debris removal was initiated for catch basins at Site 18, and 60 abandoned USTs and associated contaminated soil were removed. The installation initiated a bench-scale demonstration at Site 5 for removal of metals from soil by electrokinetics. The installation completed Phase I of an Environmental Baseline Survey (EBS) for all sites in FY94 and Phase I of an Ecological Risk Assessment (ERA) for all sites in FY95. A community land reuse plan was approved in FY96. The installation initiated Treatability Studies (TSs) at Sites 1, 2, 3, 5, 13, and 17.

During FY97, the installation began Phase II of the ERA for all sites, completed the EBS for 208 parcels with Environmental Condition of Property (ECP) assigned, conducted EBS sampling and risk screening, implemented ECP recategorization, and removed sediment from storm sewer lines at Site 18. A finding of suitability to lease was completed for all of the base property before base closure. TSs were completed for Sites 3 and 13. The installation also completed the final revised community relations plan, performed early actions at Sites 15, 16, and 18, and restructured operable units (OUs) to allow No Further Action sites to be disposed of earlier.

The installation formed a technical review committee in FY90 and converted it to a Restoration Advisory Board (RAB) in FY93. It established an administrative record in FY89, which was updated in FY96. Two information repositories also were established and routinely maintained and updated. A BRAC cleanup team was formed in FY93. A BRAC Cleanup Plan (BCP) was completed in FY94 and is updated periodically. The Navy established a partnering contract in FY93 with the University of California, Berkeley, to promote the use of innovative technologies.

FY98 Restoration Progress

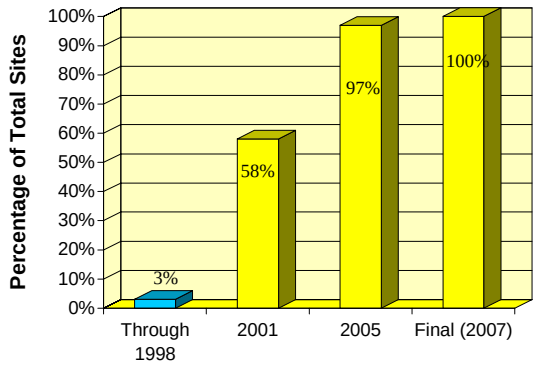
The installation completed the early removal of PCB- and lead-contaminated soil at Sites 15 and 16 and initiated additional TSs at Sites 4, 5, and 13. The Removal Action at Site 18 was completed. TSs were completed at Sites 1 and 17, and the study at Site 2 was cancelled. The electrokinetics demonstration at Site 5 was completed. The final phase of the ERA continues. The recategorization of parcels has been completed by the Navy but has not yet been agreed to by the regulators. A draft and revised draft RI for OU1 were completed and issued. The first Technical Assistance for Public Participation grant in the United States was issued to the RAB to help with the OU1 RI review. Site boundaries were redefined on the basis of contaminant plume maps, and Site 25 was established because of elevated levels of polyaromatic hydrocarbons (PAHs) in soil samples. Remedial Designs and Remedial Actions for 25 Installation Restoration sites were scheduled for FY98 but have been postponed until the appropriate Records of Decision (RODs) are signed.

The installation began a fuel line removal project to remove or close 11 miles of abandoned fuel lines. A radiological removal project to remove contamination from radium paint at Sites 1, 2, 5, and 10 began. By the end of FY98, 96 percent of the industrial buildings' asbestos work was complete. A project to abate lead-based paint and asbestos in pre-1960 residential structures began and was approximately 98 percent complete by the end of FY98.

Plan of Action

- Obtain agreement from the regulatory agencies on ECP recategorization of parcels in FY99
- In FY99, complete removal of all remaining USTs, abatement of asbestos in all industrial facilities, and abatement of lead-based paint and asbestos in pre-1960 housing units
- In FY99, complete removal of all inactive fuel lines; remove all active fuel lines; remove radium paint contamination at Sites 1, 2, 5, and 10; and complete TSs at Sites 4, 5, and 13
- Complete final RI/FS for OU1 and final RI and draft FS for OUs 2 and 3 in FY99
- Complete final RI for OU4 and final FS for OUs 2, 3, and 4 in FY00
- Complete RODs for OUs 1, 2, and 3 in FY00 and for OU4 in March 2001; complete CERCLA RODs in FY01
- Transfer last parcel of property from the Navy to the city by FY06

Sites Achieving RIP or RC Per Fiscal Year



Albany Marine Corps Logistics Base NPL

Size: 3,579 acres

Mission: Acquire, supply, and dispose of materials needed to sustain combat readiness of Marine Corps forces worldwide; acquire, maintain, repair, rebuild, distribute, and store supplies and equipment; conduct training

HRS Score: 44.65; placed on NPL in December 1989

IAG Status: Federal Facility Agreement signed in July 1991

Contaminants: VOCs, PCBs, heavy metals, pesticides, and PAHs

Media Affected: Groundwater, soil, and sediment

Funding to Date: $25.9 million

Estimated Cost to Completion (Completion Year): $18.4 million (FY2017)

Final Remedy in Place or Response Complete Date for All Sites: FY2002

Albany, Georgia

Restoration Background

Since FY85, environmental studies have identified 23 CERCLA sites and 6 RCRA sites. The sites were grouped into six operable units (OUs), including a basewide groundwater OU (OU6) and a site screening group. Site types include disposal areas, storage areas, and landfills. Contaminants include trichloroethene, polychlorinated biphenyls (PCBs), and heavy metals.

An Initial Assessment Study was completed for eight sites in FY85. In FY87, a confirmation study was completed for nine sites, a groundwater recovery system was installed, and a quarterly groundwater monitoring program initiated for the Industrial Wastewater Treatment Plant (IWTP) area. During FY89, the installation completed RCRA Facility Investigation (RFI) activities for nine sites, a corrective measures study (CMS) for one site, and an Interim Remedial Action (IRA) for capping the IWTP sludge beds. In FY90, the state issued an administrative order to complete RCRA closure of the sludge beds at the Domestic Wastewater Treatment Plant (DWTP). The installation completed a Preliminary Assessment in FY91 for one site, and a Remedial Investigation and Feasibility Study (RI/FS) in FY92. In FY93, the Remedial Design (RD) was completed for both sites at OU3; in FY94, OU3 Removal Actions and cleanup activities were completed. An RI/FS work plan was completed, and fieldwork was initiated for all five sites at OU4.

During FY95, the RI/FS for all four sites at OU1 was submitted to the regulators; an IRA was completed for one site at OU1; the RI/FS for OU2 was submitted; and an Engineering Evaluation and Cost Analysis was completed for one site at OU4. The installation also completed a focused FS, signed an interim Record of Decision (ROD), completed the RD for a site at OU5, and finished RCRA closure of the DWTP sludge beds at Solid Waste Management Unit (SWMU) 3. During FY96, the installation completed construction of a pilot-scale groundwater treatment system, initiated a Treatability Study for one site at OU1, and completed a Removal Action for another site at OU1. A final no further action (NFA) ROD was signed for OU2, and the site was closed. An IRA was completed for one site at OU5.

In FY97, the installation completed the RI/Baseline Risk Assessment (RI/BRA) and its addendum and signed a final ROD for the four sites at OU1: two required NFA and two required institutional controls (ICs). A final ROD was signed for the two sites at OU3: one site received a no further remedial action planned (NFRAP) designation and one site required ICs. The potential sources of contamination screening technical memorandum was completed for nine sites; seven are listed as NFRAP in the RCRA permit. Screening Sites 4 and 21 require further action. The RI/BRA and the NFRAP Proposed Plan for two sites at OU5 were completed. The RFI and the CMS and corrective measures implementation were finished for two SWMUs. Removal Actions were conducted for two sites that were listed as NFRAP in the RCRA permit. EPA Region 4 conducted well sampling for 30 residents for a Public Health Assessment in August. Site tours were conducted for Albany residents.

A technical review committee, formed in FY89, meets periodically. In FY92, a community relations plan was completed, and an information repository and administrative record were established.

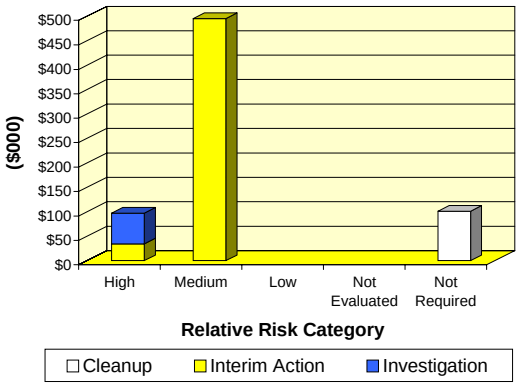
FY98 Restoration Progress

The installation completed the RI/BRA for OU4. A final ROD was signed for two sites at OU5 declaring NFRAP for all soil, surface water, and sediment. Continued progress on OU6 includes completing a USGS hydrogeologic framework/basewide groundwater technical memorandum and sampling groundwater at approximately 200 wells and 17 lower water bearing zone (LWBZ) wells to address data gaps. Two screening sites (PSC 4 and 21) were identified for further investigation. Community interest has increased significantly and will play a major role in the future.

Plan of Action

- In FY99, complete and sign a ROD for the five sites at OU4, complete and sign a Land Use Control Assurance Plan with EPA 4 to ensure that all sites with ICs are maintained in the future
- Complete investigation and Remedial Action (RA) at PSC 4 in FY99
- In FY99, plan any investigations and RAs required at PSC 21 and any newly identified SWMUs in FY99
- For OU6, complete RI/BRA and draft FS and conduct sampling at additional LWBZ wells to address new data gaps in FY99
- Complete FS, decision documents, RD, and preliminary planning for RA construction for OU6 in FY01
- Perform long-term operation and monitoring optimization for OU6 in FY01 through FY16

FY99 Funding by Phase and Relative Risk



Allegany Ballistics Laboratory NPL

Size: 1,628 acres (1,572 acres owned by the Navy)
Mission: Research, develop, and produce solid propellant rocket motors for DoD and NASA
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement signed January 1998
Contaminants: VOCs, RDX, HMX, and silver
Media Affected: Groundwater and soil
Funding to Date: $13.9 million
Estimated Cost to Completion (Completion Year): $55.8 million (FY2033)
Final Remedy in Place or Response Complete Date for All Sites: FY2011

Mineral County, West Virginia

Restoration Background

Environmental studies initiated in FY83 identified 11 sites at this government-owned, contractor-operated installation. A confirmation study recommended further study at eight of these sites. Remedial Investigation and Feasibility Study (RI/FS) activities began for six sites in FY92. Site 1 consists of six waste disposal units, including ordnance burning grounds, inactive solvent and acid pits, a drum storage area, a former open-burn area, and an ash landfill.

In FY93, a RCRA Facility Assessment identified 119 solid waste management units (SWMUs) and 12 areas of concern (AOCs). Further action was recommended at 61 of the SWMUs and AOCs. In FY94, Site 7, a beryllium landfill, was excavated. Also in FY94, the installation began to negotiate waste disposal options with the State of West Virginia and EPA Region 3. In addition, the Agency for Toxic Substances and Disease Registry completed a Public Health Assessment.

During FY95, the installation began sampling off-site residential wells. It also completed the focused RI for Site 1 and initiated a Phase I RCRA Facility Investigation (RFI) for the SWMUs and AOCs. Baseline Risk Assessments were completed for Sites 1 through 5 and Site 10. During FY96, the installation completed a Focused Feasibility Study (FFS) for groundwater, began an FFS for soil, and initiated groundwater Remedial Design (RD) for Site 1. The installation completed an FFS and initiated an RD for landfill contents and soil at Site 5. It also completed an Engineering Evaluation and Cost Analysis for Site 7, initiated an FFS for Site 10, and completed a Site Inspection and initiated an RI/FS for Site 11.

In FY97, the Record of Decision (ROD) for Site 1 was signed, and the RD for a water treatment plant (WTP) was implemented to obtain hydraulic containment. A Remedial Action (RA) was initiated for groundwater at Site 1. A ROD was signed, completing the FFS for Site 5. An RD was implemented for a landfill cap. Negotiation of waste disposal options concluded, and the Removal Action for Site 7 was completed. Eight SWMUs were targeted for cleanup. Three-dimensional seismic survey validation was used to accelerate fieldwork.

The installation established a technical review committee in FY89 and converted it to a Restoration Advisory Board (RAB) in FY95. The RAB, which has 25 members, reviews technical documents, presents its views to the community, and communicates the progress of the cleanup program. In FY94, a community relations plan was completed, and an administrative record and two information repositories were established.

FY98 Restoration Progress

The Federal Facility Agreement was signed. The RI was implemented for Site 11. For Site 10, the FFS was completed, the ROD was signed, the RD was completed, and the RA was awarded. The Site 1 WTP was used to accomplish hot-spot extraction of groundwater for Site 10. By prioritizing the Site 10 RA and making necessary changes to the construction of the Site 1 treatment plant to permit the treatment of Site 10 water, the installation was able to reduce costs. A completed Environmental Baseline Survey (EBS) identified the current environmental status at the installation.

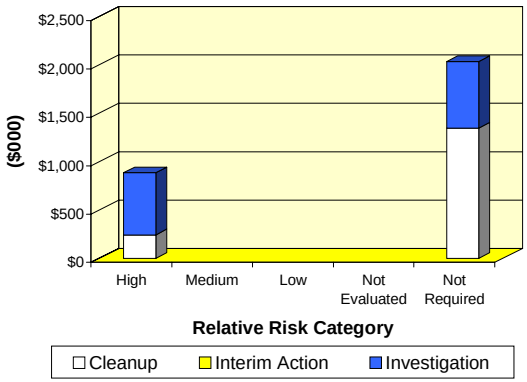
The Phase I RFI for SWMUs and AOCs, originally scheduled for completion in FY98, will be replaced with a new document in FY99 because SWMUs will be included in a no further action ROD following a revised investigation. Unforeseen geological conditions have prevented the Navy from signing the ROD, initiating the RD, and completing the RI/FS for Site 11. The RI/FS is scheduled for completion in FY99.

Partnering between the Navy, EPA, and the West Virginia Division of Environmental Protection expedited cleanup efforts. Local labor was used to the greatest extent possible to increase local involvement and allow the community to track the economic benefits it receives from the cleanup.

Plan of Action

- Complete ROD for Sites 2, 3, 4a, 4b, and 7 in FY99
- Complete RODs for various SWMUs in FY99
- Complete SWMU investigation in FY99
- Complete Site 11 RI report in FY99
- Complete Site 1 soil FS in FY99
- Complete Site 10 RA in FY99
- Initiate RD for Site 1 soil in FY00

FY99 Funding by Phase and Relative Risk



Andersen Air Force Base NPL

Size: 15,400 acres
Mission: Support the Air Force mission in the Pacific by providing troops, equipment, and facilities
HRS Score: 50.00; placed on NPL in October 1992
IAG Status: Federal Facility Agreement signed in March 1993
Contaminants: VOCs, metals, asphalt, dioxins, PCBs, and UXO
Media Affected: Groundwater and soil
Funding to Date: $56.0 million
Estimated Cost to Completion (Completion Year): $37.4 million (FY2007)
Final Remedy in Place or Response Complete Date for All Sites: FY2006

Yigo, Guam

Restoration Background

In FY84 and FY85, Preliminary Assessments identified 50 sites at Andersen Air Force Base, including landfills, waste piles, fire training areas, hazardous waste storage areas, and spill sites. The 50 sites were consolidated into 39 sites and grouped into 6 operable units (OUs). Restoration activities began when low levels of trichloroethene (TCE) and tetrachloroethene (PCE) were detected in the sole-source drinking water aquifer on the island.

Increased ecological concerns have made restoration at the installation more complex. Rapid commercial development of nonmilitary lands on the island has made the base a de facto nature preserve. Various threatened and endangered species inhabit areas of the installation. The federal Endangered Species Act requires extensive ecological inventories before any field activities can be conducted within an identified habitat of endangered species.

Landfill 5 was capped in FY93. To avoid the high cost of importing sterilized soil to Guam, the installation used a synthetic cover material to cap the landfill. The installation's success with that innovative technology prompted other agencies on Guam to use the same synthetic material. Remedial Investigation and Feasibility Study (RI/FS) activities also began in FY93. Thirty-five monitoring wells were installed.

In FY96, 25 additional groundwater monitoring wells were installed to facilitate RI sampling and later long-term monitoring (LTM) of groundwater in the karst aquifer.

In FY97, the installation completed soil sampling and analysis, soil gas surveys, geophysical surveys, and site inventories for five sites. A gas chromatography/mass spectrometry laboratory was used to analyze soil gas samples on site and accelerate fieldwork. The base was geographically reorganized into four OUs to accommodate excess-land issues and address groundwater at each site. The installation also performed site risk evaluations.

The installation formed a technical review committee (TRC) in FY93 and built a partnership with the Navy to establish a Defense Environmental Restoration Team. The TRC was converted to a Restoration Advisory Board (RAB) in 1995. The installation communicates with the neighboring villages of Yigo, Dededo, and Mangilao about potential contamination and restoration activities at the base.

FY98 Restoration Progress

The installation implemented Interim Remedial Actions (IRAs) and LTM of groundwater at 15 sites. An asphalt recovery project has recycled more than 3,000 drums of abandoned 1950s-vintage asphalt. This asphalt is being given to the local government for road repairs.

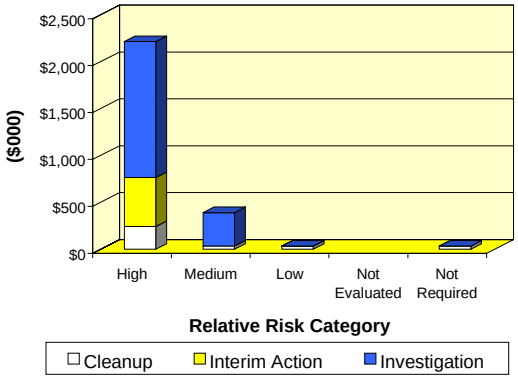
The base completed soil sampling and analysis, soil gas surveys, geophysical surveys, and site inventories for seven sites. A Record of Decision (ROD) was completed for six sites and associated groundwater, and Remedial Action is proceeding at the four sites that require cleanup. Peer reviews were done for these sites. Peer review waivers were received for presumptive remedial activities at five additional sites, and remedial activities are proceeding. Cleanup is in progress on excess lands.

A continuous partnership has been fostered with community and regulatory agencies by holding quarterly RAB and regulator meetings to receive input on base remedial activities. The installation sponsored a tour of sites under remediation for the RAB. The community relations plan was also updated.

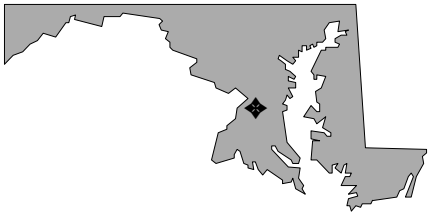
Plan of Action

- Implement IRAs at four sites
- Continue cleanup of excess lands in FY99
- Complete Engineering Evaluations and Cost Analyses for six sites in FY99
- Foster continuous partnership with Guam EPA and EPA Region 9 remedial project managers in FY99
- Continue LTM of groundwater in FY99
- Complete ROD for three sites in FY99

FY99 Funding by Phase and Relative Risk



Size: 4,300 acres
Mission: Provide Presidential airlift support
HRS Score: 23.51; proposed for NPL in July 1998
IAG Status: NA
Contaminants: Metals, SVOCs, VOCs, PAHs, PCBs, and pesticides
Media Affected: Surface water
Funding to Date: $32.9 million
Estimated Cost to Completion (Completion Year): $6.5 million (FY2007)
Final Remedy in Place or Response Complete Date for All Sites: FY2002



Camp Springs, Maryland

Restoration Background

Operations and exercises at this installation have led to surface water contamination with metals (lead, mercury, chromium, and cadmium), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and pesticides. Affected areas have been classified in five source areas. Source 1 (FT02) and Source 2 (FT03) are fire training areas where fuel and waste oil were burned during training exercises. Source 3 (AOC29) is a runway area where waste treatment plant sludge was used to elevate end and intermediate areas. Source 4 (LF05) is a landfill that was used mainly for disposal of general refuse, construction rubble, and fly ash. Medical wastes have also been found in this landfill. Source 5 (LF06 and LF07) consists of two landfills used primarily for disposal of construction wastes. Small quantities of refuse, paint, equipment, and unknown quantities of liquid waste from base shops (waste oils, paint thinner, cleaning solvents) also were disposed of in Source 5.

In FY92, a No Further Remedial Action Planned (NFRAP) document was issued for FT03. In FY95, a Remedial Investigation/Feasibility Study (RI/FS) and a Baseline Risk Assessment were conducted for Source 5.

In FY96, as part of a Preliminary Assessment and Site Inspection (PA/SI), a geophysical survey was conducted for Source 2. Objects that were looked for but not discovered included buried 5-gallon steel gasoline cans, which were believed to have been discarded after the civil rights riots in the 1960s. Test pits also were excavated at this source. At Source 1, investigations, including a PA/SI, have shown concentrations of nickel that were slightly above maximum contaminant levels (MCLs). Source 3 was investigated during a PA/SI, RI/FS fieldwork began at Source 4, and a NFRAP decision document was proposed for Source 5. The installation agreed to a groundwater monitoring plan and a five-year review process for evaluating the Source 5 NFRAP decision.

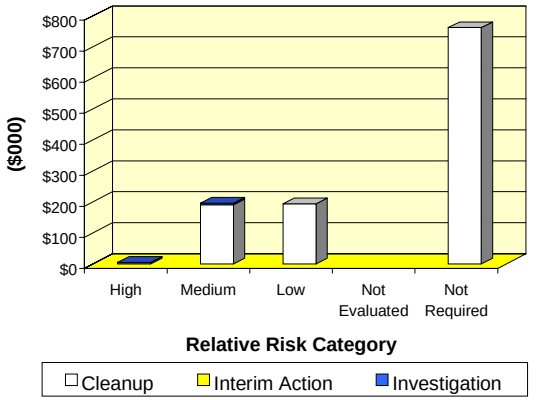
FY98 Restoration Progress

Sampling data, in conjunction with the results of the PA/SI, showed contaminants at Source 3 to be within acceptable sewage sludge land-application limits according to 40 CFR 503.13, Subpart B. Fieldwork continued at Source 4 to fill data gaps and evaluate remedial alternatives.

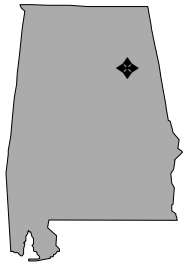
Plan of Action

- Submit rebuttal comments to proposal for NPL
- Finalize RI/FS for LF05
- Perform follow-on RI for Source 1 in FY01

FY99 Funding by Phase and Relative Risk



Size: 600 acres
Mission: Maintain combat vehicles
HRS Score: 51.91; placed on NPL in March 1989
IAG Status: IAG signed in June 1990
Contaminants: VOCs, heavy metals, phenols, petroleum products, acids, and caustics
Media Affected: Groundwater and soil
Funding to Date: $35.0 million
Estimated Cost to Completion (Completion Year): $98.0 million (FY2031)
Final Remedy in Place and Response Complete Date for All Sites: FY2011



Anniston, Alabama

Restoration Background

Since 1948, the Army has repaired, rebuilt, and modified combat vehicles and artillery equipment at the Anniston Army Depot Southeast Industrial Area (SIA). Painting, degreasing, and plating operations at the installation generate wastes containing volatile organic compounds (VOCs), phenols, heavy metals, and petroleum distillates. Studies revealed soil and groundwater contamination at 44 sites, most prominently with VOCs, metals, and phenols.

From FY79 to FY89, cleanup activities included pumping waste from an unlined lagoon into a lined lagoon, removing sludge and contaminated soil at RCRA corrective action sites, and installing groundwater interception and treatment systems that use air stripping and carbon adsorption to remove VOCs and phenols. In FY93, the installation removed sludge contaminated with VOCs, metals, and petroleum products from a former industrial wastewater treatment plant.

In FY95, the installation removed two underground storage tanks (USTs) and incorporated the associated contaminated groundwater into the groundwater operable unit (OU). Under an interim Record of Decision (ROD), the installation began a pilot study to address problems with chemical fouling in the groundwater extraction system. The Army developed an Emergency Response Plan to identify further response actions at public water-supply sites and residential wells that might be affected by activities at the installation. The installation addressed community concerns by sampling residential groundwater wells.

In FY96, the Army completed a source delineation at solid waste management unit (SWMU) 12 and the fieldwork for Phase II of the Remedial Investigation/Feasibility Study (RI/FS).

In FY97, the installation completed dye-tracing work at OU3, the off-post OU. The monitoring well inventory also was completed. A Phase I RI began at SWMUs 10 and 11 and the TNT Washout Facility and leaching beds in the Ammunition Storage Area. A partnership initiative began that involved all members of the restoration process, including federal and state regulators. The installation also held two technical review committee (TRC) meetings and a public availability meeting.

FY98 Restoration Progress

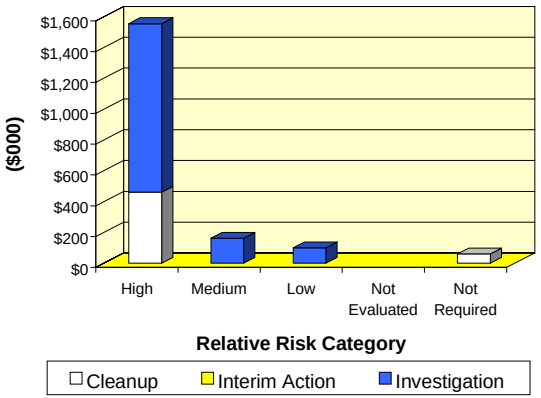
The installation completed the SIA Phase II RI report and submitted the draft SIA Groundwater OU FS. The installation completed the update to the community relations plan. The report of the findings of the groundwater dye tracer test, the Building 504 groundwater recovery trench optimization report, and the closure plan for SWMU 2 were also completed. Fieldwork concluded on the Ammunition Storage Area RI, the Off-Post Groundwater OU RI Ecological Risk Screening, and the geophysical study along the depot boundary. Data collection for the groundwater dye tracer test continued at 39 locations. At SWMU 12, the Army completed soil cleanup using hydrogen peroxide injection for Blocks 1 and 2; the cleanup for SWMU 12 Blocks 3 and 4 was not completed because of lack of funding.

The commander formed a Restoration Advisory Board (RAB), composed of 18 community members and 8 local officials, in May 1998. The RAB has adopted a charter and is reviewing the draft SIA Groundwater OU FS. Bimonthly meetings facilitate partnering among regulators, contractors, and installation personnel.

Plan of Action

- Complete the emergency Removal Action using hydrogen peroxide injection at SWMU 12 in FY99
- Complete the groundwater and soil FS at SIA in FY99
- Complete the Proposed Plan, ROD, and Remedial Design for the SIA groundwater OU in FY99

FY99 Funding by Phase and Relative Risk



Size: 6,500 acres
Mission: House the Army Armaments Research, Development, and Engineering Command
HRS Score: 42.92; placed on NPL in February 1990
IAG Status: IAG signed in July 1991
Contaminants: VOCs, explosives, and heavy metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $70.6 million
Estimated Cost to Completion (Completion Year): $38.3 million (FY2009)
Final Remedy in Place or Response Complete Date for All Sites: FY2009

Rockaway Township, New Jersey

Restoration Background

In 1880, Dover Powder Depot, now known as Picatinny Arsenal, was established to store the gunpowder needed to manufacture ammunition. From 1898 to the early 1970s, the installation manufactured explosives, propellants, and ammunition. It now houses the Army Research, Development, and Engineering Command.

Regulators performed a Preliminary Assessment and Site Inspection (SI) in FY87. In FY91, the installation identified 156 sites, including a burning ground, landfills, underground storage tanks (USTs), former production areas, and former testing sites. Releases of volatile organic compounds (VOCs), explosives, and heavy metals from these sites have contaminated groundwater, surface water, sediment, and soil.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY91. The RI/FS divided the installation into 16 areas and organized the investigation in three phases. The installation conducted an additional RI for the burning ground in FY94. Interim Actions included removing USTs, installing a groundwater extraction and treatment system, and removing drums from a landfill.

In FY95, the installation conducted several Interim Actions, including cleanup of lead-contaminated soil, operation of a groundwater pump-and-treat system for an on-site trichloroethene (TCE) plume, and installation of a drinking water line to 12 nearby residences. The FS for the burning ground and the Phase I draft RI report were submitted to the regulatory agencies. The installation also began Phase II RI activities.

In FY96, the installation's technical review committee was converted to a Restoration Advisory Board (RAB). The Army collected data from 77 sites to determine the sites' relative risk category. It also approved site investigation work plans for fast-track collection of relative risk data for 37 sites.

In FY97 and FY98, the regulators received and approved the revised Phase I RI report. The Army completed RI fieldwork, the draft Phase II report, and relative risk scoring of all sites. The installation commissioned the U.S. Geological Survey to conduct studies to support natural attenuation of the TCE plume in Area D. The U.S. Army Corps of Engineers awarded funds for a Removal Action at three sites and capping of the Post Farm Landfill. The Phase II Ecological Risk work plan was approved by the regulators and implemented by Corps contractors. A revised risk assessment for Site 20/24 was performed and submitted to the regulators; this risk assessment was used to determine that no Removal Action was necessary. Various investigative mini-work plans and reports were submitted and approved by the regulators.

FY98 Restoration Progress

The installation notified regulators that it would develop a new risk assessment for the burning ground that was consistent with policies. The installation did not complete the two planned Removal Actions. The Engineering Evaluation and Cost Analysis for 20/24 was withheld because there was not an unacceptable risk, and the NJDEP standards for soil are not applicable as determined by Army legal staff.

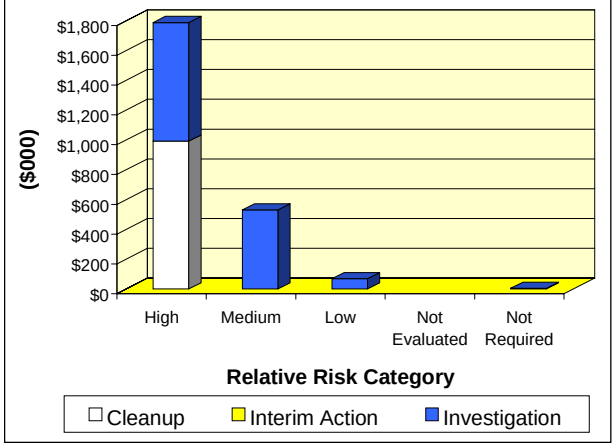
The installation has been working with regulators to complete incremental stages of the FSs for Area D groundwater, Green Pond Brook, and Bear Swamp Brook. The installation did not complete the FS for the sanitary landfill in the southern part of the arsenal because there was no unacceptable risk and the state soil standards are not applicable; consequently, the Remedial Design was not completed. The installation completed the Relative Risk Site Evaluation at the two remaining sites and completed geological and hydrogeological studies at the Post Farm Landfill. It has not installed the landfill cap pending other actions. The installation received approval for, and implemented, the Phase III Interim Remedial Action work plan.

The installation procured a contract based on the Technical Assistance for Public Participation program to provide technical support for the RAB. The Agency for Toxic Substances and Disease Registry provided a draft review of public health consultation based on the revised risk assessment for Site 20/24.

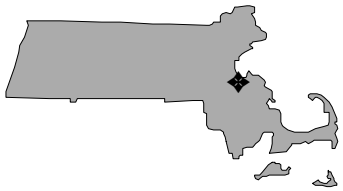
Plan of Action

- Obtain No Further Action decisions on appropriate sites based on nonresidential cleanup standards in FY99
- Submit SI work plans for Sites 3, 31, 192, and 199 and a work plan for Site 20/24 Data Report in FY99
- Complete Phase II Ecological Risk Assessment report in FY99
- Complete FSs for Area D Groundwater, Green Pond Brook, and Bear Swamp Brook in FY99
- Complete RI report for Area F and G groundwater in FY99
- Submit reports for the Area E Groundwater FS and Phase III 1A RI in FY00
- Submit Phase II RI report

FY99 Funding by Phase and Relative Risk



Size: 48 acres
Mission: Conduct materials research and development
HRS Score: 48.60; placed on NPL in May 1994
IAG Status: Signed July 25, 1995
Contaminants: Radionuclides, heavy metals, petroleum products, solvents, pesticides, and PCBs
Media Affected: Soil and surface water
Funding to Date: $96.0 million
Estimated Cost to Completion (Completion Year): $2.8 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Watertown, Massachusetts

Restoration Background

In December 1988, the BRAC Commission recommended closure of the Watertown Army Research Laboratory. The Army has moved the installation's mission activity to a combined laboratory at Aberdeen Proving Ground, Maryland. The installation closed, as scheduled, on September 30, 1995.

Environmental studies at the installation concluded that most of the soil was contaminated with heating oil, pesticides, and polychlorinated biphenyls (PCBs). Similar chemical and metal contaminants were present in a number of laboratories and machine shops. The installation divided its Remedial Investigation and Feasibility Study (RI/FS) activities into three areas (indoor, outdoor, and Charles River).

The installation completed several Interim Actions, including asbestos abatement, removal of all known aboveground and underground storage tanks, remediation of petroleum-contaminated soil, decommissioning of the central heavy-oil-fired power plant, retrofitting and disposal of PCB-contaminated transformers, closing of cooling water discharge sources, and reactor decommissioning.

The installation formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) in FY94.

In FY96, the installation completed decommissioning of facilities contaminated with radioactive materials. The installation also completed removal and demolition of the tank farm (Structure 295). A cost saving resulted from using the tank farm structure as beneficial backfill.

The Army and regulators signed a Record of Decision (ROD) for the Outdoor Soil and Groundwater Operable Unit (OU) in September 1996. In response to a request from the Watertown Arsenal Development Corporation (ADC), the BCT expedited development of a second ROD for Building 131.

Working with the RAB and the Watertown ADC, the BCT identified and approved an alternative remedy that reduced the duration of remediation effort by 1 year, with significant savings. During the design phase, the BCT reevaluated the risks associated with the Indoor OU cleanup, resulting in a reduced cleanup cost.

In FY97, the installation initiated soil and indoor remediation, initiated a finding of suitability to transfer (FOST) for various properties, and completed cleanup for 11 soil areas. Document review was expedited through simultaneous review by all agencies. The BCT separated the 11-acre River Park Parcel from the 37-acre Installation Parcel for future resolution, coordinated soil remediation, assessed indoor cleanup criteria, developed the Charles River RI/FS, and finished the Building 60/227 RI/FS.

FY98 Restoration Progress

The installation completed remediating the Indoor OU and the soil areas within the 37-acre parcel. The FOST and related transfer documents were prepared and signed. The installation developed institutional controls to provide state oversight to prohibit future owners from digging in areas contaminated with polyaromatic hydrocarbons unless they dispose of, and remediate, the material properly. The Historic Site proposal was approved, and the Watertown ADC selected a site developer. In August, the installation transferred 37 acres and buildings to the Watertown ADC.

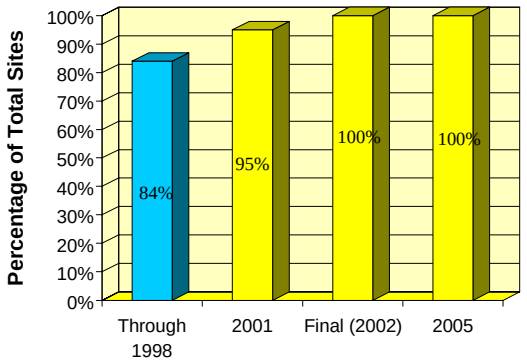
The Army delayed remediation of the 11-acre River Park parcel so that the regulatory agencies could focus on transferring the 37-acre parcel. The River Park ROD is being reevaluated to determine whether it should be combined with the adjacent Charles River ROD. The EA for the River Park was signed in September 1998 and published in the *Federal Register*. The Army initiated deleting the 37-acre parcel from the National Priorities List.

The RAB continued to meet monthly during this active period of remediation. It reviewed all documents, provided suggestions and comments, and participated in the development of institutional controls. The BCT continued work on the transfer documents. Legal representatives from the regulatory agencies worked with community legal representatives and the developer to resolve future liability issues.

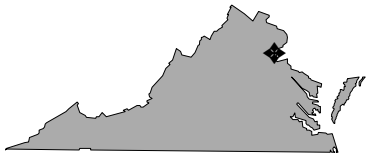
Plan of Action

- Complete soil remediation at River Park in FY99
- Complete the Charles River RI/FS in FY99, the ROD in FY00, and RA in FY01
- Complete the FOST for River Park in FY00
- Transfer 11-acre River Park parcel in FY01
- Complete BRAC activities in FY02
- Delete 37.4-acre parcel from NPL in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 580 acres
Mission: Conduct electromagnetic testing
HRS Score: NA
IAG Status: None
Contaminants: PCBs, PAHs, pesticides, and petroleum hydrocarbons
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $10.5 million
Estimated Cost to Completion (Completion Year): $2.8 million (FY1999)
FInal Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Woodbridge, Virginia

Restoration Background

In July 1991, the BRAC Commission recommended closure of the Woodbridge Research Facility and relocation of its operations to White Sands, New Mexico; the Adelphi Laboratory Center in Adelphi, Maryland; and Aberdeen Proving Ground, Maryland. The installation closed in September 1994. Pursuant to Public Law 103-307, the Army transferred the entire installation to the Department of the Interior (DOI) in June 1998. The property is now known as the Occoquan Bay National Wildlife Refuge.

Site characterization activities conducted between FY92 and FY97 have identified 49 areas of concern at the installation. Verified site types include former disposal areas and spill sites. Releases of polychlorinated biphenyls (PCBs) and petroleum hydrocarbons from those sites have contaminated groundwater, surface water, sediment, and soil. In FY95, an Interim Action included removal of approximately 1,100 tons of PCB-contaminated soil from one site.

In FY94, the installation formed a BRAC cleanup team (BCT), which improved communications between the Army, DOI, and regulatory agencies. The BCT accelerated cleanup efforts by adopting a concurrent document review process. A Restoration Advisory Board was established in FY95.

In FY97, the installation completed the field phase of an installationwide Remedial Investigation and Feasibility Study (RI/FS) begun in FY96. Decision documents for Remedial Actions (RAs) at two operable units (OUs) were completed, along with a decision document calling for no further action (NFA) at 37 installation sites. By the end of FY97, the Army had made RA or NFA decisions for 46 of the 49 sites. The installation removed eight underground storage tanks, one septic tank, one oil-water separator, one acid neutralization vault, and an array of buried ethylene glycol–filled hoses. In addition, two abandoned water production wells were properly closed.

FY98 Restoration Progress

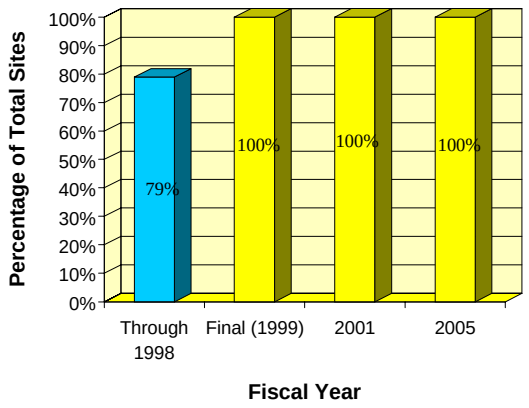
The installation began RAs at OUs 1 and 3. The field phase of this RA effort was under way at the end of FY98. Actions include clean-closure of five open dumps, closure-in-place of two open dumps, and removal of PCB-contaminated sediment from the bottom of a 1,000-foot-long ditch. The installationwide RI/FS also was completed.

The BCT tentatively decided that the remaining three sites required NFA.

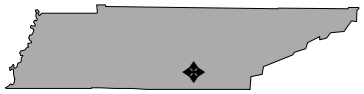
Plan of Action

- Complete RAs at OU1 and OU3 in FY99
- Complete documentation of NFA decision for three sites in FY99
- Begin long-term monitoring program in FY99
- Perform 5-year revisit at OU1 and OU3 in FY03

Sites Achieving RIP or RC Per Fiscal Year



Size: 40,000 acres
Mission: Simulate flight conditions
HRS Score: 50.00; proposed for NPL in August 1994
IAG Status: None
Contaminants: VOCs, PCBs, heavy metals, acids, petroleum hydrocarbons, and asbestos-containing material
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $53.1 million
Estimated Cost to Completion (Completion Year): $54.4 million (FY2027)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Coffee and Franklin Counties, Tennessee

Restoration Background

Arnold Engineering Development Center is a test facility for the Air Force Material Command. Its primary mission is to simulate flight conditions in aerodynamic, propulsion, and space ground-testing facilities. The installation also conducts research and applies new technology to improve facilities and associated testing techniques and instrumentation.

Principal sites at the installation include a landfill, a chemical treatment plant, a main testing area, a leaching pit, a leachate burn area, and a fire training area. The chemical treatment plant, main testing area, and leaching pit contain soil and groundwater contaminated with volatile organic compounds (VOCs).

Between FY88 and FY94, the installation removed 37 underground storage tanks. During FY89, a RCRA Facility Assessment identified 110 solid waste management units. RCRA Facility Investigations (RFIs) were conducted at 13 of these units, and the need for additional sampling was identified for 57. In FY94, the additional sampling and RFI fieldwork were completed, Preliminary Assessments were completed for all remaining sites, and RCRA closure was approved for four hazardous waste facilities.

In FY95, several Interim Remedial Actions, the RFI Phase I Report, and confirmatory sampling for Site 19 were completed. The installation also implemented four Interim Actions, including low-temperature thermal treatment of soil contaminated with VOCs and installation of a groundwater extraction and treatment system. In FY96, the installation completed Remedial Designs (RDs) for modified RCRA landfill caps at Sites 1 and 3. These RDs constitute the final actions for those sites. The installation also implemented three interim corrective measures to treat contaminated groundwater.

In FY97, the installation constructed 36 wells to monitor groundwater for Site 19. At three other sites, the installation performed a corrective measures study (CMS) for final action and completed one of two planned landfill caps.

In FY91, the installation formed a technical review committee, which was converted to a Restoration Advisory Board (RAB) in FY95. Agenda items considered by the RAB include restoration updates, project status, and the Relative Risk Site Evaluation process.

FY98 Restoration Progress

The Site LF-3 landfill clay cap was completed as planned. Eight solvent recovery wells were added to the source removal/control system at Site WP-8.

Two groundwater source control wells were added to the existing system at Site WP-6. On the basis of plume movement and geographic information system (GIS) modeling, the groundwater monitoring program was expanded to include 62 private drinking water wells as potential down-gradient receptors. Tools and methods, such as seismic reflectance, were used to better identify groundwater monitoring locations, resulting in a reduced number of constructed wells and significantly improved data quality.

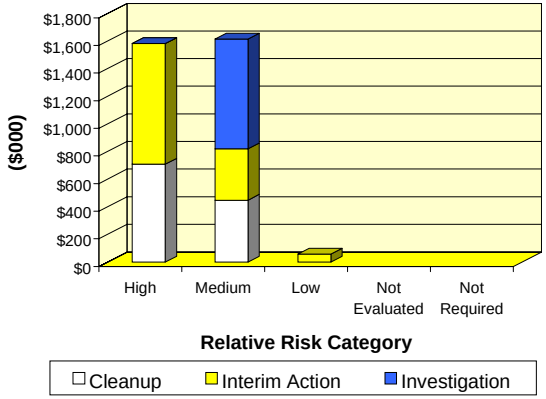
Phase I of a zero valent iron dechlorination (ZVID) pilot study and Phase I data collection for a phytoremediation pilot study were successfully completed. Three CMS studies began at Sites 6, 8, and 22. RFI work plans were drafted and submitted to EPA for approval.

RAB meetings are held quarterly. Efforts have begun to change the RAB into a Community Advisory Board.

Plan of Action

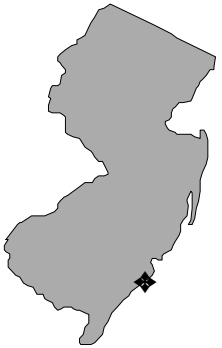
- Install public water connections for 17 residents down-gradient of the Site WP-6 plume
- Evaluate effectiveness of source containment at Site WP-6 in FY99
- Complete RFI No. 3 and No. 4 fieldwork and RFI No. 3 draft report
- Finish ZVID Phase II pilot study
- Complete CMS efforts for Sites LF-1 and LF-3
- Further delineate Site SS-22 plume migration pathway

FY99 Funding by Phase and Relative Risk



Atlantic City Air National Guard Base — Atlantic City International Airport — NPL

Size: 280 acres
Mission: Provide Air National Guard training
HRS Score: 39.65; placed on NPL in August 1991
IAG Status: Federal Facility Agreement signed in July 1993
Contaminants: VOCs, SVOCs, lead, copper, and pesticides
Media Affected: Groundwater and soil
Funding to Date: $1.5 million
Estimated Cost to Completion (Completion Year): $1.1 million (FY2014)
Final Remedy in Place or Response Complete Date for All Sites: FY2004



Pleasantville, New Jersey

Restoration Background

Atlantic City International Airport is a Federal Aviation Administration (FAA) facility. It was placed on the National Priorities List (NPL) in 1991 because of its proximity to the South Branch of Doughty's Mill Stream, which flows into Upper Atlantic City Reservoir, a source of drinking water for local residents. In addition, a sole-source aquifer underlying the FAA facility contributes 85 to 90 percent of the watershed for the Upper Atlantic City Reservoir. Sites located at the facility are the FAA salvage yard, the FAA jet fuel farm, the FAA fire training facility, and the FAA's old landfill.

The 177th Fighter Wing, New Jersey Air National Guard (ANG), is a tenant at the FAA facility. The installation's mission is to maintain fighter aircraft on continuous peacetime air defense alert to preserve U.S. air sovereignty. During wartime, the mission is to mobilize personnel and equipment for deployment to designated locations and to use air-to-air munitions in strategic defense of the North American continent. The ANG sites were not ranked for the NPL, but the ANG facility is on the NPL because it is a tenant on the FAA property.

A Preliminary Assessment (PA) for the ANG facility, completed in November 1989, identified six sites. The PA recommended Site Inspections (SIs) at all six. Two of the sites (Sites 1 and 4) were already being investigated by the FAA and were referred to FAA for further investigation. None of the ANG sites is suspected of contributing contamination to groundwater. An SI was completed by HAZWRAP in FY95 at Sites 2, 3, 5, and 6.

A Memorandum of Agreement (MOA) between the FAA and the Air National Guard Readiness Center (ANGRC) was signed in FY95. The MOA stipulates that the FAA will perform any additional studies, and the Remedial Design and Remedial Action if necessary, at ANG sites. ANGRC will provide funding. An SI addendum for additional soil and groundwater sampling at Sites 2, 3, 5, and 6 was performed in FY95. In FY96, fieldwork required under the SI addendum continued, allowing the review of the draft SI report by the FAA.

The SI addendum was completed in FY97. Relative risk evaluations were completed at Sites 2, 3, 5, and 6. A technical review committee (TRC) meets every 6 weeks. In FY97, the TRC met with the state Pinelands Commission and with local community representatives.

FY98 Restoration Progress

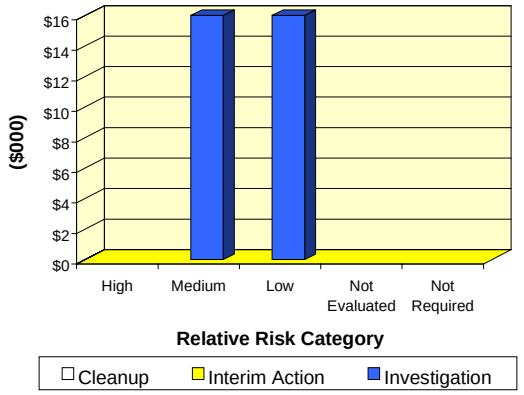
Several drums were removed from Site 6. An SI addendum was completed and is under review by FAA. Based on the results of the SI, the future scope of work at the 177th Fighter Wing is being reevaluated. Cost increases are anticipated.

Remedial Investigations (RIs) were postponed due to lack of funding.

Plan of Action

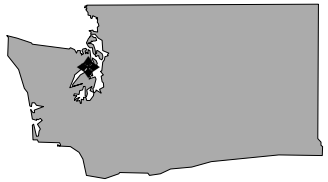
- Initiate RI in FY00

FY99 Funding by Phase and Relative Risk



Bangor Naval Submarine Base NPL

Size: 7,001 acres
Mission: Provide support base for Trident submarines
HRS Score: 30.42 (Bangor Ordnance Disposal); placed on NPL in July 1987
55.91 (Bangor Naval Submarine Base); placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in January 1990
Contaminants: Residual TNT, RDX, Otto fuel, dinitrotoluene, benzene, PCBs, pesticides, and chlorinated organic compounds
Media Affected: Groundwater, soil, and sediment
Funding to Date: $72.7 million
Estimated Cost to Completion (Completion Year): $13.8 million (FY2008)
Final Remedy in Place or Response Complete Date for All Sites: FY2005



Silverdale, Washington

Restoration Background

From the early 1940s until it was commissioned as a submarine base in 1977, Bangor Naval Submarine Base was used to store, process, and ship munitions. Past environmental chemical releases at the installation are primarily associated with the detonation, demilitarization, and disposal of explosive ordnance and associated activities. The Navy conducted an Initial Assessment Study in FY83 to identify sites requiring further investigation because of suspected soil and groundwater contamination.

In FY90, the Navy, EPA, and the State of Washington signed a Federal Facility Agreement (FFA) for the installation. Investigation of 22 sites was recommended. These sites were grouped into eight operable units (OUs) for the Remedial Investigation and Feasibility Study (RI/FS), with a Record of Decision (ROD) required for each OU under the terms of the FFA. Between FY91 and FY97, seven RODs and five expedited response actions were taken. Based on investigations and completed actions, 17 sites require no further action. Groundwater cleanup was initiated at two sites. Three sites are under investigation because chemicals were detected in the groundwater.

The installation removed underground storage tanks (USTs) from four sites and removed drums and reconstructed a bermed area at OU7. In FY95, the installation added an eighth OU and worked to provide alternate drinking water supplies to nearby residences.

In FY96, the installation completed a Remedial Design (RD) for OU2 and an RD for soil for OU6. Remedial Actions (RAs) were started at OU2, OU6, and UST 1. The installation began long-term monitoring (LTM) at Sites 10 and 26 in OU7, signed a ROD for OU7, and developed an RD for OU7. During FY97, the installation completed the RA for soil and began an RA for groundwater at OU2. Five-year monitoring at OU3 continued. The RA for soil and groundwater and off-site disposal of soil began at OU7. The installation also began an RA at UST 4, completed an RA at OU1, implemented long-term operations and LTM at OU7, and completed the RI and operated the pump-and-treat system at OU8.

The installation completed a community relations plan in FY91 and updates it biannually. A technical review committee was formed in FY87 and was converted to a Restoration Advisory Board (RAB) in FY96.

FY98 Restoration Progress

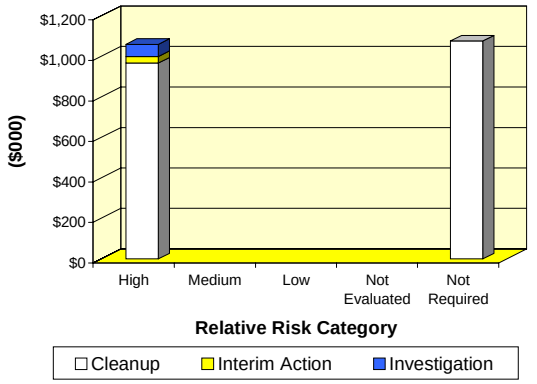
Construction completion documents for OUs 1, 2, and 7 were submitted to EPA and Washington State. RAs were completed for OUs 6 and 7. Compliance and performance monitoring and operation and maintenance continued at OUs 1, 2, 7, and 8 and USTs 1 and 4. Five-year reviews were prepared for OUs 2 and 3. A Removal Action was completed at Camp Wesley Harris. The schedule for OU8 was expanded to explore monitored natural attenuation as a potential remedy. The RA for UST 1 was not completed because the soil confirmation samples did not meet cleanup levels. The RA construction for UST 4 is complete, and the remedy will continue to operate in FY99. Soil at all OUs met cleanup levels. OU6 was delisted from the Washington State site registry. OU1 surface water and groundwater RA objectives were reevaluated.

The installation has employed natural attenuation monitoring and three-dimensional fate-and-transport modeling that includes biological and chemical degradation of the contaminants. The RAB meets monthly.

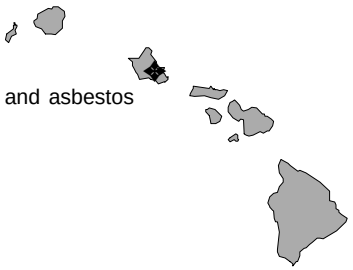
Plan of Action

- Sign OU8 ROD in FY99
- Amend OU1 ROD in FY99
- Conduct five-year review for all OUs except OU3 in FY99
- Complete RA at UST 1 in FY99
- Complete operation of RA at UST 4 in FY00
- Investigate natural attenuation of ordnance compounds in FY00
- Complete RD for OU8 in FY00
- Complete OU8 construction in FY01
- Amend OU2 ROD in FY01

FY99 Funding by Phase and Relative Risk



Size: 3,833 acres
Mission: Maintain and operate facilities and provide services and material support to aviation activities and units of the operating forces
HRS Score: NA
IAG Status: None
Contaminants: PCBs, heavy metals, petroleum hydrocarbons, pesticides, solvents, and asbestos
Media Affected: Groundwater and soil
Funding to Date: $23.7 million
Estimated Cost to Completion (Completion Year): $24.3 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2010



Barbers Point, Hawaii

Restoration Background

In July 1993, the BRAC Commission recommended closure of Barbers Point Naval Air Station. The installation is slated for operational closure in 1999.

In the early 1980s, a Preliminary Assessment (PA) identified nine sites at the installation. Contamination sources include disposal pits, a pesticide shop, a landfill, and transformer sites. Only three sites required further investigation. In FY93, an Expanded Site Inspection determined that only one of the three sites required further investigation. Primary contaminants include polychlorinated biphenyls (PCBs) and heavy metals.

In FY94, the installation began Remedial Investigation and Feasibility Study (RI/FS) activities for 17 areas identified for further investigation. After an initial site characterization, two groups of underground storage tanks (USTs) were added to the sites already identified. Other USTs had been removed in FY92 and FY93. The installation completed an Environmental Baseline Survey in FY94; nearly all property was classified as Category 7 because further investigation of groundwater (Site 19) was required. Three parcels of land identified for further investigation during the PA were classified as Category 6. In FY95, some areas on the installation were designated for retention. Further work at the Sanitary Landfill, the Golf Course Maintenance Building, and one group of USTs will be conducted under the Navy Environmental Restoration Program.

A Restoration Advisory Board and BRAC cleanup team (BCT) were formed in FY94. The installation also maintains an information repository, which is available to the public. A community relations plan (CRP) was prepared in FY95. The BCT decided to conduct Interim Removal Actions at all sites requiring cleanup.

During FY96, a sixth round of quarterly sampling in the groundwater investigation was completed. The installation removed waste at one UST site and completed a corrective action plan (CAP) for another UST site. The Local Redevelopment Authority developed a draft land reuse plan.

In FY97, Environmental Evaluations and Cost Analyses (EE/CAs) were started for Sites 1, 2, and 20. A CAP was completed at UST 6. The BCT determined that no EE/CA or Remedial Design (RD) was necessary for Site 9 and that the groundwater beneath most of the base was suitable for transfer. Relative Risk Site Evaluations have been completed at all sites where required. In addition, the latest version of the BRAC Cleanup Plan was completed, and 1,700 acres were identified and approved by regulatory agencies as uncontaminated and suitable for transfer. The land reuse plan was approved on March 17, 1997.

FY98 Restoration Progress

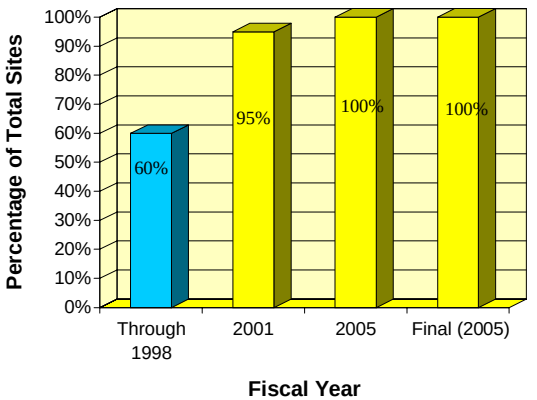
Further investigations were conducted at Sites 1 (groundwater monitoring), 2 (groundwater, surface water, and sediment monitoring), 15 (groundwater sampling), 18 (Removal Site Evaluation), and 19 (groundwater monitoring) and at USTs 6 and 7 (groundwater monitoring). UST 2 was closed. Data evaluation under the RI continued for 16 sites. The EE/CA at Site 2 and the EE/CA and RD for Site 20 were completed. The Interim Remedial Action (IRA) for Site 20 began. Further investigations at Sites 14 (RI/FS) and 15 (under the RD), an IRA at Site 1, and an EE/CA for Site 22 began. Regulatory concurrence was obtained for CERFA-uncontaminated acreage.

Because of contractor issues, the RI/FS was not completed for Sites 8 through 13. The EE/CA for Site 1 was not completed because the planned reuse is still changing.

Plan of Action

- Complete RI/FS for Sites 8 through 13, 15, and 19 in FY99
- Complete EE/CA for Sites 1 and 18 in FY99 and for Site 22 in FY00
- Complete RD for Sites 15 and 18 in FY99
- Complete IRA at Sites 1, 2, 15, 18, 20, and 22 in FY99
- Complete long-term monitoring at Sites 1 and 2 in FY99 and at Site 19 in FY02
- Prepare EE/CA for Site 14 in FY99 and FY00
- Complete RI at Site14 in FY00
- Prepare RD for Sites 1, 14, and 22 in FY00
- Conduct IRA at Sites 2 and 18 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Barstow Marine Corps Logistics Base NPL

Size: 5,688 acres
Mission: Maintain, repair, rebuild, store, and distribute supplies and equipment; formerly conducted industrial operations
HRS Score: 37.93; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in October 1990
Contaminants: Heavy metals, PCBs, petroleum hydrocarbons, pesticides, herbicides, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $77.2 million
Estimated Cost to Completion (Completion Year): $63.7 million (FY2029)
Final Remedy in Place or Response Complete Date for All Sites: FY2010

Barstow, California

Restoration Background

Barstow Marine Corps Logistics Base consists of three areas: Yermo Annex, Nebo Main Base, and the Rifle Range. Operations that contributed to contamination are vehicle maintenance, repair and maintenance of weapons and missile systems, and storage of petroleum and chemical products. The installation was placed on the National Priorities List (NPL) after high concentrations of trichloroethene (TCE) were detected in groundwater monitoring wells.

Initial Assessment Studies and other investigations conducted between FY83 and FY90 identified 38 CERCLA sites and 2 underground storage tank (UST) sites. Site types include sludge-disposal areas, plating waste disposal areas, low-level radioactive waste storage areas, spill sites, and evaporation ponds. To facilitate cleanup efforts, in accordance with the Federal Facility Agreement (FFA), the sites were grouped into seven operable units (OUs). OUs 1 and 2 address groundwater contamination at Yermo Annex and Nebo Main Base, respectively. OUs 3, 4, 5, and 6 address contaminated soil at 36 sites. OU7 was established for new sites.

After an Action Memorandum was completed in FY89, the Navy installed an activated carbon groundwater treatment system to address volatile organic compounds (VOCs) in the Yermo drinking water system. In FY91, the installation formed a technical review committee, prepared the community relations plan, and established an information repository and administrative record.

During FY92, the installation removed 41 abandoned USTs from UST Area 1. In FY93, an Interim Remedial Action at OU2 provided potable water to nearby residents. A Treatability Study using a pilot-scale extraction well and an air-sparging system was completed at OU1 to determine the groundwater recovery rate needed to control off-base migration of the contaminant plume. The installation removed industrial waste sludge from the Oil Storage/Spillage and Industrial Wastewater Treatment Plant. The percolation ponds at Site 35 continue to be aerated, and a filter was installed to remove solvents from water before it is discharged into ponds.

In FY94, the installation excavated and disposed of contaminated soil from two sites. A pilot-scale groundwater treatment study was completed at a landfill site in OU3. During FY95, the installation conducted two pilot-scale studies at OU2, one for air sparging with vapor extraction and the other for a groundwater pump-and-treat system. Carbon filtration systems were installed in wells at private residences near Yermo Annex. The installation completed an investigation of UST Area 2 and conducted Remedial Investigation and Feasibility Study (RI/FS) activities at all 38 sites.

During FY96, the installation completed construction of the groundwater treatment system at OU1. EPA Region 9 initiated a RCRA Facility Assessment (RFA), and EPA completed the RFA for 61 sites. In FY97, the installation completed the RI/FSs for OUs 5 and 6, finished a remedial site evaluation and a Removal Action at Site 21, and completed corrective actions at UST Area 2. Ultraviolet ozone oxidation technology was implemented.

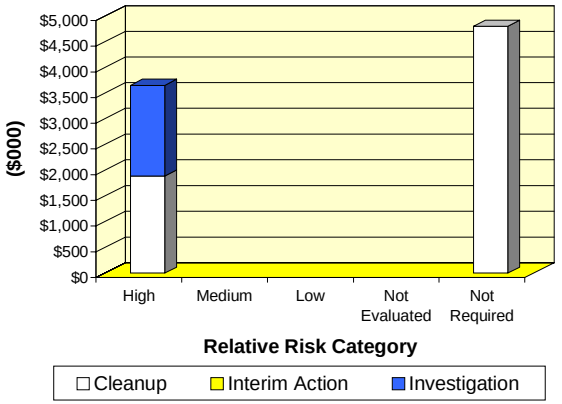
FY98 Restoration Progress

The installation completed the Records of Decision (RODs) for OUs 1, 2, 5, and 6, concluding the RODs for all sites in the original Installation Restoration Program. Sites discovered after the original program was established are being addressed under OU7. Investigations were completed at three USTs, under UST 2. In addition, the installation negotiated innovative shutoff criteria for the air-sparging/soil vapor extraction system at Site 26.

Plan of Action

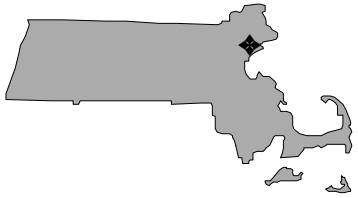
- Complete Remedial Design (RD) of off-base extraction wells for OU1 in FY99
- Complete RD for Nebo South wells for OU2 in FY99
- Complete Remedial Action (RA) at Site 7 in FY99
- Complete RA at Site 23 in FY99
- Initiate extended RFA investigation of 15 RCRA/CERCLA sites in FY99
- Complete long-term operation of groundwater RAs at Yermo and Nebo in FY99
- Continue long-term monitoring of Yermo and Nebo systems in FY99
- Complete RA at Site 20 in FY99

FY99 Funding by Phase and Relative Risk



Bedford Naval Weapons Industrial Reserve Plant — NPL

Size: 46 acres
Mission: Design, fabricate, and test prototype weapons and equipment
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Negotiation of Federal Facility Agreement planned for FY99
Contaminants: Acids, BTEX, incinerator ash, industrial wastes, paints, petroleum/oil/lubricants, photographic wastes, solvents, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $11.8 million
Estimated Cost to Completion (Completion Year): $11.2 million (FY2017)
Final Remedy in Place or Response Complete Date for All Sites: FY2002



Bedford, Massachusetts

Restoration Background

This government-owned, contractor-operated plant produces and tests prototype weapons and equipment, such as missile guidance and control systems. Four sites have been identified at the installation: Site 1 (incinerator ash disposal areas), potential soil contamination with ash and heavy metals; Site 2 (components laboratory fuel oil tank), potential soil contamination with low levels of petroleum/oil/lubricants; Site 3 (northwest groundwater plume), groundwater contaminated with a plume of volatile organic compounds (VOCs); and Site 4 (former fuel pump/tank BTEX area), soil and groundwater contaminated with benzene, toluene, ethylbenzene, and xylene (BTEX). The Navy began action to dispose of NWIRP Bedford as excess property in FY97. The planned completion of this action is scheduled for December 1999.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY88, and the Phase II RI began in FY92. Development of the work plan and fieldwork continued through FY93 and FY94 to further characterize soil contamination, locate sources of the VOC groundwater plume, and characterize migration of contaminants in groundwater.

In FY95, the draft Phase II RI report was submitted for regulatory review. A fate-and-transport groundwater model was initiated to support the risk assessment, and a Remedial Action Contract was awarded. In cooperation with the Massachusetts Department of Environmental Protection (MADEP), the Navy implemented an immediate response action, defined under state law as a short-term remedial measure, to contain and remediate the VOC groundwater plume. The treatment system is expected to prevent migration of VOCs off site.

During FY96, the baseline Human Health and Ecological Risk Assessment work plan was completed and submitted to the EPA for approval, and a fate-and-transport report was completed. The pump-and-treat system at Site 3 began operation in March 1997. Monthly monitoring of the treatment facility and quarterly monitoring of the Site 3 extraction and monitoring wells began in FY97.

The installation established a technical review committee in FY89 and converted it to a Restoration Advisory Board (RAB) in FY95. A community relations plan (CRP) was developed in FY89 and updated in FY92. An information repository is maintained at the Bedford Public Library to provide public access to the administrative record.

FY98 Restoration Progress

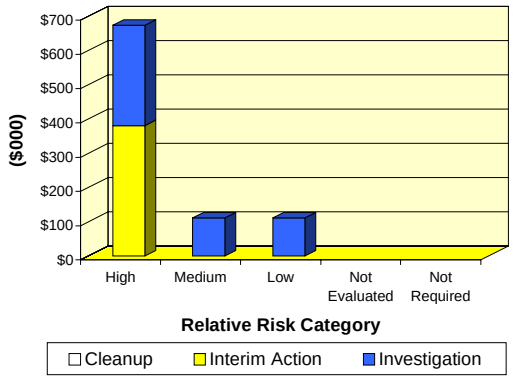
The RI phase has been extended due to regulatory agencies' numerous requests for additional fieldwork at Installation Restoration (IR) sites. RI supplemental work plans for Sites 3 and 4 were completed, and both RI supplemental investigations began. A temporary access agreement was reached on one parcel of private property for implementation of the Site 4 RI supplemental field investigation. A second temporary access agreement concerning a separate private parcel of land has yet to be signed. An interim Record of Decision (ROD) was initiated for Site 3. The RI report, including the Human Health and Ecological Risk Assessments, was not completed because of the regulatory recommendation that a supplemental investigation of Sites 3 and 4 be implemented before completion of the RI. RODs for Sites 1 and 2 have been postponed because of increased regulatory and community interest and work requirements for Sites 3 and 4.

The RAB met four times during FY98. The technical assistance for public participation (TAPP) program was presented to the RAB. In addition, the Navy conducted site tours for interested community residents and other public groups. Informal partnering has continued to expedite the decision-making process. The CRP was reviewed and determined to be satisfactory.

Plan of Action

- Complete RI supplemental investigation for Sites 3 and 4 in FY99
- Complete the RI, including the Human Health and Ecological Risk Assessments, for all four IR sites in FY99
- Complete the site management plan in coordination with the negotiation of the Federal Facility Agreement in FY99
- Begin updating the CRP in FY99
- Begin FSs for all four IR sites in FY99
- Complete the interim ROD for Site 3 in FY99
- Complete No Further Action RODs for Sites 1 and 2 in FY00
- Complete RODs for Sites 3 and 4 in FY00
- Initiate final response action for Sites 3 and 4 in FY00

FY99 Funding by Phase and Relative Risk



Size: 2,501 acres
Mission: Housed U.S. Army Soldier Support Center; provided personnel, financial, and soldier physical fitness administration and training
HRS Score: NA
IAG Status: None
Contaminants: VOCs, fuel hydrocarbons, petroleum products, pesticides, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $22.2 million
Estimated Cost to Completion (Completion Year): $0.008 million (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999

Lawrence, Indiana

Restoration Background

In July 1991, the BRAC Commission recommended closure of Fort Benjamin Harrison; realignment of the Soldier Support Center to Fort Jackson, South Carolina; and retention of the DoD Finance and Accounting Service, Indianapolis Center. The installation officially closed at the end of FY95.

The primary site types at the installation include spill areas, underground storage tanks (USTs), fire training areas, aboveground storage tanks, hazardous waste storage areas, firing ranges, and maintenance shops. Petroleum products, pesticides, and heavy metals are the primary contaminants of concern.

Phase I of a RCRA Facility Investigation (RFI) and an Environmental Investigation (EI) began in FY92. The installation began Interim Actions in FY94 to prevent contaminant migration into groundwater and to clean a storage building contaminated with pesticides. The installation landfill was closed, and capping and monitoring activities began. The installation also has removed 26 USTs.

A Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT) were formed in FY94. The BCT completed the initial version of the BRAC Cleanup Plan (BCP). A land reuse plan was prepared as part of the NEPA Environmental Impact Statement.

In FY95, the installation completed Phase I of the RFI and the EI and initiated Phase II. The installation also revised the BCP and the site-specific Environmental Baseline Surveys (EBSs) for all property disposals. The Army transferred about 600 acres and leased almost 2,000 acres of property to various recipients.

In FY97, the Army initiated Remedial Action (RA) at the firing ranges, conducted an unexploded ordnance survey, and completed RCRA closure of the hazardous materials storage facility. Cleanup of the former Army Air Force Exchange Service (AAFES) gas station site by soil aeration with enzymatic by-product was completed early. Use of geoprobes and ground-penetrating radar in the Phase II EI and RFI accelerated fieldwork.

The BCT reviewed the Phase II RFI report, planned closeout of small sites not involved in major investigations, reviewed findings of suitability to lease (FOSLs) for Lawton Loop and Encroachment parcels, reviewed and completed an Engineering Evaluation and Cost Analysis for a Removal Action at the former firing ranges, and planned and reviewed the stream relocation early action at the former state police firing range.

FY98 Restoration Progress

The Army completed the Phase II EI and published the Phase II RFI report. Removal Actions began at the firing ranges but were not completed because of weather delays. The installation is preparing a Focused Feasibility Study (FFS) for three sites with elevated ecological risk: a former wastewater treatment facility and two pesticide storage and mixing areas.

The BCT reviewed, and EPA approved, the Range Removal Action design and confirmatory sampling procedures. The BCT also reviewed the findings of suitability to transfer (FOSTs) for the Lawton Loop residential development area. The Army signed the FOST and transferred the property to the Reuse Authority. The Army completed demolition and soil removal at the below-grade pesticide storage site. At the Lawton Loop former officer housing area, the Army remediated soil containing lead-based paint residue according to HUD/EPA guidelines.

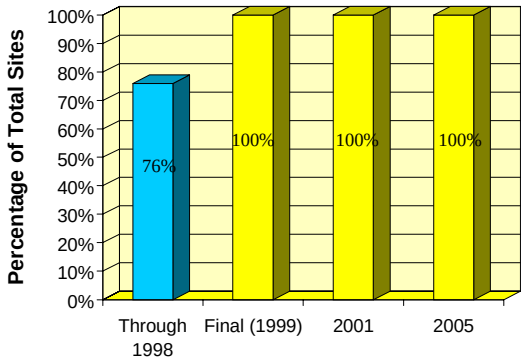
The Army applied metals-fixing agent to excavated metals-contaminated firing range soil, enabling the waste to be classified as "special" and disposed of in a special waste landfill. This effort saved the Army the cost of out-of-state transport and disposal of the excavated soil as hazardous waste.

The RAB reviewed critical geohydrology and landfill studies. The BCT was unable to resolve state and EPA objections to Army property category classification because of the presence of lead-based paint residue in the soil. As a result, the state invoked the Defense and State Memorandum of Agreement (DSMOA) dispute process. In negotiations with the state, the Army noted its complete adherence to applicable federal, state, and local regulations regarding lead-based paint and its performance of soil cleanup and remediation to the extent recommended in HUD/EPA lead-based paint guidelines. The Army advised the state that it did not intend to conduct further soil remediation. The dispute was resolved by the passage of DSMOA time constraints; no further action is anticipated.

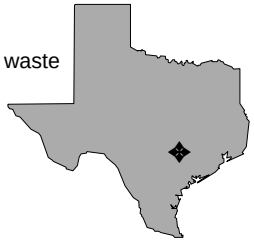
Plan of Action

- Complete all studies, decisions, and necessary site actions in calendar year 1999
- Conduct any required RA at three sites under review in the FFS in FY99
- Receive final EBS and FOST concurrence and complete all remaining FOSTs and property transfers in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 3,216 acres
Mission: Housed the 67th Reconnaissance Wing, 12th Air Force Headquarters, 12th Tactical Intelligence Squadron, 712th Air Support Operations Center, 10th Air Force Reserve, and 924th Fighter Group
HRS Score: NA
IAG Status: None
Contaminants: VOCs, pesticides, petroleum hydrocarbons, metals, and low-level radioactive waste
Media Affected: Groundwater and soil
Funding to Date: $45.7 million
Estimated Cost to Completion (Completion Year): $9.5 million (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Austin, Texas

Restoration Background

Bergstrom Air Force Base began operations in 1942, maintaining troop carrier units. In July 1991, the BRAC Commission recommended closure of the installation and retirement of the assigned RF-4 aircraft. The installation closed in late FY93, and the land reuse authority began to convert the installation to a civilian airport.

Environmental studies since FY83 have identified 30 CERCLA and 451 RCRA sites. Site types include underground storage tanks (USTs), landfills, fuel spill areas, a pesticide evaporation pit, firing ranges, a sludge weathering pit, aboveground storage tanks (ASTs), a fire training area, and a radioactive waste disposal area. Interim Remedial Actions include removal of 106 USTs, removal of contaminated soil and low-level radioactive wastes, and closure of 45 ASTs.

An Environmental Baseline Survey (EBS) was completed in FY93 and updated in FY95. Remedial Actions (RAs) included removal of remaining ASTs, USTs, and oil-water separators. Use of soil vapor extraction and air sparging systems accelerated cleanup of groundwater plumes at a group of sites.

A BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) were formed in FY94. In addition, the Air Force Base Conversion Agency signed a Memorandum of Understanding governing site management and characterization with the state regulatory agency, EPA, and the Air Force Center for Environmental Excellence.

In FY95, the installation established a partnership with the City of Austin and other stakeholders to accelerate restoration and redevelop the property.

In FY96, RAB meetings were held to address a trichloroethene (TCE) plume that was migrating off base.

In FY97, the installation completed 37 Removal Actions; cleanup of Installation Restoration Program Sites SS-08, SS-10, and SD17; and the latest EBS. The installation also completed the air injection sparging and soil venting project. Actions for several sites under investigation were agreed on by the Texas Natural Resource Conservation Commission (TNRCC), EPA, and the Air Force. Long-term monitoring (LTM) began. The RAB was disbanded by the community in FY97 because of the successful remediation efforts at the installation.

FY98 Restoration Progress

The installation completed 34 Removal Actions and a corrective measures study (CMS) for the two TCE plumes identified during the sanitary sewer investigation. Construction of landfill caps for the Combined Southeast Landfill (CSLF) Area and improvements on the North and Southfork Drainage Channel were completed. LTM of the groundwater associated with the CSLF continued.

Remediation of soil at the former pistol and rifle ranges was completed by using soil-washing technology. Processing of more than 20,000 tons of material from the ranges generated more than 61,000 pounds of recyclable lead.

Of the 481 sites, 421 have been designated for no further action. The installation forwarded closure documents recommending no further action for 23 of the remaining 60 sites.

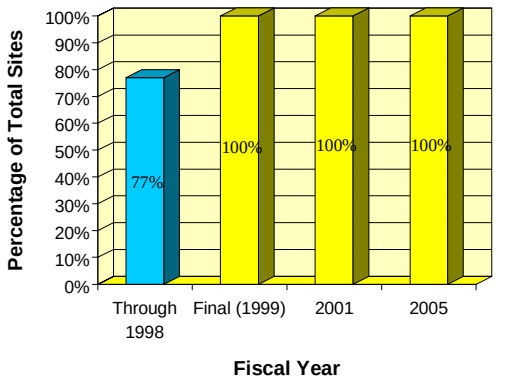
The installation was also established as the Regional Operating Location and took over programs from Carswell AFB, Texas; England AFB, Louisiana; and Williams AFB, Arizona. Because of fast-track closure of environmental sites at the installation, the reuse authority remains on schedule to open the Austin/Bergstrom International Airport in May 1999.

Some activities scheduled for completion in FY98 were delayed because of inclement weather and because of TNRCC review of projects scheduled for no further action.

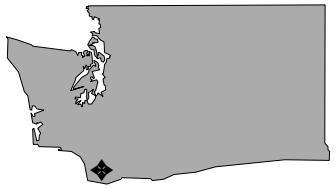
Plan of Action

- Complete remaining RAs
- Install and begin operation of the remediation system for the TCE plume (a compliance site) that has migrated off base
- Continue LTM of landfills and TCE plumes
- Continue to coordinate with the City of Austin, the TNRCC, and EPA to close the remaining sites

Sites Achieving RIP or RC Per Fiscal Year



Size: 3,020 acres
Mission: Conducted training of active and reserve DoD personnel
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants/solvents and UXO
Media Affected: Soil
Funding to Date: $2.5 million
Estimated Cost to Completion (Completion Year): $3.3 million (FY2005)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005



Vancouver, Washington

Restoration Background

In July 1995, the BRAC Commission recommended closure of Camp Bonneville.

The Army identified 14 areas of concern (AOCs): a leaking underground storage tank (UST) site, three landfills, a burn site, a drum burial site, a paint and solvent burial site, two wash racks, a maintenance pit, grease pits, a pesticide storage facility, and an old sewage lagoon site. The Army initiated site investigation work at the leaking 500-gallon underground petroleum storage tank.

In FY96, the Army awarded a contract for the removal of petroleum-contaminated soil at the UST site, submitted a draft Environmental Baseline Survey (EBS) for regulatory review, and completed a survey for lead-based paint and metals in soil.

In FY97, the installation completed the EBS and the report on the unexploded ordnance (UXO) archive search. It also began an asbestos survey and submitted the report on lead-based paint and metals in soil to the regulators for approval. In addition, 2,986 acres are awaiting regulatory approval as uncontaminated.

The installation's Restoration Advisory Board (RAB) became involved in UXO issues. The installation BRAC cleanup team (BCT) participated in document review, decision making in site investigations, interface with the Local Reuse Authority, project prioritization, and review of applicable laws and regulations. The latest version of the BRAC Cleanup Plan (BCP) was completed.

FY98 Restoration Progress

The installation completed fieldwork for the Site Inspection (SI) for 13 AOCs. These data are needed to complete the Relative Risk Site Evaluation (RRSE). The remaining AOC, Landfill 4, was not investigated because of UXO safety concerns, topography, and inclement weather. The BCT is investigating alternative technologies to complete investigation of this area.

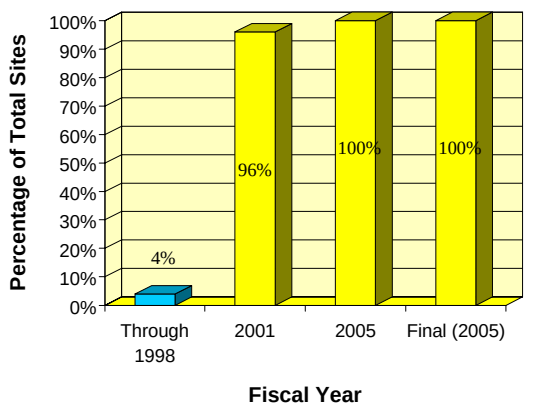
The installation determined that Landfill 1, the CS gas chamber, and USTs require no further action. The Army discovered a second munitions demolition site (Demo 2) during ordnance and explosives field sampling. Concerns about explosive residue contamination may require hazardous and toxic waste investigation. Because of the potential for installationwide UXO contamination, no additional CERFA- uncontaminated acreage is being considered for FY99.

The Army is improving partnering efforts with state and federal regulators. The Washington Department of Ecology (WDOE) and EPA Region 10 are both active members of the BCT. WDOE, EPA, and the Army meet regularly to make decisions and to monitor progress. Additionally, WDOE and EPA provide input to the RAB and participate in community outreach events. The BCT meets monthly to discuss technical issues and planning. Typical topics of discussion are SI plans and findings, SI technologies, cleanup strategies, strategic planning for the cleanup, regulatory requirements, site safety, and institutional controls.

Plan of Action

- Complete RRSE and Engineering Evaluation and Cost Analysis in FY99
- Conduct an independent technical review (or Peer Review) in FY99
- Complete multisite III 1/2/3 Remedial Action Plan in FY99
- Complete surface water sampling in FY99
- Complete data gathering for the SI in FY99
- Update the BCP in late FY99 or early FY00
- Continue UXO Survey/Disposal through FY00

Sites Achieving RIP or RC Per Fiscal Year



Brandywine Defense Reutilization and Marketing Office — Proposed NPL

Size: 8 acres
Mission: None (inactive)
HRS Score: 17.78; proposed for NPL in July 1998
IAG Status: NA
Contaminants: PCBs and solvents (TCE)
Media Affected: Surface water and groundwater
Funding to Date: $1.3 million
Estimated Cost to Completion (Completion Year): $1.5 million (FY2007)
Final Remedy in Place or Response Complete Date for All Sites: FY1999

Brandywine, Maryland

Restoration Background

The Brandywine facility is an inactive 8-acre former DRMO site approximately 8 miles south of Andrews Air Force Base (AFB). Andrews AFB acquired the property from the Navy in 1961, and the Air Force used it to store bulky aircraft parts, aircraft engine fuels and lubricants, paints, chemicals, and other supplies subject to deterioration. No hazardous materials have been stored on site since 1980. The primary contaminants of concern are polychlorinated biphenyls (PCBs) and solvents, including trichloroethene (TCE). The surface water migration pathway for the facility includes wetlands, Timothy Branch, and Mattawoman Creek.

No base personnel or other authorized persons now occupy the site. To prevent inadvertent access to the property, a chain-link fence with gate locks was constructed around the perimeter of the site. The Air Force has performed three PCB Removal Actions, removing a total of 17,000 cubic yards of contaminated soil. The most recent PCB Removal Action was in 1994. Acceptable PCB concentrations for industrial and unrestricted use were established in 1989 through meetings with regulatory agencies. The Air Force chose to remove PCB-contaminated soil to meet the unrestricted-use standards.

Andrews AFB has installed a groundwater treatment system. The installation has continually monitored the groundwater near the DRMO. The treatment system has been ready to operate for 2 years, pending approval by the Maryland Department of the Environment (MDE).

FY98 Restoration Progress

Andrews AFB made changes to the groundwater treatment system at the DRMO to accommodate MDE's requests and sought MDE's written concurrence on the system in a June 1998 letter. MDE has not furnished written concurrence; however communication and correspondence continue.

Plan of Action

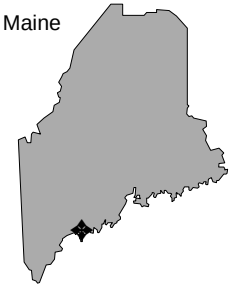
- Submit rebuttal comments to proposed listing on National Priorities List (NPL)
- Begin operating the Remedial Action pump-and-treat system to capture and remediate the TCE groundwater plume
- Clean up any residual PCB contamination both on and off site

FY99 Funding by Phase and Relative Risk

Cost data are included with Andrews Air Force Base, page A-12.

Brunswick Naval Air Station — NPL

Size: 7,259 acres
Mission: Provide facilities, services, materials, and aircraft for submarine warfare
HRS Score: 43.38; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in 1989; revised in 1990 to include the State of Maine
Contaminants: DDT, PCBs, PAHs, VOCs, and metals
Media Affected: Groundwater and soil
Funding to Date: $45.9 million
Estimated Cost to Completion (Completion Year): $17.2 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Brunswick, Maine

Restoration Background

Since FY83, environmental studies have identified 19 sites at this installation. Site types include landfills, a groundwater plume contaminated with volatile organic compounds (VOCs), and two underground storage tank (UST) sites. Activities that contributed to the contamination included intermediate aircraft maintenance, material support for maintenance, aircraft fueling services, storage and disposal of ordnance, and all-weather air station operations. On-site landfills were used to dispose of wastewater treatment sludge, paints, solvents, medical supplies, pesticides, petroleum products, and photographic and industrial chemicals. The installation was placed on the National Priorities List (NPL) because Sites 1 through 4 and 7 through 9 were used for the storage or disposal of hazardous waste.

The contaminated groundwater plume associated with Sites 4, 11, and 13 (the Eastern Groundwater Plume) probably originates from a former fire training area; three USTs formerly used to store petroleum products and waste solvents; and a waste pit used to dispose of transformer oils, battery acids, caustics, VOCs, solvents, and paint thinners. The installation completed Site Inspections for 12 sites in FY85 and for 4 more between FY91 and FY95. The installation also completed Remedial Investigations and Feasibility Studies for 14 of the 17 active sites, Remedial Design (RD) for 10 sites, and a Remedial Action (RA). A Record of Decision (ROD) was signed in FY92 for an Interim Remedial Action (IRA) to address the Eastern Groundwater Plume. The IRA was completed in FY94, and operation and maintenance of the groundwater treatment plant and extraction wells began.

In FY93, many USTs were removed or replaced, and RDs began. In FY94, the installation removed USTs from the Fuel Farm UST site, completed pilot-scale tests at another site, and began full-scale operation of an air-sparging system to remediate petroleum hydrocarbon contamination in soil.

During FY95, the installation completed a Removal Action at the former pesticide shop site where DDT was detected in soil and unfiltered groundwater samples. Long-term monitoring (LTM) of groundwater is being conducted at the site. In FY96, the installation constructed landfill caps at Sites 1 and 3 and developed final RAs at five sites, three of which were designated as Response Complete. The final ROD for the Eastern Groundwater Plume treatment plant was prepared in FY97.

In FY87, the installation established an administrative record and an information repository. In FY88, the community relations plan (CRP) was completed. The technical review committee was formed in FY88 and converted to a Restoration Advisory Board (RAB) in FY95.

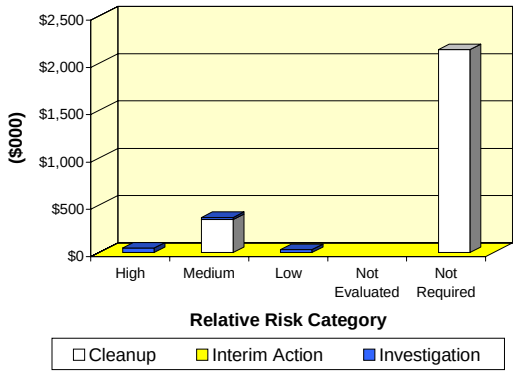
FY98 Restoration Progress

The final ROD for Sites 4, 11, and 13 was signed. The final ROD for Site 2 was not implemented. The Navy, regulatory agencies, and the RAB are making significant efforts to optimize the LTM system. The Navy reviewed the existing LTM plan for Sites 4, 11, and 13 and made progress in revising the plan, but delayed its completion to incorporate lessons learned from the Site 2 LTM plan. The Navy, regulatory agencies, and the RAB reviewed past data and made decisions on revising the plan. This process is expected to produce significant cost savings for LTM. The air-sparging system was expanded for UST 2 and is expected to concentrate the remediation on one stubborn area. In addition, it was determined that, at UST 1, there was a need to focus the system on a certain area. Although this had not been planned, the UST 1 air-sparging system was modified. The RDs planned for 1998 were not required because existing treatments proved effective with minor changes. The planned CRP update was found to be unnecessary. The RAB has been active and continues to provide comments on all documents before they are reviewed by regulatory agencies.

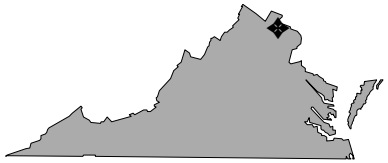
Plan of Action

- Continue RAs at Sites 4, 11, and 13 in FY99
- In FY99, complete LTM plan to halve the number of samples taken
- Utilize savings from LTM program to optimize RAs and reduce cost to complete (CTC) in FY99
- Prepare and implement LTM plan for Site 2 using lessons learned from Sites 4, 11, and 13 in FY99
- Continue RA operations at USTs 1 and 2 in FY99
- Prepare a no further action document for Sites 7, 12, 15, and 16 in FY99
- Sign a final ROD for Site 9 in FY99
- Explore ways to optimize RA operations and LTM to reduce CTC in FY99

FY99 Funding by Phase and Relative Risk



Size: 164 acres
Mission: Provided logistical and administrative support to the Military District of Washington and tenant activities
HRS Score: NA
IAG Status: None
Contaminants: VOCs, heavy metals, petroleum products, PCBs, pesticides, and herbicides
Media Affected: Groundwater and soil
Funding to Date: $5.7 million
Estimated Cost to Completion (Completion Year): $0.01 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1996



Alexandria, Virginia

Restoration Background

In December 1988, the BRAC Commission recommended closure of Cameron Station and relocation of its major logistical and transportation activities to Fort Belvoir, Virginia. The installation closed on schedule in FY95.

In FY90, Remedial Investigation and Feasibility Study (RI/FS) activities began at the installation. Sites include underground storage tanks (USTs), polychlorinated biphenyl (PCB) and pesticide storage areas, a landfill, and burn pits. After completion of Phase I RI/FS activities, sites were grouped into 12 operable units (OUs). Petroleum hydrocarbons are the primary contaminants affecting groundwater.

Interim Actions have included removal of USTs, removal of electrical transformers containing PCBs, cleanup of the installationwide storm sewer, and removal of asbestos.

In FY93, the installation formed a BRAC cleanup team (BCT). The Virginia Department of Environmental Quality (VDEQ) set up a team to advise the installation on the restoration process. RI/FS activities were also completed. In FY94, the Army completed Remedial Actions (RAs) for six OUs. The installation commander formed a Restoration Advisory Board, which has worked closely with the City of Alexandria. In addition, the installation developed a property reuse plan, which reduced conflicts between proposed and expected uses.

In FY95, the installation and VDEQ monitored a benzene-dichloroethane plume on the western side of the installation. Ultimately, it was determined that the contamination originated off-post and required no further action by the Army. An amendment to the decision document also recommended No Further Action for the OU3 landfill, with an agreement to monitor the landfill regularly. VDEQ approved a water discharge permit for OU5. The installation completed RAs for OUs 1 (PCBs), 4 (pesticides), and 6 (acid pits) and constructed the soil vapor groundwater extraction and treatment system for OU8 (gas station). The installation also awarded a contract for addressing USTs at OU12.

In FY96, the groundwater extraction and treatment system at OU5 continued to operate. The installation completed an Environmental Baseline Survey and removed the remaining USTs and prepared Findings of Suitability to Transfer for two parcels, both of which were transferred.

In FY97, the installation continued RAs at the gas station site and at the trichloroethene-contaminated area of OU5 and continued the 5-year monitoring program at OU3. The Army completed Relative Risk Site Evaluations at all sites. The installation also implemented the property-reuse plan. A transfer of parcels to private developers and the City of Alexandria was completed. The Army completed cleanup of a leaking UST at Building 2, part of OU8, by removing the contaminated soil. A total of 36.27 acres was approved as CERFA-uncontaminated.

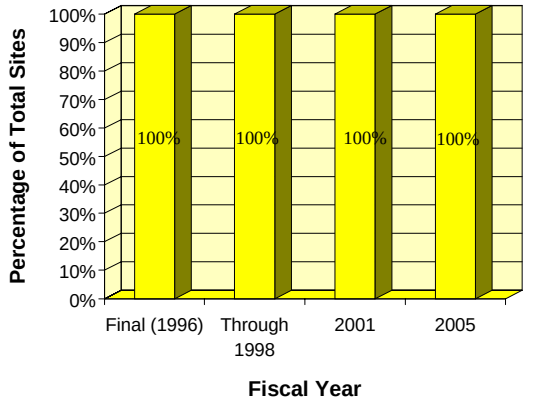
FY98 Restoration Progress

The installation conducted a BCT meeting to determine data gaps and pathways to closure for OU5. Based on the results of the BCT meeting, the installation, with cooperation from the site developer, installed seven new monitoring wells to rule out deep aquifer contamination and to fully characterize the site. The installation augmented the operations and maintenance contract for the Post Exchange (PX) Gas Station site (OU8) in an effort to reach post-closure care in FY99.

Plan of Action

- Continue to conduct BCT meetings to discuss progress and characterization results, and plans and pathways for possible closure of OU5 in FY99
- Continue 5-year monitoring program at OU3

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,579 acres
Mission: Housed the 7th Bombardment Wing, 436th Training Squadron and Detachment 1, and the 1365th Audiovisual Squadron
HRS Score: NA
IAG Status: None
Contaminants: Waste oils, petroleum/oil/lubricants, JP-4 jet fuel, solvents, TCE cleaners, and low-level radioactive material
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $30.3 million
Estimated Cost to Completion (Completion Year): $16.3 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2003

Fort Worth, Texas

Restoration Background

In July 1991, the BRAC Commission recommended closure of Carswell Air Force Base. The installation closed in FY93 but was reopened in FY94 after the BRAC Commission recommended its realignment as a joint reserve base. The installation name is now Fort Worth JRB Naval Air Station, and all restoration activity is the responsibility of the Air Force Base Conversion Agency.

Environmental studies at the installation since FY84 have identified the following site types: underground storage tanks (USTs), landfills, fire training areas, waste burial areas, contaminated groundwater plumes, contaminated ditches, and oil-water separators. The primary contaminants are petroleum hydrocarbons in groundwater, surface water, sediment, and soil and trichloroethene (TCE) in groundwater and soil.

Carswell is a joint-use base which uses both BRAC and Environmental Restoration Account funds to reach cleanup goals. For a basewide project, such as an Environmental Inpact Statement, the costs are evenly divided. Additional projects that are within defined boundaries are paid from the account affected.

In FY89, a RCRA Facility Assessment was conducted. In FY92, RCRA Facility Investigation (RFI) activities were completed for 13 solid waste management units (SWMUs). Contaminated soil was removed; Remedial Investigations (RIs) were completed for several sites; and cleanups were completed for a petroleum/oil/lubricant tank farm, a fire training area, and a stormwater ditch. Several USTs were removed, and the installation began a basewide RI for TCE-contaminated groundwater.

In FY94, an Environmental Baseline Survey was completed. RFIs were completed at five sites in FY95. The installation removed or upgraded 23 USTs and abandoned in place a hydrant refueling system. The installation also formed a BRAC cleanup team and a Restoration Advisory Board.

In FY96, cleanup activities were completed at the Maintenance Barn Site at the golf course. The installation continued delineating the groundwater plume at the airfield. In addition, risk assessment was completed at Fire Training Area No. 2, which was later closed. The installation completed cleanup at 20 hazardous waste storage units, 23 oil-water separators, and a polychlorinated biphenyl (PCB) storage area.

In FY97, the Remedial Action (RA) for the stream project was completed. Risk assessments began at Landfills 4 and 5. The Remedial Design (RD) at the base service station was completed, a risk assessment was conducted, and closure of the service station was approved. No further action at the service station is required.

FY98 Restoration Progress

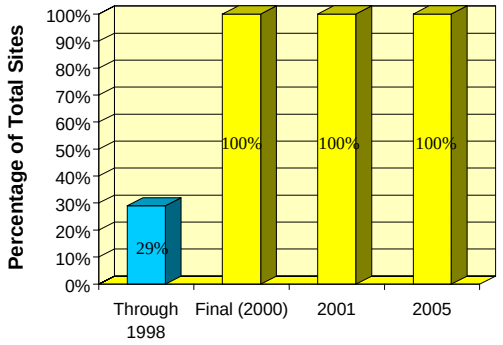
A background study was initiated to evaluate closure of six SWMUs and four areas of concern (AOCs). A final RFI/corrective measures study (CMS) was initiated for Landfills 4, 5, and 8 and the Waste Burial Area (WP-07).

Action on the stream project site and risk assessments at Landfills 4 and 5, the Sanitary Sewer, and the Off-Base Weapons Storage Area were delayed because of additional regulatory requirements in response to laboratory data quality issues.

Plan of Action

- Complete background studies to close six SWMUs and four AOCs in FY99
- Initiate transfer of sites located within the active base to the Environmental Restoration Account program in FY99
- Initiate final RD/RA for Landfills 4, 5, and 8 and WP-07, and complete cleanup of these sites by FY00
- Begin long-term monitoring at some sites in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,777 acres
Mission: Train tanker crews and service KC-135 stratotanker
HRS Score: 27.93; placed on NPL in July 1987
IAG Status: IAG signed in 1989
Contaminants: Spent solvents, PCBs, petroleum/oil/lubricants, pesticides, cyanide, and cadmium
Media Affected: Groundwater and soil
Funding to Date: $115.6 million
Estimated Cost to Completion (Completion Year): $85.8 million (FY2038)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2003

Atwater, California

Restoration Background

In July 1991, the BRAC Commission recommended closure of Castle Air Force Base. The installation was closed on September 30, 1995.

Preliminary Assessment and Site Inspection activities identified landfills, underground storage tanks (USTs), discharge areas, chemical disposal pits, fire training areas, fuel spill areas, and six polychlorinated biphenyl (PCB) spill areas at the installation.

Interim Actions have included excavating and disposing of contaminated soil from the PCB spill areas; installing potable water supply wells and filtration systems to remove trichloroethene (TCE) from the groundwater; and removing 30 USTs. Sites were grouped into four operable units (OUs). In FY91, the installation submitted Records of Decision (RODs) for OU1 and OU2.

In FY93, additional areas of concern (AOCs) were identified and incorporated into the Source Control OU (SCOU). The installation completed Remedial Design (RD) activities at OU1 and began a Remedial Action (RA), capping inactive production wells, and removing abandoned USTs.

In FY95, the installation began operating soil vapor extraction (SVE) systems at two fuel spill areas. The Environmental Baseline Survey was completed.

In FY96, Part 1 of the RI/FS report was completed. The installation removed 69 USTs and 16 oil-water separators.

In FY97, the installation completed construction of a pump-and-treat system at OU2. The BRAC cleanup team (BCT) completed the SCOU RI/FS, the CB Part I ROD, and a draft final RD/RA landfill work plan; provided the SCOU Proposed Plan for public comment; and placed four more sites in Removal Action status. The installation is over 94 percent in reuse.

The installation has a Restoration Advisory Board (RAB), which meets every other month.

FY98 Restoration Progress

The storm drain cleanup was completed and the sanitary sewer repair designed. Municipal well effects on contaminant plumes were determined, control mechanisms were developed, municipal wells AM-6 and A-16 were evaluated, and AM-16 was programmed to be operated only in high demand periods until further evaluated. Castle Vista Landfill A (CV-A), CV-B, and Landfill 2 were excavated and consolidated into Landfill 4, and the landfill RI/FS was completed. The OU1 Phase II and CV groundwater treatment plants were constructed. PCB-9 and ETC-10 RAs were completed. RCRA compliance actions included demolition of the Demineralized Water Plant and the Wastewater Treatment Plan.

SVE at CV-B, a UST site closure, and a groundwater Treatability Study on alternative carbon media began. A five-year groundwater RA review and the funding of a Federal Bureau of Prisons/ Department of Justice wetland mitigation project also were initiated. The BCP was updated. Variable oversight training was completed.

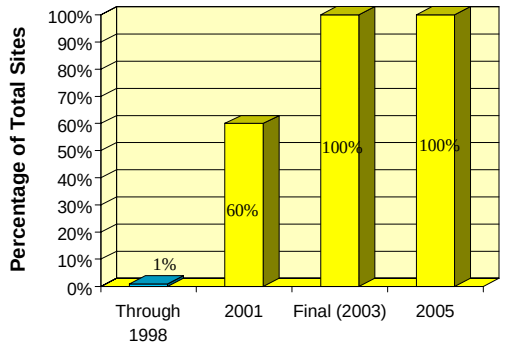
SCOU ROD Volume 1 is under review by the Air Force, and the associated RD/RA work plan was completed. SCOU ROD Volume 2 and the RD/RA work plan await resolution of cleanup-level issues. The Federal Facility Agreement schedule was revised to reflect the status of ROD negotiations and the revised RA schedule. Landfill actions were delayed because of continued SCOU ROD negotiations and to evaluate new excavation plans. Work on petroleum/oil/lubricants (POL) intrinsic remediation sites was delayed, pending resolution of risk-based remediation issues.

Continuing activities include long-term groundwater sampling, long-term operations (LTO) and maintenance of groundwater treatment systems, and LTO at two other sites. The closure report for Fuel Spill Areas 1 and 2 is also under way.

Plan of Action

- Construct site preparation for well head treatment for AM-6 to reduce response time should well waters exceed 1/2 MCL
- Construct CB Phase III groundwater treatment system and begin operations
- Continue LTO of five groundwater treatment systems and long-term groundwater sampling in FY99 and FY00
- Begin intrinsic remediation of POL intrinsic remediation sites in FY99-FY00
- Begin the sanitary sewer repair when validation issues are resolved
- Conduct an Institutional Control site survey
- Complete SCOU ROD and SCOU RD/RA work plan Volume 2
- Complete and implement the CB Part II RI/FS, Proposed Plan, and ROD
- Initiate remediation of remaining SCOU sites
- Complete last RA in FY02

Sites Achieving RIP or RC Per Fiscal Year



Cecil Field Naval Air Station

Size: 31,486 acres
Mission: Provide facilities, services, and material support for maintenance of Naval weapons and aircraft
HRS Score: 31.99; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in November 1990
Contaminants: Waste fuel oil, solvents, heavy metals, halogenated aliphatics, phthalate esters, SVOCs, and lead
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $29.8 million
Estimated Cost to Completion (Completion Year): $16.9 million (FY2007)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Jacksonville, Florida

Restoration Background

In July 1993, the BRAC Commission recommended the FY99 closure of this installation and relocation of its aircraft, personnel, and equipment to other stations.

Since FY84, environmental investigations have identified 18 CERCLA sites; 6 major underground storage tank (UST) sites; 250 BRAC grey sites; 235 USTs for removal and contamination assessment; and a RCRA site. Typical operations that caused contamination at the installation include equipment maintenance, storage and disposal of fuel and oil, fire training, and training on target ranges. The initial site assessment was completed FY95, and Remedial Investigation and Feasibility Study (RI/FS) activities began in FY93. Twelve sites were grouped in seven operable units (OUs), based on the type of waste disposed of and the profile of the suspected contaminants. The six remaining CERCLA sites are being investigated and remediated individually.

In FY94, a BRAC cleanup team (BCT) was formed, and the installation's technical review committee was converted to a Restoration Advisory Board. The regulatory agencies approved 17,005 acres as CERFA-uncontaminated. Four interim Records of Decision (RODs) were signed, and the contaminated soil at Site 16 was removed. In FY95, RODs for four sites were signed and contaminated soil at Sites 11 and 17 was removed. During FY96, contaminated soil and a bioslurper were removed from the North Fuel Farm. The ROD for Site 16 was signed.

In FY97, a no further action (NFA) ROD was signed for Site 10. Remedial Investigation (RI), Baseline Risk Assessment, and Feasibility Study (FS) documents were completed for Sites 14 and 15. The installation started ROD implementation at Sites 1 and 2. It also completed removal of Day Tank 2, Jet Engine Test Cell soil, A Avenue soil, Site 18 unexploded ordnance, and 29 miscellaneous tanks. The North Fuel Farm and Day Tank 1 Remedial Action Plans (RAPs) were completed. Lake Fretwell was removed from the State Health Advisory List.

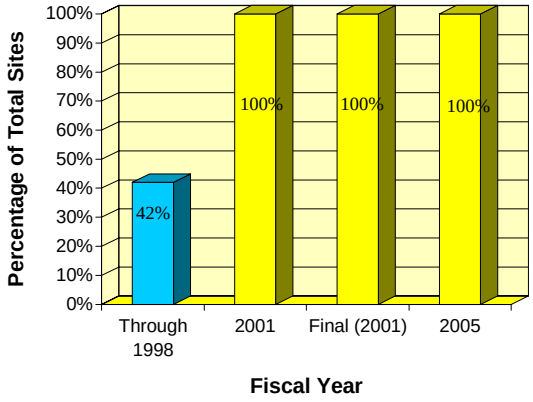
FY98 Restoration Progress

In FY98, the installation signed RODs for Sites 3, 11, and 14. The RODs for Sites 7 and 8 were not completed because of changing cleanup standards for the soil at these sites. The Site 15 ROD was delayed because of further investigation by the BCT. The RI/FS for Site 4 was completed, and an NFA document was signed. NFA documents for Sites 6, 18, and 19 have not been signed, because additional sampling is required. NFA reports were submitted for Sites 9 and 12. Remediation of 10 BRAC grey sites was delayed by need for further investigations. The installation completed the soil excavation at Site 5, the North Fuel Farm, and the Jet Engine Test Cell. A groundwater remediation system was installed at South Fuel Farm. Finding of suitability to lease (FOSL) documents were signed for 80 parcels. The installation completed FSs for Sites 11 and 15 and RIs for two sites. The investigation began at Site 6, and an FS was deemed unnecessary. The installation completed the Day Tank 2 contamination assessment report, the RAP, and six designs. Six designs and three corrective action plans for USTs, and four groundwater RDs were also completed.

Plan of Action

- Prepare Finding of Suitability to Transfer documentation for 7,000 acres in the Yellow Water Weapons Area, 6,000 acres of flightline-related property and buildings, and 640 acres to go to Clay County in FY99
- Install air-sparging system in source area and continue natural attenuation sampling in downgradient part of Site 3 plume in FY99
- Complete NFA decision document for Sites 6, 18, and 19 in FY99
- Continue natural attenuation monitoring at Sites 5, 8, 16, 17, and the Jet Engine Test Cell in FY99
- Submit ROD for Site 15 in FY99
- Submit the soil removal design and work plan for Sites 7 and 8, a groundwater design for Site 11, an air-sparging design at Site 16, and a sewer design at Site 16 in FY99
- Install air-sparging system and slip-line storm drain at Site 16 in FY99
- Begin groundwater sampling at Site 11 in FY99
- Continue operating air-sparging and soil venting system at South Fuel Farm in FY99
- Perform well pilot study at North Fuel Farm in FY99
- Perform radiological survey at Yellow Water Weapons Area bunkers in FY99
- Investigate 103rd Street pipeline in FY99
- Remove asbestos-containing material from 15 buildings in FY99
- Remove soil at Sites 6 through 8 in FY99
- Remove 15 tanks in FY99
- Complete soil removal at 10 BRAC grey sites in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 71,359 acres
Mission: Light infantry and mobilization
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, DDT, PCBs, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $15.3 million
Estimated Cost to Completion (Completion Year): $20.7 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Fort Chaffee, Arkansas

Restoration Background

In July 1995, the BRAC Commission recommended closure of Fort Chaffee, except minimum essential buildings and ranges for a Reserve Component training enclave. The BRAC parcel available for transfer is approximately 7,233 acres. The installation closed at the end of FY97 and established a caretaker staff.

Primary site types include underground storage tanks (USTs), a fire training area, landfills, an open burning and open detonation unit, and hazardous waste and hazardous material storage areas. Primary contaminants of concern include petroleum/oil/lubricants in groundwater and soil and heavy metals and pesticides in soil. Interim Actions at the installation have included removal of USTs and soil remediation at all abandoned UST locations.

The community formed a Local Redevelopment Authority in FY95. In FY96, the installation formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). The installation also began developing the BRAC Cleanup Plan (BCP) and completed a RCRA Facility Investigation that had been initiated in FY95. The draft final Environmental Baseline Survey report was completed and submitted to the regulatory agencies. The Army began investigations at the North POW Landfill and awarded a contract for site characterization of the Hazardous Waste Storage Facility. In FY97, the installation removed USTs from the BRAC parcel. The Army used Site Characterization and Analysis Penetrometer System (SCAPS) trucks for accelerated fieldwork. In addition, installation project managers received hazardous waste operations training to improve site management and project oversight. The installation took lead-agency authority under CERCLA but also met with the director of the state agency and obtained a commitment to work through the BCT. This prevented work stoppage while disagreements were resolved.

The BCT completed and implemented the open burning and open detonation unit-closure work plan. It also completed work plans for closing the Hazardous Waste Storage Facility and the Air National Guard Burn Pit. Phase I of the Site Inspection began, as did work on removing postwide USTs, oil-water separators, wash racks, and fuel fill stands.

FY98 Restoration Progress

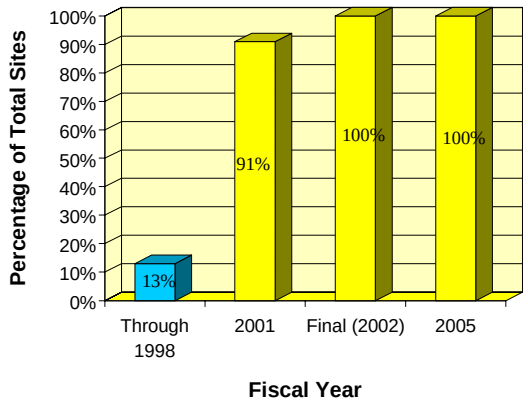
The installation conducted an Interim Removal Action at Building 5830 and Buildings 402/403 UST sites. The installation also removed all USTs and oil-water separators and the west area fuel fill stands and transmission lines. It completed Relative Risk Site Evaluations for all sites except Sites 2 and 45. The installation also scheduled all sites to be proposed for No Further Action (NFA) in FY98 and FY99 based on initial investigations and after completion of remediation in FY01. It completed an unexploded ordnance (UXO) archive search and a site visit for BRAC property. The Army awarded a contract for remediation of friable asbestos at the hospital.

The installation completed the RCRA closure evaluation for the Hazardous Waste Storage Facility; state regulators are reviewing the closure report. Several projects were Peer Reviewed in FY98 resulting in a recommendation to justify the regulator's desire for presumptive remedies at several landfills when no risk warrants other action. The RAB received training on the health effects of lead and toured ongoing remediation sites. The RAB reviewed and provided comments on the community relations plan. The Army and the state participated in four walk-through sessions for reports and documents to facilitate the state's review. The BCT reviewed reports and documents, approved the overall project schedule, and participated in public meetings on the first two rounds of sites proposed for NFA. Version 2 of the BCP was completed in December 1997.

Plan of Action

- Complete Engineering Evaluation and Cost Analysis on landfills, Sites 1 and 32, in FY99
- Remove remaining fuel fill stands in FY99
- Complete initial investigation of landfill, Site 2, and Site 45, Wood Dump, in FY99
- Continue to seek regulatory concurrence on CERFA-uncontaminated acreage in FY99
- Propose an additional round of sites for NFA in FY99 and FY01
- Implement remediation at the Site 1 and 32 landfills in FY00 and at Site 45, the Wood Dump, in FY01

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,125 acres
Mission: Served as technical training center
HRS Score: NA
IAG Status: IAG signed in September 1990
Contaminants: Petroleum/oil/lubricants, VOCs, chlorinated solvents, and metals
Media Affected: Groundwater, soil, and sediment
Funding to Date: $43.0 million
Estimated Cost to Completion (Completion Year): $55.6 million (FY2005)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Rantoul, Illinois

Restoration Background

Chanute Air Force Base was one of five Air Training Command Technical Training Centers providing specialized training for officers, airmen, and civilian employees of the Air Force and other DoD agencies. In 1988, the installation was recommended for closure. A Record of Decision for reuse of the base was signed in FY91, and closure occurred in September 1993. The majority of the installation has been licensed to the Village of Rantoul for use as an airport.

Environmental studies conducted between FY82 and FY92 identified 69 sites at the facility, including landfills, fire training areas, oil-water separators, a petroleum sludge disposal pit, jet engine test cells, and underground storage tanks (USTs).

Interim Actions have included removal of USTs, pipelines, and contaminated soil at all UST sites; removal of sludge and contaminated soil at a sludge pit; and removal of oil-water separators. The installation formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) in FY94.

In FY95, the installation completed a Treatability Study, and used low-temperature thermal volatilization to treat 60,000 tons of contaminated soil, at 14 former UST sites. All remaining sites were ranked according to the Relative Risk Site Evaluation process.

In FY96, a Remedial Investigation (RI) report for 11 sites was submitted to EPA and the State of Illinois EPA. The installation also initiated a groundwater extraction and treatment system at Building 700, a former UST site. Several parcels within Operable Unit (OU) 1 were designated as suitable for transfer. RI operations continue at OU2 because the initial RI was judged to be flawed. In addition, planning began at former UST sites for sampling of soil possibly still contaminated with fuel. Bioremediation and intrinsic bioremediation Treatability Studies for the Building 952 area spill site determined that petroleum levels were below the State of Illinois cleanup levels for petroleum contamination. Two early actions and site cleanups were completed.

The Village of Rantoul, Illinois, Aviation and Development Group has completed a reuse plan for the facility. As a result of the Local Redevelopment Authority's efforts, an operating civilian airport has been established on former property of the installation.

In FY97, the BCT reviewed and updated the BRAC Cleanup Plan (BCP), developed a long-term schedule for cleanup, monitored progress on current projects, and oversaw the contracting of upcoming projects. RAB meetings cover the progress of ongoing RIs and address concerns of community members.

FY98 Restoration Progress

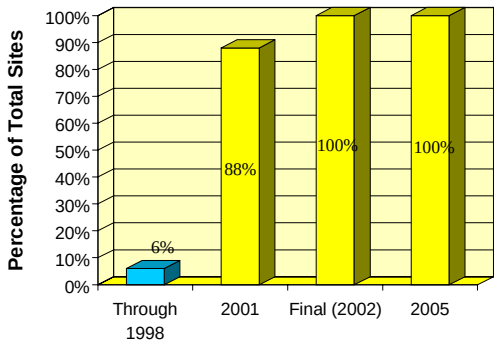
A field sampling plan was submitted for Landfills 14 through 17. Area surveys, geophysics and soil gas studies, and cone penetrometer testing were completed for the landfills. Supplements to the Environmental Baseline Survey and visual site inspections were conducted before parcels were transferred. The BCP was updated in February. RAB members continue to be kept informed on environmental studies and cleanup operations at the base.

New areas of concern were discovered in OU1, and an RI is being developed for those areas. An accelerated RI was initiated at the four landfills in OU2, Fire Training Area 2, and the Building 932 Sludge Pit.

Plan of Action

- Continue RIs at Fire Training Area 2 and the four OU2 landfills in FY99
- Initiate RIs for new areas of interest in OU1 and in and around OU2 in FY99
- Initiate RAs, as appropriate, upon RI completion in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,744 acres
Mission: Repaired, maintained, and overhauled Navy ships
HRS Score: NA
IAG Status: None
Contaminants: Asbestos, cyanide, decontaminating agents, heavy metals, paints, PCBs, pesticides, petroleum/oil/lubricants, solvents, and petroleum hydrocarbons
Media Affected: Groundwater, sediment, and soil
Funding to Date: $20.2 million
Estimated Cost to Completion (Completion Year): $24.8 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Charleston, South Carolina

Restoration Background

The Charleston Naval Complex housed five major naval commands (the Naval Shipyard [NSY], the Naval Station [NS], the Naval Fleet and Industrial Supply Center [FISC], the Fleet and Mine Warfare Training Center [FMWTC], and the Naval Reserve Center [NRC]), as well as several small organizations. In July 1993, the BRAC Commission recommended closure of the property and the majority of the commands. Operational closure of the complex occurred on April 1, 1996.

The primary sites of concern at the installation are areas that were used as landfills or disposal pits without controls for runoff and leachate. The complex was divided into 12 zones. There are 115 RCRA solid waste management units (SWMUs) and 161 underground storage tanks (USTs) at the complex. One FMWTC UST site and one NRC UST site are Response Complete. Ten zones include areas of concern (AOCs) undergoing confirmatory sampling. Zones J and L, which are in the RCRA Facility Investigation (RFI) stage, contain the waterside areas and the sanitary sewer system, respectively. Both the sewer system and the waterside sites may include contamination from any site or AOC. All cleanup activities are conducted as RCRA corrective actions. Tank removals are accomplished under the BRAC program and not necessarily under the UST program. The UST program includes sites where soil or groundwater contamination has been identified. The installation has completed initial site characterizations for all UST sites; cleanup has been completed at two UST sites and is under way at two others.

A BRAC cleanup team was formed in FY94. Two reuse groups were formed, one representing the local community and the other a state agency. A land reuse plan was developed and approved, and transfers of property to other federal agencies, as well as leases to private businesses, were completed for much of the installation property.

The installation converted its technical review committee (TRC) to a Restoration Advisory Board (RAB) in FY94. A community relations plan was completed and updated to include all SWMUs.

During FY96, the installation completed an Environmental Baseline Survey (EBS), signed a Record of Decision, and finished an Environmental Impact Statement. The installation also completed the RCRA Facility Assessment (RFA) for three SWMUs, finished one Interim Remedial Action (IRA), initiated two more IRAs at a UST site, and completed a corrective action plan (CAP) at another UST site. Fifty-four tanks were removed.

In FY97, the installation completed RFAs for 64 SWMUs; RFIs for 60 SWMUs; Removal Actions, in the form of voluntary interim measures, for 23 sites; and site assessments, a CAP, and Corrective Measures Designs (CMDs) for 3 USTs. In addition, 50 tanks were removed, and a geoprobe was used to collect soil and groundwater samples. Site management was improved through recycling of waste oil and scrap metals and disposal of nonhazardous waste materials recovered from interim removal sites. Also in FY97, the BRAC Business Plan and the EBS were updated.

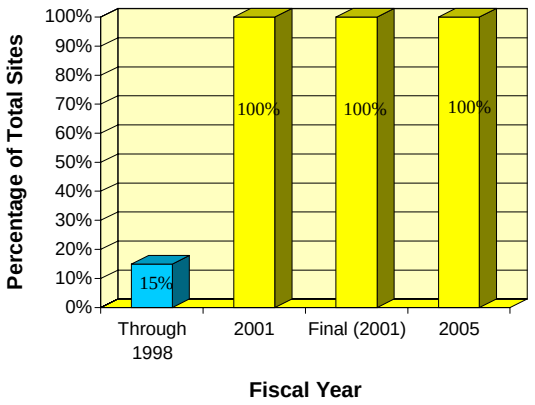
FY98 Restoration Progress

The installation completed RFIs for 70 SWMU AOCs. Four sites were transferred to the UST program for corrective action. A corrective measures study (CMS) was initiated for 12 sites; 7 sites were determined to be Response Complete. The asbestos and lead-based paint survey for historical housing was completed. Under the UST program, the installation removed all but two petroleum storage tanks, which were in use by tenants or transferred to new owners. As a result of the tank closures, 61 tank sites must be investigated. Four contamination assessments began and three were completed. One assessment required remediation, and the contract for this work was awarded. The other two assessments resulted in a no further action decision by the state regulator. The contract for investigation of the fuel distribution system was awarded in September. Other work included cleaning and demolishing a 2.1- million-gallon field-constructed fuel tank at the Chicora Tank Farm.

Plan of Action

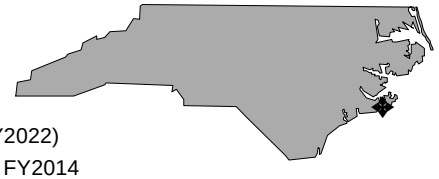
- Continue asbestos and lead-based paint abatement for historical housing in FY99
- Complete finding of suitability to transfer (FOST) for two parcels of land for Phase I and II of the economic development conveyance in FY99
- Complete or initiate CMS for all remaining SWMUs in FY99
- Continue corrective measures implementation in FY99

Sites Achieving RIP or RC Per Fiscal Year



Cherry Point Marine Corps Air Station NPL

Size: 27,715 acres
Mission: Maintain and operate support facilities; provide services and materials for marine aircraft
HRS Score: 70.71; placed on NPL in December 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: PCBs, petroleum hydrocarbons, and solvents
Media Affected: Groundwater and soil
Funding to Date: $47.8 million
Estimated Cost to Completion (Completion Year): $79.3 million (FY2022)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Cherry Point, North Carolina

Restoration Background

The station conducted an Initial Assessment Study in FY83 that identified 32 sites. A RCRA Facility Assessment performed in FY88 identified 114 solid waste management units (SWMUs). The installation and EPA negotiated a Consent Order in FY90 in which the Navy and EPA agreed to perform additional investigations at 32 of the 114 sites.

The installation characterized 22 underground storage tank (UST) sites between FY91 and FY95 and completed corrective action plans (CAPs) for 2 UST sites in FY93 and 1 UST site in FY94. During FY95, a corrective measures study was initiated for five sites and completed for one site. The installation completed corrective measures implementation for two sites and a Time-Critical Removal Action for one site. Characterizations were completed for three UST sites, and a CAP was completed for one UST site.

A technical review committee was established in FY91. Two information repositories were established in FY93. The installation's Restoration Advisory Board was established and a community relations plan was completed in FY95. The installation has established a formal partnering process with EPA Region 4 and the State of North Carolina. During FY96, the installation completed Remedial Investigation/Feasibility Studies (RI/FSs) for two sites and nine Proposed Remedial Action Plans (PRAPs). CAPs were completed at six UST sites, and designs were completed at three UST sites. A Baseline Risk Assessment is under way for all sites.

In FY97, an RI/FS was initiated for two sites and completed for four additional sites. PRAPs were prepared for two sites and completed at three additional sites. Remedial Action (RA) was initiated for eight sites and completed for four additional sites. An Engineering Evaluation and Cost Analysis was completed for one site. Three Records of Decision (RODs) were completed, but were not signed because of a deed restriction. The following technologies and techniques were implemented: a horizontally drilled product slurping system installed beneath an aircraft hangar; natural attenuation for a 40-acre contaminated landfill; a facilitywide process for developing and maintaining the quality assurance plan; site background data and decision documents to streamline fieldwork.

FY98 Restoration Progress

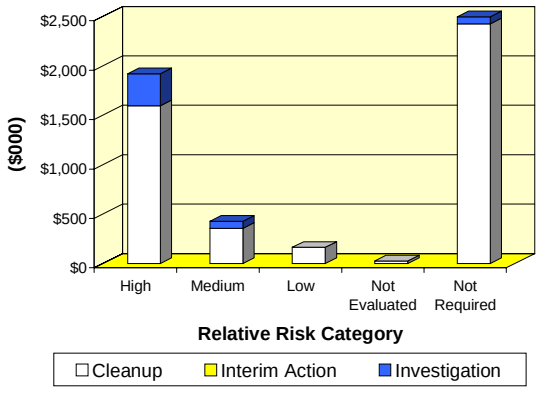
A Time-Critical Removal Action and a corresponding Action Memorandum were completed for a new site. Interim RAs were completed for Operable Unit (OU) 1, which contains seven sites, and Sites 16 and 85. The RA for OU3 was delayed because of budget cuts. An RI/FS was initiated for OU6, which consists of two sites. Data gap work plans were completed for OUs 2, 4, and 13, which contain a total of eight sites. A comprehensive RI/FS work plan was initiated for OU1, a highly contaminated area consisting of over 100 sites, SWMUs, and areas of concern (AOCs). Implementation of institutional controls delayed the signing of two RODs covering six sites. A corrective measures study was completed for Sites 7 through 9. The installation uses recovered fuel to power steam plants to reduce costs and lower air emissions. A stationwide field sampling plan streamlined project plans.

Federal Facility Agreement negotiations began. The installation created searchable administrative records and an environmental Web page to improve access to documents and historical information about the installation. The installation completed a quality assurance plan, a decision process document, a project description document, and a system to facilitate the management of work for team members.

Plan of Action

- Initiate RI fieldwork for OU1, which consists of 20 sites, SWMUs, and AOCs, in FY99
- Prepare Remedial Action Operation Plan and conduct operations and monitoring for OU 1, 2, and 3 treatment systems in FY99
- Construct RA treatment system at one site at OU3 in FY99
- Complete initial construction for one site at OU1 in FY99
- Complete draft RI for five sites at OUs 4, 6, and 13 in FY99
- Complete RI work plan for a new site in FY99

FY99 Funding by Phase and Relative Risk



Chicago O'Hare IAP Air Reserve Station — BRAC 1995

Size: 359 acres
Mission: House 126th Air Refueling Wing (Illinois Air National Guard) and Defense Logistics Agency; formerly housed 928th Airlift Wing (Air Force Reserve)
HRS Score: NA
IAG Status: None
Contaminants: VOCs, SVOCs, PNAs, petroleum hydrocarbons, metals, and low-level radioactive waste
Media Affected: Groundwater and soil
Funding to Date: $4.1 million
Estimated Cost to Completion (Completion Year): $1.9 million (FY2000)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Chicago, Illinois

Restoration Background

Chicago O'Hare International Airport Air Reserve Station began operations in 1942 as an aircraft assembly plant. The plant was deactivated in 1945, and the Air Force Reserve (AFRES) and the Air National Guard (ANG) began flying activities in 1946 and 1954, respectively.

The 1993 BRAC Commission recommended closure of this station contingent on receipt of funding from the City of Chicago. The BRAC 1995 round modified the decision and the Air Force and the city began implemeting the revised decision. In late 1996, the Air Force and the City of Chicago signed a purchase agreement. The city is paying for replacement facilities at Scott Air Force Base in exchange for the Chicago O'Hare Air Reserve Station land.

Environmental cleanup studies at the station began in 1983. To date, 16 Installation Restoration Program (IRP) sites and 20 areas of concern (AOCs) have been identified. Site types include underground storage tanks (USTs), landfills, fuel spills, aboveground storage tanks (ASTs), a fire training area, and a low-level radioactive waste disposal area. Primary contaminants are petroleum hydrocarbons, metals, PNAs, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs), which have been released into soil and groundwater.

Interim Remedial Actions have included removal of 19 USTs, contaminated soil, and low-level radioactive waste. Eleven ASTs have been closed. Remedial Actions (RAs) include removal of eight ASTs and partial on-site remediation of the south petroleum/oil/lubricant (POL) facility. The IRP sites will be recommended Institutional Controls (deed restrictions) once a groundwater classification has been made. One site (LF-001) is planned for long-term monitoring (LTM), another (RW-011) has been closed with NFA needed, a third site (ST-015) had RA (soil removal), and ST-006 was closed under regulations for leaking USTs.

In FY97, a stationwide Phase I Environmental Baseline Survey (EBS) was completed, identifying approximately 228 acres as CERFA-clean. EBS Phase II supplements are being prepared as investigations and cleanup occur and property transactions are developed.

A Restoration Advisory Board (RAB) and a Base Closure and Transition Team (BCTT) were formed in FY97. The Air Force has established a partnership with the City of Chicago and the other stakeholders. State and federal regulatory agencies have agreed to help the Air Force meet the city's schedule by means of the fast-track process. The RAB has shown interest in all aspects of the investigation, cleanup, and long-term protection activities.

FY98 Restoration Progress

A parcel-specific EBS and an RI were completed for Parcels 2 and 3A. A finding of suitability to lease (FOSL) was issued. A parcel-specific EBS was completed for Parcel 3. Approximately 50 cubic yards of lead-contaminated soil was removed from AST 1702 and disposed of.

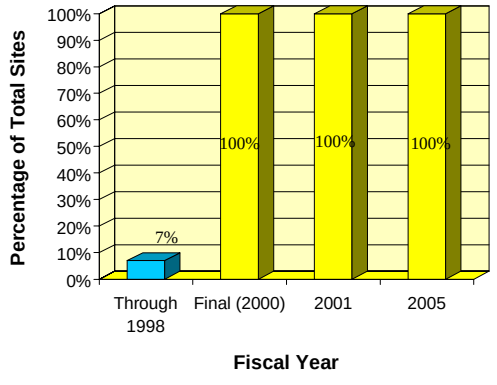
The groundwater classification was delayed to accommodate a final round of groundwater testing; this was completed in FY98. Closure of all IRP sites has been delayed, pending completion of the groundwater classification and the RI for Parcel 3. The RI at the south POL facility (SS-012) will be included in this RI. The LTM decision document for Landfill No. 1 (LF-001) has been delayed, pending discussions with regulatory agencies. Closure (NFA) of IRP Site ST-002, West POL, was delayed as part of the closure of all remaining IRP sites. ST-006, the defuel tank leak, was closed under Illinois EPA regulations for leaking USTs.

The BCTT meets monthly.

Plan of Action

- Complete a finding of suitability to transfer (FOST) for Parcel 2 in FY99
- Complete soil removal at ST012 and OT016
- Complete groundwater classification for entire facility in FY99
- Close all IRP sites in FY99
- Conduct two RAs in FY99
- Complete decision documents for all RAs in FY99
- Issue a FOSL in FY99
- Issue FOST for Parcel 3 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 191 acres
Mission: Served as shipbuilding facility and reserve shipyard
HRS Score: Unknown
IAG Status: None
Contaminants: VOCs, PNAs, PCBs, and heavy metals, including arsenic, lead, and mercury
Media Affected: Groundwater, sediment, and soil
Funding to Date: $0.2 million
Estimated Cost to Completion (Completion Year): $0.04 million (FY1999)
Final Remedy in Place or Response Complete Date for All Sites: NA

Tacoma, Washington

Restoration Background

The former Todd Tacoma shipyard is located on Commencement Bay between Hylebos and Blair Waterways in Tacoma, Washington. The 191-acre facility was acquired between 1942 and 1948 for use by the U.S. Navy. In 1960, all but 8.33 acres was conveyed to the Port of Tacoma. The remainder was retained by the Navy for a Navy and Marine Corps Reserve Training Center.

Between 1917 and 1940, the then privately owned property was in use intermittently for shipbuilding, including construction of vessels for the Navy. Beginning in 1940, the western portion of the facility, approximately 74.2 acres, owned at that time by Seattle-Tacoma Shipbuilding Corporation (later called Todd Pacific Shipyards Inc. Tacoma Division), was rapidly developed to support the Navy war effort. Adjacent lands were acquired both by the Navy and by the Maritime Commission to expand the plant. By October 1942, the Maritime Commission had transferred all of its contractual and facility interests to the Navy. Land acquisitions continued until the end of the war, and the facility, including the 74.2-acre Todd-owned portion, expanded to 191.04 acres.

After the war, the mission of the installation changed. It was designated a Naval Industrial Reserve Shipyard, and shipbuilding ceased. In September 1948, the Todd-owned property, was acquired in fee through a trade for Navy-owned property at the Todd Shipyard Drydock facility in Seattle. In October 1958, the installation was declared excess. The Navy and Marine Reserve Training Center retained 8.33 acres, and the remaining property was conveyed to the Port of Tacoma on January 1, 1960. The Port has leased portions of the facility for business and light industry.

In 1983, the Commencement Bay Nearshore/Tideflats Superfund Site was placed on the National Priorities List (NPL). The former naval yard is adjacent to the mouth of the Hylebos Waterway problem area. Sediment sampling revealed high levels of polychlorinated biphenyls (PCBs) and several other contaminants. On December 21, 1994, the U.S. Army Corps of Engineers (USACE), Seattle District, was sent a potentially responsible party (PRP) letter from the Hylebos PRP Group and on February 6, 1995, EPA Region 10, sent a General Notice Letter to the District Engineer. Other major PRPs include ASARCO Incorporated, Elf Atochem of North America, Inc., General Metals of Tacoma, Inc., Kaiser Aluminum & Chemical Corporation, Occidental Chemical Corporation, and the Port of Tacoma.

Investigations of the Commencement Bay Nearshore/Tideflats Superfund Site have been ongoing for several years. USACE, Seattle District, received approval to initiate PRP investigations using existing field studies and other sources of information in February 1996. Authority has been granted to determine DoD liability and negotiate a settlement with the other PRPs for both the FUDS property and the active Navy training center. A Site Ownership/Operational History (SOOH) was undertaken in June 1997 to develop the information required for a determination of liability.

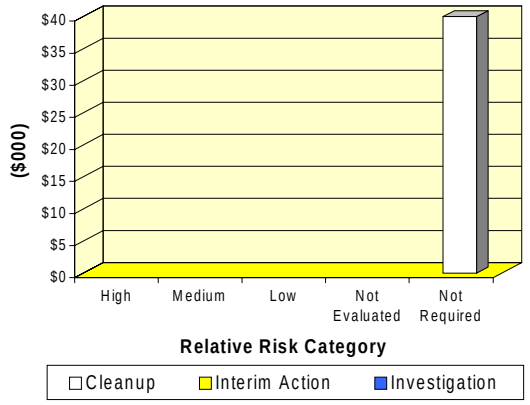
FY98 Restoration Progress

The scope of the SOOH expanded to include additional information sources and properties.

Plan of Action

- Complete SOOH in early 1999

FY99 Funding by Phase and Relative Risk



Concord Naval Weapons Station — NPL

Size: 13,023 acres
Mission: Ship, receive, inspect, and classify munitions (tidal area); serve as munitions storage and weapons maintenance, inspection, and testing facility (inland area)
HRS Score: 50.00; placed on NPL in December 1994
IAG Status: Federal Facility Site Remediation Agreement signed in September 1992
Contaminants: Heavy metals and petroleum hydrocarbons
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $43.8 million
Estimated Cost to Completion (Completion Year): $28.6 million (FY2011)
Final Remedy in Place or Response Complete Date for All Sites: FY2008

Concord, California

Restoration Background

Since FY83, investigations have identified 58 sites at this installation. Past operations, such as improper disposal of paints and solvents, spent ordnance, treated wood, and household and industrial waste; open burning of munitions; and spills or leaks from fuel storage tanks, have contributed to contamination. The installation was placed on the National Priorities List (NPL) in 1994, primarily because of surface water and sediment contamination at tidal and litigation-area sites. These sites contain sensitive habitat for threatened and endangered species and are interconnected to Suisun Bay.

During the period of FY86 through FY94, the installation completed the Remedial Investigation and Feasibility Study (RI/FS), signed the Record of Decision (ROD), and completed Remedial Design (RD) for the seven litigation-area sites. The Navy entered into consent decrees with the owners of adjacent property and recovered cleanup costs. By FY94, the installation had completed the Remedial Action (RA) for four of the litigation area sites. Site Inspections (SIs) were completed and RI began at four tidal area sites and five inland sites; SIs were also performed for six other sites. A RCRA Facility Assessment (RFA) was done for 49 solid waste management units (SWMUs), 24 of which were proposed for RCRA corrective action. Three tanks were removed from an underground storage tank (UST) site, and initial site characterization was completed for one UST site.

In FY95, three abandoned wells were closed and sealed at one inland site. By FY96, the installation had completed the RA and begun long-term monitoring (LTM) for all seven litigation-area sites. In FY97, the installation completed corrective actions for 3 of the 24 SWMUs and completed an RFA confirmation study (RFACS) for the 24 SWMUs, recommending 20 for no further action (NFA).

The installation completed its community relations plan (CRP) in FY89 and issued an updated CRP in FY96. An information repository and an administrative record were established in FY89. The installation formed a technical review committee in FY90 and converted it to a Restoration Advisory Board (RAB) in FY95.

FY98 Restoration Progress

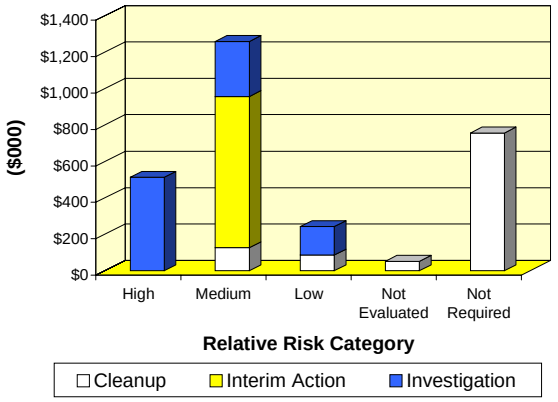
The installation completed RIs for five inland area sites and a Phase II RI for one of these sites. The Phase II RI demonstrated that NFA was required and therefore, a no-action Proposed Plan and ROD (PP/ROD) was initiated instead of the planned FS. An FS for the tidal area landfill site was completed and a PP/ROD was initiated for the site. The installation initiated a no-action PP/ROD for four inland area sites, an Engineering Evaluation and Cost Analysis (EE/CA) for one tidal area site, and an SI for four SWMUs and one inland site (Site 29). A risk-based corrective Removal Action was completed for one inland area site. The installation continued LTM for the litigation area sites.

The RIs for four tidal area sites and the EE/CA and Action Memorandum (AM) and Removal Action for 1 tidal area site were delayed because regulatory agencies required an ecological assessment. The data must be analyzed and the RI report finalized before an FS can begin, the EE/CA and AM can be completed, and the Removal Action design can begin. The draft PP/ROD for four inland sites was submitted for regulatory agency review in August, and a fifth inland site was removed from the Installation Restoration Program.

Plan of Action

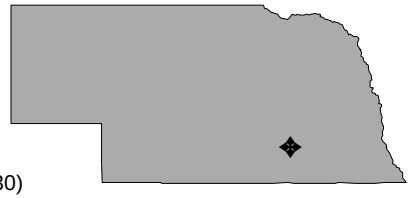
- Complete RIs for four tidal area sites and initiate FS for three tidal area sites in FY99
- Complete EE/CA and AM for one tidal area site removal and begin EE/CA and AM for another part of same site in FY99
- Initiate Removal Action design for one tidal area site and LTM for seven litigation area sites in FY99
- Initiate EE/CA and AM for one litigation-area site and accomplish Preliminary Assessment for one area of concern (AOC) in FY99
- Initiate SI for an AOC in FY99

FY99 Funding by Phase and Relative Risk



Cornhusker Army Ammunition Plant — NPL

Size: 11,936 acres
Mission: Manufactured ammunition
HRS Score: 51.13; placed on NPL in July 1987
IAG Status: IAG signed in 1990
Contaminants: Explosives and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $44.4 million
Estimated Cost to Completion (Completion Year): $37.0 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Hall County, Nebraska

Restoration Background

Cornhusker Army Ammunition Plant is a former ammunition manufacturing facility, which used numerous sumps, cesspools, and leaching pits in the manufacturing process. Those areas, as well as disposal pits, old landfills, and open burning areas, contributed to the environmental problems at the installation, resulting in its listing on the National Priorities List (NPL).

An Initial Assessment Study completed in FY80 identified 65 sites at the plant. In FY83, the Army identified an explosives-contaminated groundwater plume that had migrated off site. Unlined leaching pits, cesspools, and sumps were the primary sources of contamination. The off-site contamination affected more than 250 private residences in Hall County and nearby Grand Island. In FY86, the Army removed and incinerated about 40,000 tons of contaminated soil from cesspools and leaching pits, eliminating almost 95 percent of the sources of contamination at the installation. In FY86 and FY95, the Army provided funds to extend the Hall County municipal water distribution system to affected Grand Island residences. In FY89, the community formed a Local Redevelopment Authority (LRA). In FY94, the Army conducted Interim Remedial Actions to remove 5,000 tons of contaminated soil and completed an interim Record of Decision (ROD) for cleanup of groundwater contamination (Operable Unit [OU] 1).

To reduce restoration costs, the Army used temporary well points instead of full-scale cased wells and used innovative chemical screening techniques to identify explosive materials in groundwater. In FY95, the Army conducted a pilot-scale study of an innovative treatment technology that uses a peroxone system to break down explosive compounds. The study was successful enough to warrant a field-scale study.

In FY96, the Army submitted the final Remedial Investigation (RI) report and designated six sites (OU2) as requiring no further action. A Site Inspection was submitted for contamination at former locations of underground storage tanks. The Army submitted the 90 percent design for the groundwater treatment facility at OU1. It also issued the explanation of significant differences for the OU1 ROD and held public comment periods to explain a change in the location of the discharge point. In FY96 and FY97, the Army solicited comments from members of the community to determine the level of interest in forming a Restoration Advisory Board (RAB). Because of a lack of public interest, the RAB was not established.

In FY97, a change to the OU1 ROD initiated phased treatment. This change, with community consent, allows accelerated hot-spot removals and moved the discharge location on site. The U.S. Army Corps of Engineers completed changes in the design of the OU1 treatment system after discussions with the public and regulatory agencies. A public meeting was held to discuss the Proposed Plan for OU2; no comments were received. A draft final ROD for sites at OU2 was submitted for signature. The OU2 ROD requires no action to be protective of human health and the environment under future land use requirements.

FY98 Restoration Progress

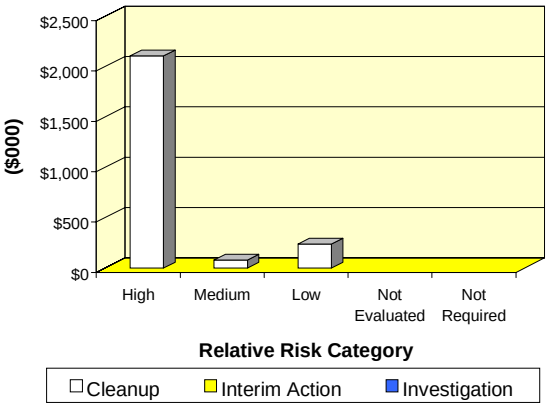
The installation submitted the final Feasibility Study and drafted the Proposed Plan for OU3 and OU4. The installation also received approval for the final Proposed Plan and ROD for OU2. EPA signed the OU2 No Response Action/No Further Action ROD in September 1998. Construction of the OU1 groundwater treatment facility is 90 percent complete. The Army continued semiannual off-post monitoring. These data will provide more information on the natural groundwater processes off-post to assist the Army and the regulatory agencies in selecting the most effective remedy.

The installation planned to petition for partial NPL deletion in FY98. Due to extended negotiation and a late FY98 signature on the OU2 ROD, the partial deletion procedures for this property were delayed.

Plan of Action

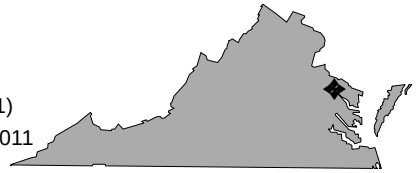
- Complete OU3 and OU4 Proposed Plans and RODs in FY99
- In FY99, begin a final Removal Action for contaminated soil
- Begin pump-and-treat operations at the water treatment plant in FY99
- Designate a new OU to remediate the open burning/open detonation area in FY99
- In 1999, begin partial NPL deletion procedures so that OU2 and other property identified for transfer can be designated as excess property

FY99 Funding by Phase and Relative Risk



Dahlgren Naval Surface Warfare Center NPL

Size: 2,677 acres main site; 1,614 acres experimental explosive area
Mission: Proof and test ordnance
HRS Score: 50.26; placed on NPL in October 1992
IAG Status: Federal Facility Agreement Signed in September 1994
Contaminants: Cleaning solvents, explosives residues, heavy metals, low-level radioactive materials, mercury, PCBs, and pesticides
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $20.9 million
Estimated Cost to Completion (Completion Year): $22.3 million (FY2011)
Final Remedy in Place or Response Complete Date for All Sites: FY2011



Dahlgren, Virginia

Restoration Background

Dahlgren Naval Surface Warfare Center was placed on the National Priorities List (NPL) because of potential migration of releases from three contaminated sites that could affect the Potomac River, Gambo Creek, associated wetlands, and local groundwater aquifers used for drinking water. Ordnance testing operations have contributed to the contamination. Site types include former landfills, former ordnance burn and disposal areas, underground storage tanks, operating ordnance ranges, and operating ordnance research and development areas. Seventy-four sites are being addressed under CERCLA.

An Initial Assessment Study identified 36 sites in FY83. In FY86, a confirmation study identified one additional site. In FY92, the installation completed a Removal Action involving the excavation and disposal of soil and concrete. During FY93, a RCRA Facility Assessment identified more than 100 solid waste management units (SWMUs), and a visual site inspection identified 6 areas of concern (AOCs) and 31 SWMUs that required further action. During FY94, the installation completed several Interim Remedial Actions. During FY95, an Engineering Evaluation and Cost Analysis and a Treatability Study (TS) began at two sites. The installation completed Site Inspections (SIs) for 10 sites and a Removal Action for 1 site.

An information repository and an administrative record were established in FY91. A community relations plan (CRP) was completed in FY92. The installation formed a technical review committee in FY92 and converted it to a Restoration Advisory Board in FY95.

In FY96, the installation updated the CRP, completed SIs for 10 sites, initiated SIs for 6 sites, and began Remedial Investigations (RIs) for 7 sites. It also started a TS of bioremediation for soil and completed Phase I of the Ecological Risk Assessment (ERA) of Gambo Creek and Phase I of the Ecological and Human Health Risk Assessments for eight sites. Two SWMUs and two AOCs were closed out.

In FY97, the installation completed Removal Actions for seven sites and began Remedial Actions (RAs) for a landfill site and a chemical burn area. Phase II of the Gambo Creek ERA work plan was initiated, but later delayed by funding and technical considerations. Sampling for three Appendix B sites and RIs for two sites were completed. The installation completed the Feasibility Study (FS) and Remedial Design (RD) and signed two Records of Decision (RODs) for two sites. An SI was completed for six sites and recommended an RI, Removal Action, further sampling, and a no further action designation. All recommended actions have been completed except the RIs. A bench-scale TS was completed and a bioaccumulation study began. Removal Actions for two sites were delayed due to safety concerns related to ordnance.

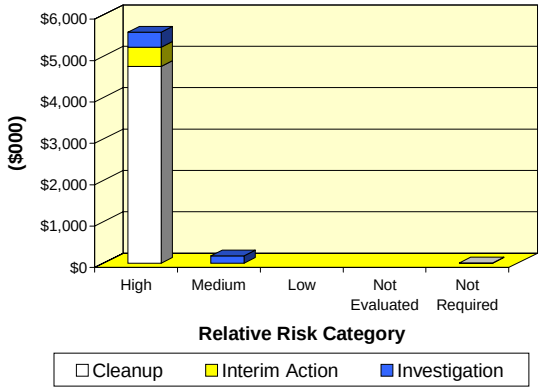
FY98 Restoration Progress

The installation completed the initial testing, and confirmed the effectiveness, of an air-sparging/soil vapor extraction (AS/SVE) system for groundwater and soil remediation. Two RIs, including Human Health and Ecological Risk Assessments, were completed for Sites 9 and 17. FSs, Proposed Plans (PPs), and RODs also were completed for these two sites. The RIs for four other sites, which were scheduled for completion in FY98, were delayed because Navy and regulatory resources focused on completing RODs for Sites 9 and 17. An RA for Site 12 (landfill cap) was nearly completed, but the size of the cap increased during field work causing minor delays. Two RDs were completed for Sites 2 and 12. The remaining five RDs, RI/FSs, and RODs for FY98 were delayed so that RODs could be finalized for two sites. SIs planned for five sites were delayed due to decreased funding. The Removal Actions for Sites 3 and 44 are under way, but were not completed due to production delays related to ordnance screening. Final signature on three Appendix B site closeout documents was delayed because of shifting priorities. The Phase II ERA was postponed, pending the outcome of RIs at two other sites. Ecological data were consolidated into a geographic information system for more efficient data management and exchange between Navy and regulators. The bioaccumulation study at Site 25 was submitted for review.

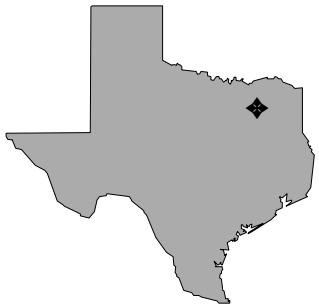
Plan of Action

- In FY99, complete RI/FSs, PPs, and RODs for two sites and install AS/SVE points to increase efficiency and decrease remediation time
- Convert administrative record to CD-ROM in FY99
- Complete RDs for two sites, Removal Action for one site, and sampling and Removal Actions for Appendix B sites in FY99
- In FY99, initiate and finalize fieldwork on the Phase II Gambo Creek ERA and initiate RA at one site and long-term monitoring (LTM) for one site
- In FY00, complete Phase II Gambo Creek ERA, RA for one site, and SIs for three sites; complete RIs and initiate FSs for five sites; and initiate LTM for two sites and RAs for two sites

FY99 Funding by Phase and Relative Risk



Size: 842 acres
Mission: Served as a pilot training center
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, solvents, heavy metals, and asbestos
Media Affected: Groundwater and soil
Funding to Date: $12.7 million
Estimated Cost to Completion (Completion Year): $43.7 million (FY2003)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Dallas, Texas

Restoration Background

In July 1993, the BRAC Commission recommended closure of the Dallas Naval Air Station (NAS). Operations will be transferred to the Fort Worth Naval Air Station. The installation closed September 30, 1998.

A number of the industrial operations that supported the installation's military mission contributed to contamination at the installation. For investigation of environmental conditions, the installation was divided into six areas. Thirteen sites were identified. The installation completed a confirmation study for six of these sites. Later, it completed a RCRA Facility Assessment, which identified 135 solid waste management units (SWMUs) and 44 areas of concern (AOCs).

During FY94, an Environmental Baseline Survey (EBS) identified 118 additional AOCs. The installation formed a 14-member Restoration Advisory Board (RAB), and established an information repository. In addition, a BRAC cleanup team (BCT) was formed, and a BRAC Cleanup Plan (BCP) was completed.

During FY95, the installation initiated fieldwork for Categories B and C, initiated the design for removal of underground storage tanks (USTs), and completed surveys of asbestos and polychlorinated biphenyls (PCBs). A Local Redevelopment Authority (LRA) was established. The LRA has adopted a land reuse plan that presents industrial aviation as the primary reuse for the installation.

During FY96, the installation completed a community relations plan, and finished a draft interim RCRA Facility Investigation (RFI) report for the Category B area. It also finished an interim RFI report for the Category C area, remediated asbestos in all buildings, and completed a background study of soil and a model finding of suitability to lease. Ten SWMUs in Category C were determined to require additional sampling.

In FY97, the installation returned 106 acres to the City of Dallas by modifying the lease. Environmental investigations will continue on this property. The EBS for Transfer and the finding of suitability to transfer (FOST) for Duncanville housing were approved by EPA, the Texas Natural Resource Conservation Commission, and the BCT. The installation also began to delineate a contaminant plume. The BCP was updated.

FY98 Restoration Progress

NAS Dallas was operationally closed and transferred to NAVFAC. A caretaker site office was established and manned, but not all tenants have left the station. The transfer of approximately 40 acres to the Army was initiated. The lease was modified to allow an 8-acre parcel to be returned to the City of Dallas. Duncanville Housing was transferred to the Department of the Interior.

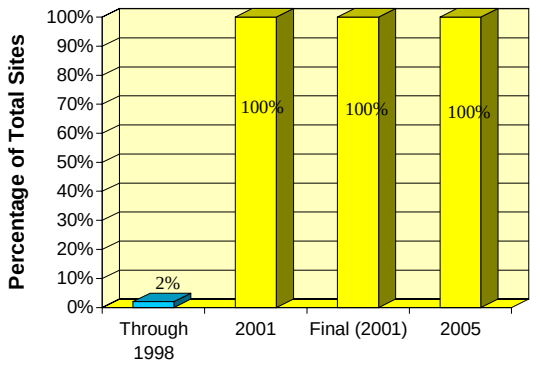
Fifteen USTs and one oil-water separator were removed. Draft interim RFI reports were completed for Categories A, D, E, and F. The draft final RFI report for Category C was completed. Ninety-eight wells and 210 soil borings were installed across the base. Interim Remedial Action (IRA) work plans were developed and finalized for two SWMUs (the Northern Fuel Farm Area and the PCB Spill Area). Interim source containment measures were implemented at the PCB Spill Area (SWMU 85). The installation employed amino acid field kits to test for specific compounds in the field during corrective actions.

The RAB met quarterly and received briefings on the status of investigations and cleanup, the technical assistance for public participation program, base reuse and closure, and remediation technology. The BCT reviewed reports, identified data gaps, and directed additional sampling needs. Tier I and Tier II partnering teams were initiated, including the Navy, the state, and EPA.

Plan of Action

- Prepare corrective action plan for Duncanville Housing in FY99
- Complete draft final RFI and final reports for Categories A, B, D, E, and F in FY99
- Remove all USTs and obtain closure in FY99
- Implement IRAs at 14 sites in FY99
- Review site data to determine other candidate sites for IRAs in FY99
- Complete Baseline Risk Assessments (BRAs) and corrective measures studies (CMSs) for three SWMU groups in FY99
- Complete Corrective Measures Design and begin corrective measures implementation for three SWMU groups in FY00
- Complete BRAs and CMSs for remaining SWMUs in FY00
- Initiate corrective actions for Duncanville Housing in FY00

Sites Achieving RIP or RC Per Fiscal Year



Davisville Naval Construction Battalion Center — NPL/BRAC 1991

Size: 1,284 acres
Mission: Provided mobilization support to Naval Construction Forces
HRS Score: 34.52; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in March 1992
Contaminants: Heavy metals, PCBs, pesticides, petroleum hydrocarbons, petroleum/oil/lubricants, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $43.2 million
Estimated Cost to Completion (Completion Year): $10.5 million (FY2017)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Davisville, Rhode Island

Restoration Background

In July 1991, the BRAC Commission recommended closure of this installation. Construction battalion training and mobilization activities were transferred to Naval Construction Battalion Center, Gulfport, Mississippi, and to Naval Construction Battalion Center, Port Hueneme, California. The installation was closed in April 1994.

Studies conducted since FY84 have identified 25 sites, including landfills, solvent storage and disposal areas, transformer storage areas, spill areas, underground storage tanks (USTs), and fire training areas. Contaminants include solvents, polychlorinated biphenyls (PCBs), petroleum/oil/lubricants, and pesticides.

In FY91, the installation completed Interim Remedial Actions (IRAs) for two PCB spill sites. In FY92 it completed a Phase I Remedial Investigation and Feasibility Study (RI/FS) for 10 sites, and in FY93 it completed an IRA and an RI/FS and signed a Record of Decision (ROD) for two sites. Restoration continued in FY94, with a site inspection, a Phase II RI/FS, a Remedial Design, and an Ecological Risk Assessment.

Fifty-six USTs were removed from seven sites, and an initial site characterization was completed. A land reuse plan was completed in FY94, and the installation leased 70 acres to the Rhode Island Port Authority and transferred 374 acres to the Army. In FY95, the installation completed a corrective action plan for 7 UST sites, removed 27 USTs, signed a no further action (NFA) ROD at two sites, and initiated one Removal Action and completed another. Twenty-four buildings and 100 acres were leased. The installation also completed five UST corrective actions and closed out one site. The installation updated risk assessments and prepared Proposed Remedial Action Plans (PRAPs) for a number of sites.

During FY97, cleanup of two sites was completed. To accelerate restoration, the Navy performed Environmental Baseline Survey (EBS) Phase II corrective actions and had regulatory agencies approve the results with minimum investigation. The installation accelerated fieldwork by using immunoassay field testing for confirmatory samples during excavation of soil contaminated with PCBs or total petroleum hydrocarbons (TPHs). A finding of suitability to transfer (FOST) was issued for a public benefit conveyance (PBC) of 1.35 acres.

The installation's technical review committee, formed in FY88, was converted to a Restoration Advisory Board (RAB) in FY94. The installation established an administrative record and an information repository in FY89. In FY94, a BRAC cleanup team (BCT) was formed. The BRAC Cleanup Plan was completed in FY95. In FY96 and FY97, the BCT prepared BRAC Business Plans and the installation updated its community relations plan. In FY97, the BCT decided to abandon groundwater operable units in favor of whole-site RODs to expedite property transfer.

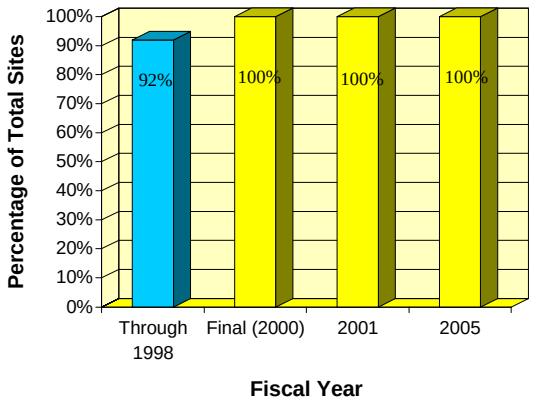
FY98 Restoration Progress

The risk assessment was completed for Sites 6, 11, and 13. NFA RODs were signed for five sites and an NFA decision document was issued for one site. The installation initiated a Remedial Action (RA) at Allen Harbor Landfill that included dredging the harbor entrance channel within the cleanup process. The installation also completed corrective actions, receiving regulator approval on 90 previously identified EBS review items. The fieldwork for five new review items was identified and completed. Long-term monitoring (LTM) was completed at three remaining former UST areas. The removal of PCB and TPH contamination is ongoing. FOSTs were issued for a PBC of 96 acres and the sale of 126 acres. The installation negotiated Federal Facility Agreement schedule modifications for Sites 3 and 7. The RAB met six times during FY98, and the BCT met frequently. Several site tours, sponsored by an EPA technical assistance grant, were conducted for public groups.

Plan of Action

- Complete RA at Allen Harbor Landfill, including harbor entrance channel dredging, in FY99
- Complete seven remaining EBS review items in FY99
- Issue FOSTs for negotiated sale of two parcels (70 and 250 acres) and PBC for one parcel (189 acres) in FY99
- Complete RI/FS, issue PRAP and ROD, and begin long-term operations for Site 7 in FY99 and for Site 3 in FY00
- Begin LTM of Allen Harbor Landfill in FY00
- Issue FOSTs for PBC of two parcels (263 and 15 acres) in FY00

Sites Achieving RIP or RC Per Fiscal Year



Defense Distribution Depot San Joaquin, Sharpe Facility

Formerly Sharpe Army Depot **NPL**

Size: 724 acres
Mission: Receive, store, and distribute supplies, materials, and equipment
HRS Score: 42.24; placed on NPL in July 1987
IAG Status: IAG signed in March 1989
Contaminants: VOCs, heavy metals, petroleum/oil/lubricants, and pesticides
Media Affected: Groundwater and soil
Funding to Date: $44.6 million
Estimated Cost to Completion (Completion Year): $33.8 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2000

Lathrop, California

Restoration Background

This facility began operation in 1941 as a supply and maintenance center. Activities conducted at the installation include overhauls, repairs, painting, paint stripping, metal finishing, and degreasing of aircraft and heavy equipment. Investigation and assessment identified 150 sites, consisting of 8 groundwater plumes and 142 contaminated or potentially contaminated soil or building sites.

A Remedial Investigation and Feasibility Study (RI/FS) for groundwater was completed in FY91, and a Record of Decision (ROD) was signed in FY93. Per ROD requirements, the two interim groundwater extraction and air-stripping systems were upgraded to further treat and control the migration of trichloroethene (TCE) plumes. A third groundwater extraction and treatment system using air stripping and carbon adsorption went into operation in June 1995 to capture the depot's central area plume. The system includes 46 extraction wells and 3 treatment plants, with a treatment capacity of more than 1,300 gallons per day.

Between FY85 and FY95, 67 underground storage tanks (USTs) and sumps underwent removal and corrective actions and 57 sites were closed. Approximately 10,000 cubic yards of contaminated soil was removed and disposed of during this period.

A Removal Action for pesticide-contaminated soil at the former pesticide mixing area was accomplished in 1995-1996. Approximately 500 cubic yards of pesticide-contaminated soil was removed.

An installation wide RI/FS and a risk assessment were completed in FY95, and the Proposed Plan was prepared and provided to the public for comment. The final ROD for Operable Unit (OU) 2, the sitewide remedy, was signed in February 1996.

During FY97, the installation completed a Removal Action for lead- and chromium-contaminated soil at Sharpe's former industrial waste treatment plant pond and submitted the final closure report. Long-term monitoring and operations and maintenance at the sitewide groundwater treatment systems continued. In addition, the design of the lead/chromium Soil Removal Action stipulated in the OU2 ROD was completed. Four USTs were removed and two were closed. Two other sites required further action. A study was initiated to determine the best in situ technologies for remediating UST sites where soil contamination had migrated beneath a building or other structure. The installation completed design of the in situ vapor extraction remedy for the TCE-contaminated soil.

The installation continued its efforts to raise interest within the surrounding community through a technical review committee. It also distributed fact sheets describing remediation efforts.

FY98 Restoration Progress

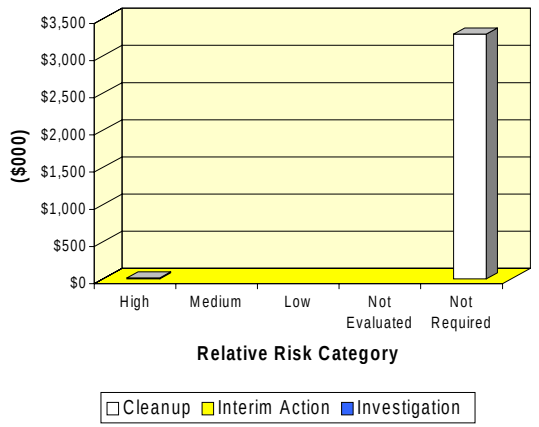
The pilot in situ bioventing project was completed at UST Site 17. Enhanced bioventing or other technologies may be necessary for achievement of cleanup levels at this site. This study, along with natural attenuation analysis, will be used to determine what cleanup levels must be achieved at the remaining 12 former UST sites. Removal of lead- and chromium- contaminated soil was completed at Sites S-3 and S-26. Further analysis of Sites S-30, S-36, and S-33/29 showed that Remedial Action (RA) per the ROD criteria is not required.

Installation of in situ soil vapor extraction (SVE) systems was completed, and the systems began operation at TCE/VOC (volatile organic compound) sites P-1A, P-1B, P-1C, P-1E and P-6A. Eleven TCE/VOC sites will not require RA per ROD criteria. Setup of the Sharpe 3-D groundwater model began. Information on new field boundary conditions was gathered to ensure that the scenarios modeled were true to field conditions. A dense non aqueous-phase liquid (DNAPL) study was completed at Site P-6A. The DNAPL pools were not located, and an additional groundwater extraction well is recommended.

Plan of Action

- Complete in situ vapor extraction remediation of TCE/VOC sites in FY99–FY00
- Complete the OU2 metals sites RA report in FY99
- Complete the OU2 No Further Action and institutional control sites RA Report in FY99
- Add an additional groundwater extraction well at Site P-6A per recommendation of DNAPLs study in FY99
- Complete setup of groundwater model in FY99
- Run different groundwater modeling scenarios leading to an Environmental Restoration Water Management Report (Plan) in FY99
- Continue to operate, maintain, and monitor the groundwater extraction and treatment system in FY99
- Complete OU2 TCE/VOC SVE sites RA report in FY00
- Complete OU1 interim groundwater RA report in FY00
- Complete installation wide preliminary closeout report by December 2000
- Complete five-year review in FY03

FY99 Funding by Phase and Relative Risk



Defense Distribution Depot San Joaquin, Tracy Facility — NPL

Size: 908 acres
Mission: Store and distribute medical, textile, food, electronic, industrial, construction, chemical, and other supplies and equipment
HRS Score: 37.16; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in 1991
Contaminants: Chlorinated solvents, heavy metals, pesticides, petroleum/oil/lubricants, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $68.0 million
Estimated Cost to Completion (Completion Year): $28.0 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2001

Tracy, California

Restoration Background

Beginning in FY80, environmental studies identified 32 sites at this installation, including burn and disposal pits, hazardous waste storage sites, and other areas of contamination. Newly discovered sites and underground storage tanks (USTs) brought the total site count to 65. Contamination has been identified in on-site soil and in on-site and off-site groundwater.

In FY86, a Remedial Investigation and Feasibility Study (RI/FS) was initiated to address the groundwater and soil contamination. The groundwater investigation was placed on a faster track because of the potential threat to area drinking water.

Between FY88 and FY91, 32 USTs were removed, along with 1,060 cubic yards of contaminated soil. In FY92, bottled drinking water was supplied to two nearby farm residences where wells were threatened by the groundwater plume. The depot also installed a pump-and-treat system consisting of an air stripping plant with carbon absorption, five extraction wells, and three injection wells.

A Record of Decision (ROD) for the remedy of groundwater contamination was signed in early FY93 and modified in FY95 to allow natural attenuation of a portion of the contaminant plume outside the installation.

In FY95, a pilot low-flow groundwater-monitoring project was completed. An environmental geographic information system (GIS) was established, which facilitates RI/FS and Remedial Design and Remedial Action (RD/RA) work. The installation removed more than 1,000 cubic yards of contaminated soil at the child-care facility. The installation-wide risk assessment was completed, and the Proposed Plan was prepared and provided to the public for comment.

In FY96, an Engineering Evaluation and Cost Analysis and an Action Memorandum for removal of pesticide-contaminated soil from the former industrial pond and pipeline sites were completed and concurred in by the regulatory agencies. Design work for this Removal Action and installation of extraction wells and infiltration galleries for the Operable Unit (OU) 1 groundwater-air stripping pump-and-treat system were initiated.

In FY97, the industrial pond soil Removal Action design was completed and the implementation contract awarded. Work began on the pesticide-contaminated soil Removal Action. The final sitewide RI/FS was completed. The installation also prepared the Proposed Plan for sitewide remedies, and the draft sitewide OU2 ROD was prepared and submitted. The contract for constructing the OU1 pump-and-treat system was awarded. Also, contaminated-soil Removal Actions were performed at five former UST sites, and approximately 376 cubic yards of contaminated soil was removed. As of FY97, 16 sites had been closed, and 15 required RAor further characterization to achieve closure.

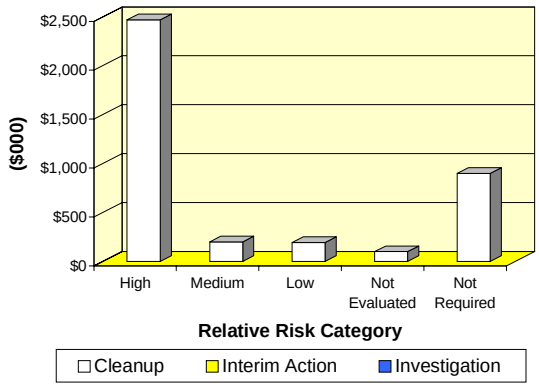
FY98 Restoration Progress

The sitewide comprehensive ROD was signed, the industrial pond soil Removal Action was completed, the RD for the remaining sites was prepared, and the contract for cleanup of the remaining sites was awarded. Construction of the new OU1 air stripper, extraction wells, and installation galleries continued. The full-scale low-flow groundwater-monitoring system was installed and turned on.

Plan of Action

- Install wet season controls on stormwater pond in FY99
- Complete installation and start-up of OU1 groundwater treatment system, Air-stripping Plant Number 2, and associated extraction and disposal systems in FY99
- Per OU2 ROD, design and install OU2 soil vapor extraction systems at four trichloroethene and tetrachloroethene sites in FY99 and FY00
- Per OU2 ROD, perform OU2 ROD soil Removal Actions at five sites in FY99 and FY00
- Implement institutional controls at several sites per OU2 ROD in FY99 and FY00
- Install bioventing system at one former UST site to test the feasibility of using this technology at Tracy Facility in FY99
- Continue groundwater treatment and monitoring program in FY99

FY99 Funding by Phase and Relative Risk



Size: 642 acres
Mission: Store and distribute clothing, food, medical supplies, electronic equipment, petroleum products, and industrial chemicals
HRS Score: 58.06; placed on NPL in October 1992
IAG Status: Federal Facility Agreement signed in March 1995
Contaminants: Pentachlorophenol, PCBs, chlorinated solvents, petroleum/oil/lubricants, pesticides, heavy metals, and chemical warfare agents (suspected)
Media Affected: Groundwater and soil
Funding to Date: $28.3 million
Estimated Cost to Completion (Completion Year): $3.7 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2004

Memphis, Tennessee

Restoration Background

In September 1995, the BRAC Commission recommended closure of Defense Distribution Depot Memphis. Environmental studies beginning in FY81 identified 75 CERCLA sites at the installation. The BRAC announcement necessitated evaluation of new sites before transfer, bringing the site total to over 120. Remedial Investigation and Feasibility Study (RI/FS) activities were accomplished for 40 sites in FY90. Between FY86 and FY89, underground storage tanks (USTs) were removed from the installation. Upon NPL listing in 1992, all CERCLA and remaining UST sites were divided into four Operable Units (OUs). In FY95, the installation completed the RI/FS work plans for all four OUs.

In FY85, an Interim Remedial Action (IRA) was completed to remove a pentachlorophenol (PCP) wood preservative treatment vat, a UST used for PCP storage, and contaminated soil in the area of the site. In FY91, the depot initiated an IRA to address groundwater contamination at Dunn Field. From FY93 to FY95, all but two of the remaining USTs were removed or closed in place.

Starting in FY94, community relations activities included development of a community relations plan, establishment of a Restoration Advisory Board (RAB), and distribution of a quarterly cleanup program newsletter.

In FY94, groundwater monitoring was performed to characterize contamination at the installation. On the basis of the results, a draft Proposed Plan was developed for the Dunn Field IRA. In FY95, the Interim Record of Decision (ROD) for groundwater contamination at Dunn Field was completed. In FY96, the installation completed fieldwork and document reviews for the Environmental Baseline Survey (EBS).

Closure of the installation occurred in September 1997. Initial RI/FS fieldwork was completed in FY97 and monitoring wells were installed at Dunn Field. The EBS, version 1of the BRAC Cleanup Plan, and the local reuse authority's redevelopment plan were also completed.

FY98 Restoration Progress

Fieldwork in support of an Engineering Evaluation/Cost Analysis (EE/CA) for the removal of suspected chemical warfare material sites at Dunn Field was accomplished.

Removal Actions were taken in three areas of the main installation. Dieldrin-contaminated soil was removed from housing, which has a planned reuse as homeless housing (Site 73). PCB-contaminated soil was removed from around the cafeteria (Site 48), which has a planned reuse as a culinary school. The two remaining USTs were removed from Site 57 in July.

The groundwater IRA was installed and began operation in October. This system, which was designed to prevent off-site migration and achieve some product recovery, is working successfully. Through a negotiated agreement, the city of Memphis sewer system is treating the effluent water.

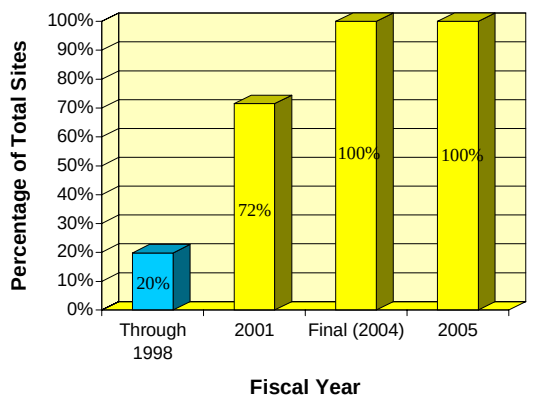
The RI/FS contracts for both the main installation and Dunn Field were awarded. These include additional sampling to fill main installation data gas, full sampling at Dunn Field, risk assessments and RI/FS reports, the Proposed Plan, public meetings, and the final ROD on both the main installation and Dunn Field.

The preliminary risk evaluation (PRE) (an EPA Region 4 document) using the main installation RI data was finalized. It recommends up to 16 sites for no further action (NFA). A Parcel 3-specific risk assessment was developed to support early reuse of the golf course/recreation areas through lease or transfer.

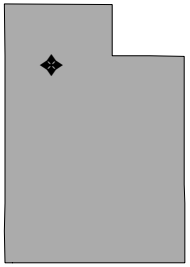
Plan of Action

- Finalize EE/CA and remove the chemical warfare material at Dunn Field in FY99 and FY00
- Perform early removals at two areas of the main installation (the paint shops [Sites 29 and 31] and the Defense Reutilization and Marketing Office yard [Site 38]) in FY99
- Perform erosion control/revegetation project at Site 64, former Bauxite piles, in FY99
- Prepare a no further action document for the sites recommended for NFA in the PRE, and for other sites recommended for NFA (SWMUs addressed in RCRA Facility Assessment) in FY99
- Finish the risk assessment and RI/FS for the main installation in FY99
- Prepare RODs and develop Remedial Designs (RDs) in FY00; Remedial Action (RA) will follow in FY00 and FY01
- Perform fieldwork for Dunn Field RI/FS in FY99
- Prepare ROD for Dunn Field sites and start RDs in FY00; begin RAs in FY01
- Evaluate use of bioremediation technique for Dieldrin-contaminated soil on golf course in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 1,129 acres
Mission: Store and distribute DoD commodities, including electronic equipment and textiles; package petroleum and industrial and commercial chemicals
HRS Score: 45.10; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in November 1989
Contaminants: Solvents, paint and paint residues, petroleum/oil/lubricants, insecticides, chemical warfare agents, methyl bromide, metal-plating wastes and sludge, PCB-contaminated transformer oils, degreasers, acids and bases, and sand-blast residues
Media Affected: Groundwater and soil
Funding to Date: $47.5 million
Estimated Cost to Completion (Completion Year): $22.1 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Ogden, Utah

Restoration Background

In September 1995, the BRAC Commission recommended closure of Defense Distribution Depot Ogden (DDOU) except for minimal essential land and facilities for a Reserve Component area. The depot closed in September 1997.

A Preliminary Assessment in FY80 identified 44 potentially contaminated sites at the installation. Twenty-two of the sites required further action. Prominent site types include oil-burning pits, disposal pits, a french drain system, and burial sites, which have contaminated groundwater and soil.

In FY90, a Federal Facility Agreement divided the sites into four operable units (OUs) to address groundwater and soil contamination. From FY92 through FY95, the installation conducted Remedial Actions (RAs) at all OUs, including excavation and disposal of contaminated soil and debris, and installation of wells and piping for groundwater extraction and treatment systems. More than 130 groundwater monitoring wells and more than 100 extraction or injection wells have been installed. The use of advanced technology helped the installation identify the contents of glass bottles excavated at OU3 and complete the removal of white phosphorus from the soil at OU4.

In FY95, groundwater treatment facilities began operation at OUs 1, 2, and 4; a RCRA Facility Investigation (RFI) was initiated; and low-level contamination screening sites and leaking aboveground storage tanks (ASTs) were investigated. The installation established a BRAC cleanup team (BCT), and the technical review committee was converted to a Restoration Advisory Board (RAB). During FY96, a Local Redevelopment Authority (LRA) was established, and an installation-wide Environmental Baseline Survey and a BRAC Cleanup Plan (BCP) were completed.

In FY97, the installation implemented corrective measures for ASTs and received agreement from regulatory agencies concerning the designation of 779 acres as CERFA-uncontaminated. The BCP and land reuse plan was updated, and Phases I and II of the RFI were completed. Six sites were approved for no further action, leaving six sites for evaluation and cleanup.

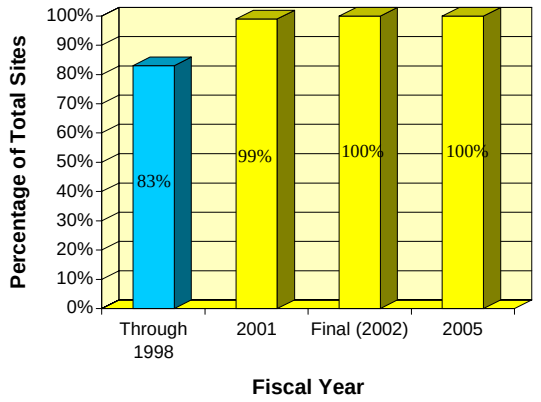
FY98 Restoration Progress

DDOU completed investigation and cleanup of PCB contamination at 135 transformer sites. Phase II of the AST/underground storage tank (UST) investigation, Phase II of the RFI, and investigation of the gasoline release at Building 21 also were completed. The installation prepared a corrective action plan for Building 21. In addition, the Cooperative Agreement with Ogden LRA for depot management was extended to September 1999, and the DDOU RAB received Technical Assistance for Public Participation training. The installation finished an Environmental Assessment for disposal of excess property and completed investigation of identified BRAC sites. Leases were approved for 16 tenants leasing 1.6 million square feet of building space and creating 663 new jobs. The BCT provided comments on DDOU's findings of suitability to transfer (FOSTs).

Plan of Action

- Complete two FOST's accounting for 60 percent of the installation's excess property during FY99
- Complete the lease in furtherance of conveyance of two parcels of excess property in FY99
- Complete the Memorandum of Agreement for mitigation of DDOU Historic District with Utah State Historical Preservation Office and the Advisory Council on Historic Preservation in FY99
- Complete the study on use of natural attenuation at OU2 in FY99
- Complete the corrective action plan for ASTs and USTs and achieve remedy in place (RIP) at these sites in FY99
- Complete the corrective measures study for the remaining solid waste management units under the RFI in FY99
- Complete installation of the groundwater treatment facility enhancement at OU4 in FY99
- Remove the OU4 hot spot source area in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 342 acres
Mission: Develop, field, and sustain combat and tactical vehicles
HRS Score: NA
IAG Status: None
Contaminants: Heavy metals, VOCs, SVOCs, and PCBs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $9.4 million
Estimated Cost to Completion (Completion Year): $0 (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1997

Detroit, Michigan

Restoration Background

In July 1995, the BRAC Commission recommended realignment of Detroit Arsenal and the closing and disposing of the Detroit Arsenal Tank Plant. The installation closed in December 1997. Cleanup requirements for disposal will continue through April 1999.

Environmental studies conducted at the installation identified the following site types: underground storage tanks (USTs), landfills, metal plating and surface treatment areas, and petroleum release areas. Studies have determined that groundwater and soil are contaminated with volatile organic compounds (VOCs) and heavy metals.

Completed Interim Actions include removal of USTs, excavation of contaminated soil, and in situ treatment and removal of petroleum-contaminated soil. Cleanup activities were completed at a fuel farm site and a metal plating area.

In FY95, the installation formed a BRAC cleanup team, and the Local Redevelopment Authority (LRA) began work on the land reuse plan. In FY96, the commander established a Restoration Advisory Board (RAB). The installation completed an Environmental Baseline Survey (EBS) and a CERFA report. Based on the results of the EBS, the installation initiated a contract for a Remedial Investigation and Feasibility Study (RI/FS) and held a kickoff meeting for evaluating radiological hazards.

In FY97, the regulatory agencies approved RI work plans. The installation subsequently completed the RI Phase I fieldwork and presented the results in the RI Phase I report. The LRA completed the land reuse plan, which specifies a mixture of commercial and industrial reuse. A finding of suitability to transfer was initiated to transfer CERFA-clean acreage for immediate reuse. The installation completed the Version I BRAC Cleanup Plan. Subject matter experts addressed RAB meetings to educate members on the RI and cleanup process.

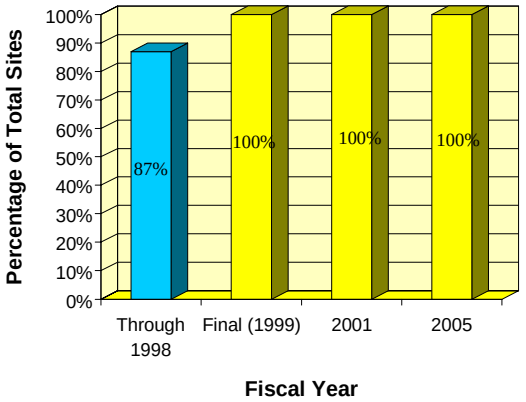
FY98 Restoration Progress

The regulatory agencies approved the RI Phase II work plans, and the installation completed the RI Phase II in September. The Army performed a risk assessment on all RI Phase I and II data. The RI report was not completed in FY98, as originally planned, because of delays in receiving EPA concurrence on RI work plans and the need for additional sampling rounds to support risk assessments and Removal Actions. The installation completed a Removal Action at the T-12 site and initiated Removal Actions at four additional sites. The installation also closed seven groundwater monitoring wells and transferred CERFA-clean acreage as planned.

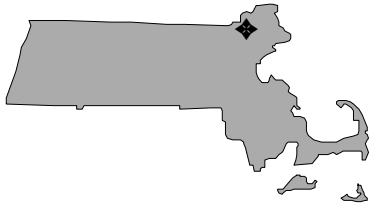
Plan of Action

- Complete the RI/FS in FY99
- Complete all Removal Actions in FY99
- Complete all BRAC activities in FY99
- Transfer all BRAC property in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 9,283 acres
Mission: Support Reserve Component training
HRS Score: 42.24; placed on NPL in November 1989
IAG Status: IAG signed in November 1991
Contaminants: VOCs, heavy metals, petroleum products, PCBs, pesticides, herbicides, and explosive compounds
Media Affected: Groundwater and soil
Funding to Date: $77.5 million
Estimated Cost to Completion (Completion Year): $21.9 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Fort Devens, Massachusetts

Restoration Background

In July 1991, the BRAC Commission recommended that Fort Devens close and establish a reserve enclave. In FY96, the Army closed Fort Devens, replacing it with the Devens Reserve Forces Training Area (RFTA), which assumed the remaining Army mission.

Environmental investigations conducted at this installation since FY89 have identified 84 sites with 324 BRAC areas of concern (AOCs), including landfills, vehicle and equipment maintenance and storage yards, the Defense Reutilization and Marketing Office (DRMO) scrap yard, motor pools, and underground storage tanks (UST). Investigations revealed soil contaminated with heavy metals, petroleum products, and polychlorinated biphenyls (PCBs) and groundwater contaminated with heavy metals and solvents.

In FY94, the commander formed a Restoration Advisory Board (RAB). The technical review committee, now a subcommittee of the RAB, and a BRAC cleanup team also assist in reviewing issues and documents.

In FY95, the installation began several Interim Actions, including removal of USTs and installation of a soil vapor extraction system. The installation also completed two Records of Decision (RODs) for the Shepley's Hill Landfill Operable Unit (OU) and the Barnum Road Maintenance Yards OU. In addition, an Environmental Impact Study was completed, and an enhanced Preliminary Assessment identified 10 areas requiring evaluation.

In FY96, the Army transferred 2,913 acres and leased 669 acres to the Massachusetts Development and Finance Agency. The Army and regulators signed a ROD for the South Post Impact Area to monitor the level of explosives and solvents in the groundwater. The installation completed radiological surveys for 98 percent of affected buildings on the property and completed fieldwork for the explosive ordnance survey. A Feasibility Study (FS) for landfill consolidation is under way.

In FY97, the Army transferred an additional 21 acres of previously leased land to the Massachusetts Development and Finance Agency. Approximately 222 acres was also transferred to the Federal Bureau of Prisons. The installation completed the Environmental Condition of Property (ECP) assessment for a 22-acre parcel that will eventually be transferred to the U.S. Department of Labor.

The Army and EPA approved a no-further-action ROD for AOC 63AX. The installation completed the Remedial Investigation (RI) and FS and the Proposed Plan for AOCs 32 and 43A. The installation also completed the explosive ordnance survey.

FY98 Restoration Progress

In December 1997, the installation issued a Proposed Plan addressing remediation at AOCs 9, 11, 40, and 41 and Study Areas (SAs) 6, 12, and 13. The Proposed Plan followed a 2-year negotiation between the Army, EPA, the state, and the Devens Commerce Center. Due to unforeseen public and political opposition to the Proposed Plan, no ROD was achieved in FY98 for the seven small landfill and debris disposal areas. In February 1998, the Army and EPA approved a ROD for AOCs 32 (DRMO scrap yard) and 43A (petroleum, oil, and lubricants [POL] bulk storage area). Supplemental RIs began at AOC 50 and AOC 57. The installation completed an Interim Removal Action at AOC 69W.

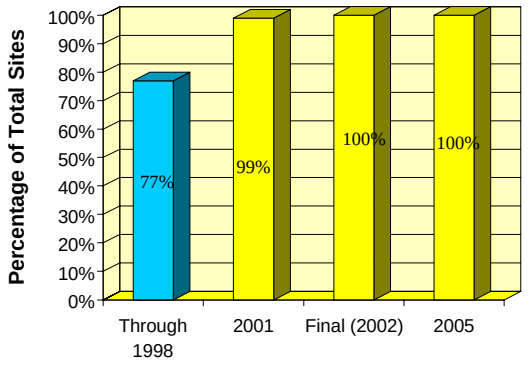
Of the 324 BRAC areas requiring environmental evaluation (AREEs) and CERCLA sites, 236 require no further action. Fifty-eight more sites are awaiting regulatory approval for no further action status.

The Army transferred 22 acres of land to the Department of Labor for construction of a Job Corps Center. Transfer of 836 acres to the Department of Interior, U.S. Fish and Wildlife Service was delayed because of issues with the ECP. Resolution of those issues is pending.

Plan of Action

- Complete supplemental RIs at AOCs 50 and 57 in FY99
- Complete FSs at two sites in FY99
- Sign two RODs for eight sites in FY99 and two RODs in FY00
- Initiate Remedial Actions at seven sites in FY99
- Transfer 836 acres to U.S. Fish and Wildlife Service in FY99
- Issue a revised Proposed Plan in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 30,997 acres
Mission: Provide training and reserve support
HRS Score: NA
IAG Status: NA
Contaminants: PCBs and Asbestos
Media Affected: Building Interior
Funding to Date: $1.1 million
Estimated Cost to Completion (Completion Year): $0 (FY2000)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Pemberton Township, New Jersey

Restoration Background

In July 1995, the BRAC Commission recommended realignment of Fort Dix and transfer of excess property. In FY95, a BRAC cleanup team (BCT) was formed.

The installation began developing a BRAC Cleanup Plan (BCP) and an Environmental Baseline Survey (EBS). It also began archive searches to investigate the possible presence of radioactive materials and unexploded ordnance (UXO) and a polychlorinated biphenyl (PCB) survey. In FY97, the BCP, the EBS, the UXO archive search, the PCB survey, and an investigation of BRAC underground storage tank (UST) sites were completed.

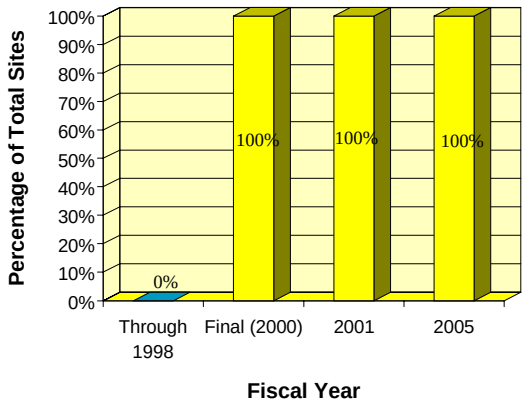
FY98 Restoration Progress

The installation began a hazardous waste Site Inspection (SI), a UXO site investigation, a PCB sampling investigation, and an asbestos sampling survey. It also completed a radiological site investigation and finished asbestos abatement for one BRAC building. An Environmental Condition of Property (ECP) document was completed for a transfer of property to the Air Force, and draft ECPs were completed for transfer of property to the Navy, the Coast Guard, and the Federal Bureau of Prisons. The installation completed the final BRAC UST report. It continues efforts to complete a BRAC limited SI for two areas of concern identified in the EBS report, a BRAC asbestos survey, and abatement of contaminants on properties to be transferred to the state. Restoration Advisory Board (RAB) activities are supported by the Fort Dix NPL RAB.

Plan of Action

- Complete hazardous waste SI, UXO site investigation, PCB sampling investigation, asbestos sampling survey, and radiological archive search in FY99
- Complete final ECPs for property transfers to the Federal Bureau of Prisons in FY99
- Conduct investigation at two potential UST sites in FY99
- Conduct PCB remediation in FY00
- Conduct asbestos abatement for BRAC Building 8401 (state prison) in FY00
- Complete final ECPs for property transfers to the Navy, and the Coast Guard in FY00
- Conduct Finding of Suitability to Transfer for property transfer to the State

Sites Achieving RIP or RC Per Fiscal Year



Size: 30,997 acres
Mission: Provide training and reserve support
HRS Score: 37.40; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in September 1991
Contaminants: Heavy metals, petroleum/oil/lubricants, chlorinated solvents and PCBs
Media Affected: Groundwater, surface water, sediment, and surface and subsurface soil
Funding to Date: $33.8 million
Estimated Cost to Completion (Completion Year): $102.2 million (FY2045)
Final Remedy in Place or Response Complete Date for All Sites: FY2021

Pemberton Township, New Jersey

Restoration Background

In FY79 through FY82, the installation evaluated the Fort Dix Sanitary Landfill and 16 other sites, including storage areas, underground storage tanks (USTs), landfills, lagoons, impact areas, and an incinerator. Heavy metals, petroleum/oil/lubricants, and chlorinated solvents were suspected in the soil and groundwater. The installation placed a series of groundwater monitoring wells around the perimeter of the landfill.

In FY93, the installation performed site characterization and field screening at several sites. USTs and associated contaminated soil were removed from seven sites. Fort Dix also formed a technical review committee (TRC) consisting of regulators, local residents, and installation personnel. In FY94 and FY95, the installation built a multilayer cap over the sanitary landfill and began long-term monitoring (LTM) of groundwater, surface water, and sediment. In July 1995, the BRAC Commission recommended realignment of Fort Dix, allowing it to retain ranges, facilities, and training areas for Reserve Components training.

In FY96, the commander formed a Restoration Advisory Board (RAB) to replace the TRC, in accordance with Army guidance. During FY97, the installation conducted a Remedial Investigation (RI) at the MAG-1 Area.

FY98 Restoration Progress

The installation completed an Environmental Investigation and Alternatives Analysis of 19 sites. It also began RI activities at nine additional sites. Interim Remedial Actions (IRAs) were completed at two sites.

The installation provided the completed groundwater model to regulatory agencies for review and installed additional monitoring wells where needed, for ongoing investigations. LTM of groundwater, surface water, sediment, and air emissions continued at the Fort Dix Sanitary Landfill, a National Priorities List (NPL) site. The Army completed a Mann-Whitney statistical analysis of the data and provided it to the regulatory agencies. A RI, a FS and a natural attenuation addendum were completed for the golf course sites. The installation removed 80 abandoned USTs. An IRA at the Taxi Stand site also was completed. The installation continued RIs for the Armament Research and Development Center (ARDC) site, the Boiler Blowdown site, the Fire Training Tank site, the ANC-9 Landfill site, and the Barnes Building sites and began RI at the New Egypt Armory site.

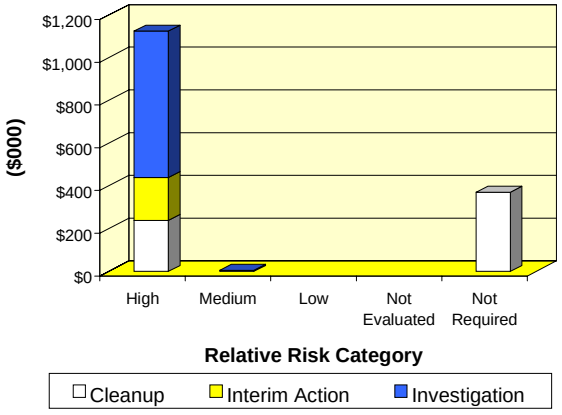
The installation provided numerous technical presentations of Installation Restoration Program (IRP) reports to the RAB. The RAB also received presentations on the statistical analysis of monitoring data from the Fort Dix Sanitary Landfill, the Fort Dix groundwater model, and the MAG-1 site FS. The RAB toured the Fort Dix sewage treatment plant and reviewed all new RI/FS documents made available during the year.

The installation discussed with EPA Region 2 placing the Fort Dix sanitary landfill NPL site on the EPA construction complete list. The installation is also reviewing modifications to the monitoring plan for the NPL Landfill with federal and state regulators. It wants to reduce the number of wells and constituents because the statistical analysis reveals generally decreasing contaminant levels.

Plan of Action

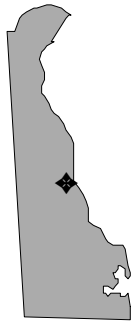
- Continue removing abandoned USTs and begin investigations of contaminated UST sites in FY99
- Incorporate the Fort Dix groundwater flow model into IRP investigations in FY99
- Continue LTM and long-term maintenance of the Fort Dix Sanitary Landfill
- Complete RI/FS for Boiler Blowdown and ANC-9 Landfill in FY99
- Complete RI/FS for Fire Training Tanks, ARDC, New Egypt Armory, and Barnes Building sites in FY00
- Complete the Proposed Plan and the Record of Decision for MAG-1, the Golf Course sites, and 19 other sites in FY99
- Begin the RI/FS for the range landfill site in FY99

FY99 Funding by Phase and Relative Risk



Dover Air Force Base NPL

Size: 3,730 acres
Mission: Provide airlift support for troops, cargo, and equipment
HRS Score: 35.89; placed on NPL in March 1989
IAG Status: Federal Facility Agreement signed in August 1989
Contaminants: Solvents, paints, petroleum products, VOCs, heavy metals, and plating wastes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $38.6 million
Estimated Cost to Completion (Completion Year): $53.3 million (FY2011)
Final Remedy in Place or Response Complete Date for All Sites: FY2004



Dover, Delaware

Restoration Background

Since 1942, this base has provided airlift assistance for troops, cargo, and equipment. Former waste management practices contaminated the shallow groundwater aquifer with petroleum products, volatile organic compounds (VOCs), and heavy metals. The principal site types at the installation are underground storage tanks (USTs), oil-water separators, fire training areas, landfills, fuel spills and leaks, and a fuel hydrant system.

A Preliminary Assessment was completed in 1983 and a Site Inspection was completed in 1989. Fifty-nine restoration sites have been identified to date. Basewide Remedial Investigation and Feasibility Study (RI/FS) fieldwork was completed in FY94.

In FY95, the installation began pilot tests of innovative treatment technologies, funded by the Remediation Technology Development Forum (RTDF). Three Records of Decision (RODs) were signed, which incorporated the innovative treatment technologies into Remedial Actions (RAs). The installation also completed an RA at a former waste oil tank site, removed USTs from one site, and completed a Focused Feasibility Study.

In FY96, the installation conducted a natural attenuation project at four sites contaminated with chlorinated solvents. Corrective action plans were completed for six sites contaminated with petroleum. An Engineering Evaluation and Cost Analysis (EE/CA) was completed for excavation of a waste oil-contaminated soil source.

In FY97, basewide RIs were approved by state and federal regulators. Three innovative technology projects funded by RTDF continued. Three RODs were signed for natural attenuation at four sites. A Remedial Design characterization of a former fire training area was conducted by magnetic scanning and ground-penetrating radar. The installation characterized a source of pesticide soil contamination in the industrial area and completed an EE/CA for soil removal with an asphalt cap. Contracts were awarded for installation of two free-product recovery systems.

FY98 Restoration Progress

The installation completed construction of a free-product recovery system, which includes recovery wells, piping, and in-well skimmer pumps to extract spilled JP-4 jet fuel. A pesticide source excavation and asphalt capping project was initiated. This project is slightly behind schedule due to a delay in contracting.

Design and investigation of a former fire training area were completed. The installation also completed a drum removal action at the former fire training area, began fieldwork on an RA for removing two industrial waste basins, and began natural attenuation monitoring at three petroleum exclusion sites.

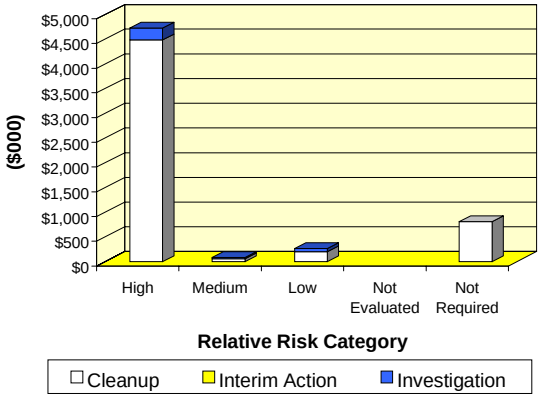
The soil excavation project was completed for a waste oil-contaminated area on the golf course. The project generated 1,935 tons of contaminated soil, which was shipped to a treatment and disposal facility. An RTDF-accelerated anaerobic bioremediation project was successful in the total cleanup of chlorinated solvent contamination in the pilot test cell. Complete dechlorination of contamination was seen in the test cell after bioaugmentation Plans to expand the project to clean up a larger contaminant plume are under way.

Basewide FSs were not completed as scheduled. The FSs are on hold pending regulator concurrence on the basewide Ecological Risk Assessment (ERA). A ROD to close out approximately 20 sites is also on hold pending regulator concurrence on the basewide ERA. The installation generated three RODs: two for natural attenuation of groundwater and one for excavation of industrial waste basins.

Plan of Action

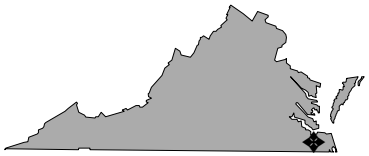
- Complete construction of a second free-product recovery skimming project in FY99
- Complete FSs for active sites in FY99
- Generate ROD to close out approximately 20 sites in FY99
- Implement long-term operations at free-product recovery site in FY99
- Complete excavation of industrial waste basins and associated contaminated soil in FY99
- Implement natural attenuation monitoring projects at two sites in FY99

FY99 Funding by Phase and Relative Risk



Driver Naval Radio Transmitting Facility

Size: 597 acres
Mission: Provided radio transmitting facilities and services to support Naval ships, submarines, and aircraft
HRS Score: NA
IAG Status: None
Contaminants: Dichlorobenzene, PCBs, petroleum/oil/lubricants, trichlorobenzene, SVOCs, and lead
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $6.8 million
Estimated Cost to Completion (Completion Year): $0 (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1996



Suffolk, Virginia

Restoration Background

This facility was established as a Naval Air Station to train pilots during World War II. The installation was converted to a transmitter facility after the war. In July 1993, the BRAC Commission recommended closure of the installation. Installation operations ceased on March 31, 1994.

Since FY84, environmental studies have identified 11 sites at the installation. Site types include a former service station, two polychlorinated biphenyl (PCB) spill areas, and a number of landfills and other areas used to dispose of solvents, acids, bases, and general refuse.

In FY87, a confirmation study for Sites 1, 5, and 8 detected semivolatile organic compounds (SVOCs) in groundwater at Site 1, a former landfill. In FY92, the installation completed baseline Ecological and Human Health Risk Assessments for Site 5. In FY93, the installation removed PCB-contaminated soil at Site 5. In FY94, a Remedial Investigation and Feasibility Study (RI/FS) was completed, and a Record of Decision (ROD) was signed, for Site 5. Cleanup was completed at Site 8, a former gas station.

During FY95, the installation completed a Site Inspection (SI) for Sites 2, 3, 4, 6, 9, 10, and 11 and recommended no further action (NFA) for the sites. The installation also completed the RI/FS at Site 1 and began long-term monitoring (LTM) at the site. The Remedial Design and Remedial Action (RD/RA) were completed for Site 5. Cleanup consisted of removing and disposing of 2,200 cubic yards of PCB-contaminated soil. The installation also constructed a soil cap for creosote-contaminated soil at Site 7. At Site 8, contaminated soil was excavated and incinerated off site. The installation removed PCB-contaminated soil from the storage area near Building D-10. An Environmental Baseline Survey (EBS), which identified 557 acres as uncontaminated, was completed in FY94. The installation was divided into five parcels to facilitate transfer of property.

During FY96, the installation completed a Preliminary Assessment, an SI, and an RA for Site 7 and completed an RA for Building D-10. Hydraulic and ecological LTM began at Sites 1, 5, and 7. The installation also completed its land reuse plan. In FY97, the installation amended the EBS, and the Site 1 ROD was completed and signed.

The installation formed a technical review committee in FY88 and converted it to a Restoration Advisory Board (RAB) in FY94. In FY92, the installation completed a community relations plan and an administrative record, and established an information repository. A BRAC cleanup team (BCT) was formed in FY94. In FY97, the installation completed its BRAC Cleanup Plan. The RAB was discontinued in FY97.

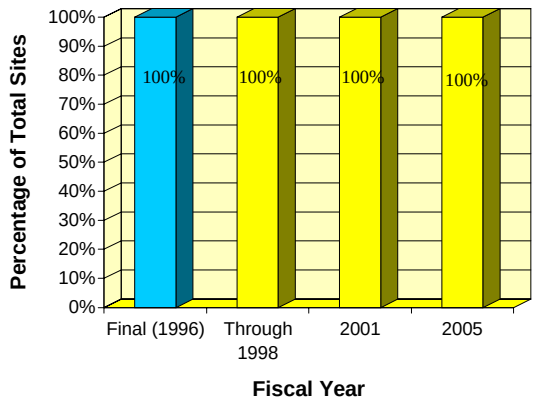
FY98 Restoration Progress

Third-round LTM sampling continued. A draft finding of suitability to transfer (FOST) was completed and is under review by the BCT. The EBS is being updated and will be completed in conjunction with the final FOST. The land reuse plan also is being updated. Informal partnering continued during the review of the draft FOST. Regulators participated in drafting the FOST.

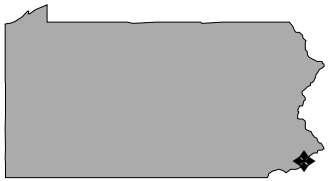
Plan of Action

- Finalize the FOST and the EBS in FY99
- Complete the land reuse plan in FY99
- Continue LTM sampling and reporting in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 87 acres
Mission: Procure and distribute textile, subsistence, and medical supplies in support of the Armed Forces
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, PCBs, pesticides, and asbestos
Media Affected: Groundwater and soil
Funding to Date: $12.5 million
Estimated Cost to Completion (Completion Year): $6.2 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Philadelphia, Pennsylvania

Restoration Background

In July 1993, the BRAC Commission recommended closure of the Defense Personnel Support Center (DPSC), now the Defense Supply Center Philadelphia (DSCP), and relocation of its mission to the Aviation Supply Office in North Philadelphia, Pennsylvania. The BRAC Commission also recommended closure of the Defense Clothing Factory and the Defense Contract Management District Mid-Atlantic.

Environmental studies since FY82 identified the following site types: underground storage tanks (USTs), aboveground storage tanks, pesticide management areas, hazardous waste management areas, polychlorinated biphenyl (PCB) containing transformers, asbestos-contaminated areas, and former railroad track areas. A plume, identified as primarily JP-4 jet fuel, underlies large portions of the installation. Studies indicate that the plume originated off site and migrated onto DSCP.

The installation completed cleanup of a PCB-contaminated sewer site in 1991 before the BRAC Commissions recommendation of closure. The installation also completed preliminary analysis of soil, groundwater and a draft work plan for Remedial Investigation and Feasibility Study (RI/FS) activities. RI/FS and Remedial Action (RA) activities began at the clothing factory in FY94 in preparation for interim leasing to the City of Philadelphia. RA activities included the cleanup of DDT in two buildings and the removal of two USTs and contaminated soil associated with the use of DDT. A hazardous waste management area was closed, and asbestos remediation was completed in one building of the clothing factory. RI activities to determine the extent and source of petroleum contamination underlying the installation are complete.

The BRAC cleanup team (BCT), formed in FY94, has provided information to the Base Transition Office and the Local Redevelopment Authority to support reuse plans for the installation. The final Environmental Baseline Survey and the BRAC Cleanup Plan are complete, and an Environmental Assessment was prepared to evaluate alternatives for reuse of the clothing factory. In FY95, a Restoration Advisory Board was established.

During FY95–FY96, RAs were completed at all known UST sites, nine USTs were removed, and one UST was closed in place. All 10 PCB-containing transformers were removed. Phase I of the basewide Expanded Site Inspection (ESI), previously known as the RI/FS, was completed. Baildown and recovery tests were completed for 12 on-site wells, and removal of free product from the surface of the groundwater began. A consent decree was signed between the installation, the Pennsylvania Department of Environmental Protection (PaDEP), and Sun Oil (a neighboring refinery), allowing the parties to collaborate on defining the extent of the plume and to develop a remediation plan to recover free product.

In FY97, the finding of suitability to lease for Building 13, portions of Building 9, and an adjacent parking area was completed and the lease for these parcels was signed. Approximately 15 percent of the parcels at the installation have been certified as environmentally clean. A conceptual plan and a risk assessment plan for the installation were completed and approved by PaDEP. Nineteen Federal Facilities Compliance Act sites were identified, and two have been remediated and certified closed by the BCT.

FY98 Restoration Progress

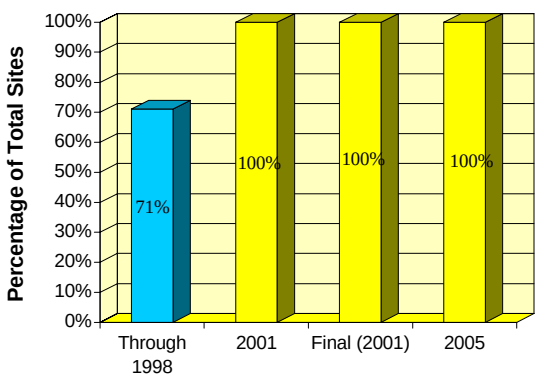
Skimming operations at DSCP have produced a total of about 152,000 gallons of free product since operations began in FY96. The Phase III ESI was 90 percent complete by the end of FY98. Installation Restoration Program (IRP) Site 29 was officially closed.

This site consists of PCB-containing transformers at various locations on DSCP.

Plan of Action

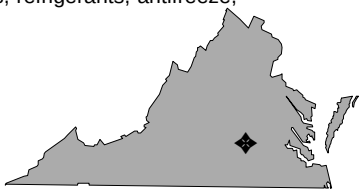
- Continue RA and/or closure of IRP sites during FY99 to complete closure of the installation
- Begin Phase I plume remediation project in early FY99
- Complete Human Health Risk Assessment in FY99

Sites Achieving RIP or RC Per Fiscal Year



Defense Supply Center Richmond — NPL

Size: 631 acres
Mission: Manage general supplies for the Armed Services
HRS Score: 33.85; placed on NPL in July 1987
IAG Status: IAG signed in 1991
Contaminants: Phenols, solvents, paints and paint residues, corrosives, pesticides, refrigerants, antifreeze, photographic chemicals, and oils
Media Affected: Groundwater and soil
Funding to Date: $27.4 million
Estimated Cost to Completion (Completion Year): $28.2 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Richmond, Virginia

Restoration Background

Preliminary Assessments and Site Inspections identified 31 sites at this installation. During negotiation of an FY91 Interagency Agreement, sites were grouped into eight operable units (OUs) and six Expanded Site Inspections (ESIs). In FY92, a ninth OU was listed as an Interim Action site. Seven of the sites were determined to pose no hazard to the environment; four sites are not covered by CERCLA.

In FY89, an underground storage tank (UST) program was implemented. Through FY95, 30 tanks were replaced with double-wall plastic tanks, and the need for 20 tanks was eliminated.

Two Records of Decision (RODs) were signed in FY92, designating institutional controls (ICs) for contaminated soil at OU1 and a vapor vacuum extraction system as the Remedial Action (RA) for contaminated soil at OU5. Operations at a pilot plant indicated that contamination in the OU5 soil had decreased to undetectable levels, prompting modification of the ROD and OU5 closeout. In FY93, a third ROD was signed, requiring installation of an extraction and treatment system to remove volatile organic compounds (VOC's) from the groundwater at OU9. The system was implemented in September 1996. In FY95, a fourth ROD was signed requiring a two-phase RA for soil at the National Guard Area. ICs and excavation and disposal of 150 cubic yards of contaminated soil were implemented.

Also in FY95, six ESIs were completed. Three areas proceeded to the Remedial Investigation and Feasibility Study (RI/FS) phase and were designated OUs 10, 11, and 12. One other area was combined with OU4; the remaining two require no further action. During the RI/FS for OU7, another site was identified, which was called OU13. Exploratory trenching of soil at OU2 was conducted to characterize materials disposed of in an abandoned landfill.

During FY96, the installation completed investigations at one UST site, closed out the investigation of an indoor pistol range, and implemented an air stripping system. The RIs for the fire training area (OU4 and OU7), the acid neutralization pits (OU8), and the fire training pit (OU7) were completed. Fieldwork concluded for a pilot study for OU7 and OU8 to determine the feasibility of a dual-phase vacuum vapor extraction technology and for background risk assessment. A computer model of the contamination plume for the PX gas station was completed, and the corrective action plan was modified.

During FY97, the installation implemented a recovery system for the gasoline phase on groundwater at the PX gas station. It also completed remediation of soil at OU3 and the final FS for OU4. A work plan for removal of contaminated soil from OU2 and a draft Proposed Plan for OU4 were completed. The installation initiated a Treatability Study for groundwater at OU8.

FY98 Restoration Progress

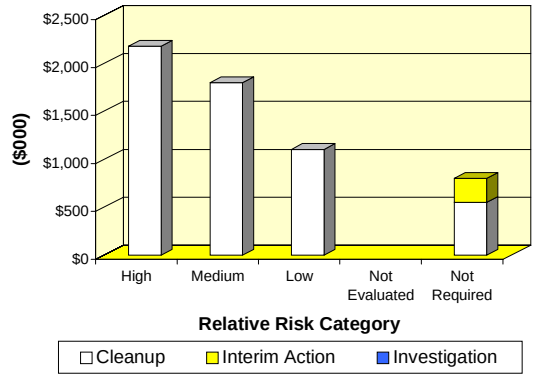
A five-year review of OU1 and the FS and drafts of the Action Memorandum, the Proposed Plan, and the ROD for OU2 were completed. Storm sewers in OU2 were videotaped as a means of determining their condition. A work plan was developed for delineating and removing hydrocarbon in OU2. A revised risk assessment of OU4, after a change in criteria resulted in savings of more than $1.3 million in design and cleanup costs. The point of compliance for OU6 was determined.

A design for a pilot test for density-driven convection was completed for OU7. A pilot test for OU8 also was completed, and with minor modifications, the pilot system is sufficient for cleaning up the groundwater in approximately 5 years. A draft Proposed Plan and a ROD supporting dual-phase extraction for OU8 were prepared. Draft Proposed Plans and RODs for OUs 10 and 11 were completed. Draft final RIs for OUs 12 and 13 and a draft FS for OU12 were issued. Also, one UST project was completed.

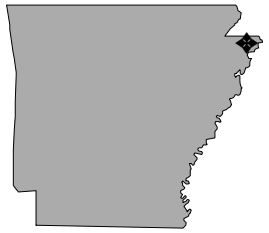
Plan of Action

- Complete delineation and removal of hydrocarbon-contaminated soil at OU2 in FY99
- Issue explanation of significant differences for OU3 that will permit delisting of the OU in FY99
- Issue final Proposed Plans and RODs for OUs 2, 4, 6, 8, 10, 11, and 12 in FY99
- Complete pilot test of density-driven convection and issue Focused Feasibility Study addendum, draft final Proposed Plan, and ROD for OU7 in FY99
- Complete pilot test of dual-phase vacuum extraction at OU6 in FY99
- Issue final Proposed Plans and RODs for OUs 7 and 13 in FY00
- Delist OU1, OU3, and OU5 in FY00
- Start Remedial Designs for OUs 2, 6, 7, 12, and 13 in FY00

FY99 Funding by Phase and Relative Risk



Size: 3,286 acres
Mission: Supported B-52 strategic bombers and KC-97 and 135 stratotanker operations
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, VOCs, and metals
Media Affected: Groundwater and soil
Funding to Date: $26.6 million
Estimated Cost to Completion (Completion Year): $2.7 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Blytheville, Arkansas

Restoration Background

In July 1991, the BRAC Commission recommended closure of Eaker Air Force Base, which formerly supported aircraft and tanker operations. The installation was closed on December 15, 1992.

Environmental studies conducted between FY85 and FY90 identified 12 sites at Eaker. In FY90, a RCRA Facility Assessment identified 21 solid waste management units and 9 areas of concern. Prominent site types include underground storage tanks (USTs), aboveground storage tanks, oil-water separators, petroleum/oil/lubricant (POL) spill sites, and landfills. Other sites include a fire training area, storage areas, an explosive ordnance disposal (EOD) range, a small-arms firing range, a trap and skeet range, a JP-4 jet fuel hydrant system, and a bulk fuel storage tank farm. Remedial Investigation and Feasibility Study fieldwork was initiated for the first 12 sites. Later, an Administrative Consent Order was signed indicating that 30 sites (including the initial 12) are subject to RCRA corrective action and will be addressed under a RCRA Facility Investigation (RFI). The installation also completed an Environmental Baseline Survey (EBS) and identified 337 acres as CERFA-clean.

Interim Actions at the installation include removal of 125 USTs and 31 oil-water separators, remediation of contaminated soil at UST sites and at the JP-4 fuel hydrant system by a soil treatment technology, and provision of an interim soil cover and native vegetation for Landfill 4. The installation also is using natural attenuation and land treatment to remediate contaminated soil.

The installation formed a BRAC cleanup team and a Restoration Advisory Board in FY94 and completed a community relations plan in FY95. In FY95, fieldwork began for the RFI.

In FY96, the installation submitted an RFI report to the regulatory agencies. Human Health and Ecological Risk Assessments were performed at contaminated sites. Bioventing began at three sites. The installation completed clearance of unexploded ordnance at the EOD range and is completing a report presenting the results of sampling conducted there. The installation also completed sampling at the Defense Reutilization and Marketing Office (DRMO) storage facility under an approved closure plan.

In FY97, several Interim Removal Actions occurred: removal of pesticide-contaminated soil, removal of one UST, and removal of free product by bioslurper at the base service station. Cleanup activities continued at POL spill sites. The installation also evaluated parcels of land for possible lease or transfer. Use of a model site during the planning stage of the corrective measures study (CMS) to demonstrate the CMS process and variables helped resolve issues with the state and EPA. The latest version of the BRAC Cleanup Plan and several Supplemental EBSs (SEBSs) also were prepared.

FY98 Restoration Progress

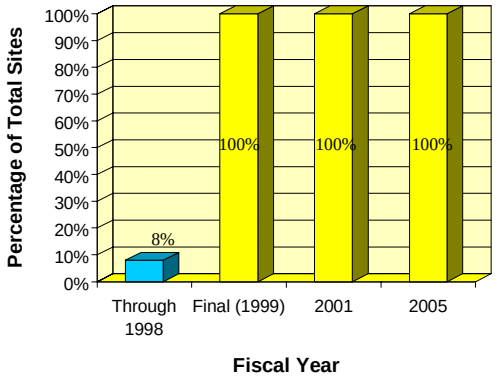
The RFI was approved by the Arkansas Department of Pollution Control and Ecology (ADPC&E) and EPA. The CMS was submitted to regulators for review and comment. ADPC&E approved use of risk-based closure at the EOD range and DRMO facilities. The state approved discontinuation of operation of bioventing systems at two of the sites where bioventing was implemented in FY96. In addition, Interim Remedial Actions were performed at the Roads and Grounds Maintenance Facility and the Entomology Shop.

A finding of suitability to lease (FOSL) and a SEBS were completed, resulting in the leasing of the Potable Water System and the Wastewater System and placing all Eaker property under lease. A finding of suitability to transfer (FOST) and another SEBS also were completed, resulting in the transfer by deed of the nonappropriated housing and the Capehart housing to the private sector.

Plan of Action

- Receive approval for the CMS in FY99
- Complete the FOST and the SEBS for transfer by deed of the Golf Course, the Potable Water System, and the 100 acres of commercial property
- Implement all Remedial Actions by the end of FY99
- Complete FOST and SEBS for the transfer by deed of all remaining base property by the end of FY03

Sites Achieving RIP or RC Per Fiscal Year



Earle Naval Weapons Station NPL

Size: 706 acres shoreside; 10,428 acres inland
Mission: Handle, store, renovate, and ship munitions
HRS Score: 37.21; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in December 1990
Contaminants: VOCs, SVOCs, heavy metals, hydrocarbons, and petroleum products
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $15.9 million
Estimated Cost to Completion (Completion Year): $18.9 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2004

Colts Neck, New Jersey

Restoration Background

Preliminary Assessments completed in FY83 identified 29 sites of concern, 4 of which required further investigation. The sites include landfills, production areas, storage areas, maintenance areas, and disposal areas. To date, 67 sites (48 CERCLA and 19 underground storage tank [UST] sites) have been identified. Releases of volatile organic compounds (VOCs) and heavy metals from landfills and production areas have contaminated groundwater and soil at the installation.

In FY87, a Site Inspection (SI) identified 11 contaminated sites. An SI in 1992 examined 16 additional sites. The first SI recommended additional characterization of the 11 identified sites through well monitoring, soil borings, and surface water sampling. No further action (NFA) was recommended for two sites. The second SI recommended further action at 13 sites and established the need for basewide background data.

In FY91, the installation began Remedial Investigation and Feasibility Study (RI/FS) activities. An interim draft RI report for the first 11 sites was submitted in FY92 and recommended cleanup of all sites, including capping, removal, and long-term monitoring. The first round of RI/FS was completed in late FY93. Data were obtained during the second RI/FS round in FY94.

One UST site was investigated in FY91 and closed in FY92. At several UST sites, soil was excavated and disposed of in FY93. In FY94, the installation completed a work plan, an Action Memorandum, and an Engineering Evaluation and Cost Analysis for a Removal Action at Site 20. The installation also prepared a corrective action plan for UST 8. USTs were removed, and some leaking USTs were identified. In FY95, the installation completed RI fieldwork at 21 sites and removed and recycled soil from Site 20. EPA approved recommendations for no further action at 14 sites. NFA was recommended for six UST sites.

In FY96, the installation signed a data-sharing agreement with the New Jersey Department of Environmental Protection, enabling the Navy to overlay state wetland delineations and aerial photographs onto geographic information system (GIS) maps. The installation completed the RI for 27 sites, initiated Removal Actions at 5 sites, and began FS activities at 4 sites. A pilot study helped the installation determine the best method of removing a layer of free product from groundwater at Site 16. During FY97, the installation completed Remedial Actions (RAs) at five sites and the FS at four sites. Remedial Design (RD) began for two landfill caps, surface soil remediation, and four UST sites.

In FY90, the installation formed a technical review committee (TRC), completed a community relations plan (CRP), and established an information repository containing a copy of the administrative record. In FY95, the TRC was converted to a Restoration Advisory Board (RAB).

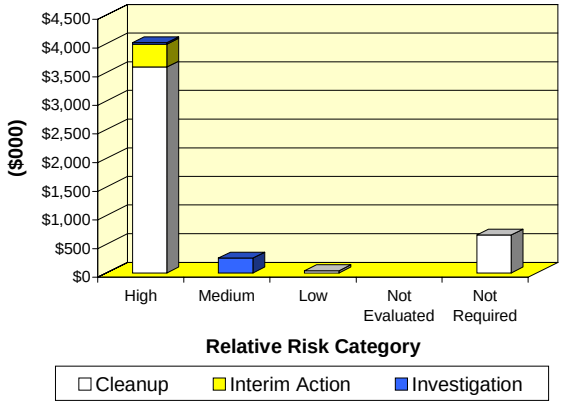
FY98 Restoration Progress

Landfill caps were designed and built for Sites 4 and 5. The simultaneous construction of the caps resulted in significant cost savings. The RAB was given a site tour of the completed caps. RD, removal of contaminated soil, and site restoration were completed at Site 19. The CRP was updated to reflect the completed actions. Although funding was unavailable for RD at Site 26, the Record of Decision (ROD) was signed and a source area removal was completed. Two additional sites, a former pesticide shop and a battery disposal area, were identified. College students performed rapid bioassessment of streams under a partnership agreement. UST corrective actions were initiated as planned. Monitored natural attenuation was selected as the remedy for two sites. Removal Actions were completed at Sites 13 and 26 and expanded at Site 16F. An unanticipated lead removal was completed at Site 5. The Removal Action at Site 12 was postponed because of decreased funding.

Plan of Action

- Complete NFA ROD in FY99 for eight sites where Removal Actions are complete
- Complete RD and begin RA (air-sparging) at Site 26 in FY99
- Begin Preliminary Assessment for Sites 47 and 48 in FY99
- Complete Removal Actions at Sites 12 and 47 in FY99
- Begin RDs at Sites 3, 10, and 13 in FY99
- Begin RAs at Sites 3 and 10 in FY99
- Perform Interim Action (bank stabilization) at Sites 6 and 17 in FY99
- Begin RA at Site 13 in FY00
- Begin Site Inspections for Sites 47 and 48 in FY00

FY99 Funding by Phase and Relative Risk



Edwards Air Force Base NPL

Size: 301,000 acres
Mission: Research and develop aircraft
HRS Score: 33.62; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in 1990
Contaminants: Waste oils, solvents, VOCs, petroleum hydrocarbons, petroleum/oil/lubricants, rocket fuel, and heavy metals
Media Affected: Surface water, sediment, groundwater, and soil
Funding to Date: $124.6 million
Estimated Cost to Completion (Completion Year): $245.6 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2004

Kern County, California

Restoration Background

In FY93, an Expanded Source Investigation and a RCRA Facility Assessment identified solid waste management units and the following site types: underground storage tanks (USTs), fuel pipelines, landfills, hazardous waste disposal areas, and wastewater and surface water runoff collection areas.

Interim Remedial Actions (IRAs) have included installation of four groundwater extraction and treatment systems to remove JP-4 jet fuel and solvents; removal of 327 USTs; removal of 843 drums of hazardous waste from, and capping of, one site; stabilization of soil to immobilize dioxin and heavy metals; replacement of leaking JP-4 jet fuel pipelines; capping of the fire training facility; implementation of bioventing at three sites; implementation of two soil vapor extraction (SVE) and treatment systems to remove volatile organic compounds (VOCs); installation of a fence at a landfill; and implementation of in-well vapor stripping at a solvent disposal area. Removal Actions were conducted at 12 sites. Edwards expanded public participation by including four public members on the technical review committee and developing four public information repositories.

In FY96, using bioventing, the installation cleaned and closed a former UST site ahead of schedule. An innovative bioremediation treatment facility was opened to remediate soil contaminated with petroleum products. The installation began five Interim Actions. IRAs began at Operable Unit (OU) 1 with construction of two 2-phase extraction systems to remediate petroleum hydrocarbon and VOC contamination in groundwater and soil. At OU2, IRAs were conducted to activate a bioventing system and to begin construction of a 2-phase extraction system. Decision documents were signed for 40 areas of concern (AOCs) in OUs 1 and 2.

In FY97, 24 early actions and 15 site cleanups occurred. The Sampling Technology, Assessment and Remediation (STAR) program, and the Base Environmental Analysis Laboratory (BEAL), an on-base laboratory, were used to accelerate fieldwork. All three dual-phase extraction systems constructed in FY96 began operation in FY97.

The Restoration Advisory Board has been actively providing input since January 1995 and distributes a monthly newsletter to more than 5,000 stakeholders.

FY98 Restoration Progress

The STAR program was used to investigate 23 AOCs and further characterize contamination at 9 sites. An outside laboratory was contracted to help the BEAL with analyses from sampling.

The installation used regulatory oversight to streamline 46 AOC and site reports, which were used instead of the more time-consuming RI reports.

Five Engineering Evaluations and Cost Analyses (EE/CAs) and three Treatability Study work plans for high-relative-risk sites were completed and approved by regulatory agencies. Eight sites at the South Base area were cleaned up, and biovent units were installed at five sites. No Further Investigation (NFI) letters were signed for 27 sites and AOCs. Mobile free-product recovery systems recovered 2,865 gallons of fuel (in well skimmers removed an additional 281 gallons of fuel) from the groundwater aquifer for a total of 19,214 gallons to date. By implementing early actions, the installation reduced the high-relative-risk ranking at 13 sites.

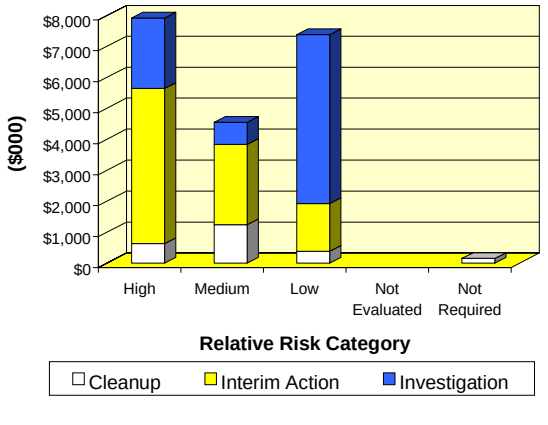
A two-phase treatment system at Site 45 reduced contaminants to levels that no longer require catalytic oxidation. The catalytic oxidizer was moved to the newly constructed SVE system at Site 11. Carbon filtration is being used to remove the remaining contamination at Site 45. The installation partnered with EPA Region 9 to establish a multiphase, multicomponent data quality management program to ensure accuracy of laboratory data.

The installation tracked the following items as indicators of business performance: NFI status letters and RA completion certificates, to track site closures; number of gallons removed, to track performance of the mobile free-product and bioslurper recovery systems; and tons of contaminated soil treated, to track performance of a bioremediation facility.

Plan of Action

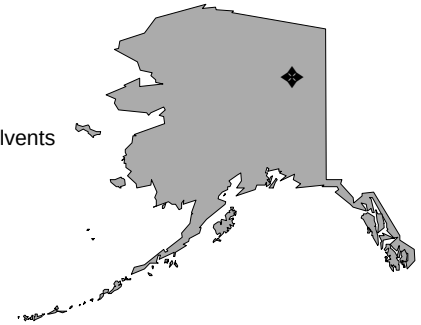
- Continue STAR program for investigating AOCs and sites in FY99
- Test biotrickling filter technology at Site 17 in FY99
- Perform an Ecological Risk Assessment of the Piute Ponds and other areas in FY99
- Install pump-and-treat systems at Sites 37 and 133 in FY99
- Continue LTM, groundwater studies, and remediation in FY99-FY00
- Test four technologies at Site 85 in FY99-FY00

FY99 Funding by Phase and Relative Risk



Eielson Air Force Base NPL

Size: 19,790 acres
Mission: Provide tactical air support to Pacific Air Forces
HRS Score: 48.14; placed on NPL in November 1989
IAG Status: IAG signed in May 1991
Contaminants: Heavy metals, petroleum/oil/lubricants, VOCs, PCBs, and solvents
Media Affected: Groundwater and soil
Funding to Date: $51.6 million
Estimated Cost to Completion (Completion Year): $9.3 million (FY2014)
Final Remedy in Place or Response Complete Date for All Sites: FY1999



Fairbanks, North Star Borough, Alaska

Restoration Background

Environmental studies at Eielson Air Force Base (AFB) began in FY82. By FY93, the installation had identified 64 sites. Thirty-one of the sites were grouped into six operable units (OUs); 24 were investigated and determined to require no further action.

Sites include fire training areas, landfills, spill sites, aboveground storage tanks, underground storage tanks (USTs), and disposal pits. Primary contaminants affecting groundwater and soil include petroleum/oil/lubricants (POLs), benzene, and chlorinated solvents.

Interim Actions completed in FY90 and FY91 include removal of four USTs and removal and incineration of POL-contaminated soil. Bioventing was implemented at two POL sites, and land treatment is being used to remediate the POL-contaminated soil excavated during Remedial Investigation (RI) and Removal Actions.

In FY94, the installation demonstrated the use of air sparging for removing volatile organic compounds (VOCs) from contaminated groundwater. A mobile wastewater treatment system was set up to treat monitoring-well purge water.

In FY95, the installation received regulatory approval for use of bioventing and natural attenuation as cleanup alternatives and began Remedial Design (RD) at OUs 1 and 2. The installation also began fate-and-transport modeling for lead-contaminated sites at OU2. A Remedial Action (RA) contract for landfill capping, bioventing, natural attenuation, soil vapor extraction (SVE), and remediation of lead contamination began at OUs 3, 4, and 5. Also in FY95, the installation converted its technical review committee to a Restoration Advisory Board (RAB).

In FY96, RD was conducted for polychlorinated biphenyl (PCB) contamination at Garrison Slough. Bioventing and SVE began at OUs 1 and 2. The installation also completed Removal Actions for lead and POL soil contamination at OU2. A cesspool and a dry well were removed.

In FY97, remedial efforts were completed at all 66 Federal Facility Agreement (FFA) sites except Site SS-067, which contained additional PCB contamination. Approximately 235,000 pounds of PCB-contaminated soil from this site was shipped to a Toxic Substances Control Act (TSCA) receiving facility. Land treatment operations continued using a windrow technique implemented in FY96. All Records of Decision (RODs) for the base's Installation Restoration Program (IRP) have been signed. Limited field investigations (LFIs) and response actions were completed at 44 AOCs, where more than 3,000 drums were removed and disposed of and over 218,000 pounds of lead-contaminated sand was removed from a firing range.

FY98 Restoration Progress

Eielson AFB reached the Construction Complete phase of the CERCLA process, and the preliminary closeout report (PCOR) received EPA signature. Cleanup efforts at the Chena River Site were completed.

In addition, the Eielson IRP accomplished its first 5-year ROD review, and the installation obtained EPA signature on the OU2 and OU3, OU4, and OU5 ROD amendments.

Remediation efforts at Site SS-067 (Garrison Slough PCB removal) were completed. Approximately 645,000 pounds of PCB-contaminated soil with a greater than 50 parts per million (ppm) PCB concentration has been disposed of at a TSCA receiving facility. All long-term operations (LTO) and long-term monitoring (LTM) activities at active sites continued. A total of 245 drums were removed during an area of concern (AOC) LFI/response action project. Actions were completed at all but four AOCs.

Land treatment operations were completed, and over 20,000 cubic yards of POL-contaminated soils was remediated to Alaska Department of Environmental Conservation Level A standards (<100 ppm POL contamination).

Community interest in converting the Eielson RAB into a Community Advisory Board was assessed. The community showed no interest in making this change.

Plan of Action

- Complete LFI and response actions (remove approximately 800 drums) at the remaining four AOCs in FY99
- Demolish Building 500 (Chena Annex) under the Clean Sweep program in FY99
- Continue LTO/LTM at active sites in FY99
- Continue biannual RAB meetings in FY99
- Establish an institutional control plan in the Base General Plan in FY99
- Continue enforcing institutional controls in FY99
- Delineate extent of DRO contamination at Site OT008 in FY99, for possible FY00 Removal Action.

FY99 Funding by Phase and Relative Risk

No relative risk category funding was programmed in FY99 for this installation.

Ellsworth Air Force Base NPL

Size: 4,858 acres
Mission: Provide long-range bombardment missiles and air refueling support
HRS Score: 33.62; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in January 1992
Contaminants: Solvents, petroleum/oil/lubricants, lead, and low-level radioactive waste
Media Affected: Groundwater and soil
Funding to Date: $56.6 million
Estimated Cost to Completion (Completion Year): $34.5 million (FY2018)
Final Remedy in Place or Response Complete Date for All Sites: FY2005

Rapid City, South Dakota

Restoration Background

Environmental studies conducted from FY85 to FY87 identified 20 sites at Ellsworth Air Force Base. Site types include landfills, underground storage tanks (USTs), maintenance areas, a fire training area, and a low-level radioactive waste burial site. Groundwater and soil contamination resulted from releases of trichloroethene (TCE) and petroleum/oil/lubricants (POL) at these sites. Sites at the installation were classified in 12 operable units (OUs).

In FY91, the installation removed 72 USTs and constructed a pilot-scale groundwater treatment plant for TCE and POL contamination. In FY93, 160 UST sites were evaluated and 31 USTs were removed, including 5 USTs from the low-level radioactive waste burial site. Field-screening techniques were used to eliminate 1 year of Remedial Investigation and Feasibility Study (RI/FS) activities.

In FY94, Remedial Design began for OUs 1, 2, 4, and 9 through 12. An Interim Action extended the installation's water supply line to three private homes near the southwest part of the base. An additional 100 USTs were removed. In FY95, the installation completed the final FS for OUs 1, 2, 4, 9, 10, and 12 and began Interim Remedial Actions, which included groundwater extraction and treatment and soil vapor extraction. The drinking water program was extended to 12 additional off-base residences with contaminated drinking water wells. Twelve USTs and 4,000 cubic yards of contaminated soil were removed, completing the UST investigation and removal program.

During FY96, a final FS report and a Proposed Plan for OUs 3, 5, 7, and 8 were completed along with the RI/FS report and the Proposed Plan for OU11. Remedial Actions (RAs) started for OUs 1 through 5, 7 through 10, and 12. Construction of a groundwater extraction and treatment system began for OU11, and RA construction was completed at OU6. Interim Records of Decision (RODs) were signed for OUs 1 and 4, and final RODs were signed for OUs 1 through 10 and OU12. Nine of the final RODs required RAs (OUs 1 through 8 and OU12); two proposed no further action (OU9 and OU10).

In FY97, the ROD for OU11 was signed, and the RA began. RAs were completed for OUs 1 through 5, 8, and 12. Long-term monitoring (LTM) for OUs 3, 5, 6, 7, 8, and 12 and WP-22 started. Long-term operations (LTO) started for OUs 1, 2, 4, and 11 and non-NPL Sites SS-8, ST-10, and ST-14. The remedy for four of the sites was a landfill cover. The installation also removed unexploded ordnance from Site OT-18.

In FY94, a Restoration Advisory Board (RAB) was formed. The installation also formed partnerships with regulatory agencies to expedite document review and facilitate compliance with regulations through preventive measures. In FY96, the RAB held public meetings to review all 11 final RODs.

FY98 Restoration Progress

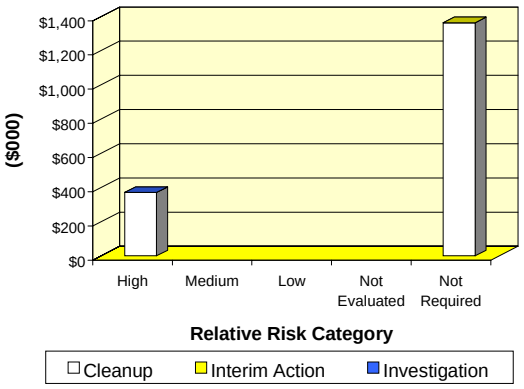
The RA for OU11 continued. The drinking water program was extended with a 26,640-foot water line on the eastern part of the base. LTM and operations and maintenance continued. After ordnance removal, a Preliminary Assessment and Site Inspection (PA/SI) began at OT-18. A PA/SI at Site ST-26 (non-NPL) began.

Bimonthly construction meetings and weekly conference calls involving the installation, Air Combat Command, regulatory agencies, contractors, and the U.S. Army Corps of Engineers allowed project coordination and execution.

Plan of Action

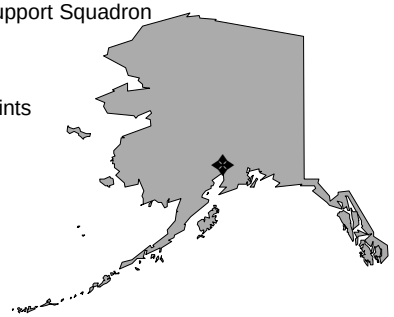
- Extend RA at OU11
- Finish PA/SI for Site OT-18 and start RI/FS
- Continue LTM and LTO at all OUs and all sites except WP-22
- Continue PA/SI and cleanup of new site ST-26 (non-NPL)

FY99 Funding by Phase and Relative Risk



Elmendorf Air Force Base NPL

Size: 13,103 acres
Mission: Headquarters Alaskan Command, 11th Air Force and host unit, 3rd Wing; also hosts Alaskan NORAD Region, Rescue Coordination Center, and 632nd Air Mobility Support Squadron
HRS Score: 45.91; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in 1991
Contaminants: VOCs, heavy metals, petroleum/oil/lubricants, solvents, and paints
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $63.4 million
Estimated Cost to Completion (Completion Year): $23.9 million (FY2026)
Final Remedy in Place or Response Complete Date for All Sites: FY2005



Anchorage, Alaska

Restoration Background

Environmental studies completed between FY83 and FY98 identified 84 sites at this installation. Sites include old construction landfills, petroleum spill sites, and underground storage tanks (USTs). Thirty-seven sites, which are grouped into six operable units (OUs), are covered by the Federal Facility Agreement. An additional 39 sites are covered by the State-Elmendorf Environmental Restoration Agreement with the State of Alaska.

In FY92, asphalt recovery was completed at SS10 in OU4. In FY93, the installation completed construction of a long-term groundwater treatment system at OU2. This Interim Remedial Action was performed at a site containing four 1-million-gallon USTs.

In FY94, the installation removed polychlorinated biphenyl (PCB)-contaminated sediment from a stormwater ditch at OU3. Because the ditch is adjacent to an elementary school in a residential area, an expedited response action was initiated to remove the PCBs. Also in FY94, bioventing Treatability Studies (TSs) were completed at three sites, an intrinsic remedial TS was completed for OU4, and a Record of Decision (ROD) was signed for OU1.

In FY95, the installation continued Remedial Investigation and Feasibility Study (RI/FS) work at OU6 and completed RODs for OU2, OU4, and OU5. It also completed Remedial Designs (RDs) for closing the four 1-million-gallon USTs in OU2, cleaning up PCBs in OU3, installing bioventing systems in OU4, and constructing an engineered wetland in OU5. Removal Actions were conducted at a pesticide storage facility in OU7 and at an asphalt seep area at OU1. The installation also put in place, and began operating, bioventing systems at eight UST sites and began long-term monitoring (LTM) of groundwater. Also in FY95, the installation formed a Restoration Advisory Board (RAB).

In FY96, the installation prepared RDs for OU6. In addition, the installation closed the four 1-million-gallon USTs and removed associated pipeline at OU2, conducted a PCB TS for OU3, installed the bioventing systems at OU4, and began constructing the engineered wetland at OU5.

In FY97, RODs were signed for OUs 3 and 6. RDs were completed for remediation of PCBs at OU3 and for removal of the North Jet Pipeline. The installation began beach sweeps at LF04 in OU6, TSs for a two-phase high-vacuum extraction (HVE) system at SD15 in OU6, and limited field investigations at nine areas of concern (AOCs). In addition, long-term operations (LTO) continued for the completed engineered wetland at OU5 and for 22 bioventing systems at 10 sites. Basewide LTM of groundwater and surface water continued, one bioventing system closed, and 13,800 feet of pipeline at ST32 was removed. The RAB charter was rewritten to focus on all environmental activities, beginning the transition to a Community Advisory Board. Also in FY97, Elmendorf's RAB received the Pentagon Crystal Award.

FY98 Restoration Progress

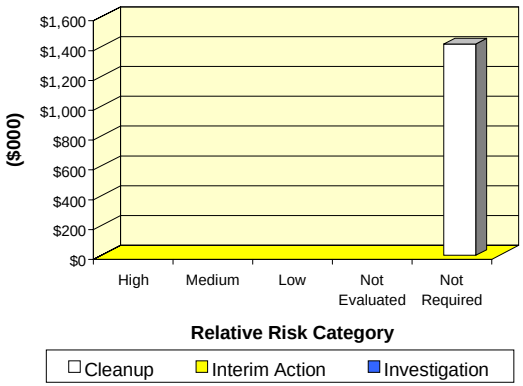
The PCB removal at OU3 is 95 percent complete, and limited field investigations began at nine AOCs. A five-year remedy review was conducted, and Remedial Action (RA) completion reports for OUs 1, 2, 4, 5, and 6 were completed.

Removal of 11,000 feet of North Jet Pipeline was completed, and recovery of free product at OU2 continued. The annual beach sweep at LF04 removed more than 30,000 pounds of general refuse and 21,000 pounds of recyclable metals. LTO continued at the OU5 engineered wetland system and the two-phase HVE system at SD15. LTO at 22 bioventing systems on 10 sites and LTM of the basewide groundwater and surface water also continued.

Plan of Action

- Continue LTM of groundwater in OU1, OU2, OU4, OU5, and OU6 in FY99
- Complete closure document on shutdown of the groundwater treatment system at OU2 in FY99
- Complete RA completion report for OU3 in FY99
- Continue LTO of 22 bioventing systems at 10 sites, the wetland system at OU5, and the groundwater treatment system at OU2 in FY99
- Continue surface water sampling of the wetland system at OU5 in FY99
- Conduct annual beach sweep at LF04 in OU6 in FY99
- Continue LTO of HVE system at SD15 in FY99

FY99 Funding by Phase and Relative Risk



Size: 4,738 acres (includes 74 acres of off-station housing)
Mission: Serve as the primary Marine Corps jet fighter facility on the West Coast; provide materials and support for Marine Corps aviation activities; provide housing for Marine Corps personnel
HRS Score: 40.83; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in October 1990
Contaminants: TCE and other VOCs, petroleum hydrocarbons, PCBs, pesticides, and herbicides
Media Affected: Groundwater and soil
Funding to Date: $52.5 million
Estimated Cost to Completion (Completion Year): $67.5 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2008

Irvine, California

Restoration Background

In July 1993, the BRAC Commission recommended that this installation be closed and that its aircraft, personnel, equipment, and support be transferred to Miramar Naval Air Station and Camp Pendleton Marine Corps Base in California. The installation was placed on the National Priorities List (NPL) in February 1990.

Environmental studies conducted at the station since FY86 have identified 25 CERCLA sites, more than 450 areas of concern, and 398 underground storage tanks (USTs) managed in 18 groups. Site types include inactive landfills, USTs, oil-water separators, temporary accumulation areas, and spill sites at which solvents and petroleum hydrocarbons were released into soil and groundwater. The 25 CERCLA sites were grouped into three operable units (OUs): volatile organic compound (VOC)–contaminated regional groundwater (OU1), sites contributing to groundwater contamination (OU2), and all remaining CERCLA sites (OU3). In FY89, a groundwater treatment system was installed. Remedial Investigation and Feasibility Study (RI/FS) activities began in FY90. The installation investigated 157 solid waste management units and completed a RCRA Facility Assessment in FY93. A Phase I RI/FS was completed in FY93, and Phase II activities began in FY94.

From FY94 to FY97, the installation began remediation at two landfills. The technical review committee, formed in FY90, was converted to a Restoration Advisory Board (RAB) in FY94, and the BRAC cleanup team was formed in FY94. Forty-one inactive USTs were removed in FY95. The Environmental Baseline Survey, completed in FY95, indicated that 63 percent of the installation property was eligible for designation under CERFA as uncontaminated. Eighty-five percent of the property is environmentally suitable for transfer; most of the remaining 15 percent is associated with contaminated groundwater located more than 90 feet below ground surface.

In FY96, the installation updated its community relations plan and its BRAC Cleanup Plan (BCP). The Local Redevelopment Authority (LRA) approved proposals to convert the installation to a commercial airport. The installation completed the RI for OU2 and OU1. The soil vapor extraction (SVE) systems began operation at two UST areas. During FY97, the BCP was updated, Proposed Plans (PPs) and Records of Decision (RODs) were completed and signed for 11 no action OU3 sites, and an interim ROD was completed for the VOC Source Area vadose zone. The FS for OU2 and three early actions were completed. Two of these actions were performed at OU2, and one was performed at OU3. Regulatory agencies concurred that 3,209 acres of the installation are uncontaminated.

FY98 Restoration Progress

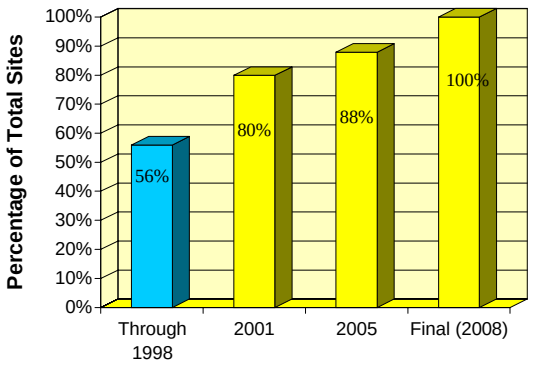
Regulatory closure letters were received for 285 USTs, and 35 closure letters are pending. Eighteen USTs were investigated, and 60 USTs remain open. The RI/FS for OU3 (Sites 8, 11, and 12) was completed and a draft PP was submitted for regulatory agency review. The FS for OU2A gained regulatory concurrence, but the PP and ROD were delayed because OU2A and OU1 were combined. SVE remediation was used to extract 900 pounds of trichloroethene (TCE) from the VOC Source Area, which is awaiting final Remedial Design (RD) concurrence from regulatory agencies. The FS and the PP for OU2B and OU2C landfill sites were completed. The RODs for these sites were delayed because there were extensive comments from the LRA. The Site 1 (OU3) RI was not completed because the site remained operational. The RIs for Sites 7 and 14 (OU3) were also postponed because these sites were evaluated as low relative risk. The CERCLA long-term groundwater monitoring plan was developed and sent to regulatory agencies for review and comment.

The RAB reviewed documents, participated in workshops and public comment meetings, and attended site tours. The Navy worked with the Department of Toxic Substances Control and the State of California.

Plan of Action

- Complete RD and start construction and operation of the SVE system at Site 24 (OU2A) in FY99
- Complete PP and public comment period and submit draft ROD for agency review for Sites 18 and 24 (OU1/2A) in FY99
- Sign settlement agreement with Orange County Water District, Irvine Ranch Water District, and the Department of Justice in FY99
- Complete and sign ROD and begin RD for Sites 2 and 17 (OU2B) in FY99
- Complete PP and public comment period and sign ROD for Sites 8, 11, and 12 (OU3) in FY99
- Submit draft ROD to regulatory agencies for review and resolve reuse and CERCLA issues for Sites 3 and 5 (OU2C) in FY99
- Complete RI fieldwork and submit draft RI report for Sites 7 and 14 (OU2B) in FY99
- Complete RI fieldwork at Site 1 (OU3) in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,282 acres
Mission: Used as a tactical fighter wing
HRS Score: NA
IAG Status: None
Contaminants: Industrial waste, spent solvents, fuels, waste oil, paints, pesticides, alkali, low-level radioactive waste, chlorine gas, PCBs, TCE, and medical waste
Media Affected: Groundwater and soil
Funding to Date: $28.5 million
Estimated Cost to Completion (Completion Year): $13.9 million (FY2030)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Alexandria, Louisiana

Restoration Background

In July 1991, the BRAC Commission recommended closure of England Air Force Base. The installation closed in September 1992.

Since FY82, environmental studies have identified 42 sites at the installation, including landfills, underground storage tanks, aboveground storage tanks (ASTs), fire training areas, oil-water separators, a sewage treatment pond, a low-level radiation site, and gas training kit burial sites. In FY92, a RCRA Facility Assessment identified 59 solid waste management units (SWMUs) and 5 areas of concern. In FY93, a BRAC cleanup team was formed.

In FY94, the installation formed a Restoration Advisory Board and completed the Phase I RCRA Facility Investigation (RFI) and the Environmental Baseline Survey (EBS).

In FY95, the installation updated its BRAC Cleanup Plan and completed a basewide lease. The installation also completed comprehensive field investigations to establish background soil concentration levels, began field activities for a Phase II EBS, completed a lead-based-paint survey of houses and schools, and completed an AST cleaning project. EBS Phase I and II studies identified 282 sites that required some investigative or remedial action. The installation began Interim Actions at several sites. It also completed closure of an aircraft refueling and hydrant system and cleanup of chlorine gas sterilizer and the medical waste incinerator.

In FY96, the installation replaced the fire station oil-water separator and completed cleanup at the civil engineering drainage ditch, the low-level radiation site, the hospital polychlorinated biphenyl (PCB) site, and jet engine shop. Delineation of a trichloroethene (TCE) groundwater plume began. The final Comprehensive Background Survey (CBS) was submitted to EPA and the Louisiana Department of Environmental Quality (LDEQ). In addition, the installation transferred 167.5 acres of CERFA Category 1 through 4 property and completed a finding of suitability to transfer for an additional 991 acres. Also in FY96, work began on a Human Health Risk Assessment and an Ecological Risk Assessment Consensus Statement.

In FY97, the installation completed a corrective measures study for RFI sites and completed the Interim Action at the Fire Training Site and three other contaminated-soil sites. SWMU 41 was closed and capped.

FY98 Restoration Progress

The Phase I Ecological Survey was completed for some sites, and it was determined that several of the sites require a Phase II Survey. Data gaps were filled for the TCE plume through additional groundwater monitoring and completion of a flow meter borehole study.

The installation obtained concurrence from EPA and LDEQ on the Human Health Risk Assessment and Ecological Risk Assessment Consensus Statements, which provide the screening levels for risk assessments. The installation also obtained EPA and LDEQ concurrence on the final CBS report.

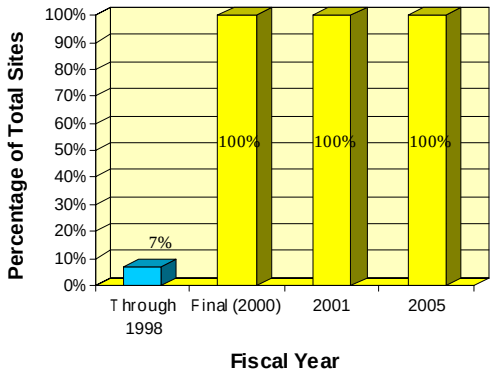
A Technical Assistance Visit was conducted, which provided recommendations on, and specific tasks for, improving environmental restoration project execution. Fourteen sites were closed and officially transferred to the Local Reuse Authority (LRA); 141 additional sites have been closed and are awaiting transfer. Contracts for completing investigations, remediation, and/or closure have been negotiated for 125 other sites.

The Chemical Burial Mound remediation project was delayed because the Army determined that incineration was not the appropriate disposal method for these materials. This determination resulted in additional Army requirements.

Plan of Action

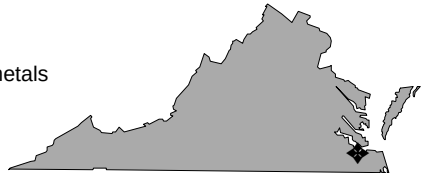
- Characterize the TCE plume in FY99
- Complete Site Inspections at restoration sites in FY99
- Begin remediation of contaminated soil from the Chemical Burial Mound in FY99
- Modify the Hazardous and Solid Waste Amendments (HSWA) permit in FY99
- Complete Remedial Action for the POL area and remove additional soil along underground fuel lines in FY99
- Complete investigations, remediation, and closure of remaining 127 sites by mid-FY00

Sites Achieving RIP or RC Per Fiscal Year



Fort Eustis NPL

Size: 8,228 acres
Mission: House the Army Transportation Training Center; provide training in rail, marine, and all other modes of transportation involved in amphibious operations
HRS Score: 50.00; placed on NPL in December 1994
IAG Status: None
Contaminants: Petroleum products, PCBs, VOCs, pesticides, and heavy metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $41.7 million
Estimated Cost to Completion (Completion Year): $7.1 million (FY2024)
Final Remedy in Place or Response Complete Date for All Sites: FY2011



Newport News, Virginia

Restoration Background

Fort Eustis is home to the Army Transportation Center, where officers and enlisted soldiers receive education and training in all modes of transportation, aviation maintenance, logistics and deployment doctrine, and research. Investigations have identified 27 sites at the installation, including landfills, underground storage tanks (USTs), pesticide storage areas, range and impact areas, and surface impoundments. The migration of contaminants from some sites to creeks and estuaries and the potential migration through surface water and the upper water table to the James River are of greatest concern at the installation. Analysis of samples indicated the presence of polychlorinated biphenyls (PCBs), pesticides, polyaromatic hydrocarbons, and lead in surface water and sediment.

In FY90, a Remedial Investigation (RI) began for four sites near estuaries at the installation. In FY92, the Army completed a Preliminary Assessment and a Site Inspection at eight more sites where suspected soil contaminants included fuel and oils, pesticides, and volatile organic compounds (VOCs).

In FY94, the installation completed Interim Remedial Actions (IRAs) for removal of contaminated soil at the Felker Airfield Tank Farm and a waste-oil storage tank site. It also completed cleanup at the two landfills. In the following year, the state approved a corrective action plan (CAP) involving installation of pneumatic pumps and passive skimmers to recover petroleum products from groundwater at the Helicopter Maintenance Area UST site. The installation formed a technical review committee, which meets semiannually.

In FY96, the installation established an administrative record and set up information repositories at three local libraries. The state regulatory agency approved another CAP for installation of a free-product recovery system at the Gas Station UST site. The Agency for Toxic Substances and Disease Registry published a final Public Health Assessment that indicated that the Fort Eustis National Priorities List (NPL) site poses no apparent risk to public health. The assessment says that health education and a follow-up health study are not warranted. In FY97, a draft Feasibility Study (FS) and an Engineering Evaluation and Cost Analysis for two areas of contaminated sediment were submitted to the regulators for review. Fort Eustis capped a pesticide storage yard with asphalt, limiting exposure to contaminated soil. Fort Eustis solicited public interest in forming a Restoration Advisory Board (RAB). Because interest was insufficient, no RAB was formed.

FY98 Restoration Progress

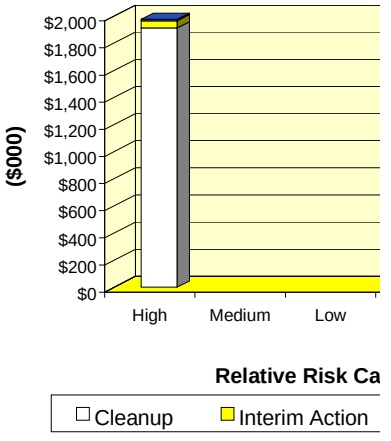
The installation continued operating free-product recovery systems at two UST sites. It also continued long-term monitoring (LTM) of the groundwater and surface water at a closed landfill. The Army constructed a methane soil vapor extraction system at one closed landfill and installed a methane collection trench at another closed landfill. The installation awarded a contract for an IRA for capping contaminated sediment at a small pond (Brown's Lake). FS and LTM contracts were awarded for evaluating any residual contamination at the pond after the IRA is complete.

EPA is reviewing three RI reports for four estuary sites, a fire training area, a buried sludge site, and a pesticide storage area. The installation completed investigation and field efforts at Eustis Lake and the pesticide storage area and submitted the reports to EPA and the state. The installation also updated the admini- strative record in late FY98; the record is available on CD-ROM.

Plan of Action

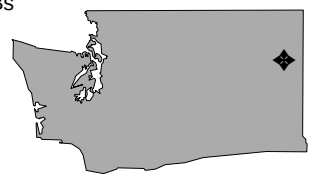
- Continue operating the free-product recovery system at two UST sites
- Continue LTM of groundwater and surface water at one closed landfill and operation of a methane vapor extraction system at another closed landfill
- Complete review of three RI reports for four estuary sites, a fire training area, a buried sludge site, and a pesticide storage area in FY99
- Complete the IRA capping of contaminated sediment at Brown's Lake
- Award IRA for removal of PCB-contaminated sediment in Bailey Creek

FY99 Funding by Phase and Relative Risk



Fairchild Air Force Base NPL

Size: 4,300 acres
Mission: Provide aerial refueling and airlift services
HRS Score: 31.98; placed on NPL in March 1989
IAG Status: IAG signed in 1990
Contaminants: Solvents, fuels, electroplating chemicals, cleaning solutions, corrosives, photographic chemicals, paints, thinners, pesticide residues, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $34.2 million
Estimated Cost to Completion (Completion Year): $34.6 million (FY2026)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Spokane County, Washington

Restoration Background

Environmental studies since FY85 have identified 37 sites at the installation, including contaminated fire training areas, landfills, radioactive waste sites, spill sites, waste pits, disposal pits, and ditches.

In FY92, Interim Actions included removal of 1,600 cubic yards of soil contaminated with fuels and oils. Drinking water was provided to members of the local community to replace drinking water contaminated by trichloroethene (TCE) leaching from a landfill (Craig Road Landfill). By FY93, the installation had identified 30 sites and completed Remedial Investigation and Feasibility Study (RI/FS) activities at 8 sites. The Air Force signed two Records of Decision (RODs). Two sites required no further action, two required long-term monitoring (LTM) or institutional controls, and four required cleanup.

In FY94, the installation completed Remedial Designs (RDs) for two sites, began RD at a third site, and started construction on a Remedial Action (RA) at a base landfill. The installation participated in bioventing technology and intrinsic remediation initiatives by the Air Force Center for Environmental Excellence.

In FY95, the installation formed a Restoration Advisory Board (RAB). It also completed construction of a landfill cap and expansion of an extraction and treatment system to contain a TCE-contaminated groundwater plume at the Craig Road Landfill. Construction of a new groundwater extraction and treatment system to contain a TCE-contaminated plume at a wastewater lagoon site (WW-1) also began. The installation began a Preliminary Assessment and Site Inspection (PA/SI) for nine areas of concern (AOCs) and the two remaining original sites.

The installation completed an RI/FS for 20 sites in FY96, and the Air Force signed a ROD for the sites. The installation put the wastewater lagoon treatment plant into operation. RA construction began at a former fire training area, a TCE-contaminated ditch, and a spill area at the Bulk Fuel Storage Site. Because of contamination identified during the PA/SI, seven AOCs were transferred to the Installation Restoration Program. In FY97, groundwater air-sparging and soil bioventing systems were implemented at the former fire training area. The final Public Health Assessment report was released by the Agency for Toxic Substances and Disease Registry. The final report, which followed a year-long review, validated the base's past and current cleanup program. RAB and community input into the process was critical in FY97.

FY98 Restoration Progress

In cooperation with EPA and the state, the installation initiated a five-year review of all active remedial sites. Monitoring and operational data were examined to ensure that the sites' selected remedies provide protection to the environment and human health. LTM and operations and maintenance (O&M) continue for two pump-and-treat plants at WW-1 and CRL. The basewide and off-base residential well sampling program also continues.

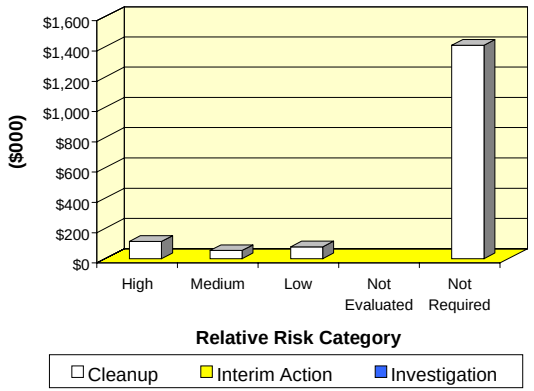
Fieldwork began for groundwater data gathering at TCE orphan plumes to support natural attenuation of chlorinated solvents. Construction and Interim Removal Actions were completed at the wastewater lagoons (plume edge work), a POL bulk storage area, a waste storage area, waste fuel operations, a fuel transfer facility, arsenic ditches and culverts, and the former fire training area.

Delisting of portions of the installation from the National Priorities List (NPL) was delayed after negotiations with EPA determined that the entire installation should be delisted as a unit. The ROD for nine sites and two AOCs also was delayed. Investigations for a preferred alternative for two of these sites (SS-39 and SD-37) are still under way.

Plan of Action

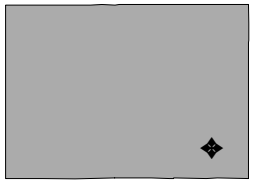
- Achieve final consensus on natural attenuation of chlorinated solvents at TCE orphan plumes and oil-water separator site in FY99
- Start work on a ROD for nine sites and two AOCs in FY99
- Continue LTM and O&M for groundwater treatment plants, groundwater air sparging, soil bioventing systems, and basewide groundwater sampling in FY99

FY99 Funding by Phase and Relative Risk



F.E. Warren Air Force Base NPL

Size: 5,866 acres
Mission: Provide operational and security support for intercontinental ballistic missiles and perform aerospace rescue operations
HRS Score: 39.23; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in September 1991; Modification 11 signed July 1998
Contaminants: Oil, solvents, metals, acids, petroleum, and explosives residues
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $56.0 million
Estimated Cost to Completion (Completion Year): $69.7 million (FY2012)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



Cheyenne, Wyoming

Restoration Background

The Air Force began restoration activities at F.E. Warren Air Force Base in FY84 with soil removal from the area later designated as Spill Site 4. In FY85, a Preliminary Assessment/Site Inspection identified 25 potentially contaminated sites. In FY86, the installation removed 500 tons of contaminated soil from the acid dry well site for off-site disposal. A Phase I Remedial Investigation (RI) began in FY87 and confirmed the presence of contaminants at 20 sites, which were later grouped into 10 operable units (OUs). The RI process also identified five plumes of trichloroethene (TCE)-contaminated groundwater. In FY89 and FY90, the installation conducted additional Removal Actions at Spill Sites 1 and 7. In FY90, the entire base was placed on the National Priorities List (NPL) because of the TCE-contaminated groundwater.

In FY92, the installation signed a no further action (NFA) Record of Decision (ROD) for the acid dry well site (OU4). In FY94, the installation submitted an NFA ROD for Fire Protection Training Area (FPTA) 2 (OU5). To minimize the risks associated with a contaminated groundwater plume potentially generated by Landfill 3, the installation began delivering bottled water to more than 20 families in the Nob Hill subdivision next to the base. The installation also began bioventing of petroleum hydrocarbon-contaminated soil at FPTA 1 (OU10).

In FY95, a packed-tower air stripper was installed as part of a 1-year Treatability Study for TCE-contaminated groundwater at Spill Site 7. The installation signed an NFA ROD for soil contamination at OU1 and a ROD for an Interim Remedial Action (IRA) using an evapotranspiration (ET) cover at Landfill 6. The installation also was selected to test a two-phase vapor extraction system. A Restoration Advisory Board was formed.

In FY96, all sites underwent Relative Risk Site Evaluation. A design was completed for a Time-Critical Removal Action that involved rerouting the creek near Landfill 2C. This approach was disputed and was later revised. In FY97, the installation constructed a water line to provide drinking water to residents of Nob Hill. Construction began on the IRA ET cover at Landfill 6. In addition, RODs were signed for the installation of a RCRA D cap at Landfill 5A and a passive treatment wall for contaminated groundwater at Spill Site 7.

FY98 Restoration Progress

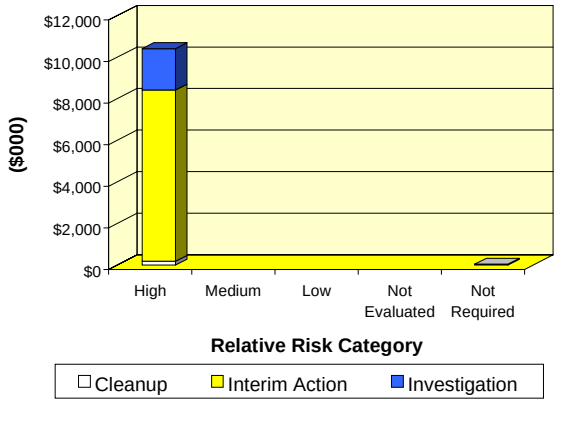
The design for the Landfill 6 cover was changed from an ET cover to a cover with a geosynthetic clay liner (GCL). Designs for the Landfill 6 GCL cover, the Landfill 5A RCRA D cover, and the Spill Site 7 passive treatment wall were completed. Construction of the Landfill 5A RCRA D cover began. The Engineering Evaluation and Cost Analysis and the Action Memorandum for a Non-Time-Critical Removal Action at Landfill 2C were finalized, and construction activities began according to Federal Facility Agreement (FFA) requirements. This Removal Action involved excavation and off-site disposal of waste.

A basewide master restoration schedule was created, and Modification 11 of the FFA schedule was negotiated and finalized. This modification reduced the time to achieve final remedy in place by 2 years, from 2009 to 2007.

Plan of Action

- Install the iron filings wall at Spill Site 7 in FY99
- Construct the GCL cover at Landfill 6 in FY99
- Begin comprehensive RI/FS efforts in Zones B and C, and complete RI field efforts in Zone A in FY99
- Conduct a basewide type Ia Five-Year Review in FY99
- Complete the IRA at Landfill 2C in FY99
- Complete construction of the RCRA D cover at Landfill 5A in FY99
- Continue exploring early Removal Actions and innovative technologies for expediting cleanup in a cost-effective manner

FY99 Funding by Phase and Relative Risk



Fike-Artel Chemical NPL

Size: 12 acres of former 16,000-acre government plant
Mission: Manufacture smokeless powder (private party operated a batch chemical plant)
HRS Score: 36.3; placed on NPL in September 1983
IAG Status: None
Contaminants: Dioxin, organic and inorganic chemicals, and metals
Media Affected: Groundwater and soil
Funding to Date: $0.6 million
Estimated Cost to Completion (Completion Year): $0.3 million (FY2024)
Final Remedy In Place or Response Complete Date for All Sites: NA

Nitro, West Virginia

Restoration Background

Environmental restoration sites at Fike-Artel Chemical have been grouped into five operable units (OUs): disposal of storage tank and drum contents (OU1); decontamination and disposal of storage tanks, surface drums, and aboveground structures (OU2); removal of buried drums (OU3); Remedial Investigation and Feasibility Study (RI/FS) of groundwater and soil (OU4); and RI of the cooperative sewage treatment plant (OU5). Private-sector potentially responsible parties (PRPs) and EPA are leading all environmental restoration activities.

In FY93, an RI was completed for OU1. In FY94, RI activities began at OU2. Twenty PRPs signed an agreement with EPA to remove 7,000 to 16,000 buried containers from OU3.

In FY95, an Interim Action was conducted to remove underground storage tanks (USTs) and aboveground storage containers (OUs 1, 2, and 3). RI activities were completed for OU2 and started for OU5, and RI/FS activities began for OU4.

In FY96, USTs and building OUs were demolished and removed. Final allocation of liability was achieved and a principal agreement was signed. The Consent Decree for OU4 was filed in court and protested by a nonsigning party. The RI work plan was submitted to EPA for approval. EPA and the PRPs were negotiating a Consent Decree.

In FY97, the PRPs (private and government) revised the RI/FS work plan for OU4, and the plan was submitted to EPA for review and concurrence. In addition, the PRPs completed a UST Removal Action for OU5.

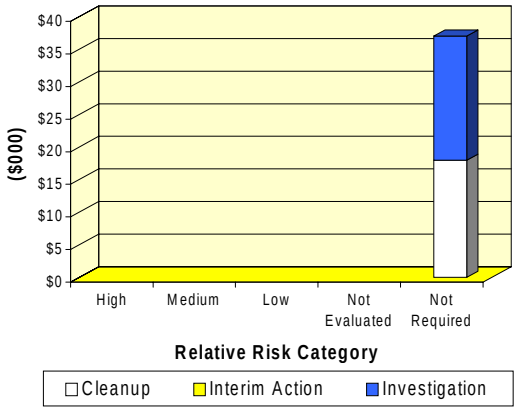
FY98 Restoration Progress

The PRPs received EPA approval on the RI/FS work plan and completed soil and groundwater sampling.

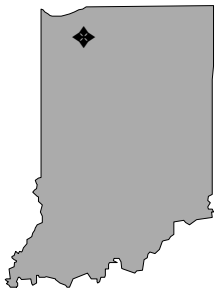
Plan of Action

- In FY99, issue the RI/FS report for EPA review

FY99 Funding by Phase and Relative Risk



Size: 443 acres of 13,400-acre former ordnance plant
Mission: Manufactured ordnance (private use involved solvent recycling and chemical manufacturing)
HRS Score: 52.05; placed on NPL in September 1983
IAG Status: None
Contaminants: VOCs, solvents, PCBs, PAHs, and inorganic compounds
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $6.5 million
Estimated Cost to Completion (Completion Year): $27.9 million (FY2007)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



La Porte, Indiana

Restoration Background

Environmental studies conducted at Fisher-Calo in FY82 identified 11 areas of contamination, including 8 areas of soil contamination and 3 groundwater contaminant plumes. Surface soil is contaminated with solvents, inorganic compounds, and polychlorinated biphenyls (PCBs). Groundwater is contaminated with volatile organic compounds (VOCs). Surface water samples indicate the presence of inorganic compounds, and sediment samples contain PCBs.

A Remedial Investigation (RI) was completed in FY89, and a Feasibility Study (FS) was completed in FY90. A Record of Decision was submitted in late FY90. A Consent Decree, entered into by EPA and the potentially responsible parties (PRPs), requires the PRPs to conduct Remedial Design and Remedial Action (RD/RA) activities. In FY93, the RD work plan was completed and approved by the regulatory agencies. RD activities in FY94 included design of a groundwater extraction and treatment system and a soil flushing or soil vapor extraction (SVE) system. By FY97, the U.S. Army Corps of Engineers had conducted relative risk evaluations at all sites.

In FY95, RD activities included operation of the SVE system and enhanced vapor extraction pilot treatment facilities. Interim Remedial Actions included removal and disposal of about 3,000 buried containers.

During FY96, continuing RD/RA efforts included excavating and incinerating soil containing semivolatile organic compounds and PCBs, completing design of soil flushing or SVE systems for soil contaminated with VOCs, and completing design of groundwater extraction and treatment systems. These actions are being completed by the PRP site group, which also has continued to pursue litigation on issues related to DoD liability.

In FY97, construction of the groundwater treatment system began. The private PRPs continued to operate existing source area systems and began the design of others. Source area design is under EPA review. An air-sparging system is being operated for Area 3.

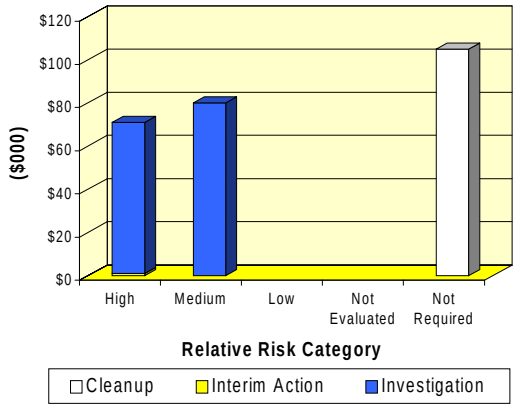
FY98 Restoration Progress

The private PRPs began operating the groundwater pump-and-treat system in February 1998. The government PRP and the private PRPs reached a settlement in principle on allocation of costs.

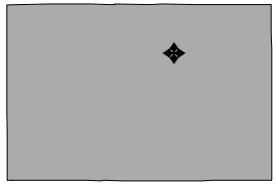
Plan of Action

- Finalize settlement in form of Consent Decree in FY99
- Complete soil remedy in FY03
- Complete groundwater remedy in FY28

FY99 Funding by Phase and Relative Risk



Size: 578 acres
Mission: Provided medical services, training, and research
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, asbestos, lead-based paint, and radioactive waste
Media Affected: Groundwater and soil
Funding to Date: $11.1 million
Estimated Cost to Completion (Completion Year): $17.8 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Aurora, Colorado

Restoration Background

In July 1995, the BRAC Commission recommended closure of all facilities at Fitzsimons Army Medical Center except the Edgar J. McWhethy Army Reserve Center. All tenants will be relocated to other installations. The Army will transfer ownership of excess property to public and private entities by FY03.

Environmental studies at the installation identified several sites, including aboveground storage tanks, underground storage tanks, landfills, clinical areas, pesticide and herbicide facilities, a wastewater treatment plant, and maintenance areas.

A BRAC cleanup team (BCT) was formed to investigate and ensure cleanup of all areas of concern to facilitate property transfer to the Fitzsimons Redevelopment Authority. EPA and the state regulatory agency reviewed the scope of work for the Environmental Baseline Survey and the BRAC Cleanup Plan in FY95.

The commander formed a Restoration Advisory Board (RAB) in FY96. The RAB has met bimonthly to promote the exchange of information among community members and federal and state regulatory agencies. The installation also completed a community relations plan. A low-level radioactive waste landfill (Landfill 5) was excavated, and no radioactivity was detected. Before beginning the excavation, the installation held a media day to address community concerns.

The installation removed tanks and associated contaminated soil from the UST area for the former heating plant and has received formal approval of closure documents from the Colorado Department of Public Health and Environment.

In FY97, the installation initiated groundwater studies and Site Inspections for all sites. Accelerated fieldwork techniques (hydropunch, geoprobe, and cone penetrometer) were employed. In addition, a Total Environmental Restoration Contract was employed at the installation.

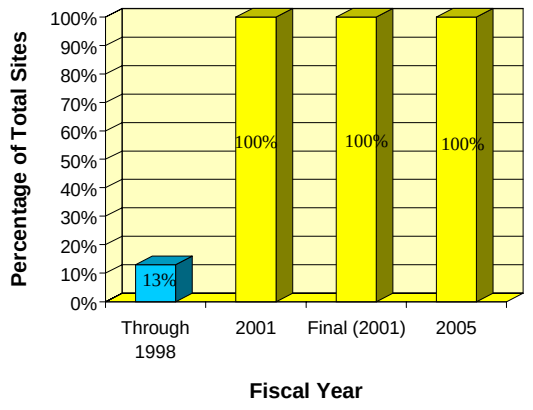
FY98 Restoration Progress

The installation completed studies at four landfills closed prior to 1972: the golf course, pesticide and herbicide facilities, the optical fabrication laboratory, and clinical and maintenance facilities. The Nuclear Regulatory Commission (NRC) decommissioning was completed and a license termination request was forwarded to the NRC. Remediation was started at the Army and Air Force Exchange Service (AAFES) service station and at other underground and aboveground storage tank locations. The BCT reviewed and approved four findings of suitability to transfer (FOSTs) and four findings of suitability to lease (FOSL). Several projects were peer reviewed in FY98. The installation plans to adopt peer review recommendations subject to results of sampling.

Plan of Action

- Based on studies completed in FY98, evaluate the need for risk assessments and remediation at the maintenance areas, the Clinical Salvage Yard, and Optical Fabrication Laboratory
- Independent technical review (or Peer Review) scheduled for April 1999
- Perform NRC confirmatory survey if required for NRC license termination in FY99
- Select landfill closure options and start Remedial Design and remediation in FY99
- Perform risk assessment at the golf course and pesticide storage facilities in FY99
- Complete investigations at the Waste Water Treatment Plant and Perinatal Research Center in FY99

Sites Achieving RIP or RC Per Fiscal Year



Former Weldon Spring Ordnance Works NPL

Size: 17,232 acres
Mission: Manufactured TNT and DNT during World War II
HRS Score: 30.26; placed on NPL in February 1990
IAG Status: IAG signed in 1990; amended in August 1991
Contaminants: TNT, DNT, lead, asbestos, PCBs, PAHs, and low-level radioactive material
Media Affected: Groundwater and soil
Funding to Date: $163.3 million
Estimated Cost to Completion (Completion Year): $77.2 million (FY2004)
Final Remedy in Place or Response Complete Date for All Sites: FY2004

St. Charles County, Missouri

Restoration Background

From 1941 to 1944, the Weldon Spring Ordnance Works produced explosives for the Armed Services. The Army currently occupies the 1,655-acre Weldon Spring Training Area. The majority of the remaining property is owned by the state and is maintained as a wildlife area and an agricultural research facility of the University of Missouri.

Sites at the Weldon Spring Ordnance Works include lagoons, landfills, burning grounds and trinitrotoluene (TNT) and dinitrotoluene (DNT) production lines. Ongoing environmental studies, beginning in FY77, have revealed contamination of groundwater and soil. Initial assessments indicated the presence of explosives, lead, asbestos, pentachlorophenol (PCP), and polyaromatic hydrocarbons (PAHs). Areas containing radioactive material also were identified and are being addressed and remediated by the U.S. Department of Energy (DOE), with the cost of remediation shared by DoD and DOE.

Cleanup activities are grouped in operable units (OUs) including OUs for soil/pipeline (OU1), groundwater (OU2), building demolition and debris removal (OU3), and payments to the DOE for DoD liability (OU4). The OU2 Remedial Investigation (RI) began in FY91.

The U.S. Army Corps of Engineers (USACE) conducted several studies that relate to remediation efforts at the site: a biodegradation research study with the University of Idaho (FY92); a historical survey of activities, with the University of Cincinnati (FY94); and a study, with Texas A&M University, of genetic effects on organisms. USACE also established two community focus groups that included representatives of environmental groups and members of the community. The goal of the groups was to obtain objective, unbiased viewpoints on cleanup decisions.

In FY94, USACE began predesign studies and initiated the Remedial Design (RD) for OU1. The predesign studies and RD were completed in FY95. USACE also worked with DOE to prepare final joint RI and Feasibility Study (FS) work plans for OU2 and to complete two rounds of quarterly groundwater monitoring.

During FY96, USACE completed the RD and the Record of Decision (ROD) for OU1. The draft RI for OU2 was submitted to the regulatory agencies for review. The RI report was finalized in July 1997. Groundwater monitoring is ongoing at OU2.

A Restoration Advisory Board (RAB) meets periodically to discuss cleanup issues. RAB members include representatives of the community, the state regulatory agency, EPA, and other government entities, including the Missouri Department of Conservation (MDOC) and DOE.

FY98 Restoration Progress

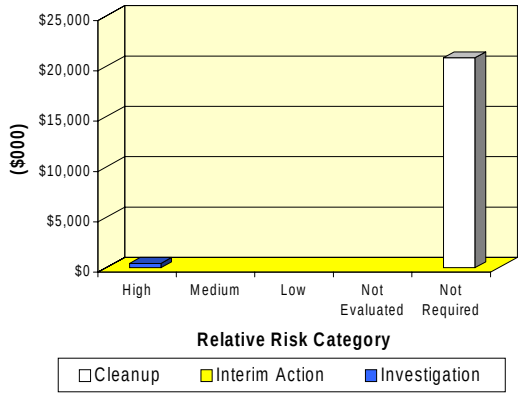
The draft Proposed Plan for OU2 was submitted as a joint effort with DOE. However, comments from EPA and the Missouri Department of Natural Resources delayed finalization of the Proposed Plan until FY99. The OU1 Remedial Action (RA) work plans for soil and pipeline incineration were completed. The incinerator was erected, trial burns were successfully completed, and normal incineration of the contaminated soil and pipelines began. Significant partnering was conducted with regulators regarding initial operation of the incinerator. Three regular RAB meetings and four special RAB meetings were held regarding incinerator operation.

USACE, Kansas City District, has been concerned that the original concrete structures at the facility pose a risk to the local population. Although the perimeter of the facility is fenced, unauthorized use of the facility has resulted in at least two deaths and numerous injuries. To address this problem USACE began the demolition of these structures. RD and demolition of one such structure, Water Treatment Plant No. 2, was completed in FY98.

Plan of Action

- Complete remaining OU1 RA activities in FY99
- Complete ROD for OU2 in FY99
- Pursue OU2 activities separate from DOE after signature of the ROD in FY99
- Coordinate details of long-term monitoring (LTM) with regulators and initiate LTM in FY00
- Complete RD for demolitions and actual demolition of Power Plant No. 2 in FY99
- Complete the RD for the demolition of Power Plant No.1 in FY00
- Coordinate and plan remaining Potentially Responsible Party payments to DOE in FY00

FY99 Funding by Phase and Relative Risk



Fridley Naval Industrial Reserve Ordnance Plant — NPL

Size: 82.6 acres
Mission: Design and manufacture advanced weapons systems
HRS Score: 30.83; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in March 1991
Contaminants: Petroleum/oil/lubricants and VOCs
Media Affected: Groundwater and soil
Funding to Date: $27.9 million
Estimated Cost to Completion (Completion Year): $33.3 million (FY2019)
Final Remedy in Place or Response Complete Date for All Sites: FY2009

Fridley, Minnesota

Restoration Background

Investigations conducted at this government-owned, contractor-operated installation between FY83 and FY88 identified trichloroethene (TCE) in groundwater. The facility was placed on the National Priorities List (NPL) in FY90 because of the TCE contamination in the groundwater, which discharges into the Mississippi River upstream from the Minneapolis drinking water plant.

Site types at the installation include waste disposal pits and trenches, source areas beneath the main industrial plant, a foundry core butt disposal area, and sitewide groundwater contamination. Wastes and contaminants associated with these site types include petroleum/oil/lubricants, solvents, plating sludge, construction debris, and foundry sands.

In FY83, the installation completed Preliminary Assessments and established four sites. A fifth site was established in FY91 for all groundwater, sitewide. The five sites were divided into three operable units (OUs). OU1, Site 5, is the sitewide groundwater. OU2, comprising Sites 1, 2, and 4, includes all source areas outside of the plant buildings. OU3, Site 3, consists of the source areas under the main industrial plant. Sites 1 and 2 have achieved Response Complete status. The remaining OU2 efforts are being conducted under Site 4.

OU1 Feasibility Study activities were completed in FY88, and a Record of Decision (ROD) was signed in FY90. The ROD included a Remedial Action (RA) to provide hydraulic containment and recovery of all future off-site migration of contaminated groundwater. In FY95, the installation initiated a Remedial Design for the groundwater treatment plant. In FY96, it combined OU2 (soil in the unsaturated zone outside the main plant) with OU3 (source contamination beneath the main plant) to effectively manage cleanup.

During FY97, the installation finished removing drums from Site 4, finished the Remedial Investigation (RI) work plan for Site 3, began constructing the groundwater treatment plant, and issued a site management plan. The RA contractor began constructing the groundwater treatment plant before completion of the design to save time and make adjustments in design implementation.

The installation formed a technical review committee in FY93 and converted it to a Restoration Advisory Board (RAB) in FY95. The installation prepared its community relations plan in FY91 and updated the plan in 1997. An administrative record was compiled and an information repository established in FY95. EPA, the Minnesota Pollution Control Agency, and the Navy meet monthly as a formal partnering team. This team developed a plan for screening an off-site area of contaminated groundwater to better understand the impact on the Mississippi River. A Human Health Risk Assessment (HHRA) is being conducted for Site 3 and will be included in the draft RI report.

FY98 Restoration Progress

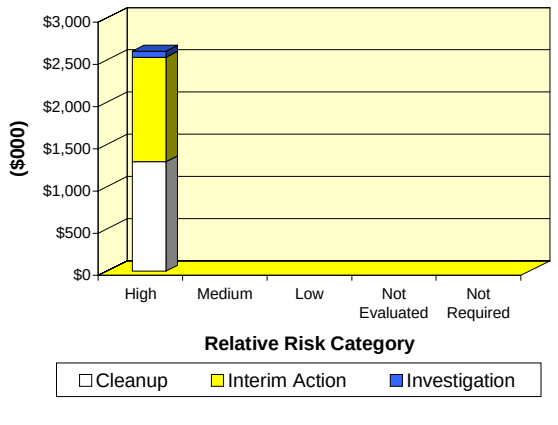
The installation issued the draft RI report, including the HHRA, for Site 3. The five-year review of the groundwater remedy for Site 5 and the groundwater treatment facility construction were completed. The installation conducted a long-term operations and maintenance optimization study for the groundwater remedy to identify cost savings. The evaluation of residual contamination in Anoka County Park continued throughout FY98, but there was not enough funding to complete the project and further evaluation was deemed necessary. A screening effort to assess residual groundwater contamination in Anoka County Park was completed, and recommendations for addressing the issue were included in the five-year review document for the groundwater remedy. The installation began implementing exit strategies and will continue to work on this project. A preliminary draft strategic exit plan was developed.

The partnering team developed a strategy for evaluating Anoka County Park and received the Certificate of Commendation from the Governor of Minnesota in recognition of successful partnering efforts. The Minnesota Department of Health conducted a Public Health Assessment at the installation. The Site 3 risk assessment was developed, with regulatory input during the early stages of the development. The RAB was briefed on Technical Assistance for Public Participation grants, received copies of all Navy deliverables for review, and conducted site tours of the groundwater treatment facility.

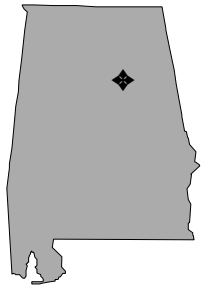
Plan of Action

- Continue to evaluate residual groundwater contamination in Anoka County Park in FY99
- Complete RI for Site 3 (OU3) in FY99
- Begin long-term operations at Site 5 in FY99
- Complete source investigation at Site 3 in FY00 to shorten life cycle of the Site 5 remedy and develop a more efficient extraction system

FY99 Funding by Phase and Relative Risk



Size: 41,191 acres
Mission: House the U.S. Army Chemical School, the U.S. Army Military Police School, and the DoD Polygraph Institute
HRS Score: NA
IAG Status: None
Contaminants: VOCs, SVOCs, pesticides, explosives, metals, UXO, radioactive sources, and chemical warfare agents
Media Affected: Groundwater and soil
Funding to Date: $22.7 million
Estimated Cost to Completion (Completion Year): $81.8 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2005



Anniston, Alabama

Restoration Background

In July 1995, the BRAC Commission recommended closure of most Fort McClellan facilities. The minimum essential land and facilities for a Reserve Component enclave and essential facilities for auxiliary support of the chemical demilitarization operation at Anniston Army Depot were retained. The installation is scheduled to close in FY99.

Environmental studies since FY90 identified the following site types: maintenance facility areas; training and range areas; underground storage tanks (USTs); landfills; incinerators; handling storage areas for toxic and hazardous materials; and chemical agent and radioactive substance training, storage, and disposal areas. Trichloroethene (TCE) and 1,1,2,2-tetrachloroethane are the primary contaminants affecting groundwater.

From FY90 to FY92, the installation conducted an enhanced Preliminary Assessment, which identified 67 sites and performed Site Inspections (SIs) at 17 of these sites (12 former chemical agent training areas, 3 former landfills, and 2 possible munitions-disposal areas).

In FY95, the installation conducted Remedial Investigation (RI) activities at 12 of the 17 sites. Based on the SI report and other supporting data, EPA concluded that environmental conditions at Fort McClellan did not warrant National Priorities List (NPL) listing of the installation. The installation conducted a radiological characterization of the Hot Cell (Building 3192) and the surrounding grounds, and the Nuclear Regulatory Commission (NRC) approved the work plans to clean up the Hot Cell. The Army selected a BRAC environmental coordinator and established information repositories at three locations. The community formed a Local Redevelopment Authority.

In FY96, the installation commander formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). The Army completed remediation of the Hot Cell as required for closeout of the NRC license. The Army also awarded a contract for SI at 17 sites.

The installation accelerated fieldwork in FY97 by using passive soil gas screening technique to screen 11 sites for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). The installation also used a geoprobe at UST sites for site characterization, removed 11 USTs, and replaced 13 USTs. It conducted a postwide background metals survey to supplement the earlier RI report and lay the foundation for a risk-based approach to future investigations. The Army conducted a Risk Assessment Training Course for BCT and RAB members, and the BCT attended partnering training.

Fort McClellan hosted the Defense Environmental Response Task Force (DERTF) meeting in 1997. This meeting gave RAB members a chance to address DERTF on the cleanup and reuse of property contaminated with unexploded ordnance (UXO). The BCT implemented the Total Environmental Restoration Contract as the contracting mechanism for BRAC sites.

FY98 Restoration Progress

The installation completed the BRAC Cleanup Plan (BCP) version I, the final Environmental Impact Statement (EIS), and an Environmental Baseline Survey (EBS). The installationwide work plan and the sampling and analysis plan (SAP) were completed in August. The Huntsville Division, Corps of Engineers, is evaluating ultrawide band synthetic aperture radar imagery for a UXO survey at another installation to determine whether it will be applicable at Fort McClellan. The Engineering Evaluation and Cost Analyses (EE/CAs) for the eastern bypass and the chemical weapons/munitions–contaminated parcels were awarded.

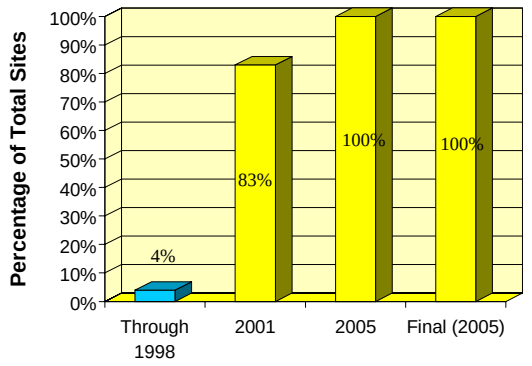
RAB members participated in site tours and special meetings associated with closure and cleanup of the installation. They also received documents for review and participated in discussions on establishing a national wildlife refuge at McClellan. The RAB held meetings at multiple locations in surrounding towns and municipalities to show the RAB's commitment to reaching out to all interested parties.

The BCT participates in monthly facilitated team-building sessions. In FY98, it completed the EBS, BCP version I, the installationwide work plan and SAP,, and site-specific field sampling plans for 67 CERFA Category 7 parcels. Fieldwork for SIs at these parcels began in September. The installation received state and EPA letters of concurrence on CERFA-uncontaminated acreage documented in the EBS.

Plan of Action

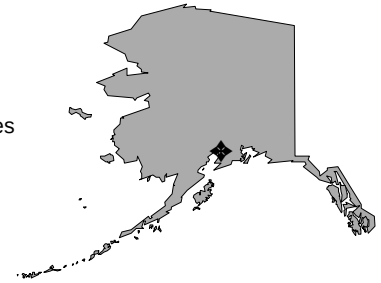
- Complete site investigation fieldwork and draft reports for all CERFA Category 7 property identified in the EBS through FY99
- Publish Record of Decision for EIS in the *Federal Register* in FY99
- Complete radiological Historical Site Assessment in FY99
- Award contract for identification and disposal of UXO in FY99
- Continue EE/CAs on UXO-contaminated properties through FY00
- Complete Environmental Condition of Property for transfer of the Chemical Depot Training Facility and associated facilities for the DOJ Center for Domestic Preparedness in FY99
- Continue negotiations with USFWS for transfer of the Mountain Longleaf National Wild Life Refuge

Sites Achieving RIP or RC Per Fiscal Year



Fort Richardson NPL

Size: 64,470 acres
Mission: Support and sustain forces assigned to U.S. Army Alaska
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement signed in December 1994
Contaminants: White phosphorus, PCBs, heavy metals, petroleum/oil/lubricants, solvents, dioxins, chemical agents, UXO, explosives, and pesticides
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $62.0 million
Estimated Cost to Completion (Completion Year): $22.8 million (FY2009)
Final Remedy in Place or Response Complete Date for All Sites: FY2009



Anchorage, Alaska

Restoration Background

Since World War II, Fort Richardson has supported combat unit training and operations. These activities contaminated soil, surface water, sediment, and groundwater with petroleum/oil/lubricants (POL), solvents, and polychlorinated biphenyls (PCBs). Parts of a 2,500-acre wetland serving as an ordnance impact area are contaminated with white phosphorus.

Preliminary Assessments and Site Inspections completed in FY83 identified 38 contaminated sites. Removal Actions have addressed PCB contamination in soil, underground storage tank (UST) sites, two drum burial sites, and more than 4,000 cubic yards of soil contaminated with volatile organic compounds (VOCs) and chemical agents. The Army also treated 20,000 cubic yards of POL-contaminated soil by thermal desorption.

In FY88, the installation and regulatory agencies established a Cooperative Agreement, forming the Eagle River Flats Task Force (now the Eagle River Flats Biological Technical Advisory Group). Under a Memorandum of Agreement with the Cold Region Research and Engineering Laboratory, several agencies conduct research to satisfy CERCLA requirements and develop cleanup techniques for the Eagle River Flats ordnance impact area.

In FY95, the installation conducted Remedial Investigations (RIs) for Operable Unit (OU) A, to address three potential source areas, and for OU B, a former disposal site for chemical agent identification sets and other small munitions. The Army installed groundwater monitoring wells in the disposal area after a geophysical survey identified potential subsurface anomalies. The installation conducted a focused Treatability Study (TS) for dredging white phosphorus contamination at OU C, the Eagle River Flats Area, and completed a preliminary source evaluation in OU D at nine potential source areas.

The Army completed groundwater sampling at OU B and OU A and submitted draft RI and Feasibility Studies (FSs) to EPA. The installation initiated a pond draining and pumping TS for OU C. Evaluations of petroleum sites were completed under the restoration agreement between the State of Alaska and the Army. More than 20 sites required no further action with negotiated alternate cleanup levels.

In FY97, the installation completed a TS involving heat-enhanced soil vapor extraction (SVE) at OU B. It also completed the RI/FS for OU C and the RI for OU D. Records of Decision (RODs) for OUs A and B were completed and signed.

FY98 Restoration Progress

The installation established a Restoration Advisory Board (RAB), and quarterly meetings began in October 1997. The RAB participated in document review and submitted comments. It also toured Fort Richardson's contaminated sites.

The installation completed a postwide risk assessment and incorporated the results into the OU D RI/FS report. It also successfully drained six ponds, reducing white phosphorus levels in the ponds. The installation signed a ROD for OU C.

A unique 6-phase soil heating system proved extremely effective in removing chlorinated compounds from soil at the Poleline Road Disposal Area. This technique resulted in 93 to 100 percent removal rates from a hot spot of heavily contaminated soil in 6 weeks of treatment. The Army expects that additional treatments conducted during FY98 will significantly reduce the time required to treat the hot spot using dual-phase high vacuum extraction of soil and shallow groundwater. The Army remediated two stockpiles of solvent-contaminated soil excavated from the Poleline Road Disposal Area in 1993 and 1994 using heat-enhanced SVE.

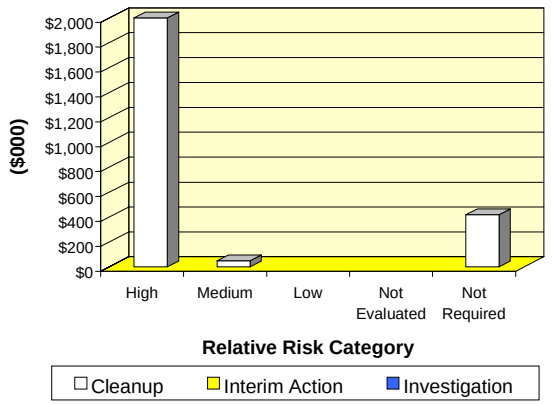
The installation installed SVE systems to remove POL contamination at Ruff Road and the Building 986 POL Laboratory dry well; both are former OU A sites that are now part of the State of Alaska–Fort Richardson Non-UST Petroleum Agreement.

Fort Richardson continues to work effectively with the state and EPA Region 10. Remedial project managers meet at least quarterly and communicate daily on issues affecting site investigations or cleanup. Both state and federal regulatory agencies have been involved with the U.S. Army Alaska's initiative to develop standard operating procedures for the management of institutional controls on Army-controlled property in Alaska.

Plan of Action

- Complete and sign the OU D ROD in FY99
- Design and install the OU B dual-phase vacuum extraction system in FY99
- Continue draining and pumping of ponds at OU C in FY99
- Complete SVE remediation at former OU A POL sites in FY99
- Conduct quarterly RAB meetings and another site tour in FY99 and FY00

FY99 Funding by Phase and Relative Risk



Gentile Air Force Station

Also known as Defense Electronics Supply Center, Dayton

BRAC 1993

Size: 164 acres
Mission: Provided logistical support to the military services by supplying electrical and electronic material
HRS Score: NA
IAG Status: None
Contaminants: Low-level radioactive waste, paint, petroleum/oil/lubricants, solvents, pesticides, herbicides, PCBs, lead, hydrofluoric acid, and coal pile runoff
Media Affected: Groundwater and soil
Funding to Date: $5.9 million
Estimated Cost to Completion (Completion Year): $3.5 million (FY2004)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Kettering, Ohio

Restoration Background

In July 1993, the BRAC Commission recommended closure of the Defense Electronics Supply Center (Gentile Air Force Station) and relocation of its mission to the Defense Construction Supply Center in Columbus, Ohio. The installation closed in December 1996. An Environmental Baseline Survey (EBS) completed in FY94 identified 9 sites and 48 areas of concern (AOCs) on the installation. Prominent site types include underground storage tanks (USTs); areas of past industrial operations; and landfills containing construction debris, hardfill, small amounts of waste oil, solvents, asbestos, low-level radioactive waste, and a subsurface material suspected to be paint thinner. Releases from these sites have contaminated soil and groundwater.

In FY93, to expedite the closure process, a reuse committee was formed to evaluate the effect that installation closure will have on the community and to provide advice on the long-term future use of the installation. The committee helped prepare a market survey of the types of commercial space in high demand in the area. In FY95, the findings were incorporated into an award-winning reuse plan. The installation's BRAC cleanup team (BCT) identified environmental concerns and developed a plan for fully investigating the sites and AOCs. The Local Redevelopment Authority (LRA) has subleased two parcels on the installation.

A Restoration Advisory Board (RAB) was formed in FY94.

In FY95, all but one of the remaining polychlorinated biphenyl (PCB)-containing transformers were removed from the installation.

In FY96, a finding of suitability to lease was completed to further a planned conveyance by deed of the remainder of the installation. Approximately 86 acres was leased to the LRA and the City of Kettering.The installation completed an Environmental Impact Statement, updated the installationwide EBS, and completed a Record of Decision. Remedial Design and Remedial Action (RA) activities began at the installation. A Memorandum of Agreement (MOA) between the DLA and the Air Force Base Conversion Agency (AFBCA) was signed to document funding responsibilities. Phase I of the Remedial Investigation and Feasibility Study (RI/FS) was completed.

In FY97 early regulatory buy-in for Site WP026 facilitated the prompt transfer of Parcel A to the LRA for a required tenant move-in date. No Further Remedial Action Planned documents were signed for 23 sites. All USTs had been removed by FY97.

FY98 Restoration Progress

An FS was initiated for Site SD001, Little Beaver Creek. A non-intrusive investigation of Site LF008, the Construction Debris Disposal Area, began. Parcels A, C, and D were transferred, and 110 acres has now been transferred to the LRA.

Long-term monitoring (LTM) began at Site WP026 and Parcel B. Sites SS014, SS020, SS028, and SS030 continue to be evaluated in a supplemental RI (SRI). The BRAC Cleanup Plan was updated.

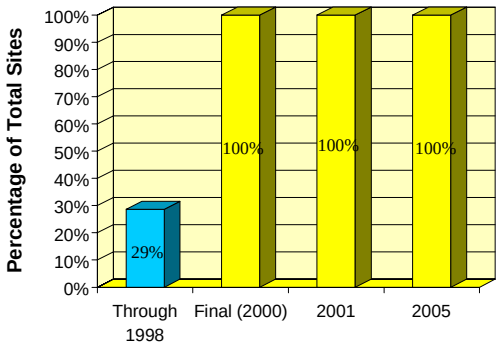
The MOA between the DLA and the AFBCA was amended to terminate DLA's involvement in the environmental restoration effort as of September 30, 1998. The BRAC funds being held by DLA for the remaining cleanup effort will be transferred to the Air Force Center for Environmental Excellence (AFCEE).

The RAB meets quarterly to provide a forum for discussion and information.

Plan of Action

- Complete all remaining FSs in FY99
- Initiate any required long-term operations and LTM in FY99
- Complete the SRI in FY99
- Complete RA on Sites LF008, SS028, WP026, and SD001, if required, by August 2000

Sites Achieving RIP or RC Per Fiscal Year



Size: 5,226 acres
Mission: Provided tactical fighter operations support
HRS Score: 33.62; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in October 1990
Contaminants: Petroleum/oil/lubricants, VOCs, and lead
Media Affected: Groundwater and soil
Funding to Date: $72.3 million
Estimated Cost to Completion (Completion Year): $24.7 million (FY2031)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Victorville, California

Restoration Background

Environmental studies conducted at George Air Force Base since FY81 have identified the following site types: landfills, petroleum spill sites, underground storage tanks (USTs), waste storage and disposal units, and fire training areas. Sites were grouped into three operable units (OUs).

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY84 and have been accelerated by use of field screening techniques. The installation has completed Relative Risk Site Evaluation at all sites. In FY91, the installation implemented an Interim Remedial Action (IRA) at OU1. Other Interim Actions at the installation include removal of more than 80 USTs and contaminated soil, and cleanup and closure of a hazardous waste storage yard. In FY91, a RCRA Facility Assessment identified 113 solid waste management units. In FY92, the installation prepared an Engineering Evaluation and Cost Analysis and installed a pumping system at OU2. A BRAC cleanup team (BCT) was formed in FY92, and the installation's technical review committee was converted to a Restoration Advisory Board (RAB) in FY94. The installation closed on December 15, 1992. The BCT continues to meet monthly.

In FY93, the installation completed a final draft FS and a Proposed Plan for OU1 and began an Environmental Baseline Survey. IRAs were in progress at OU1 and OU2.

In FY94, the Air Force and regulatory agencies signed a final Record of Decision (ROD) for OU1.

In FY95, the installation removed 30 oil-water separators and associated contaminated soil, began operation of bioventing systems at seven fuel-contaminated sites, and removed and disposed of soil from a low-level radioactive waste disposal site. All basewide RI/FS fieldwork was completed, and a draft report was issued.

In FY96, the installation began construction of landfill-surface rehabilitation projects. Mobile recovery units were developed to remove JP-4 jet fuel from contaminated groundwater at OU2. In addition, removal of the liquid fuel distribution system and of all USTs was completed. The installation also began cleanup by bioventing at six fuel spill sites.

In FY97, the installation completed construction of all landfill closures and landfill-surface rehabilitation projects and the Phase II construction of the OU1 treatment system.

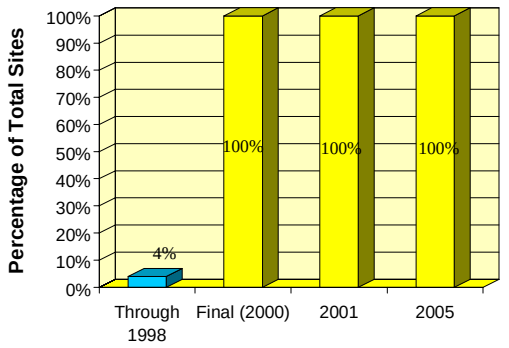
FY98 Restoration Progress

The remedial project managers signed the ROD for OU3 in October 1998. The base continued to investigate TCE removal at OU1, and initiated an optimization study to study the effectiveness of the ongoing pump-and-treat system. A contract for lead removal at the firing range was initiated. The OU2 Treatability study and biovent study were completed. A basewide sampling and analysis plan also was completed.

Plan of Action

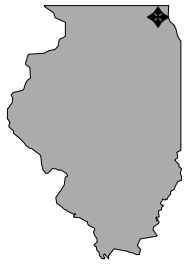
- Submit the OU2 FS for review, including SVE pilot study results
- Continue removal of free product at OU2 by FY00
- Complete closeout of bioventing sites
- Implement OT-51 Remedial Design and Remedial Action
- Implement a basewide groundwater monitoring program
- Complete lead removal at indoor firing range
- Continue long-term operations and monitoring at OU1 and OU2 through FY31

Sites Achieving RIP or RC Per Fiscal Year



Glenview Naval Air Station and Libertyville Training Site — BRAC 1993

Size: 1,300 acres (1,121 acres at Glenview; 164 acres at Libertyville)
Mission: Provided accommodations for aircraft, conducted flight and general training, and served as a NIKE missile location (Libertyville site)
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, heavy metals, PCBs, solvents, asbestos, and waste activated sludge
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $24.3 million
Estimated Cost to Completion (Completion Year): $0.2 million (FY2000)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1997



Glenview, Illinois

Restoration Background

Glenview was established in 1937 to provide accommodations for Service aircraft. In World War II, the station was used for flight training. In 1946, it became a Reserve Command training facility. Libertyville was a flight training site and a NIKE missile air defense location. In July 1993, the BRAC Commission recommended closure of Glenview Naval Air Station, except for 93 acres of housing property, and the Libertyville Training Site. Closure occurred in FY95.

Forty-three sites were identified at the two bases: 33 CERCLA sites and 2 underground storage tank (UST) sites at Glenview; 7 CERCLA sites and 1 UST site at Libertyville. Of these sites, those that present the greatest risk are fire-fighter training areas, landfills, fuel storage areas, and areas where waste was disposed of on the land surface.

In FY88, a Preliminary Assessment identified six potentially contaminated sites at Glenview. A Site Inspection (SI) completed in FY92 identified three more sites at Glenview. Between FY92 and FY94, the installation completed an Interim Removal Action for five of seven CERCLA sites at Libertyville. During FY94, an Environmental Baseline Survey was completed for the two bases.

Because Glenview is 18 miles from Libertyville, two separate local communities are involved with these sites, requiring the formation of two Restoration Advisory Boards. The Navy prepared the Libertyville community relations plan (CRP) in FY93 and the Glenview CRP in FY95. The BRAC cleanup team (BCT), which formed in FY93, works closely with the two Local Redevelopment Authorities (LRAs), which also formed in FY93. A BRAC Cleanup Plan was completed in FY94, and a land reuse plan in FY95.

During FY95, an SI was completed at Glenview Site 8. Also at Glenview, the installation initiated SI activities at 16 sites and Remedial Investigation and Feasibility Study (RI/FS) activities at 4 sites. In FY96, the installation completed removal of all USTs from Glenview, initiated SIs at three sites, and replaced contaminated soil with clean fill in parts of the airfield. The installation also prepared a finding of suitability to transfer (FOST) for Glenview Golf Course and began developing a FOST for most of the airfield property.

During FY97, the installation began an SI at 7 Libertyville sites; began an RI and conducted an Interim Remedial Action (IRA) at 7 Glenview sites; and completed an SI at 20 Glenview sites and UST removals at 1 Glenview site. Some sites scheduled for remediation in FY97 were found to require no further action (NFA). The Navy implemented a formal partnering agreement with regulatory agencies and conducted training for facilitated meetings. The BCT approved a FOST for 545.8 acres at the former Glenview airfield; 120 acres of Glenview property were leased. Except for 11 acres of leased property at the Airfield, all sites have since been transferred. The Navy transferred the Airfield Parcel to the LRA in FY97.

FY98 Restoration Progress

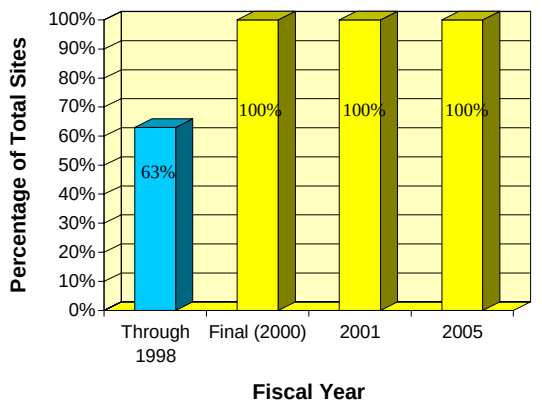
Restoration activities at Glenview included the completion of an SI at two sites, an RI at one site, and an IRA at one site. Five sites at Glenview were designated NFA on the basis of SIs and completion of an IRA for a small spill area. Another RI was not finished as planned because the site required further characterization. The completion of IRAs for five Glenview sites was postponed because BCT priorities shifted in response to LRA requests. At Libertyville, restoration activities included SIs at five sites, an IRA at one site, and UST removal at another site. Three sites at Glenview and three sites at Libertyville, all scheduled for IRAs, were designated NFA.

The Navy transferred Parcels 2 (99.2 acres), 3 (138 acres), and 4 (51.8 acres) and the Golf Course Parcel (109.3 acres) to the Village of Glenview LRA. Of the 1,028 acres at Glenview and the 164 acres at Libertyville available for transfer, 944.2 acres have been transferred. One FOST for an additional 14 acres at Glenview and two FOSTs for a combined 151 acres at Libertyville are in development.

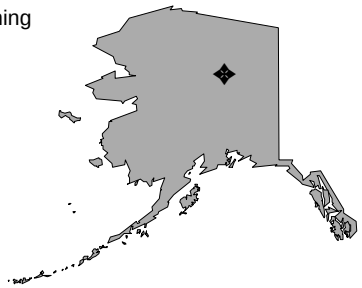
Plan of Action

- Complete final details for UST removal at one site at Glenview and one site at Libertyville in FY99
- Complete SIs at six sites at Glenview and six sites at Libertyville in FY99
- Complete an RI at three sites at Glenview in FY99
- Complete IRAs at 11 sites at Glenview and 1 site at Libertyville in FY99
- Initiate an IRA at one site at Libertyville in FY99
- Complete FOSTs for Parcels 5A, 5B, and 5C at Glenview and Parcels 1 through 3 at Libertyville in FY99
- Complete IRA and SI at one site at Libertyville in FY00
- Complete final FOST for Parcel 4 at Libertyville in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 640,000 acres
Mission: Support Army training, cold weather testing, and cold weather training
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, pesticides, solvents, and radionuclides
Media Affected: Soil
Funding to Date: $18.3 million
Estimated Cost to Completion (Completion Year): $8.5 million (FY2007)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2004



Fort Greely, Alaska

Restoration Background

In July 1995, the BRAC Commission recommended realignment of Fort Greely. The Army will complete realignment by FY02. Site types at the installation include underground storage tanks (USTs), fire training areas, and a radioactive waste line from a nuclear power plant. Soil contaminants from leaking USTs and associated piping include petroleum, oil, and lubricants (POL). Pesticides, such as DDE and DDT, also have contaminated soil at the installation.

To reduce environmental risk, the installation conducted Interim Actions, including removal of USTs and POL-contaminated soil. The installation also used land treatment, bioventing, and low-temperature thermal desorption to remediate contaminated soil.

During FY95, the community formed a Local Redevelopment Authority (LRA) to develop a land reuse plan for the installation. In FY96, the commander formed a Restoration Advisory Board (RAB). The RAB held regular meetings for information exchange between the community and federal and state regulatory agencies. The Army also formed a BRAC cleanup team (BCT) to investigate and ensure cleanup of all areas of concern and conducted an Environmental Baseline Survey (EBS).

In FY97, Fort Greely used an available Total Environmental Restoration Contract to complete investigation of the majority of EBS sites. In addition, ground-penetrating radar was used to locate the nuclear power plant water waste line for removal.

The Army held a kick-off partnering session with regulators to provide early buy-in to field investigation. The BCT attended RAB meetings, produced the latest BRAC Cleanup Plan (BCP), concurred in the designation of CERFA-clean acreage, and set cleanup levels for the nuclear power plant radioactive waste line removal.

FY98 Restoration Progress

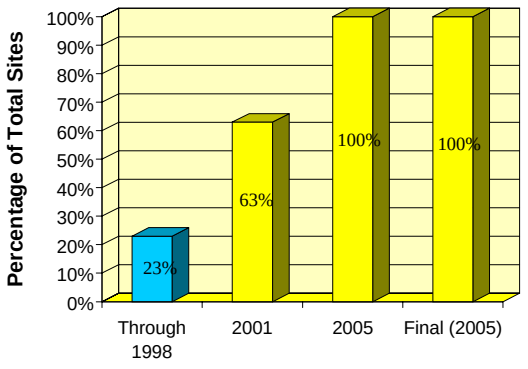
EPA, the Alaska District Corps of Engineers, the LRA, contractors, the State of Alaska, and the Army attended a partnering session in December 1997 that developed a plan of action for FY98 site investigations.

The Total Environmental Restoration Contractor has almost completed initial investigation and characterization of all but two sites identified in the EBS. The two remaining sites are old landfills originally thought to be retained property and were not listed for evaluation in FY98. It appears that 21 sites require some remediation. The BCT agreed that 1,758 acres of 1,785 acres available for transfer is CERFA-uncontaminated. The installation did not complete remediation at the fire training areas because the technology at the areas failed to meet cleanup standards. The installation also did not complete disposal of radioactive waste associated with the removal of the radioactive waste line and associated pipe and soil. The last section of the corridor to be excavated was larger than expected, and there was not enough time or money to complete the task in FY98. The installation completed additional sampling, as suggested by EBS and BCP studies.

Plan of Action

- Conduct a risk assessment to close out fire training areas in FY99
- Complete excavation and disposal of radioactive waste associated with waste line removal in FY99
- Begin remedial efforts at EBS sites in FY99
- Conduct Removal Actions or risk assessments at seven sites in FY99
- Publish BCP Version 2 in FY99
- Conduct Engineering Evaluations and Cost Analyses at seven other sites in FY00
- Conduct a phytoremediation study for treatment of radioactive materials in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 3,552 acres
Mission: Operate air refueling and long-range bombardment facility
HRS Score: 34.20; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in June 1990
Contaminants: VOCs, heavy metals, PCBs, grease, degreasers, caustic cleaners, dyes, penetrants, pesticides, and solvents
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $92.8 million
Estimated Cost to Completion (Completion Year): $68.4 million (FY2033)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2003

Rome, New York

Restoration Background

In FY81, a Preliminary Assessment and a Site Inspection (SI) identified 54 sites at Griffiss Air Force Base. Site types include landfills, underground storage tanks (USTs), fire training areas, disposal pits, and spill areas. Possible off-site groundwater contamination was identified.

Interim Actions conducted at the facility between FY86 and FY91 included modification of a landfill cap and removal of contaminated soil and USTs from a tank farm, various disposal pits, and the area adjacent to an aircraft nosedock. During FY91 and FY92, as an Interim Remedial Action (IRA), an $8 million alternative water distribution system was constructed to serve community residents outside of the installation. Remedial Investigations (RIs) of the areas of concern (AOCs) began in FY93.

In FY95, work began on numerous UST closures and contaminated-soil removals. Contracts for closures under RCRA and contracts for the closure of fuel distribution systems were awarded. The installation also completed an Environmental Baseline Survey (EBS) and received concurrence on 45 of the 1,150 acres proposed as uncontaminated. A final reuse plan also was submitted. A BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) were formed. A Local Redevelopment Authority was formed to address socioeconomic issues related to closure of the installation. A BRAC Cleanup Plan also was completed.

In 1996, the installation completed an Environmental Impact Statement and issued a final reuse Record of Decision (ROD) for the BRAC III realignment. In FY96, 96 of the 210 UST sites and hydrant fuel systems were closed. The installation also began Feasibility Study (FS) activities. Design work began for an IRA at seven AOCs. Samples were collected at 30 sites, and 470 sites were screened under the area of interest (AOI) program, which identifies potential sites. In addition, the installation presented the Relative Risk Site Evaluation (RRSE) to the members of the RAB for questions and comments. The RAB concurred with the RRSE process for determining priorities.

In FY97, the final RI report for 31 AOCs (Federal Facility Agreement sites) was completed. Thirteen draft Proposed Plans for no further action were submitted. The FS process began with submission of the draft Remedial Alternative Development and Screening Report. IRAs began at seven sites.

FY98 Restoration Progress

IRAs have been completed on three of the seven IRA sites. Completion of IRAs at the remaining four sites is anticipated in the near future. The final supplemental investigation report was completed for the 31 AOCs. Five RODs were submitted for execution.

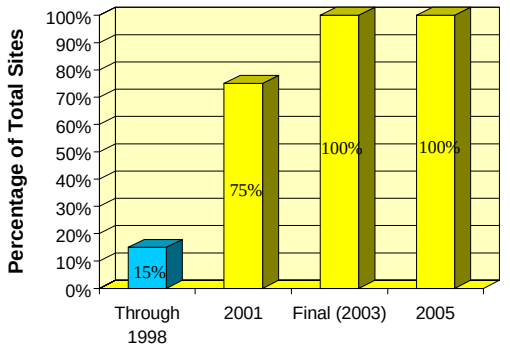
A landfill consolidation program began and is nearing completion. Draft Proposed Plans were submitted for Landfills 1, 2/3, 5, 6, and 7. The final Remedial Designs (RDs) for the landfills have started. The AOC draft long-term monitoring (LTM) baseline study work plan was submitted, and regulatory comments were received. The work plan is now under revision.

Under the AOI program, the draft Expanded Site Inspection (ESI) report has been submitted and regulatory comments received. The AOI FS and associated RDs were delayed until completion of the ESI report. Additional sampling and data collection will be necessary for some sites. The close spill sites program began with submission of the draft Phase I work plan. A RCRA closure report was submitted for 76 areas. Concurrence has been received on 16 areas. Regulatory review continues. UST and oil-water separator closures are also in progress, and airfield closure has started.

Plan of Action

- Complete IRAs for four sites in FY99
- Complete landfill consolidation program in FY99
- Complete the AOI ESI in FY99
- Complete closure designs, Proposed Plans, and RODS for landfills in FY99
- Begin landfill remediation in FY99
- Complete FS for the creeks in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,722 acres
Mission: House a refueling wing; formerly housed a bombardment wing
HRS Score: NA
IAG Status: None
Contaminants: Household and industrial waste, spent solvents, fuels, waste oil, pesticides, lead, silver, munitions, asbestos, potential radiation contamination, PCBs, and lead-based paint
Media Affected: Groundwater and soil
Funding to Date: $11.6 million
Estimated Cost to Completion (Completion Year): $4.8 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2001

Peru, Indiana

Restoration Background

In July 1991, the BRAC Commission recommended realignment of Grissom Air Force Base. After the installation was realigned in September 1994, the Air Force retained approximately 1,400 acres for military activities, and 1,300 acres were returned to the community for redevelopment.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY91. The installation has completed clean closure at underground storage tank (UST) removal sites and finalized No Further Action (NFA) documents for 22 areas of concern (AOCs) and one Installation Restoration Program site.

Grissom is a joint-use base which uses both BRAC and Environmental Restoration Account funds to reach cleanup goals. For a basewide project, such as an Environmental Inpact Statement, the costs are evenly divided. Additional projects that are within defined boundaries are paid from the account affected.

In FY94, the installation formed a BRAC cleanup team (BCT) and prepared a BRAC Cleanup Plan (BCP). The basewide Environmental Baseline Survey (EBS) was completed. The installation also completed Supplemental EBSs and findings of suitability to lease (FOSLs) on specific parcels.

In FY95, the installation began use of ex situ bioremediation, natural attenuation, and geoprobe technology. Site characterization and corrective action plans began at UST sites in the former Military Family Housing Area and at the BX gas station. The installation formed a Restoration Advisory Board (RAB).

In FY96, the installation developed a Focused FS (FFS) to fill specific data gaps in the RI, continued investigation of 16 AOCs, and completed an asbestos survey of BRAC buildings. An Economic Development Conveyance was signed in May 1996.

In FY97, the installation completed the first finding of suitability for early transfer (FOSET), and 201 acres was transferred to the state. Fieldwork on the FFS and an investigation of 9 AOC sites and 40 oil-water separators were completed. An unexploded ordnance (UXO) survey and an environmental investigation began for the munitions burn and burial area. Removal of USTs was completed.

FY98 Restoration Progress

The installation continued to close out AOCs. A UXO statement of clearance was issued for the munitions burn and burial area, and the Environmental Investigation was completed. The small-arms firing range (SAFR) was investigated for the presence of lead above a BCT-adopted risk level. Projects to resolve trichloroethene contamination at oil-water separator 896 and the interim hazardous waste storage site, and petroleum soil contamination at former UST sites were initiated.

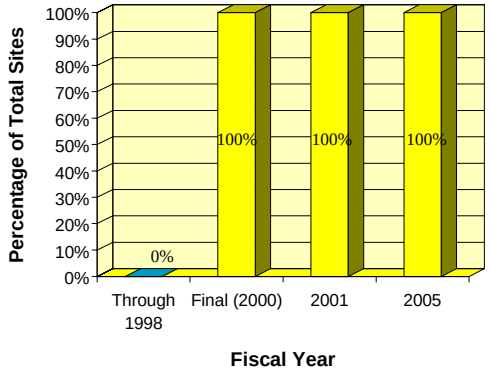
The BCT reached consensus on the closure, with NFA, of the firing-in butt. The BCP abstract was updated. The BCT reached consensus on the use of institutional controls (ICs) as the remedy for naturally occurring metals in shallow groundwater and on Remedial Action (RA) for the landfills. Long-term monitoring (LTM) optimization plans also began.

The RA decision document (RADD) for landfills was delayed because of additional regulator requirements (methane gas sampling), which was initiated. Completion of the decision document for the fire protection training areas is awaiting completion of the FFS. Supplemental investigations of former leaking USTs were delayed by changes in the scope. Findings of suitability to transfer (FOSTs) for all properties are not expected to be completed until FY01.

Plan of Action

- Finalize the FFS and sign the RADD for the fire protection training areas in FY99
- Execute UXO survey and submit a certificate of clearance for the firing-in butt and the grenade training range in FY99
- Submit initial phase of the natural attenuation study to the state for groundwater contamination at the BX and flightline gas stations in FY99; submit RADD in FY01
- Sign decision document establishing ICs as the remedy for metals in the groundwater in FY99
- Reach resolution within BCT on the fate of the alleged buried B58 aircraft site in FY99 and execute cleanup, if needed, in FY99-FY00
- Finalize the munitions burn and burial area report and sign an NFA decision document in FY99
- Complete the methane gas study in FY99 and sign RADD for the landfills in FY00
- Execute RA at the outdoor SAFR and the indoor SAFR in FY99 and sign NFA decision document in FY00
- Continue close out of AOCs in FY00-FY01 and complete FOSTs for remaining property in FY00-FY01
- Complete groundwater monitoring at the former Military Family Housing and sign an NFA decision document in FY00

Sites Achieving RIP or RC Per Fiscal Year



Guam Apra Harbor Complex

BRAC 1995

Size: 17,493 acres

Mission: Maintained and operated facilities, provided services and materials, and stored and issued weapons and ordnance in support of the operating forces of the Navy and shore activities; provided dry-dock facilities, repair services, and related services for Guam Naval Activities

HRS Score: NA

IAG Status: IAG signed in 1993

Contaminants: PCBs, petroleum/oil/lubricants, solvents, pesticides, and heavy metals

Media Affected: Groundwater and soil

Funding to Date: $83.3 million

Estimated Cost to Completion (Completion Year): $70.0 million (FY2013)

Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2013

Apra Harbor, Guam

Restoration Background

This facility consists of Navy commands in the Apra Harbor area and the former Naval Magazine (NAVMAG) area southeast of the harbor. Four of the commands (Guam Naval Activities (NAVACTS), Naval Fleet and Industrial Supply Center (FISC), Naval Ship Repair Facility (NSRF), and Public Works Center (PWC)) were recommended for realignment or closure by the BRAC Commission in July 1995. The Naval Ship Repair facility ceased operations in September 1997.

Operations that contributed to contamination were support, photographic and printing shops, a dry cleaning plant, power plants and boilers, pest control operations, and chemical and medical laboratories. Wastes were stored and disposed of in landfills, incinerators, and wastewater treatment plants.

The four commands have 29 CERCLA sites in the Installation Restoration Program, 21 RCRA sites, and 3 BRAC sites. Of the CERCLA sites, 12 are Response Complete, 3 are in the study phase of a Remedial Investigation and Feasibility Study (RI/FS), 3 are in the cleanup phase of Interim Remedial Action (IRA), and 3 are in the study phase of IRA. Of the RCRA sites, 19 are in the RCRA Facility Investigation (RFI) and corrective measures study (CMS) phase. Two Removal Actions have been completed, and a Human Health Risk Assessment and an Ecological Risk Assessment have been prepared for the four commands. Of the three BRAC sites, one is in the study phase and two are in the Engineering Evaluation and Cost Analysis (EE/CA) phase. In FY95, a draft EE/CA for NAVACTS Site 28 was completed and the site was included in the 1995 BRAC round. Because of suspect data, confirmatory sampling was conducted concurrently with the RI for the adjacent wetland area.

The complex completed a joint community relations plan in FY92. A local information repository was established in FY94. The complex converted its technical review committee (formed in FY89) to a Restoration Advisory Board (RAB) in FY95. During FY96, the BRAC cleanup team (BCT) completed an Environmental Baseline Survey (EBS) and a BRAC Cleanup Plan (BCP). In FY97, regulators and the Navy created a Memorandum of Understanding. Also in FY97, the BCT completed a finding of suitability to lease for two parcels, finished resampling of suspect data, and expanded an RI.

FY98 Restoration Progress

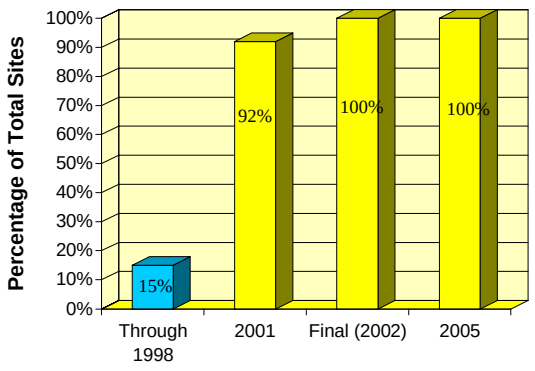
At NAVACTS, Corrective Measures Design (CMD) was completed for four sites. Corrective measures implementation (CMI) is under way at two sites. The draft EE/CA for Site 1 was completed. However, because of erosion on the cliff, design and construction of the Site 1 Removal Action were not completed. A separate Removal Action is being designed to stabilize the cliff. The planned Removal Action for Site 14 was conducted. The planned Removal Action for Site 4 was deferred, pending receipt of regulator comments on the revision of the remedial alternative. Investigations began for Areas of Concern (AOCs) 1 and 2. At FISC, investigation began at Site 33. At Site 19, the EE/CA and the draft design of the Removal Action were completed. CMI is under way at Site 12.

At NSRF, the RA was delayed so that the EE/CA could be presented to the RAB. CMI is complete for Site 51, and Guam EPA tentatively approved the final RFI report for surface and subsurface soil at the remaining seven NSRF sites; no CMD was needed. At PWC, the Removal Action for Site 16 was not completed. Two areas of contamination remain at the site, and additional sampling may be performed. The RIs for Sites 16 and 17 were not performed because funding was reallocated to other projects. CMD was completed at Sites 1 and 11, and CMI is under way at Site 1. Investigation began at AOC 1. The Removal Action began at Site 28.

Plan of Action

- Complete revised draft EE/CA for NAVACTS Site 28 in FY99
- Begin CMI for PWC Site 11 and NAVACTS Site 26 in FY99
- Complete CMI at PWC Site 1, FISC Site 12, and NAVACTS Sites 16 and 17 in FY99
- Conduct investigations at Barrigada Disposal Areas and begin EE/CA at NAVACTS AOC 3 in FY99
- Complete investigation and start EE/CA and RA at NAVACTS AOC 2 in FY99
- Complete EE/CA at FISC Site 33 in FY99
- Complete RD for seawall and begin IRA at NAVACTS Site 1 in FY99
- Complete EE/CA and RD and begin RA at NSRF AOC 1 in FY99
- Complete RD and RA at NSRF Site 25 in FY99
- In FY99, complete a Removal Action for NAVACTS Site 14 and an RI, EE/CA, and RD at PWC AOC 1
- Finalize design and initiate Removal Action at FISC Site 19 in FY99
- Complete RI and begin RD at the New Apra Heights Disposal Area NAVACTS AOC 1

Sites Achieving RIP or RC Per Fiscal Year



Port Hadlock Naval Ordnance Center

Pacific Division Attachment **NPL**

Size: 2,716 acres
Mission: Receive, store, maintain, and issue ordnance
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: IAG signed in August 1996
Contaminants: TNT, RDX, heavy metals, PCBs, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $7.2 million
Estimated Cost to Completion (Completion Year): $5.6 million (FY2006)
Final Remedy in Place or Response Complete Date for All Sites: FY2006

Port Hadlock, Washington

Restoration Background

Since FY84, environmental investigations at this installation have identified 17 sites. The primary sources of contamination are landfills and ordnance disposal sites. Environmental investigations have focused on cleaning up existing, and preventing future, contamination of shellfish beds near the installation. Contaminants can migrate by overland flow into bays or through soil to the sea-level aquifer. The bays near Port Hadlock are used for both recreational and commercial fishing. An investigation completed in FY88 found trace metals (including lead), organics, and petroleum hydrocarbons in shellfish near the North End Landfill. A study in FY93 produced similar results.

In FY87, a tank was removed and field monitoring of explosive gas concentrations was completed at the buried Imhoff tanks. A Remedial Action (RA) for the site involved installation of piping and fans to vent methane gas from the tanks. Two Removal Actions were completed in FY91. One involved removing abandoned underground storage tanks (USTs); the other included removal of one UST and excavation and disposal of associated petroleum-contaminated soil. The installation performed an additional Removal Action at this second site in FY94, removing petroleum-contaminated soil and disposing of it at an off-site landfill.

In FY95, Interim Remedial Actions (IRAs) were completed at three sites. At two sites, soil contaminated with ordnance was removed and disposed of off site. At the third site, sediment containing polyaromatic hydrocarbons (PAHs) was removed. The two ordnance-contaminated sites are located in an area used by Native American tribes, prompting concerns about archaeological and cultural resources. A Record of Decision (ROD) for no further action (NFA) was signed for these sites and three others. Erosion and groundwater discharge from Site 10 (a landfill) have contributed to contamination of surrounding beaches and had significant influence on National Priorities List (NPL) scoring. A ROD was signed designating capping for the landfill and installation of a seawall to minimize erosion. The installation used biogeoengineering techniques to prevent shoreline erosion.

During FY96, the installation completed the Remedial Design at Sites 10, 11, 12, 18, and 21, and the RA at Site 18. The Navy and the National Council of Historic Places signed a Memorandum of Agreement to protect archaeological remains during construction of the RA. The tribes also signed after consultation.

Compliance monitoring continued at one site and began at another during FY96. A Removal Action was initiated at Site 34 (an open burning and open detonation area that was identified in FY95), groundwater monitoring began at Site 21, and compliance monitoring continued at Site 12. The Navy, EPA Region 10, and the State of Washington signed an Interagency Agreement (IAG) for eight sites.

During FY97, an RA was completed at Site 10, operations and maintenance (O&M) activities and compliance monitoring for groundwater began, and site investigations were initiated at Sites 33 and 35. An early action at Site 10 was performed to prevent erosion. At Site 34, an IRA and a Site Inspection (SI) were completed and the site was proposed for NFA.

The installation's technical review committee, which was formed in FY88, was converted to a Restoration Advisory Board (RAB) in FY95. The RAB includes 30 members who represent regulatory agencies, local Native American tribes, and neighboring communities. A community relations plan was developed in FY92 and revised in FY96. The installation also distributed fact sheets covering such topics as state involvement and oversight, the Site Hazard Assessment program, the results of shellfish and sediment sampling, and the results of cleanups.

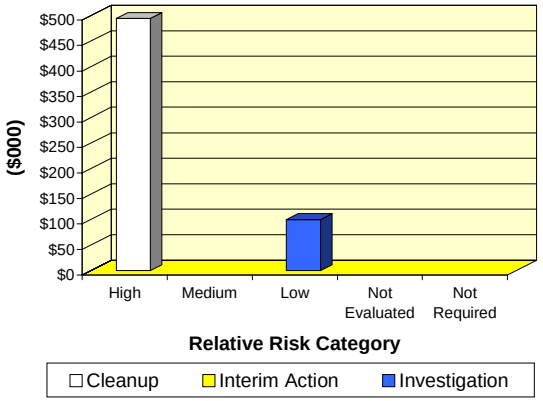
FY98 Restoration Progress

O&M and compliance monitoring for groundwater were completed. Site investigations were completed at Sites 33 and 35, and both sites were proposed as NFA sites. Compliance monitoring continued at Sites 12 and 21, which must await regulatory acceptance before response is complete.

Plan of Action

- Begin SI at Site 36 in FY99
- Complete sampling at Sites 12 and 21 in FY99
- Complete risk analysis of sediment and shellfish for Site 10 in FY99
- Conduct long-term monitoring of groundwater and long-term operations until 2002

FY99 Funding by Phase and Relative Risk



Size: 722 acres
Mission: Conducted reserve training
HRS Score: NA
IAG Status: None
Contaminants: Metals, VOCs, SVOCs, fuel hydrocarbons, PCBs, PAHs, and pesticides
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $19.7 million
Estimated Cost to Completion (Completion Year): $5.7 million (FY2004)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2004

Novato, California

Restoration Background

In December 1988, the BRAC Commission recommended closure of about 700 acres at Hamilton Army Airfield (HAAF), as well as relocation of the airfield's mission. There are eight areas at the installation: a former petroleum/oil/lubricant (POL) hill area; a hospital complex; five "Out Parcels" (A-2, A-3, A-4, A-5, and A-6); and the main airfield parcel. Out Parcels A-2, A-3, A-5, and A-6 were transferred to the City of Novato, California, in 1996.

Investigations at the main airfield parcel addressed tidal wetlands, a perimeter drainage ditch, underground storage tanks (USTs), burn pits, aboveground storage tanks, onshore and offshore fuel lines, a former sewage treatment plant, a pump station, an aircraft maintenance and storage facility, the east levee construction debris disposal site, a POL area, and a revetment area. Metals, petroleum hydrocarbons, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, and polychlorinated biphenyls (PCBs) are the main contaminants of concern.

In FY94, the installation formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). To facilitate cleanup, the BCT conducted a bottom-up review of the installation's restoration program. Since FY94, the BCT has met monthly to discuss environmental restoration efforts, receive briefings on the restoration program, and review documents. The RAB meets monthly to discuss restoration activities and issues related to property reuse.

During FY95, the installation completed a draft Environmental Impact Statement. Additional Remedial Investigation (RI) work continued at five sites. Cleanup actions conducted at the installation included removal of USTs and removal of soil contaminated with petroleum constituents and PCBs.

In FY96, the Army continued RI and Feasibility Study (FS) activities on the main airfield BRAC parcel. Out Parcels A-5 and A-6 were transferred to a local development authority. In addition, the local reuse authority selected a wetlands reuse scenario for the BRAC airfield parcel.

In FY97, the Army removed two USTs. The HAAF BCT, consisting of the Army, the U.S. Army Corps of Engineers (USACE), the BRAC environmental coordinator office, and regulatory agencies, worked to expedite cleanup by using a data-quality-objective approach to site characterization.

FY98 Restoration Progress

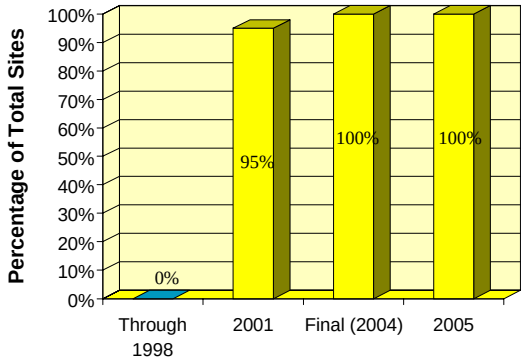
The Army accelerated the restoration schedule and revised the restoration plan of action in FY98. The comprehensive RI report was submitted to the regulatory agencies for review. The installation is using Interim Removal Actions to accelerate the restoration schedule. An Interim Removal Action work plan was prepared and fieldwork was initiated for several sites that were identified in the RI report. The risk assessments and the Focused FS (FFS) were delayed so that the results of confirmation sampling data from the Interim Removal Actions could be included. The Army completed the design for the onshore fuel line remedy and removed the fuel line. The offshore fuel line was flushed, sealed, and abandoned in place. The reuse developer's delay in performing the building demolition caused a delay in fieldwork necessary for preparation of the closure reports for Out Parcel A-4. The installation is now preparing the closure reports.

The installation is trying to rekindle interest in the RAB at the BCT. The installation needs public input to meet the accelerated cleanup schedule. The installation also held a partnering session with the regulatory agencies, command headquarters, USACE, and the restoration contractor. The meeting was used to ease tensions about lines of authority and to refocus efforts toward base closure and transfer. The installation also has been working on a Memorandum of Agreement with the future landowner to identify the actions for which the Army will be responsible.

Plan of Action

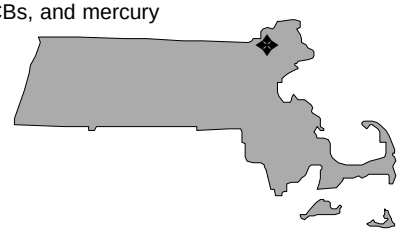
- In FY99, complete a fate-and-transport study to justify leaving some remaining onshore fuel line contamination in place
- Complete the Interim Removal Actions for all sites inside of the perimeter levee in FY99
- Complete the risk assessment and FFS in FY99
- Complete closure reports for Parcel A-4, the POL hill, the hospital area, and the offshore fuel line in FY99
- Complete the Interim Removal Actions for sites outside of the perimeter levee early in FY00
- Issue a no further action ROD in early FY00; conduct long-term monitoring (LTM) if required
- Complete BRAC activities in FY00, except for LTM

Sites Achieving RIP or RC Per Fiscal Year



Hanscom Air Force Base NPL

Size: 826 acres
Mission: Support Electronic System Center
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: None
Contaminants: VOCs, chlorinated solvents, gasoline, jet fuel, tetraethyl lead, PCBs, and mercury
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $28.9 million
Estimated Cost to Completion (Completion Year): $18.2 million (FY2020)
Final Remedy in Place or Response Complete Date for All Sites: FY2000



Bedford, Massachusetts

Restoration Background

Historical operations at Hanscom Air Force Base involved generation, use, and disposal of numerous hazardous substances, such as chlorinated solvents, fuel, aromatic solvents, tetraethyl lead, and polychlorinated biphenyls (PCBs). Possible sources of contamination include a former industrial wastewater treatment system, a former filter-bed/landfill area, a jet fuel residue and tank sludge area, two landfills, three former fire training areas, a paint waste disposal area, a mercury spill area, the former aviation fuel handling and storage facilities, underground storage tanks (USTs), and various fuel spill areas.

Environmental studies identified a total of 22 sites. All required actions have been completed, and no further response is planned, for 13 of these sites. Decision documents for no further response are being prepared for two additional sites. Remedial Investigations and Feasibility Studies (RIs/FSs) are under way at the remaining seven sites, and Interim Remedial Actions have been completed or are under way at six of the seven.

In FY88, the final Remedial Action (RA) was completed at the closed municipal waste landfill, and Interim Actions were completed at three high-risk sites in Operable Unit (OU) 1. Buried drums and contaminated soil also were removed. In FY89, the final RA was completed for the mercury release site.

In FY90, Interim Actions included removing abandoned tanks and petroleum-contaminated soil at UST sites. In FY91, the installation began operating the OU1 groundwater collection and treatment system to remove VOCs from groundwater and completed an Interim Action at the Army and Air Force Exchange Service (AAFES) service station UST site, including removal of 2,700 tons of contaminated soil.

In FY94, the installation removed more than 1,300 tons of contaminated soil from a former UST site. In FY95, the installation began an Interim Action involving dual-phase groundwater extraction and soil vapor extraction system at the former aviation fuel handling and storage area for remediation of petroleum releases. The installation's technical review committee was converted to a Restoration Advisory Board (RAB).

In FY96, the installation entered a partnership with EPA and Tufts University to support research and development while filling data gaps in RIs. In FY97, the installation automated the groundwater recovery and treatment system at OU1 and added two new recovery wells to the collection system. Human Health and Ecological Risk Assessments were completed for the capped municipal waste landfill, and the Massachusetts Contingency Plan (MCP) documentation was filed to establish natural attenuation as the final remedy for the AAFES service station UST site.

FY98 Restoration Progress

The installation completed Site Inspections (SIs) at two UST sites, an RI at the former filter-bed/landfill site, and groundwater monitoring at OU1 and the AAFES service station site. FS and Record of Decision (ROD) processes for OU1 and OU3 and operation of the groundwater recovery and treatment system at Site ST21 continued.

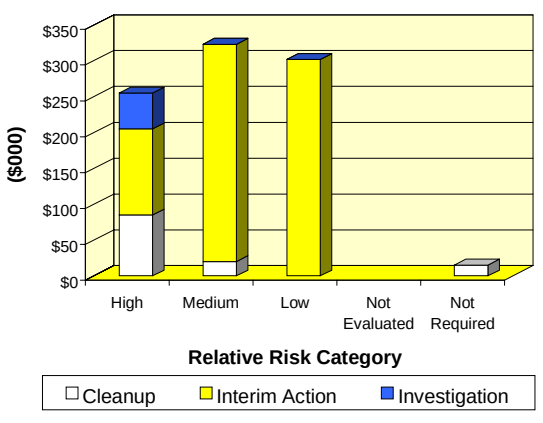
Tufts University completed an environmental technology initiative at OU1, which EPA has publicized as a success story. The installation hosted an Air Force Technology Transfer Project to demonstrate vacuum-enhanced recovery of chlorinated hydrocarbons from groundwater at the former fire training site in OU1. The success of this project resulted in the scheduling of an additional 6-month demonstration for FY99. Three RAB meetings were held in FY98.

Technical problems delayed the Human Health and Ecological Risk Assessments for OUs 1 and 3 and the process to establish the final remedy for the base motor pool UST site.

Plan of Action

- Complete Human Health and Ecological Risk Assessments for OU1 and OU3 and the RI at the former aviation fuel handling and storage site in FY99
- Complete MCP process to establish natural attenuation as final remedy for the base motor pool UST site in FY99
- Complete No Further Action decision documents for two UST sites in FY99
- Host Air Force Technology Transfer Project to demonstrate vacuum-enhanced recovery of chlorinated hydrocarbons from groundwater at Site FT01 in OU1
- Continue FS and ROD process for OU1 and OU3 in FY99
- Continue operating the groundwater recovery and treatment system for OU1 and the dual-phase recovery and treatment system at the former aviation fuel handling and storage area in FY99
- Continue long-term monitoring at the AAFES service station site and long-term maintenance at the capped municipal waste landfill in FY99

FY99 Funding by Phase and Relative Risk

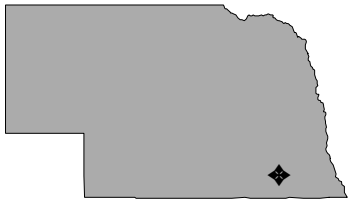


Hastings Groundwater Contamination Site

Formerly Blaine Naval Ammunition Depot

NPL

Size: 48,753 acres
Mission: Produce, load, and store ammunition
HRS Score: 42.24; placed on NPL in June 1986
IAG Status: IAG under negotiation
Contaminants: Explosive compounds, UXO, VOCs, PAHs, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $57.0 million
Estimated Cost to Completion (Completion Year): $161.4 million (FY2031)
Final Remedy In Place or Response Complete Date for All Sites: FY2005



Hastings, Nebraska

Restoration Background

Operations at the Blaine Naval Ammunition Depot (NAD) subsite contributed to groundwater and soil contamination at the Hastings Groundwater Contamination Site. The U.S. Army Corps of Engineers (USACE) designated five operable units (OUs) at the site: three OUs for the 2,900-acre Hastings East Industrial Park (HEIP) area (OU4, soil; OU8, vadose zone; and OU14, groundwater); one OU for the former Naval Yard Dump, the Explosives Disposal Area, and the Bomb and Mine Complex Production Facility (OU16); and one OU for a 44,500-acre area whose contamination status is unknown (OU15).

Soil sampling, installation of monitoring wells, and geophysical surveys were conducted for the Remedial Investigation (RI) of the HEIP area. EPA signed a Record of Decision (ROD) to remove surface soil. In FY95, EPA signed an amendment to the ROD for removal of soil from the HEIP area.

RI, Feasibility Study (FS), and Remedial Design (RD) activities were conducted for two OUs. A Time-Critical Removal Action was conducted in an area where an air-sparging pilot study was conducted, to remove utility accesses and piping that had been identified as a source of groundwater contamination. Engineering Evaluations and Cost Analyses (EEs/CAs) were performed to assess alternatives for environmental restoration in several areas. USACE also completed a preliminary environmental study for the remaining 44,500 acres at the former depot.

In FY96, the RD for Soil Vapor Extraction (SVE) and remediation of surface soil at the HEIP area was completed. Phase II of the RD for SVE began at three source areas in OU8. USACE completed the air-sparging pilot study as part of the RI/FS for OU14 and began the Time-Critical Removal Action for the air-sparging facility. A comprehensive RI began for 44,500 acres at the former depot. A Time-Critical Removal Action for subsurface soil and drums was conducted at the Naval Yard Dump. In addition, a Remedial Action (RA) for surface soil at the HEIP area and a Removal Action at the HEIP area were initiated.

In FY97, a sitewide groundwater Baseline Risk Assessment began. USACE used shallow and deep soil gas sampling and testing and fielded indefinite-delivery contracts to expedite contracting of the cleanup.

The property's 20-member Restoration Advisory Board (RAB) participated in a site tour and risk assessment training.

FY98 Restoration Progress

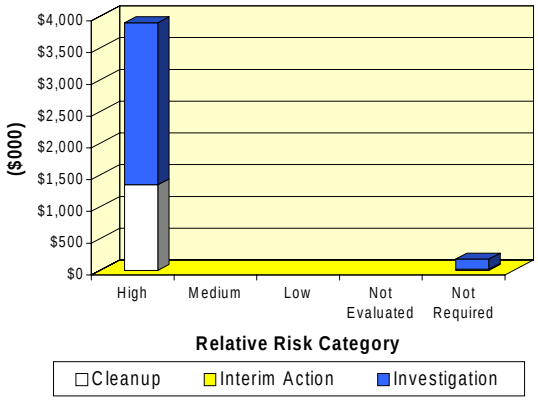
The OU4 RA was completed in June. EPA completed an RA report on the OU4 soil repository, and operations and maintenance for the repository began. A Total Environmental Restoration Contract (TERC) was awarded. Activities contracted for, and now in progress, under this vehicle include groundwater Ecological Risk Assessments (ERAs), a Removal Action for the explosives disposal area, and design and construction of SVE systems, as well as preparation of numerous NAD-wide plans. Two innovative technologies, in situ bioremediation and in-well stripping, were pilot tested. The OU8 Phase I systems produced significant reductions in contamination. In coordination with USACE, Huntsville, a contract for the ordnance and explosives (OE) EE/CA was awarded, and work is now in progress.

The property's RAB members participated in groundwater hydrogeologic training. The Army signed a Federal Facility Agreement and final approval awaits conclusion of a 30-day public comment period.

Plan of Action

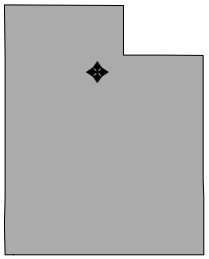
- Conduct Technical Assistance for Public Participation training for RAB in November 1998
- Complete OE EE/CA in FY99
- Complete technical memo to address carcinogenic polyaromatic hydrocarbons (cPAH) in FY99
- Continue annual groundwater monitoring program in FY99
- Complete OU14 groundwater ERA in FY99
- Design and construct OU8 Phase II SVE systems in FY99
- Complete OU14 groundwater model in FY99
- Finalize site-wide plans in FY99
- Submit OU15 ERA in FY99
- Conduct field sampling for OU15 and OU16 EE/CA in FY99

FY99 Funding by Phase and Relative Risk



Hill Air Force Base NPL

Size: 6,666 acres
Mission: Provide logistics support for weapons systems
HRS Score: 49.94; placed on NPL in July 1987
IAG Status: IAG signed in April 1991
Contaminants: Solvents, sulfuric acid, chromic acid, metals, and petroleum wastes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $115.3 million
Estimated Cost to Completion (Completion Year): $196.2 million (FY2047)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



Ogden, Utah

Restoration Background

Between FY82 and FY87, Preliminary Assessment and Site Inspection activities were completed at Hill Air Force Base. Since FY87, 97 sites have been identified. Forty of these sites have been grouped into nine operable units (OUs). Site types include disposal pits, landfills, surface impoundments, underground storage tanks (USTs), fire training areas, firing ranges, discharge and wastewater ponds, a contaminated building, a munitions dump, and spill sites.

The base installed five systems to treat groundwater, capped two landfills at OU1, capped one of the discharge and wastewater ponds at OU3, and recovered and treated trichloroethene (TCE)-contaminated groundwater at OU6. In FY95, the installation began work on the Remedial Investigation and Feasibility Study (RI/FS) for OUs 5 and 6 and implemented Phase I of the Interim Remedial Action at OU8. The installation also completed decision documents for 66 sites, signed Records of Decision (RODs) for five OUs, and signed two interim RODs.

In FY96, the installation demonstrated nine technologies for cleaning heavily contaminated chemical pits. A ROD was signed for Chemical Pit 3 (OU2), and construction of a containment system began. In addition, four UST sites were closed and five additional decision documents, as well as the ROD for OU2, were completed,. The installation also completed Remedial Design and Remedial Action (RD/RA) activities at OU7 and completed the design and implemented the RA for upgrading the horizontal drain system at Landfill 1.

In FY97, a ROD was signed, and the RD phase began, for OU6. More than 200 areas of concern in OU9 were investigated and closed, requiring no further action. Innovative technologies, such as surfactant-enhanced removal of chlorinated solvents and steam-enhanced removal of dense nonaqueous-phase liquids, were used at the installation. Use of hydropunch/geoprobe, real-time groundwater chemistry monitoring, and electromagnetic techniques accelerated fieldwork. Consolidating treatment system operations and completing investigations at unevaluated parts of the base under a single OU saved $600,000 and reduced the time line by 2 years.

The installation formed a Restoration Advisory Board (RAB) in FY94. In FY97, RAB involvement in a review of the OU6 Proposed Plan provided an opportunity for early input into the groundwater collection approach. RAB comments were incorporated, reducing the estimated time to cleanup with only a marginal cost increase.

FY98 Restoration Progress

A hydraulic barrier was constructed and is operating at OU2, and an innovative asphalt capping scheme was designed and constructed for OU3. At an off-base area with groundwater contamination, a natural attenuation cleanup strategy was employed and an innovative aeration curtain was also implemented to prevent contamination from moving into the local community. TCE in the groundwater was reduced by 99.4 percent. Over 42,000 gallons of solvent has been removed, with a 98 percent removal efficiency, reducing the cost of long-term treatment by $30 million.

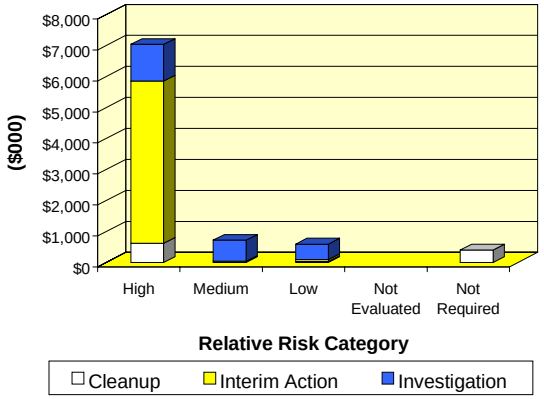
A ROD was signed for six sites in OU1. The installation cosponsored a national conference in Salt Lake City on natural attenuation of chlorinated solvents for regulatory personnel and stakeholders.

A partnership is in place and a cleanup agreement is being drafted for the Utah Test and Training Range (UTTR) to avoid unnecessary investigations and studies. All USTs have been addressed with a risk-based corrective action approach; some of these sites are still awaiting regulatory concurrence. Partnership efforts with EPA Region 8 and the Utah Department of Environmental Quality continued. A new EPA remedial project manager was assigned to the installation, and orientation is under way. RAB attendance increased dramatically due to dedicated project team involvement.

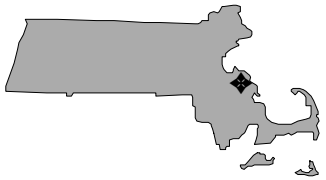
Plan of Action

- Complete installation of five additional cleanup systems
- Close eight sites
- Sign innovative cleanup agreement for the UTTR
- Continue stakeholder involvement by hosting additional RAB training and continuing to bolster attendance
- Complete test demonstration of innovative technology using co-metabolic cleanup of TCE
- Complete design for cleanup construction at six sites

FY99 Funding by Phase and Relative Risk



Size: 125 acres
Mission: Served as a Naval Ammunition Depot and Army Reserve Center
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, heavy metals, VOCs, PCBs, and asbestos
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $1.2 million
Estimated Cost to Completion (Completion Year): $0.2 million (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Hingham, Massachusetts

Restoration Background

In July 1995, the BRAC Commission recommended closure of Hingham Annex, a sub-installation of Fort Devens. The installation is now inactive. Studies have identified the following site types at the Annex: underground storage tanks (USTs), aboveground storage tanks (ASTs) and spill sites, waste disposal areas, sewage filter beds, storage areas for polychlorinated biphenyl (PCB)–containing transformers, and areas with asbestos-containing materials (ACM). Investigations have determined that groundwater and soil are contaminated with volatile organic compounds (VOCs) and heavy metals.

Interim Actions at the installation include removal of USTs; ASTs; an oil-water separator; contaminated soil, including contaminated soil from an area that held PCB-containing electrical transformers; and ACM (building insulation and roofing tiles). The Army also used an innovative technology, asphalt batching, to remediate contaminated soil.

In FY93, the Army formed a BRAC cleanup team (BCT), which includes representatives of the installation and the state regulatory agency. The installation has involved the community in the restoration process by holding public meetings, publishing newsletters and a brochure, and participating in televised interviews.

During FY95, a Phase II Screening Site Inspection (SSI) was completed. The state regulatory agency allowed the installation to proceed with removal of soil contaminated with petroleum/oil/lubricants (POL), pending revision of the Human Health and Ecological Risk Assessments. In FY96, the installation removed the POL-contaminated soil. The installation conducted an Environmental Baseline Survey (EBS) and received comments on the draft report. The BCT completed the BRAC Cleanup Plan (BCP), version I. The Army awarded contracts for additional field sampling to support a finding of no significant risk in revised Human Health Guidelines and to conduct Ecological Risk Assessments (ERAs). Another contract was awarded for removing soil contaminated with petroleum. The installation also distributed a progress update newsletter to all residents within a 1-mile radius of the installation. Public interest has been insufficient to support formation of a Restoration Advisory Board.

The Army completed the final BCP in FY97. Seven early actions—for asbestos, Building 25 AST, Building 25 Transformer Area, Waste Disposal Area, Building 54 Transformer Area, Building 90 AST, and Building 90 PCB Transformer—were also completed. The installation conducted an unexploded ordnance archives search to support a recommendation of no further action and prepared a report on the results. It also performed release abatement measures (RAM) while conducting a Phase II Comprehensive Site Assessment (CSA) and an SSI.

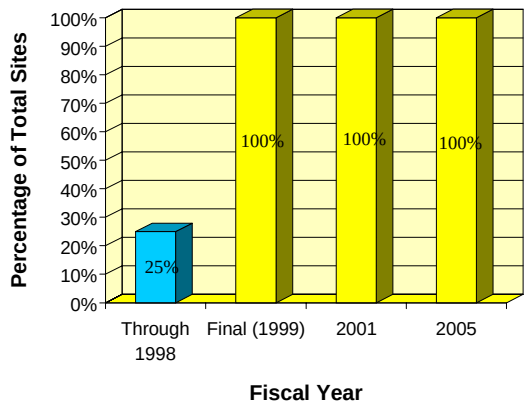
FY98 Restoration Progress

The installation completed the Human Health Risk Assessment and submitted it to state regulators for approval. The installation also removed contaminated soil from seven sites. A toxicity study was completed at two sites to address potential risks identified in the ERA. The installation removed soil contaminated with petroleum at three sites; however, it did not achieve the cleanup goal for benzo(a) pyrene at one site. Additional sampling and analysis were performed at the site to justify a No Significant Risk determination. State regulators determined that various ACM and building rubble were in violation of Massachusetts environmental regulations and asked the Army to take remedial action. The installation still awaits approval and funding of this effort from the U.S. Army Forces Command. A NEPA survey and Cultural Resources Investigation was completed. Regulators are reviewing the Phase II CSA. Concurrence on the proposed CERFA-uncontaminated acreage was delayed because the Massachusetts Department of Environmental Protection requested more information, which required additional field studies.

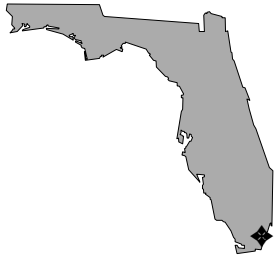
Plan of Action

- Complete Removal Action at one POL-contaminated site in FY99
- Complete RAM and obtain regulatory approval in FY99
- Complete final Phase II SSI and obtain regulatory approval in FY99
- Resolve asbestos and solid waste issues with state regulators in FY99
- Propose acreage as CERFA-uncontaminated and receive concurrence from the appropriate regulatory agencies in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,940 acres
Mission: Housed the Strategic Air Command 19th and 379th Bomb Wings
HRS Score: 42.40; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in March 1991
Contaminants: Heavy metals, VOCs, cyanide, pesticides, solvents, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $22.6 million
Estimated Cost to Completion (Completion Year): $5.8 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2001



Homestead, Florida

Restoration Background

In July 1993, the BRAC Commission recommended that Homestead Air Force Base be realigned. The 31st Fighter Wing was inactivated, and all other operations except Air Force Reserve activities were relocated.

Homestead is a joint-use base which uses both BRAC and Environmental Restoration Account funds to reach cleanup goals. For a basewide project, such as an Environmental Inpact Statement, the costs are evenly divided. Additional projects that are within defined boundaries are paid from the account affected.

In FY86, a Preliminary Assessment and Site Inspection identified 26 sites in three major areas of concern: the fire training area, the residual pesticide disposal area, and the electroplating waste disposal area. Sites include the JP-4 jet fuel leak area, a landfill, a polychlorinated biphenyl (PCB) spill area, underground storage tanks (USTs), aboveground storage tanks (ASTs), and oil-water separators. Remedial Investigation and Feasibility Study (RI/FS) activities began in FY87. Additional field investigations were conducted in FY92 and FY93. Interim Actions have included removal of USTs and contaminated soil, groundwater extraction and treatment, and removal of oil-water separators.

After experiencing hurricane damage in 1992, the installation conducted an Environmental Baseline Survey (EBS), which was completed in FY94. The EBS revealed more than 540 potentially contaminated sites. By FY95, 400 sites had been closed. In addition, over 1,000 acres were proposed as CERFA-clean. Approximately 2,052 acres are available for transfer, including the Airport Parcel. By the end of FY95, the installation had completed removal and disposal of 240 USTs, 99 ASTs, and 142,000 cubic yards of petroleum-contaminated soil. A Removal Action for soil contaminated with lead at the fire training area in OU8 also was completed.

From FY95 through FY96, the installation conducted Interim Remedial Actions using hot-spot removal methodologies, voluntary maintenance, and housekeeping actions at 13 sites. In FY96, the remaining sites identified in the EBS were consolidated into 30 operable units (OUs) and 5 major fuel areas. Significant progress was made in remediating the 15 remaining sites where petroleum contamination is present, investigating 31 CERCLA sites, and removing the remaining USTs and ASTs. In FY96, the Homestead program was split between the Air Force Base Conversion Agency (AFBCA) (BRAC) and the Air Force Reserve Command (DERP). The installation transferred 40 acres to the U.S. Department of Labor. The cleanup of a significant portion of Parcel 6 allowed 84 acres to be transferred by deed to a local agency (the Homeless Trust). In FY97, the AFBCA completed Removal Actions at seven OUs.

The BRAC cleanup team (BCT) holds monthly review meetings. A Restoration Advisory Board (RAB) formed in FY94 and was chartered in FY96. The installation and EPA held a joint training session for RAB members on the Relative Risk Site Evaluation process.

FY98 Restoration Progress

The transfer of 214 acres to the Department of Interior was completed, with the property being provided to the Miami-Dade County Department of Parks and Recreation.

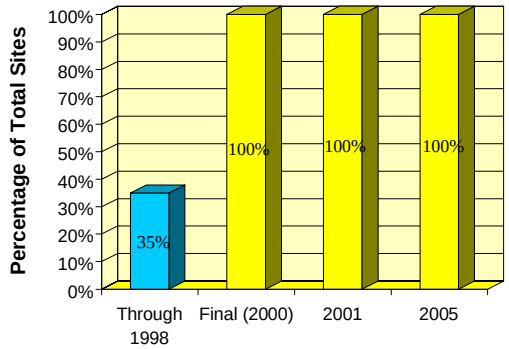
Remedial Actions (RAs) continue, and remedial bioventing systems were installed at three former fuel sites. This technology will result in significant cost savings, while meeting cleanup standards. A 250,000-square-foot bioventing system was designed and installed at six former JP-4 fuel pumphouse sites.

A Record of Decision (ROD) was signed and the Remedial Action Work Plan was approved for OU2. A corrective action plan was completed for Site SS-15A. RIs/FSs were completed for OUs 18, 22, 26, 28, and 29. RIs were completed for OUs 20/21, 30, and 31. A Proposed Plan was completed for five OUs. The BCT continued on-board review of documents.

Plan of Action

- Complete the RODs for OUs 18, 22, 26, 28, and 29 in FY99
- Start RAs at OUs 18, 26, 28, and 29 in FY99
- Complete RA at OU2 in FY99
- Complete Remedial Action Plan for fuel site SS-15A in FY99
- Complete RI for OU11 in FY99
- Complete the finding of suitability to transfer (FOST) for Parcels 13 and 14 to Miami-Dade County

Sites Achieving RIP or RC Per Fiscal Year



Size: 936 acres, including 493 acres on land and 443 acres submerged
Mission: Repaired and maintained ships
HRS Score: 48.77; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in September 1990 and revised in January 1992
Contaminants: Heavy metals, PCBs, petroleum hydrocarbons, VOCs, and SVOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $142.6 million
Estimated Cost to Completion (Completion Year): $251.6 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2010

San Francisco, California

Restoration Background

In July 1991, the BRAC Commission recommended closure of this installation. The station ceased operations on April 1, 1994, and is in caretaker status. It is now the responsibility of the Naval Facilities Engineering Command's Engineering Field Activity West. Parts of the installation have been leased to private parties.

The installation divided the property into six geographic areas, Parcels A through F, to facilitate studies, cleanup, and transfer of the property. Environmental studies identified 78 CERCLA sites. Site types include landfills and land disposal areas containing primarily heavy metals and volatile organic compounds (VOCs).

A BRAC cleanup team, formed in FY94, has expedited cleanup. The installation prepared its BRAC Cleanup Plan in FY94 and updates it regularly. The installation also prepared a community relations plan in FY89 and revised it in FY97. The technical review committee was converted to a Restoration Advisory Board in FY94.

In FY91 and FY93, 36 underground storage tanks were removed, and 10 were closed in place. The installation demonstrated an innovative technology for recycling sand-blasting grit that contains low levels of copper and lead generated by ship-cleaning operations. A full-scale demonstration was completed in FY93, allowing the Navy to use the technology at other installations.

In FY96, the installation completed the basewide Environmental Baseline Survey (EBS). A Record of Decision (ROD) for no further action was signed for Parcel A. The installation has completed nine Interim Removal Actions at sites throughout the shipyard. Federal Facility Agreement schedules were renegotiated to accommodate budget shortfalls and facilitate technical solutions. To expedite fieldwork, the installation used field variances and technical scopes.

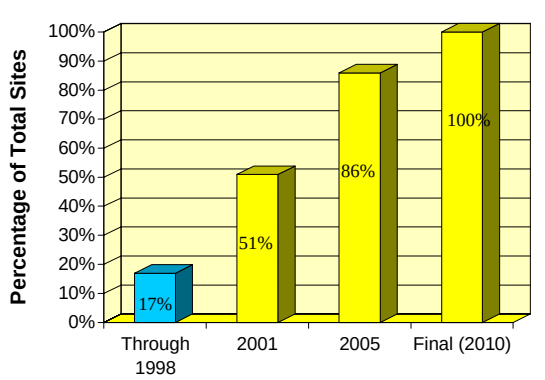
FY98 Restoration Progress

The installation signed a ROD, completed a Remedial Design (RD), and began a Remedial Action (RA) for Parcel B, and the parcel was divided into two parts to expedite transfer. The basewide EBS was updated. Interim Removal Actions were completed for Parcels B, C, D, and E. The installation also completed draft Feasibility Studies for all parcels. RODs for Parcels C and D were not signed, because of unresolved technical issues. A final agreement with the City of San Francisco to transfer Parcel A and execute a lease in furtherance of conveyance (LIFOC) was not completed because of extensive public comment on the joint National Environmental Protection Act (NEPA)–California Environmental Quality Act (CEQA) document.

Plan of Action

- Complete NEPA/CEQA process in FY99
- Transfer Parcel A and part of Parcel B and execute the LIFOC in FY99
- Sign the ROD, complete RD, and start the RA for Parcels C and D in FY99
- Sign the ROD and start RD for Parcels E and F in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 163 acres
Mission: Conduct research, development, engineering, and limited manufacturing of aviation electronics and of missile, space-borne, undersea, and surface weapons systems, and related equipment
HRS Score: NA
IAG Status: None
Contaminants: Solvents, degreasers, alcohol, chemical laboratory waste, pesticides, wastewater, heavy metals, acids, petroleum/oil/lubricants, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $1.6 million
Estimated Cost to Completion (Completion Year): $0.3 million (FY2004)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Indianapolis, Indiana

Restoration Background

Indianapolis Naval Air Warfare Center, Aircraft Division (NAWCAD) was commissioned in 1942 as a Naval ordnance plant. In later years, its mission was redefined to add space, undersea, and surface weapons. Typical operations conducted at the facility in support of this mission included machining; electroplating; degreasing of metal parts; carpentry; painting; operation of photographic laboratories; testing and evaluation; destruction of documents; and storage of supplies, materials, and fuels. In July 1995, the BRAC Commission recommended closure of NAWCAD. Various functions, along with personnel, equipment, and related support, were to be relocated.

The installation completed a Preliminary Assessment in FY88. In FY90, two underground storage tank (UST) sites were identified. In FY92, site assessments were completed at the two sites, and they were designated Response Complete. In FY96, the installation delineated Site 1 and began a Remedial Investigation and Feasibility Study (RI/FS). Eighteen areas of concern (AOCs) were identified, and sampling began.

In FY95, the installation initiated an Environmental Baseline Survey (EBS); it completed the fieldwork for the EBS in FY96. The installation identified 38 AOCs that required further investigation. These AOCs were consolidated into 18 AOCs and 16 UST sites. The NAWC Indianapolis Reuse Planning Authority formed and completed a preliminary privatizing business plan. The Navy signed a lease with the city and, in FY97, completed transfer of operations.

A Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT) were formed in FY96. The installation established an information repository and worked with the RAB to complete a community relations plan. The BRAC Cleanup Plan (BCP) was completed in FY97.

In FY97, the installation completed closure of the Hazardous Waste Transfer Facility. In addition, draft baseline Human Health and Ecological Risk Assessments were completed. Portable gas chromatography, direct-push sample collection, and immunoassay test kits accelerated fieldwork.

FY98 Restoration Progress

The Navy prepared an Environmental Baseline Survey for Transfer and a finding of suitability to transfer (FOST) and submitted the documents for public comment. The Navy also completed five process closures in accordance with state requirements. A closure letter from the state was received for 30 UST sites. The Remedial Design and Remedial Action (RD/RA) at Site 1 were delayed because the preliminary Engineering Evaluation and Cost Analysis (EE/CA) studied and rejected use of Fenton's reagent for in situ chemical oxidation. The final baseline Human Health and Ecological Risk Assessments, the RD, and the RA planned for 18 AOCs were not performed because RIs did not demonstrate a need for environmental remediation. Decision documents were prepared for eight AOCs, recommending no further action or the use of institutional controls.

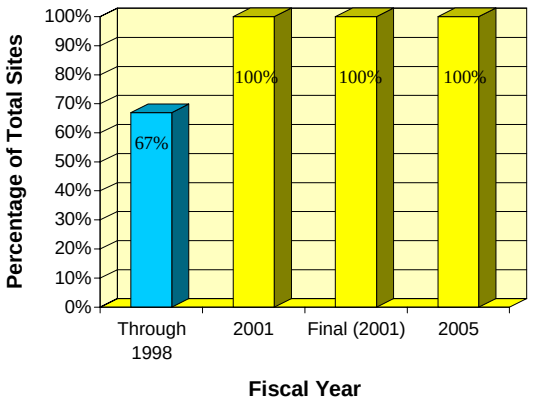
The BCT agreed to complete as much of the RI sampling and analysis process as possible in a single phase. The cleanup process was expedited by the BCT's willingness to approve a dynamic work plan and the use of innovative technologies, including on-site portable gas chromatograph, direct-push sample collection, immunoassay test kits, and in situ chemical oxidation. RAB meeting attendance was steady and disproportionately high considering the small size of the facility and its relatively clean environment. Partnering meetings included regulators, the Navy, facility representatives, and all major site contractors. Analytical data were presented, and updates on document development were presented and discussed.

Transfer of all property was planned for FY98 but not accomplished. The property was to be transferred to the Indianapolis Reuse Planning Authority, the Local Redevelopment Authority (LRA), with a covenant deferral for early transfer of contaminated property. The LRA expected to sell the property to Raytheon Systems Company, which is currently subleasing the property from the LRA. Transfer was delayed when Raytheon refused to accept the property with the covenant deferral.

Plan of Action

- Complete initial transfer of property (125 of 163 acres) to the City of Indianapolis through an economic development conveyance in FY99
- Finalize FOST for uncontaminated parcels in FY99
- Revise BCP in FY99
- Complete Environmental Assessment in FY99
- Complete EE/CA and Interim Removal Action for Site 1 in FY99
- Finalize decision documents for Group 1 in FY99
- Finalize RI report in FY99
- Finalize FS and Proposed Plan reports in FY00
- Finalize decision documents for Group 2 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Indian Head Naval Surface Warfare Center NPL

Size: 3,423 acres (923 acres at Stump Neck Annex)
Mission: Conduct research, development, and production of rocket and torpedo propellants and explosives
HRS Score: 50.00; placed on NPL in February 1995
IAG Status: None
Contaminants: Waste propellants, explosives, acids, paints, solvents, heavy metals, low-level radioactive material, TCE, and industrial wastewater
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $8.6 million
Estimated Cost to Completion (Completion Year): $56.8 million (FY2013)
Final Remedy in Place or Response Complete Date for All Sites: FY2013

Indian Head, Maryland

Restoration Background

This installation produces and handles complex chemicals to accomplish its mission. Lead, silver, and mercury are the primary contaminants of concern. The acreage at the Stump Neck Annex was not included in the National Priorities List (NPL) listing.

A Preliminary Assessment (PA) in FY83 identified 29 potential CERCLA sites. A supplemental PA in FY92 identified an additional 17 potential sites, 2 of which were recommended for no further study. The installation has conducted Site Inspections at 19 sites. Two more sites were identified in FY94. Silver-contaminated soil was removed at the X-Ray Building, and soil in two swales was remediated. A Site Characterization Report was completed for Building 766, where soil is contaminated with mercury. An Engineering Evaluation and Cost Analysis for the Removal Action was completed. A weir was installed at the discharge point of a pond to prevent migration of mercury farther downstream. In FY91, the U.S. Fish and Wildlife Service completed a study of mercury levels in fish from Mattawoman Creek, which receives runoff from a large part of the facility. The study concluded that the concentration of mercury in fish at the installation was comparable to typical concentrations found in fish throughout Maryland.

In FY95, the installation removed soil at the X-Ray Building site and published the Removal Action report. The installation also finished excavating the mercury-contaminated soil at Building 766. Biomonitoring of the downstream pond indicated that the mercury had no adverse effect on fish. The installation is also removing trichloroethene (TCE) and treating TCE-contaminated groundwater at Site 57 (Building 292).

The installation formed a technical review committee in FY93 and converted it to a Restoration Advisory Board (RAB) in FY95. The installation has prepared a community relations plan and established an information repository.

During FY96, the installation initiated Remedial Investigation/ Feasibility Study (RI/FS) activities for 14 sites, completed fieldwork for the removal of lead-contaminated soil at Site 56, and initiated project closeout reports for the site.

In FY97, soil vapor extraction (SVE) pilot studies were completed at Site 57 to determine the feasibility of using SVE technology at the site. Pilot studies indicated that site conditions will inhibit the application of SVE for the soil media. A Removal Action was planned to address the immediate threat of groundwater contamination at the site, while an RI/FS will be conducted to further evaluate the conditions of the site and other means for final Remedial Action. RI fieldwork was initiated for five other high priority sites (Sites 12, 39, 41, 42, and 44). A draft RI report has been completed and is currently under review by the Navy and EPA. A work group has been established for document review to ensure that all issues and solutions are understood and agreed to by all parties.

FY98 Restoration Progress

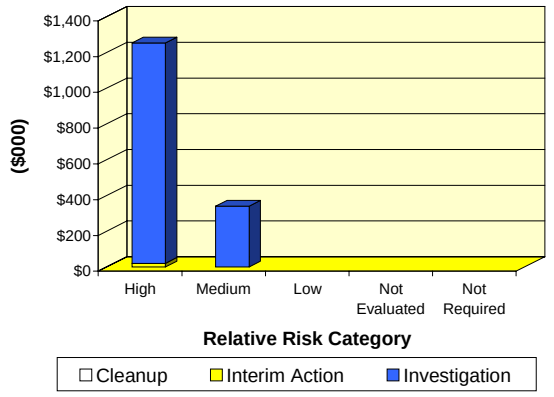
RIs are near completion for Sites 12, 39, 41, 42, and 44. The contractor mobilized to perform a Removal Action at Site 57. This Removal Action will line and restore several hundred feet of sewer piping, which runs through a TCE-contaminated plume. The project will use an alternative means of pipe rehabilitation, which will provide a less costly alternative to sewer replacement. The RI contract for Site 57 was awarded, work plans were completed, and the contractor was scheduled to start work after the Removal Action at the site is completed. The work plans for RIs at Sites 47 and 53 were completed, and work is scheduled to begin when funding becomes available.

A project to convert hard copies of the administrative record to electronic format is near completion. This effort will reduce the volumes of paper records to two CDs, increasing the availability of administrative records to the public and providing a useful management tool. Each member of the RAB will have a copy of the CDs. A Tier 2 partnering group recognized that Navy partnering efforts with EPA and the Maryland Department of the Environment are not immediately necessary.

Plan of Action

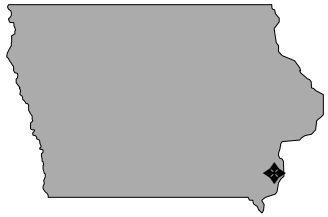
- Initiate official partnering efforts with EPA in FY99
- Finalize draft RI reports for Sites 12, 39, 41, 42, and 44 in FY99
- Complete Removal Action at Site 57 in FY99
- Complete RI fieldwork and report for Sites 47, 49, and 53 in FY99
- Initiate FSs for Sites 12, 39, 41, 42, and 44 to evaluate alternative final remediation techniques in FY99
- Develop work plan for RI at Sites 11 and 21 in FY99
- Complete Records of Decision and develop Remedial Designs for Sites 12, 39, 41, 42, and 44 in FY00
- Begin Remedial Action at Sites 39 and 41 in FY00
- Initiate FSs for Sites 47, 49, and 53 in FY00
- Continue RI/FSs for Sites 11 and 21 in FY00

FY99 Funding by Phase and Relative Risk



Iowa Army Ammunition Plant NPL

Size: 19,024 acres
Mission: Load, assemble, and pack munitions
HRS Score: 29.73; placed on NPL in August 1990
IAG Status: IAG signed in December 1990
Contaminants: Explosives, heavy metals, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $43.0 million
Estimated Cost to Completion (Completion Year): $80.4 million (FY2040)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Middletown, Iowa

Restoration Background

In 1941, the Army constructed the Iowa Army Ammunition Plant to load, assemble, and pack various conventional ammunition and fusing systems. During operations, industrial process wastewaters and by-products were disposed of at the installation. Site types include surface impoundments, production areas, landfills, and a fire training pit. Soil and groundwater contamination resulted primarily from disposal of explosives and heavy metal–containing wastes directly on soil. The installation also identified small amounts of contamination by volatile organic compounds (VOCs).

Environmental studies, beginning in the early 1980s, identified 40 restoration sites. Of those sites, 33 required further study. In FY92, Remedial Investigation and Feasibility Study (RI/FS) activities began. In FY96, the installation completed its RI; however, supplemental RI efforts have since been initiated. Restoration activities through FY96 included closing one cell in the inert landfill, removing aboveground treatment tanks, removing lead-contaminated soil from a production line, and cleaning up an abandoned coal storage yard. The installation, in coordination with the local public water utility, funded a project connecting local residences to a public water supply. Other restoration activities involved excavation and off-site incineration of pesticide-contaminated soil and excavation of explosives-contaminated sumps. The installation created four operable units (OUs)—a soil OU (OU1), an interim soil OU (OU2), a groundwater OU (OU3), and an overall OU (OU4). OUs 1 and 2 were merged for ease of management. At the inert landfill, the installation constructed a new RCRA-type cell; however, capping did not occur, because surface impoundment material and solid waste management unit (SWMU) material are still being placed in the landfill.

In FY97, the Army removed more than 80,000 cubic yards of contaminated soil from the former Line 1 impoundment area and the Line 800 lagoon. It created wetlands and began phytoremediation to clean up residual contamination. The installation is holding the most highly contaminated soil in a designated corrective action management unit until it determines the most effective method of treatment. The Army continued a demonstration of aerobic and anaerobic bioslurry techniques. The Army, EPA, the University of Iowa, the U.S. Fish and Wildlife Service, and private entities are cooperating in demonstrations of other methods of remediating explosives-contaminated soil.

The installation has increased community awareness through meetings and slide presentations with the installation's Restoration Advisory Board (RAB), the public, and the news media.

FY98 Restoration Progress

The Army completed two studies on removing of explosives contamination from soil. The U.S. Army Environmental Center (AEC) completed the bioslurry demonstration, and the U.S. Army Corps of Engineers (USACE) completed humic polymer testing. Soil removal at the former Line 1 impoundment area and the Line 800 lagoon was completed. The installation capped five landfill cells and placed soil from the inert landfill burning grounds under the landfill cap or in Trench 6. The impacted soil was removed from the East Burn Pads and the North Burn Pads.

The installation began predesign characterization sampling at the West Burn Pads and Burn Cages and began excavating the impacted soil at the North Burn Pads landfill and the fire training pit. It also began treating VOC-contaminated soil from the fire training pit by using the low-temperature thermal desorption unit. The installation initiated the off-post groundwater study and supplemental RI groundwater activities around the Line 800 lagoon.

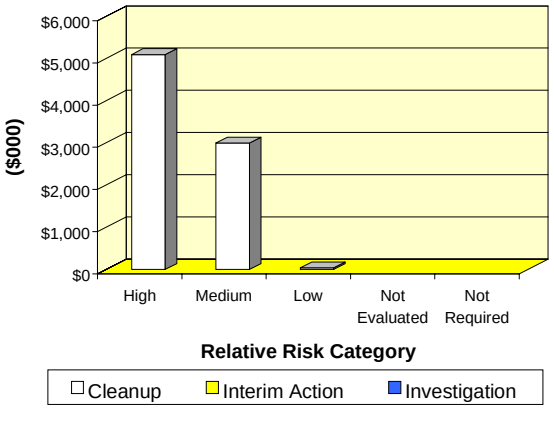
The installation did not complete the groundwater Record of Decision (ROD), due to funding constraints, but did complete the interim soil ROD and a ROD addressing soil remediation. As a cost-saving measure, the remediation team decided to keep the RCRA landfill open for placement of soil from other remediation projects.

The RAB received training on the CERCLA process and program and established RAB operating procedures. It also helped establish cleanup priorities and provided comments on selection of a soil treatment remedy and affected off-post drinking water wells. The RAB visited the site to review cleanup progress. The installation continues to foster partnerships with regulators. EPA, USACE, AEC. It also created a project management team, which meets monthly or as required.

Plan of Action

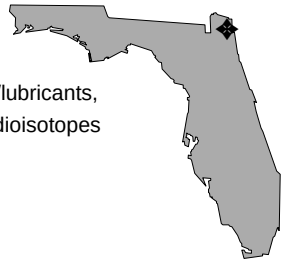
- Complete soil removal at the North Burn Pads landfill, the East Burn Pads, and the fire training pit in FY99
- Initiate off-post groundwater investigation in FY99
- Continue monitoring of phytoremediation effectiveness in FY99
- Complete the groundwater ROD in FY00

FY99 Funding by Phase and Relative Risk



Jacksonville Naval Air Station NPL

Size: 3,820 acres
Mission: Maintain and operate facilities; provide services and materials to support aviation activities and aircraft overhaul operations
HRS Score: 31.02; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in October 1989
Contaminants: Waste solvents, acids and caustics, cyanide, heavy metals, petroleum/oil/lubricants, low-level radioactive wastes, oil, paint, PCBs, pesticides, phenols, and radioisotopes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $60.7 million
Estimated Cost to Completion (Completion Year): $58.7 million (FY2017)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Jacksonville, Florida

Restoration Background

Jacksonville Naval Air Station (NAS) includes the following site types: fire training areas, waste storage and disposal areas, transformer storage areas, radioactive-waste disposal areas, and other miscellaneous support and maintenance areas. Typical operations have generated solvents, sludge (from on-site treatment plants), and low-level radioactive waste, which have migrated into nearby soil and local groundwater supplies.

There are 47 CERCLA sites, 20 underground storage tank (UST) sites, and 3 RCRA solid waste management units (SWMUs) at the installation. The installation has completed Preliminary Assessments (PAs) for 40 sites and Site Inspections (SIs) for 42 sites. Fifteen sites have proceeded to the Remedial Investigation and Feasibility Study (RI/FS) phase. To expedite the cleanup process, three operable units (OUs) were defined. OU1 consists of two disposal pits, OU2 consists of six sites known as the Wastewater Treatment Plant Area, and OU3 consists of six sites called the Industrial Area. UST sites have received No Further Action.

During three Interim Remedial Actions (IRAs) in FY94, the installation erected fences at five sites and removed soil from one. A Record of Decision (ROD) has been signed for two sites. An interim ROD was signed for one site in FY95.

To facilitate cleanup, the installation developed a Remedial Response Decision System that establishes guidelines and criteria for evaluating site data and proposing remedial response activities. The installation's technical review committee, which was formed in FY88, was converted to a Restoration Advisory Board (RAB) in FY95. In FY91, the installation completed its community relations plan and established an administrative record and information repository.

During FY96, the installation continued RI/FS activities at six sites and completed two IRAs. It completed PA/SIs for three sites, RI/FSs for two sites, and Engineering Evaluations and Cost Analyses (EE/CAs) for six sites. UST 1 received a no further action (NFA) designation. A site assessment, two closure action plans, and an IRA were completed for UST sites. For two UST sites, monitoring-only plans were approved, and corrective measures implementation (CMI) was completed at one SWMU. Five IRAs were initiated. In FY97, the installation completed the Remedial Design and Remedial Action (RA) for OU1, completed the corrective action and IRA for UST 1, and implemented a monitoring-only plan at UST 10. In addition, the installation finished IRAs for Site 18 and SWMU 2 and initiated long-term monitoring (LTM) for SWMU 2.

FY98 Restoration Progress

The installation conducted a Baseline Risk Assessment and completed six RI/FS activities for OU2. Six RI/FSs continued at OU3. The installation also completed two PA/SIs for potential sources of contamination (PSCs), one IRA to remove spreading groundwater contamination, one corrective action plan and corrective action, and the CMI and IRA for SWMU 1. An RA for two sites, scheduled for completion in FY98, was not finished because additional materials needed to be disposed of under the landfill cover. LTM at UST 1, scheduled to begin in FY98, was delayed by problems with the sanitary sewer line. UST 13 and Area A at UST 17 received NFA designations. A contamination assessment report and Remedial Action Plan (RAP) was awarded for UST 15, and UST 10 was investigated under PSC 45. LTM was conducted at UST 16, which was transferred from NAS Cecil Field to NAS Jacksonville.

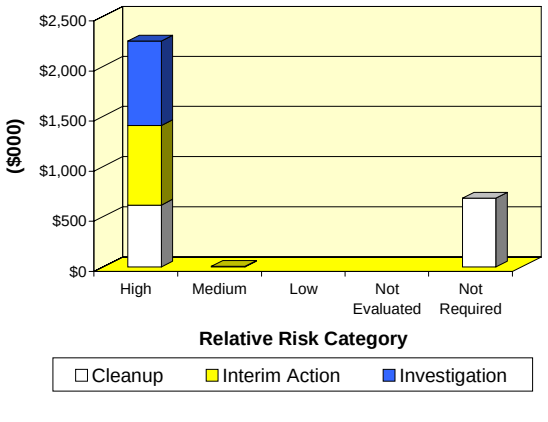
An application for closure permit was submitted for regulatory review. Seven monitoring wells were installed at SWMU 1 and T-56 Wash Area in response to conditions set in the permit application. Detection monitoring efforts are under way to determine the extent of contamination associated with the T-56 Wash Area.

The RAB was involved in the review of the RI/FS for OU2 and site visits at sites that had IRAs and RAs ongoing or planned. The RAB received training about investigative and remedial processes used at the installation. The Navy entered into partnering with the State of Florida, EPA, and Comprehensive and Long-term Environmental Action, Navy (CLEAN) and RA contractors. This partnering has led to quicker reviews and agreement with regulators about satisfying requirements and entering into fieldwork.

Plan of Action

- In FY99, continue RI/FS activities at OU3, begin RI/FS for PSCs 47 and 51, and initiate FS for Hangar 1000
- In FY99, begin a site assessment report (SAR) and RAP for UST 4, continue LTM at UST 16, begin RA at UST 15, complete RI/FS for PSC 21, and sign ROD for OU2
- Continue LTO at USTs 1 and 7 in FY99 and FY00 and FS for Hangar 1000 in FY00
- In FY00, begin RA at UST 4, initiate SAR/RAP at UST 5, and complete RI/FS for OU3 and PSCs 47 and 51

FY99 Funding by Phase and Relative Risk



Size: 55,270 acres
Mission: Performed production acceptance testing of ammunition, weapons, and their components
HRS Score: NA
IAG Status: None
Contaminants: Solvents, petroleum products, VOCs, PCBs, heavy metals, depleted uranium, and UXO
Media Affected: Groundwater and soil
Funding to Date: $18.6 million
Estimated Cost to Completion (Completion Year): $6.6 million (FY2021)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Madison, Indiana

Restoration Background

In December 1988, the BRAC Commission recommended closure of the Jefferson Proving Ground in Madison, Indiana, and relocation of the installation's mission to Yuma Proving Ground in Arizona. The installation was closed on September 30, 1995.

Sites identified during environmental studies included landfill and disposal areas, hazardous waste storage areas, fire training areas, underground storage tanks (USTs), and buildings with asbestos-containing materials. Contaminants at the installation include depleted uranium, heavy metals, unexploded ordnance (UXO), solvents, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and petroleum hydrocarbons. Interim Actions include installation of a landfill cap, removal of USTs, and excavation of contaminated soil.

In FY94, the installation submitted the draft Phase I Remedial Investigation (RI) report for sites south of the firing line. The regulatory agencies requested additional studies to further characterize contaminants. Phase II RI data collection began in FY96 and continued into FY97.

In FY95, the installation removed 18 USTs, treated contaminated soil in Bioremediation Cell No. 1, and constructed a landfill cap at Gate No. 19. The installation also surveyed and decontaminated depleted uranium support facilities.

The Restoration Advisory Board (RAB) expanded its membership, adding representatives of the NRC, the U.S. Fish and Wildlife Service, the Indiana Department of Health, and public interest groups. A Local Redevelopment Authority replaced the existing Redevelopment Board.

In FY96, a finding of suitability to lease (FOSL) report and a finding of suitability to transfer (FOST) report were prepared for two portions of installation property. Two more FOST reports were completed in FY97.

In FY96, the installation submitted Interim Remedial Action (IRA) work plans for 10 sites to the regulatory agencies and began cleanup activities. The installation also initiated Phase II field sampling, the UXO removal operations, and long-term monitoring of the landfill at Gate No. 19. The Army leased approximately 3,400 acres of the containment area in "furtherance of conveyance," which will allow transfer within 7 to 10 years. In addition, 1.2 acres was transferred under a no-cost public conveyance.

The Army completed FOST and FOSL reports for parts of the installation, in conjunction with the Record of Decision. The installation initiated a facilitated partnership with regulators while enhancing community outreach with an updated community relations plan. Work continued on the IRA sites, and Phase II RI data were collected.

FY98 Restoration Progress

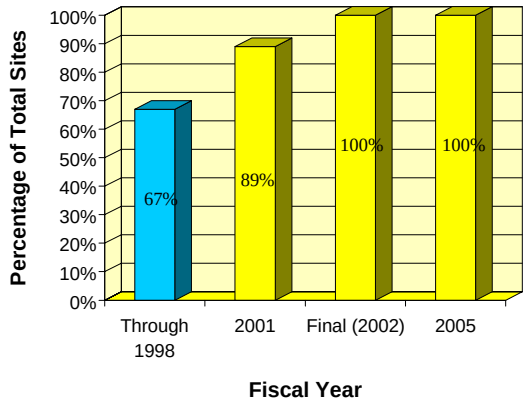
The installation completed the Phase II RI report and submitted it for regulatory review. The installation also began completing technical memorandums to eliminate sites from the RI and completed field studies for an Ecological Risk Assessment. The installation did not initiate the work plan for intrinsic bioremediation (natural attenuation) at solvent sites but will make it a part of the Feasibility Study (FS) to be completed in FY99. Relative Risk Site Evaluations are under way for the remaining 10 sites. Lengthy regulatory reviews delayed the planned concurrence on the closure of the burning ground.

The Army partnered with the NRC, the U.S. Fish and Wildlife Service, and the Indiana Department of Natural Resources during the fiscal year. The installation provided RI Phase II data to the RAB for review.

Plan of Action

- In FY99, obtain regulatory concurrence on Phase II RI data
- In FY99, sign decision document(s) to eliminate site(s) from the RI
- Complete FS for solvent sites in FY99
- Obtain regulatory concurrence for closure of open burning unit in FY99
- Continue to prepare technical memorandums through FY00
- Complete all BRAC activities by FY20

Sites Achieving RIP or RC Per Fiscal Year



Jet Propulsion Laboratory NPL

Size: 176 acres
Mission: Conduct research and develop aeronautics, rocketry, and space exploration technology
HRS Score: 50.00; placed on NPL in October 1992
IAG Status: IAG between NASA and EPA signed in 1992
Contaminants: VOCs and various inorganic chemicals
Media Affected: Groundwater
Funding to Date: $0.6 million
Estimated Cost to Completion (Completion Year): $0.2 million (FY2001)
Final Remedy in Place or Response Complete Date for All Sites: NA

Pasadena, California

Restoration Background

In 1980, samples from drinking water wells of the city of Pasadena were found to be contaminated with volatile organic compounds (VOCs), including trichloroethane (TCA), trichloroethene (TCE), and tetrachloroethene (PCE). NASA and the California Institute of Technology Jet Propulsion Laboratory initiated an environmental study to determine whether the Jet Propulsion Laboratory was a potential source of the contaminants. A Preliminary Assessment and a Site Inspection were conducted, and an Expanded Site Inspection was completed in FY90.

In October 1993, the Omaha District of the U.S. Army Corps of Engineers (USACE) proposed an Interim Settlement Agreement to NASA and the California Institute of Technology Jet Propulsion Laboratory for DoD participation in funding environmental restoration activities.

For study and cleanup, the laboratory site was divided into three operable units (OUs): on-site groundwater contamination (OU1), on-site contamination sources (OU2), and off-site groundwater contamination (OU3). In addition, the installation identified eight waste disposal areas. NASA prepared and submitted a Remedial Investigation and Feasibility Study (RI/FS) work plan to EPA for approval. NASA is the lead agency for the RI.

In FY94, RI/FS activities began with the installation of groundwater monitoring wells at OU1. RI fieldwork at OU3 also was initiated. RI/FS activities continued during FY95 with a second sampling round for on-site soil vapor extraction wells.

In FY95, an Interim Remedial Action (IRA) was implemented, involving installation of a groundwater treatment system for contaminated municipal wells.

Five off-site groundwater monitoring wells were also installed, and one round of groundwater samples was collected.

In FY96, NASA conducted a second round of groundwater sampling at five off-site monitoring wells. Three additional monitoring wells were installed to determine the direction of groundwater migration beneath the installation. Four soil-gas probes were installed to determine the extent of vertical migration of contamination. NASA completed all off-site drilling at the installation.

In FY97, NASA conducted quarterly off-site well sampling and monitoring, and risk assessment analysis was developed. NASA also completed the on-site RI and began the FS. Pilot treatment plants for VOCs and perchlorates (an additional contaminant of concern, which previously could not be detected) were implemented and may result in Interim Actions.

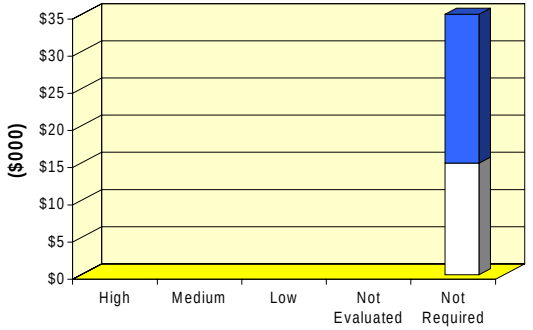
FY98 Restoration Progress

The draft RI for OUs 1 and 3 were completed by NASA and the Jet Propulsion Laboratory. An FS perchlorate pilot study using ion-exchange resins and a cathodic system is under way.

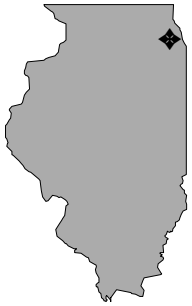
Plan of Action

- Complete the Record of Decision for OU1 and OU3 by FY01
- Begin groundwater hydrology modeling of Raymond Basin in FY99
- Begin cost sharing negotiations in FY99

FY99 Funding by Phase and Relative Risk



Size: 23,544 acres
Mission: Manufacture, load, assemble, and pack munitions and explosives
HRS Score: 35.23 (Loading, Assembling, and Packing Area); placed on NPL in March 1989
32.08 (Manufacturing Area); placed on NPL in July 1987
IAG Status: IAG signed in June 1989
Contaminants: Explosives, heavy metals, VOCs, and PCBs
Media Affected: Groundwater, sediment, and soil
Funding to Date: $25.2 million
Estimated Cost to Completion (Completion Year): $91.5 million (FY2033)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Wilmington, Illinois

Restoration Background

The Army constructed Joliet Army Ammunition Plant (JOAAP) in the early 1940s. It was one of the largest munitions and explosives manufacturers in the Midwest. Installation operations included manufacturing of explosives and loading, assembling, and packing (LAP) of munitions for shipment. The 14,385-acre LAP Area and the 9,159-acre Manufacturing Area have been placed on the National Priorities List (NPL).

Environmental studies conducted between FY78 and FY88 identified 53 sites. Prominent site types in the two areas include ash piles, landfills, open burning and open detonation areas, and surface impoundments. The installation consolidated all sites into two operable units, one that addresses groundwater contamination and another for contamination of soil and sediment.

During a FY85 Interim Remedial Action (IRA), the Army removed more than 7 million gallons of explosives-contaminated water from the Red Water Lagoon. After disposing of the water off site, the Army dredged the lagoon, removed the sludge and liner, and covered the entire area with a clay cap. IRA activities in FY93 included capping two ash piles. Phase II Remedial Investigations (RIs) were completed for the Manufacturing Area (FY94) and for the LAP Area (FY95) and approved by the regulatory agencies.

In FY94, the Joliet Arsenal Citizen Planning Commission developed and approved a future land use plan for the installation. In FY95, the Army completed the initial phase of the bioslurry reactor demonstration. Also in FY95, the Army partnered with a commercial company, Tufts University, and Argonne National Laboratory to demonstrate new technologies at the site. In FY95, the installation formed a Restoration Advisory Board (RAB), which represents the area within 25 miles of the installation.

In FY96, the Army completed environmental screening of 15,000 acres to be transferred to the Forest Service, U.S. Department of Agriculture. A 982-acre parcel was transferred to the Department of Veterans Affairs. The Army completed its bioslurry reactor demonstration. The regulatory agencies approved the land application of the treated material. The installation removed more than 1,000 exterior-mounted, oil-filled electrical switches that contained polychlorinated biphenyls (PCBs) and 3 oil pits from the explosives burning ground. Some of the oils collected in the pits contained PCBs that had caused PCB contamination at the site. The installation also removed petroleum- and PCB-contaminated soil from Site L6 and cleared the ground for transfer to future owners.

In FY97, JOAAP provided a host site for a U.S. Army Corps of Engineers Waterways Experiment Station (USAWES) field trial of explosives and metal probes for the Site Characterization and Analysis Penetrometer System (SCAPS) unit. The Army completed Feasibility Studies at all active study sites at the installation. The RAB participated in work prioritization and remedy selection for the Removal Action at Site L6; hosted a media tour; and received training in risk assessment, risk management, and risk communication. The installation partnered with EPA and USAWES on a groundwater natural attenuation and phytoremediation study and included state and federal remedial project managers in review of internal draft reports. The installation also transferred over 15,000 acres of land to the Forest Service.

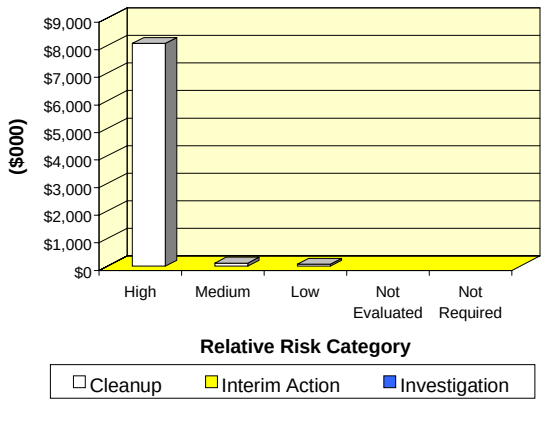
FY98 Restoration Progress

The installation released an installationwide Proposed Plan and conducted a public presentation and comment period. A Record of Decision (ROD) was initiated but was delayed for incorporation of some late comments. The installation began the Remedial Design for soil and groundwater remediation and conducted a biotechnology demonstration for selection of a bioremediation process. A natural attenuation pilot study also was completed and showed that natural attenuation was a viable alternative. Land transfers to the state and Will County were delayed because of issues with the ROD. The RAB requested and received special training on the Proposed Plan and ROD and formed a committee to provide specific comments on both documents.

Plan of Action

- Complete and obtain approval for the ROD in FY99
- Select a bioremediation technology in FY99
- Begin Remedial Actions for Explosives and PCB Soil Remedial Units in FY99
- Complete transfer of land to the State of Illinois for industrial development and to Will County for use as a landfill in FY99

FY99 Funding by Phase and Relative Risk



Size: 4,660 acres
Mission: Provide depot-level aircraft and engine repair
HRS Score: NA
IAG Status: None
Contaminants: Metals, VOCs, and SVOCs
Media Affected: Groundwater and soil
Funding to Date: $134.3 million
Estimated Cost to Completion (Completion Year): $93.7 million (FY2019)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2004
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2004

San Antonio, Texas

Restoration Background

In July 1995, the BRAC Commission recommended realignment of Kelly Air Force Base (AFB). The Defense Distribution Depot, San Antonio, will be closed, and the airfield and all associated support activities will be attached to Lackland Air Force Base in Texas.

Investigations have identified 54 sites and several areas of interest on base, including landfills, spill sites, former fire training areas, low-level radioactive waste sites, underground storage tanks, aircraft maintenance areas, sludge lagoons, sludge-spreading beds, and former ranges. Sites are separated into five zones: Zone 1; properties west of Leon Creek (to be realigned to Lackland AFB); Zone 2, south and west of the runway; Zone 3, industrial operations area; Zone 4, off-base area known as east Kelly; and Zone 5, flightline, warehouses, and administrative support operations (to be realigned to Lackland AFB).

Kelly is a joint-use base which uses both BRAC and Environmental Restoration Account funds to reach cleanup goals. For a basewide project, such as an Environmental Inpact Statement, the costs are evenly divided. Additional projects that are within defined boundaries are paid from the account affected.

A basewide groundwater and surface water monitoring program began in FY94. By the end of FY95, final reports had been prepared for Remedial Investigation and Feasibility Study (RI/FS) phases for 41 sites in Zones 1, 2, and 3.

A BRAC cleanup team formed in FY96, and the first BRAC Cleanup Plan was issued. Construction was planned for stormwater culvert rerouting east of Zone 3. A draft groundwater compliance plan was prepared and is awaiting approval.

In FY97, a Zone 4 site was remediated, and the property leased to private industry. A source area was discovered in Zone 3 at Site MP. The final Zone 5 RI report and the Zone 3 groundwater decision document were submitted for regulatory review. Monitoring for natural attenuation parameters was completed.

FY98 Restoration Progress

A state groundwater permit and compliance plan were issued, establishing a dual RCRA and CERCLA/IRP regulatory framework for the installation. A contract was awarded for constructing an Interim Remedial Action (IRA) consisting of a hydraulic barrier for controlling contaminated groundwater flow from Zones 3 and 4. A groundwater treatment plant and an effluent polishing facility were built to reduce secondary treatment costs. Several IRAs and groundwater extraction and treatment systems were optimized. The installation completed additional field investigations for Zone 1 and a study to improve annual groundwater monitoring. Long-term operations and long-term monitoring optimization studies began.

RI/FS activities for Zone 4, FS activities for Zone 5, and groundwater monitoring at Zone 3 continued. Characterizations and delineation of off-base contamination for Zone 4 continued because contamination was found to extend to a greater area than anticipated. Planned completion of Remedial Actions (RAs) for soil in Zones 2 and 3 did not occur, because of substantial changes in the work plan. Additional confirmatory sampling and data analysis were done. No RA was selected for the downgradient plume, which will be addressed in the Corrective Actions Implementation Work Plan.

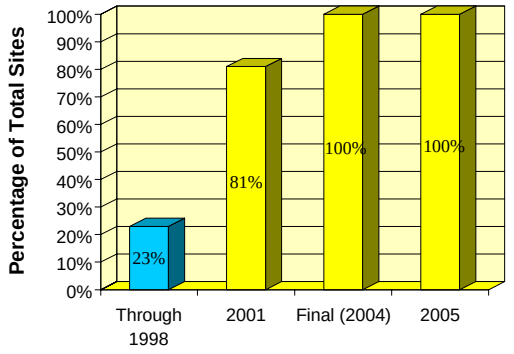
Arsenic-contaminated soil was removed from Site S-7 in east Kelly. A Removal Action began at a newly discovered source area, a spill site at the former metal plating shop. More than 1,000 gallons of dense nonaqueous-phase liquid was removed. Investigations concluded at the Site MP source area; the selected RA awaits regulatory approval.

Innovative technology demonstrations included electrochemical geooxidation at the former waste pit, natural attenuation for chlorobenzene at a former waste storage and disposal area, and sonic cone penetrometer for off-base groundwater contamination. A Technical Assistance for Public Participation application was developed and contracts were awarded. A Technical Assistance Visit to the installation resulted in more justifiable cost-to-complete figures and project schedules.

Plan of Action

- Begin construction on stormwater reroute project in FY99
- Complete the on- and off-base RI, and construct the IRA for groundwater, for Zone 4 in FY99
- Complete FS for Zone 5 in FY99
- Complete delineation/characterization for Zone 3 and conduct sampling in off-base area in FY99
- Complete Zone 2 and 3 RAs in FY99
- Install slurry wall for former metal plating shop in FY99
- Construct Quintana Road Culvert and install additional IRAs for groundwater in Zone 1 in FY99
- Complete construction of hydraulic barrier to control contaminated groundwater flow by FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 340 acres
Mission: Test, prove, overhaul, and issue torpedoes
HRS Score: 32.61; placed on NPL in October 1989
IAG Status: Federal Facility Agreement signed in 1990
Contaminants: VOCs, heavy metals, petroleum hydrocarbons, herbicides, fuel, PCBs, and pesticides
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $26.4 million
Estimated Cost to Completion (Completion Year): $38.0 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2005

Keyport, Washington

Restoration Background

In September 1995, the BRAC Commission recommended realignment of this installation. The center's responsibility for maintaining combat system consoles and its general industrial workload were moved to Puget Sound Naval Shipyard.

Operations at the installation, including plating, torpedo refurbishing, and disposal practices, contributed to contamination at the site. Since FY84, environmental investigations at the installation have identified site types such as underground storage tanks, sumps, spill sites, a landfill, and an underground trench. Environmental investigations conducted under CERCLA have identified 12 sites.

In FY92, an underground trench and several sumps were excavated, and chromium-contaminated soil was removed and replaced with clean fill at a chromate spill site.

In FY93, the Navy completed Remedial Investigation and Feasibility Study (RI/FS) activities for Operable Unit (OU) 2. Additional RI activities were initiated at Site 1 (OU1) because of public concern. Temporary buildings located above the landfill at OU1 were vacated and removed. In FY94, a Record of Decision (ROD) was signed for OU2 (Sites 2, 5, 8, and 9). In FY95, the Navy began additional groundwater sampling at OU1 and conducted a Phase I Removal Action at Site 8 (OU2). The Navy also conducted interim corrective measures for Site 23 and performed a corrective action consisting of removal and closure in place for hazardous waste storage tanks and sumps.

During FY96, the Navy conducted additional groundwater, sediment, and tissue sampling and analysis at OU1 and began long-term monitoring (LTM) at Sites 2 and 8 (OU2). Pursuant to the OU2 ROD, the Navy also completed the confirmational groundwater sampling at Site 5 and sediment sampling at Site 9, making these No Further Action sites. Work plans for Phase II soil removal were initiated at Site 8. Corrective measures, including removal of tanks and soil and in situ remediation of contaminated soil, were conducted at Site 23. In FY97, USGS developed a groundwater flow model and performed degradation analysis and tritium dating in support of natural attenuation at OU1. The University of Washington also provided information on phytoremediation. In addition, the Navy continued LTM of groundwater at Sites 2 and 8 (OU2).

A technical review committee was formed in FY89 and was converted to a Restoration Advisory Board (RAB) in FY95. A community relations plan (CRP) was completed in late FY90. The CRP was updated in FY96. In FY97, the RAB, regulators, and technical experts worked to identify technological alternatives for the OU1 Focused Feasibility Study (FFS).

FY98 Restoration Progress

The Navy completed the FFS, the Proposed Plan (PP), and the ROD for OU1. The selected remedies included phytoremediation, sediment removal, tide gate upgrade, institutional controls (ICs), and LTM (including natural attenuation). The Navy also began the Phase II removal of metals-contaminated soil at Area 8 (OU2). In addition, the Navy continued LTM at OU2 and groundwater monitoring at Sites 2 and 8.

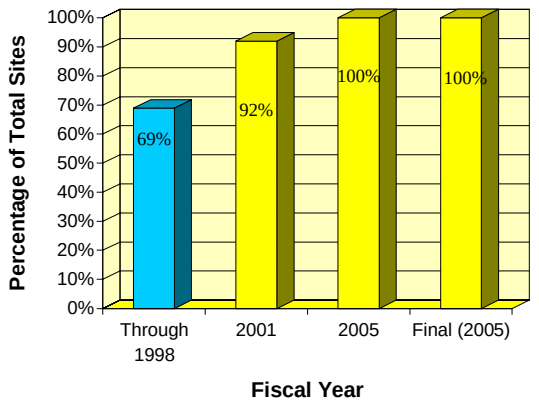
The RAB was closely involved throughout the cleanup process at OU1. It helped find possible remedial technologies and short-list remedial alternatives and provided input about the selected remedy. This was done through RAB meetings, open discussions, and "homework assignments." Communication with the community was a key to a successful and accepted PP. During the scoping of the OU1 FFS, the Navy met with federal and state fish and wildlife agency personnel, the state wetlands staff, the Suquamish tribe, and the Washington State Department of Ecology to focus on all stakeholder needs. The Navy also worked with USGS and the University of Washington on developing preferred alternative cleanup technologies.

At Site 8 (OU2), the Navy and Remedial Action (RA) contractors worked together in developing revised work plans to enable continued remediation despite the delayed completion of the new plating plant.

Plan of Action

- Complete Remedial Design for phytoremediation, sediment removal, and tide gate upgrade for OU1 in FY99
- Begin phytoremediation for OU1 in FY99
- Complete RA for sediment removal and tide gate upgrade for OU1 in FY99
- Develop IC plan (ICP) and work plans for LTM for OU1 in FY99
- Complete RA at Site 8 in FY99
- Continue LTM and implementation of ICP at OUs 1 and 2 in FY00
- Continue operations and maintenance at OU1 in FY00
- Complete corrective action at Site 23 in FY00
- Complete RAs at all sites in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 5,215 acres
Mission: Conducted long-range bombardment and air refueling operations
HRS Score: NA
IAG Status: None
Contaminants: Petroleum, pesticides, heavy metals, and solvents
Media Affected: Groundwater and soil
Funding to Date: $39.9 million
Estimated Cost to Completion (Completion Year): $29.5 million (FY2012)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Gwinn, Michigan

Restoration Background

In July 1993, the BRAC Commission recommended closure of K.I. Sawyer Air Force Base, inactivation of the 410th Wing, and transfer of the base's B-52H aircraft to Barksdale Air Force Base, Louisiana. In September 1995, the installation officially closed.

Environmental studies have been in progress at the installation since FY84. Twenty-five sites were identified as requiring additional investigation. Sites include landfills, fire training areas, underground storage tanks (USTs), aboveground storage tank spill sites, drainage pits, and a drainage pond. Petroleum hydrocarbons, trichloroethene (TCE), tetrachloroethene, vinyl chloride, 4-methyl phenol, and heavy metals are the primary contaminants affecting soil and groundwater.

Interim Remedial Actions include removal of USTs; removal and cleanup of contaminated soil; installation of 14 groundwater extraction wells; construction and operation of a groundwater treatment plant; removal of fuel from groundwater at the former petroleum/oil/lubricant (POL) storage area; and installation of pilot-scale bioventing systems. A downgradient fuel recovery trench is also being used to capture contaminants at the leading edge of the POL Area fuel plume. Remedial Investigation (RI) is still under way at three Installation Restoration Program sites. No Further Action closure documents are complete for five sites. An impermeable membrane cap has been installed at Landfills 3 and 4.

Annually, a comprehensive RI report on the basewide groundwater monitoring plan is completed. RCRA closure plans have been developed for the Explosive Ordnance Disposal (EOD) Range. The installation completed its Environmental Baseline Survey in FY94 and received regulatory concurrence on these designations. A Restoration Advisory Board (RAB) was formed in FY94. The installation's BRAC cleanup team schedules meetings immediately before RAB meetings to facilitate communication between the two groups. In FY95, the Local Redevelopment Authority submitted a reuse plan. In addition, the installation began leasing property and completed a redevelopment plan.

Seven large aboveground fuel storage tanks and the aircraft hydrant refueling system were removed. All USTs have been removed except three, all of which have a planned reuse. RCRA corrective measures were completed at two interim status hazardous waste storage facilities. The EOD Range and a grenade range were cleared of ordnance residues. Investigation and closeout of approximately 200 environmental areas of concern (AOCs) were completed.

FY98 Restoration Progress

RIs were completed at FT-06, LF-1, LF-4, and ST-04. Investigations were completed, and several AOCs were closed out. The purge-and-treat groundwater cleanup system at DP-02 began operating, as did the bioventing system and the downgradient trench at ST-04. Five regulated USTs were removed. A geophysical survey and a limited excavation determined that a landfill cap was not necessary at LF-01.

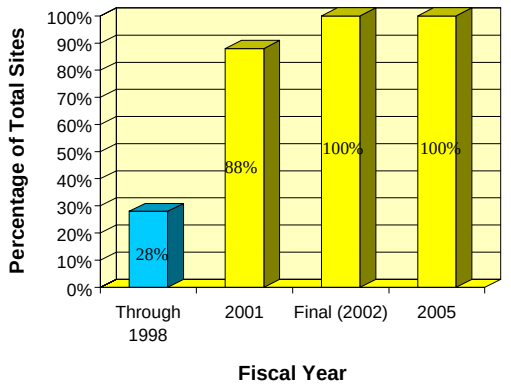
Four Remedial Action Plans (RAPs) were completed. RAPs at ST-04, FT-06, and LF-01 were delayed due to problems regarding the nature or location of site contaminants. The EOD Range closure was delayed due to regulatory requirements for additional sampling.

The abstract for the BRAC Cleanup Plan was updated. RAB members toured cleanup sites and reviewed documents and decisions before finalization.

Plan of Action

- Complete Remedial Actions for EOD Range in FY99
- Finalize RAP for FT-06, LF-01, and ST-04 in FY99
- Continue operating the purge-and-treat system at DP-02 and the bioventing system at ST-04 in FY99
- Operate a pilot-scale soil vapor extraction (SVE) system in FY99
- Initiate long-term operations of the DP-02 purge-and-treat system, the bioventing/contaminant removal systems at ST-04, and the air-sparging/SVE system at FT-06 in FY00
- Initiate long-term monitoring of landfill caps in FY00

Sites Achieving RIP or RC Per Fiscal Year



Lake City Army Ammunition Plant — Northwest Lagoon — NPL

Size: 3,935 acres
Mission: Manufacture, store, and test small-arms munitions
HRS Score: 33.62; placed on NPL in July 1987
IAG Status: IAG signed in September 1989
Contaminants: Explosives, heavy metals, solvents, and petroleum/oil/lubricants
Media Affected: Groundwater and soil
Funding to Date: $48.3 million
Estimated Cost to Completion (Completion Year): $109.7 million (FY2028)
Final Remedy in Place or Response Complete Date for All Sites: FY2007

Independence, Missouri

Restoration Background

Operations at the Lake City Army Ammunition Plant, a government-owned, contractor-operated facility, include the manufacture, storage, and testing of small-arms munitions. Principal site types at the installation include abandoned disposal pits, sumps, firing ranges, old lagoons, old dumps, and closed RCRA lagoons and burning grounds. Environmental studies initially identified 73 sites, which were consolidated into 35 sites for further investigation.

Sampling at seven representative areas identified groundwater contaminated with volatile organic compounds (VOCs), explosives, and heavy metals. After the plant was placed on the National Priorities List (NPL), it conducted a Remedial Investigation and Feasibility Study (RI/FS) focusing on four operable units (OUs), the Northeast Corner OU, the Area 18 OU, Area 8 OU, and an installationwide OU. Area 8 was subsequently incorporated into the installationwide OU.

In FY93, the installation drafted RI/FS reports for the Area 18 OU and the Northeast Corner OU. In FY94, the installation completed the draft RI report for the Area 8 and installationwide OUs and finished Relative Risk Site Evaluations. The installation completed an Engineering Evaluation and Cost Analysis (EE/CA), an Action Memorandum, and design documents in FY95.

In FY96, the installation began revising its community relations plan. It also initiated a Removal Action at the Area 18 OU, with concurrent development of the final Record of Decision (ROD). The Army completed the FS report for the Area 18 OU and submitted the Proposed Plan to the regulatory agencies. The installation and EPA began an informal dispute resolution process concerning the Area 18 Proposed Plan. Also, in FY96, the installation initiated Removal Actions for sumps, installationwide groundwater containment, and the capping and leachate collection system for the abandoned landfill in Area 16. The installation submitted a draft final FS for the Northeast Corner OU.

In FY97, the installation completed a pump-and-treat system for Area 18. It developed an EE/CA and an Action Memorandum for the leachate collection trench and a cap for the abandoned landfill in the Area 16/Northeast Corner OU. The Northeast Corner OU oil and solvent pits, which created the VOC groundwater plume leading to the installation boundary, became a higher priority than the abandoned landfill. The Army proceeded with an interim ROD to install a permeable reactive barrier in the Northeast Corner OU. The Army also abandoned the removal action for the landfill and will incorporate the landfill's cleanup into the final Northeast Corner OU ROD.

The commander formed a Restoration Advisory Board (RAB). Through the RAB and monthly program managers meetings, the installation has improved relations with the public and regulatory agencies.

FY98 Restoration Progress

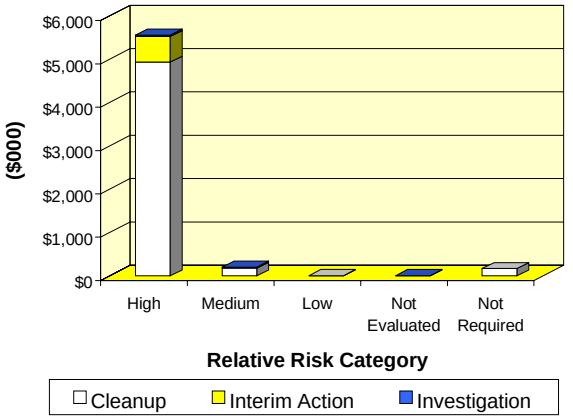
The installation completed the final ROD for the Northeast Corner OU Interim Action. It also installed an EW-2 extraction well at the northern boundary to prevent off-post migration of a contaminated groundwater plume. Revisions of the draft sump characterization work plan began. Installationwide characterization of groundwater was completed using the U.S. Army Corps of Engineers Site Characterization and Analysis Penetrometer System rig. Cleanup of depleted uranium on the firing range began under a NRC decommissioning plan.

The RAB held six meetings in FY98. The installation held meetings with EPA and the Missouri Department of Natural Resources to prepare an installation action plan.

Plan of Action

- Complete ROD for Area 18 in FY99
- Complete Remedial Design and Remedial Action (RD/RA) for Area 18 by FY00
- Complete RD/RA for Interim Action in the Northeast Corner OU by FY00
- Complete final FS, Proposed Plan, and ROD for the entire Northeast Corner OU by FY00
- Complete the final risk-based screening criteria document and installationwide FS by FY00
- Complete sumps characterization and removal by FY00

FY99 Funding by Phase and Relative Risk



Lakehurst Naval Air Engineering Station NPL

Size: 7,382 acres
Mission: Technology development and engineering
HRS Score: 50.53; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in October 1989
Contaminants: Fuels, PCBs, solvents including TCE, and waste oils
Media Affected: Groundwater and soil
Funding to Date: $37.3 million
Estimated Cost to Completion (Completion Year): $42.2 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY1998

Lakehurst, New Jersey

Restoration Background

Historical operations at this installation involved handling, storage, and on-site disposal of hazardous substances. Forty-five potentially contaminated sites were identified. Investigation began in FY83 and the Remedial Investigation and Feasibility Study (RI/FS) was completed by the end of FY95. As of FY97, 33 of the 45 sites required no further action.

Contaminated soil, drums, tanks, and debris were removed at 23 sites. Innovative technologies have been implemented, including soil washing, asphalt batching, and solar-powered spray irrigation and sparge treatment systems. In FY93, the installation developed groundwater modeling, which supported, and built consensus for, use of natural attenuation as the proposed action for a large trichloroethene (TCE) plume. The model was also used to optimize recovery well locations and pumping rates at the station's four groundwater treatment systems.

An interim Record of Decision (ROD) for a 3-year pilot project for natural restoration at Areas I and J was signed in FY95; the pilot project began in FY96. Also in FY96, Remedial Designs were completed for upgrades of the installation's four pump-and-treat systems, and RODs were completed for continued treatment of groundwater and soil in Areas C and H. FSs for Areas A/B, E, and K also were completed. A soil vapor extraction (SVE) system began operating at Site 13, and soil bioventing/vapor extraction systems began operating at Sites 16 and 17.

During FY97, RODs for Areas A/B, E, and K were completed. Negotiated reduction of monitoring for the pump-and-treat systems from quarterly to semiannually will save up to $150,000 per year. Accelerated fieldwork techniques were implemented, including excavation and restoration of petroleum hydrocarbon–contaminated wetlands. The installation created an aeration system and a surface water reservoir to treat groundwater and irrigate the station's golf course.

FY98 Restoration Progress

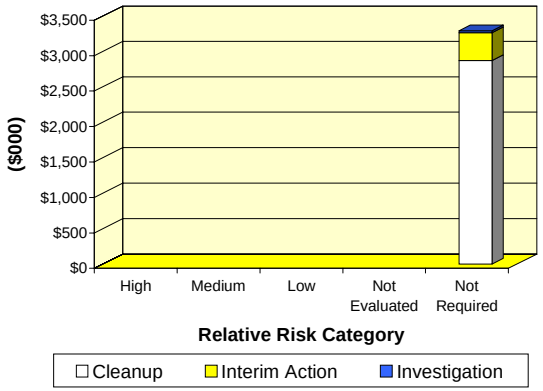
The groundwater recovery systems at Areas A, C, E, and H were modified to optimize system performance and improve the recovery of contaminated groundwater for treatment. An SVE/groundwater sparge system was installed in Area E, a groundwater sparge wall was installed in Area A, and a free-product recovery trench was installed in Area C to accelerate groundwater remediation. The installation installed solar-powered spray irrigation systems in Areas A and D to treat groundwater. At Site 16, three new blowers were added to the bioventing systems, and new sparge piping was installed. At Site 17, a larger capacity blower was installed to improve system performance. The schedule for Area I and J groundwater treatment was modified. Dates for the Proposed Plan (PP) and the ROD were shifted to allow completion of the natural restoration pilot program. An activated carbon treatment system was added to Site 13 to allow extraction as well as injection.

The Restoration Advisory Board (RAB) met every other month to present the status of the facility's environmental program and address any related questions from the public. The station is located upgradient of Toms River (a community identified with a child cancer cluster). Congress appropriated funding to study the occurrences of cancer in this area, and the RAB was an excellent forum for community discussion of this issue. The Lakehurst Environmental Branch assisted the Naval Air Warfare Center, Trenton with many Installation Restoration projects, including sampling, Remedial Actions, and report preparation that had to be completed before closure of the facility.

Plan of Action

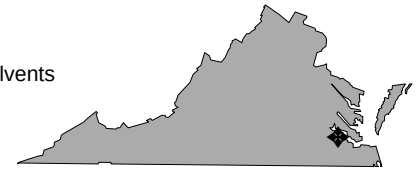
- In FY99, prepare final PP and ROD for Areas I and J, upon completion of natural restoration pilot program
- Start National Priorities List (NPL) delisting process in FY99
- Continue operations and maintenance of four groundwater pump-and-treat systems, six vapor extraction/bioventing/sparging systems, and six spray irrigation systems in FY99

FY99 Funding by Phase and Relative Risk



Langley Air Force Base — Including NASA Langley Research Center — NPL

Size: 3,152 acres
Mission: House Air Combat Command Headquarters, 1st Fighter Wing, 74th Tactical Control Facility, 480th Reconnaissance Technical Group, and NASA Langley Research Center
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Petroleum products, chlordane, PCBs, heavy metals, and solvents
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $45.1 million
Estimated Cost to Completion (Completion Year): $33.3 million (FY2007)
Final Remedy in Place or Response Complete Date for All Sites: FY2005



Hampton, Virginia

Restoration Background

This installation includes Langley Air Force Base and the NASA Langley Research Center. The base, which has been an airfield and an aeronautical research center since 1917, is the home base of the First Fighter Wing, Headquarters Air Combat Command, and NASA Langley Research Center.

A FY81 Preliminary Assessment (PA) and a Site Inspection (SI) and additional studies identified 45 sites at the installation, including landfills, underground storage tanks (USTs), a bulk fuel distribution system, and storm sewers. Investigations have determined that contaminants are migrating into Tabb Creek, the Back River, and ultimately the Chesapeake Bay.

In FY85, the installation discovered additional fuel contamination and free-product plumes. Subsequently, the installation replaced the fuel distribution system, investigated contaminated sediment in the storm sewers, and conducted Removal Actions to address free product at eight sites. Corrective action plans for the eight petroleum-contaminated sites were completed, and USTs at those sites were removed. Removal Actions to remediate soil and groundwater contamination began at three other sites. Additional actions at the sites included removal of abandoned USTs and free product and installation of a treatment plant to remove emulsified fuel from groundwater.

In FY93, the installation began SIs at 33 sites and Remedial Action construction at six sites. In FY94, NASA removed about 600 cubic yards of contaminated sediment from its storm sewers. In FY95, the installation completed construction of a second groundwater extraction and treatment system for petroleum-contaminated groundwater at two sites. A soil vapor extraction system also was implemented to remediate petroleum-contaminated soil near a filling station. During FY96, Remedial Investigations were initiated at 13 sites, and the installation completed SI activities at 33 sites and Removal Actions at 2 sites. In FY97, the installation implemented Removal Actions at three sites and continued operations and maintenance of the groundwater treatment plant.

In FY95, the installation's Restoration Advisory Board participated in the Variable Oversight Initiative, a national initiative by EPA and state regulatory agencies to streamline regulatory review. The initiative involved formation of the Langley AFB Partnership to improve communication and to set cleanup priorities.

FY98 Restoration Progress

The installation completed Interim Remedial Actions for two sites, signed decision documents designating No Further Response Acton Planned (NFRAP) for three sites, completed Proposed Plans and public meetings for two sites, and established three areas of concern that later became Installation Restoration Program (IRP) sites. Nine USTs were removed from three sites, a recovery system and monitoring wells were upgraded at three sites, and one petroleum/oil/lubricants (POL) site was closed with NFRAP approved by the state.

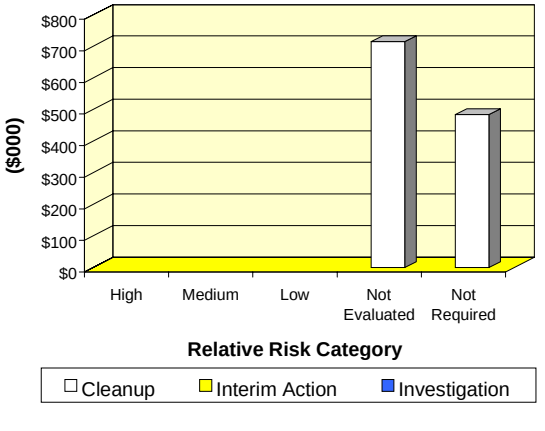
The new Back River IRP site, which surrounds Langley, was programmed for a PA/SI to determine what environmental impact the base had on Back River, and a former wastewater treatment plant was removed to eliminate a pathway to the Back River.

The installation saved approximately $815,000 by using the Langley Partnership to determine the technical approach for managing soil at one site. To date, estimated cost savings of more than $3.6 million and time savings of 24 months were achieved through the Langley Partnership. The Federal Facility Agreement is under negotiation.

Plan of Action

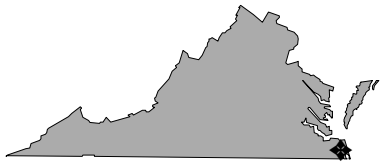
- Continue to use streamlined oversight tools and the Langley Partnership in FY99
- Sign two Records of Decision (RODs) in FY99
- Close out seven sites in FY99
- Complete an interim groundwater approach and RODs for two sites in FY99
- Close three additional POL sites in FY99
- Develop an Ecological Assessment summary report for all sites in FY99

FY99 Funding by Phase and Relative Risk



Naval Amphibious Base Little Creek — Proposed NPL

Size: 2,147 acres
Mission: Provide logistic facilities and support services to meet the amphibious warfare training requirements of the Armed Forces
HRS Score: 50; proposed for NPL on July 28, 1998
IAG Status: Federal Facility Agreement negotiations to be initiated in FY99
Contaminants: Mixed municipal wastes, VOCs, SVOCs, and heavy metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $13.2 million
Estimated Cost to Completion (Completion Year): $19.9 million (FY2013)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



Virginia Beach, Virginia

Restoration Background

Site types at this installation include landfills, a music equipment plating shop, a laundry waste disposal area, a pentachlorophenol (PCP) dip tank, sandblast yards, battery storage areas, and underground storage tanks (USTs). The installation was proposed for the National Priorities List (NPL) mainly because of the potential for contaminants in the soil and groundwater to migrate to surface water and endanger ecological receptors. Because of EPA funding constraints, the Virginia Department of Environmental Quality (VDEQ) has provided the majority of the regulatory oversight. If the installation is placed on the NPL, EPA will have the resources to help provide regulatory and technical oversight.

An Initial Assessment Study (IAS) completed in 1984 identified 17 potentially contaminated sites. Of these sites, Sites 7 and 9 through 13 were recommended for confirmation studies; Sites 4, 5, 15, and 16 were recommended for mitigation measures; and Sites 1, 2, 6, 8, 14, and 17 were recommended for no further action (NFA). Site 3 was addressed under a separate program. The six sites recommended for further study were sampled for groundwater, surface water, and sediment contamination in October 1986 as part of the Round I Verification study. These results were used to determine whether to expand the sampling effort conducted during the Interim Remedial Investigation (IRI). In 1988, a RCRA Facility Assessment identified potential solid waste management units (SWMUs). The SWMUs of greatest concern were scheduled for further investigation.

During 1991, the IRI was conducted. A study to collect, organize, and present data on background groundwater quality and conditions was also conducted. A Preliminary Site Inspection (PSI) was prepared for Sites 4, 5, 15, 16, and 17 and it detected chemical contaminants of concern in the groundwater at Site 5, and elevated levels of polychlorinated biphenyls (PCBs) in the soil at Site 16. NFA was proposed for Sites 4, 15, and 17.

From 1993 through 1994, a Remedial Investigation (RI) was conducted at Sites 7 and 9 through 13 and a Site Inspection (SI) was performed at Sites 5 and 16. The RI included a Phase I risk assessment and recommended long-term monitoring (LTM) for Sites 9 and 10; a source Removal Action and monitoring for Site 11; and additional evaluation for Sites 7, 12, and 13. The SI recommended monitoring at Site 5 and a Removal Action at Site 16. During 1995, the PCB-contaminated soil was removed from Site 16, and the site was closed. At Site 11, a source Removal Action was completed. Corrective actions were completed for 10 USTs, and two other UST sites underwent long-term operations.

A community relations plan was completed in 1995. A Restoration Advisory Board (RAB), established in 1994, meets every 6 months. RAB members include federal and state regulatory personnel, local government officials, environmental organizations, and community members.

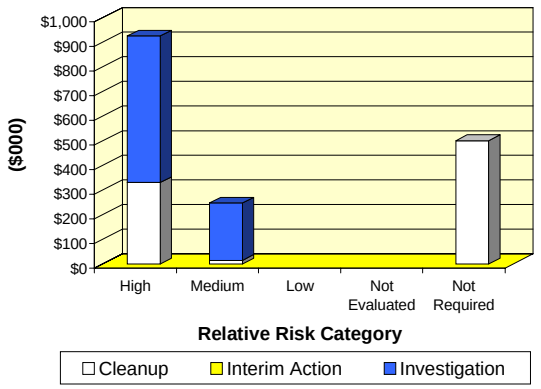
FY98 Restoration Progress

Two construction projects were completed at Site 7: the first involved removing 610 cubic yards of debris from the site; the second, placing approximately 20,000 cubic yards of soil cover over the landfill. The first round of groundwater sampling for LTM of Site 7 was conducted after the soil cover was constructed. At Site 8 and SWMU 3, field investigations for an SI were started and additional field investigations for the RI at Sites 11, 12, and 13 are under way. To evaluate the natural attenuation option for the volatile organic compound (VOC) contamination at Site 12, multilevel samplers were installed. At Site 13, an Engineering Evaluation and Cost Analysis (EE/CA) for removal of PCP-contaminated soil was submitted for comments. Two rounds of groundwater sampling required for groundwater LTM at Sites 9 and 10 were completed.

Plan of Action

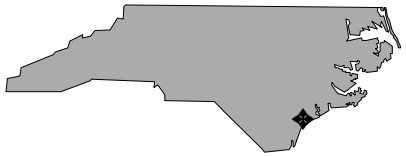
- Complete site management plan in FY99
- After the installation is placed on the NPL, begin Federal Facility Agreement negotiations in FY99
- Formalize partnering with EPA and VDEQ in FY99
- Start SI field investigation work at SWMUs 1, 2, 4, 5, and 6 in FY99
- Finalize the Phase I Supplemental RI (SRI) for Site 11 and the Phase II SRI for Sites 12 and 13 in FY99
- Complete draft Feasibility Study (FS) for Sites 11 through 13 in FY99
- Remove PCP-contaminated soil at Site 13 and finalize EE/CA in FY99
- Develop master project plans to expedite, and promote consistency in, the development of future project plans in FY99
- Submit 3-year groundwater monitoring report for Sites 9 and 10 in FY99
- Complete final FS for Sites 11 and 13 in FY99

FY99 Funding by Phase and Relative Risk



Camp Lejeune Marine Corps Base NPL

Size: 151,000 acres
Mission: Provide housing, training facilities, logistical support, and administrative supplies for Fleet Marine Force units and other assigned units; conduct specialized schools and other training as directed
HRS Score: 36.84; placed on NPL in October 1989
IAG Status: Federal Facility Agreement signed in February 1991
Contaminants: Battery acid, fuels and used oils, paints and thinners, PCBs, pesticides, solvents, and metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $72.5 million
Estimated Cost to Completion (Completion Year): $133.6 million (FY2038)
Final Remedy in Place or Response Complete Date for All Sites: FY2011



Jacksonville, North Carolina

Restoration Background

Investigations at Camp Lejeune identified 176 sites, including 86 leaking underground storage tank (UST) sites. Contaminants released from past storage and disposal operations have migrated to a shallow aquifer, several surface water bodies, and a deep aquifer used for drinking water.

In 1991, a Federal Facility Agreement under CERCLA was signed. Since then, 18 operable units, comprising 42 of the 91 Installation Restoration (IR) sites, have been identified as requiring additional investigation or remediation.

Between FY83 and FY88, the installation completed an Initial Assessment Study for 72 sites and Site Inspections for 8 sites, conducted 26 Remedial Investigations and Feasibility Studies (RI/FSs), signed Records of Decision (RODs) for 19 sites, and completed Remedial Design for 10 sites. Three Interim Remedial Actions at two sites and six Time-Critical Removal Actions (TCRAs) were completed. Final Remedial Actions (RAs) were completed at four sites. Remediation systems were installed and are operating at four sites. Since FY88, the installation's UST program has completed site assessments (SAs) at 76 sites and corrective action plans (CAPs) at 34. Remediation systems were designed and implemented at 23 sites, and are operating at 16. The installation has requested closure and no further action (NFA) at 26 sites. Eleven UST sites were moved to the IR program for further action.

In FY97, RI Phase I investigations were completed at 6 sites, RIs were completed at 12 sites, a groundwater modeling study was finished, air-sparging and in-well aeration Treatability Studies (TSs) were completed at 2 sites, a surfactant-enhanced aquifer remediation TS was initiated, and a TCRA for polychlorinated biphenyl (PCB)–contaminated soil was initiated. Long-term monitoring was performed at nine sites, and RAs were conducted at three sites. Final RODs were signed for four sites. The SA phase was completed at five UST sites; one was found to require NFA. The designs were completed at four UST sites, and implementation was completed at three others. Corrective action was under way at 12 UST sites. For the third time, Camp Lejeune was awarded the Secretary of the Navy Environmental Cleanup Award for Marine Corps installations.

The installation formed a technical review committee in FY88 and converted it to a Restoration Advisory Board (RAB) in FY95. The installation also completed a community relations plan in FY90 and established an information repository and an administrative record in FY91.

FY98 Restoration Progress

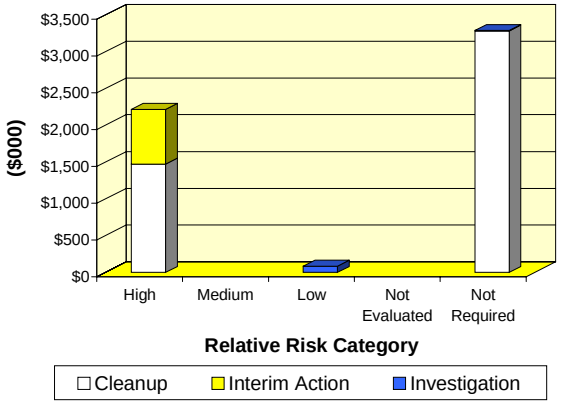
The installation completed a TCRA for PCB-contaminated soil at Site 36, initiated an Engineering Evaluation and Cost Analysis (EE/CA) for Non-Time-Critical Removal Actions (NTCRAs) at Sites 84 and 85, and initiated natural attenuation evaluations at Sites 35, 36, 54, 69, 73, and 86. Monitored natural attenuation will probably be one of the primary remedies at these sites. Groundwater monitoring ended at Site 24 after no contaminants of concern were found. Monitoring began at Sites 3, 35, and 69. RAs continued at 14 UST sites, with NFA indicated at USTs 16, 27, and 43. Remediation was completed at UST sites 22, 32, and 36. Natural attenuation began at 14 UST sites. The construction phase began at UST sites 9, 50, and 62. The installation initiated negotiations with regulators about land use control assurance plans (LUCAPs) and implementation plans. Final RODs for Sites 36, 43, 44, 54, and 86 were prepared and will be signed after the final resolution of LUCAP issues. An amendment to the final ROD for Site 3 was prepared after completion of a design phase TS. The amended ROD will be signed after resolution of LUCAP issues.

Project coordination meetings were held with the state EPA to discuss new guidelines for obtaining NFA status for sites. A Web site was established to provide information about the IR program to regulators, Navy and Marine Corps personnel, contractors, RAB members, and the general public. Conversion of the administrative record to CD-ROM was initiated.

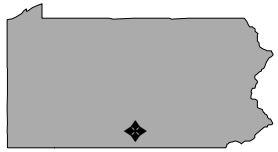
Plan of Action

- Resolve LUCAP issues and sign final RODs for Sites 36, 43, 44, 54, and 86 in FY99
- At Site 3, sign amended ROD after resolution of LUCAP issues and complete RA in FY99
- Prepare and sign final ROD for Site 69 in FY99
- Complete EE/CA at Sites 84 and 85 and NTCRA at Site 85 in FY99
- Complete surfactant-enhanced aquifer remediation TS at Site 88 and implement construction at UST site 67 in FY99
- In FY99, complete first CERCLA five-year review and obtain NFA status for approximately 15 UST sites
- Complete conversion of the administrative record to CD-ROM and place on the Web site in FY99
- Complete CAP for UST site 86 and SA for UST site 46 in FY99

FY99 Funding by Phase and Relative Risk



Size: 19,243 acres
Mission: Store, maintain, and decommission ammunition; rebuild and store tracked and wheeled vehicles; rebuild, store, and maintain missiles; provide warehousing and bulk storage
HRS Score: 34.21 (Southeastern Area); placed on NPL in July 1987
37.51 (Property Disposal Office); placed on NPL in March 1989
IAG Status: IAG signed in February 1989
Contaminants: VOCs, petroleum/oil/lubricants, PCBs, heavy metals, explosives, and asbestos
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $89.9 million
Estimated Cost to Completion (Completion Year): $105.2 million (FY2030)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2024



Franklin County, Pennsylvania

Restoration Background

Letterkenny Army Depot contains a variety of contaminated sites, including disposal lagoons and trenches, oil burn pits, an open burning and open detonation area, an explosives washout plant, two scrap yards, landfills, industrial wastewater treatment plant lagoons, and industrial wastewater sewer lines. Two National Priorities List (NPL) sites are located in the southern part of the installation.

The installation has concentrated its remedial efforts on source removal. They include excavation, low-temperature thermal treatment, backfilling, and capping of soil in the industrial wastewater treatment plant lagoons and the three K-Areas; emergency repairs to leaking industrial wastewater sewers; removal of the Property Disposal Office (PDO) fire training pit; and emergency removal of playground soil at the PDO Area and of sediment contaminated with polychlorinated biphenyls (PCBs) in the Rocky Spring springhouse. In FY91, the installation signed a Record of Decision (ROD) for no further action for PDO Operable Unit (OU) 1. Remedial Investigation and Feasibility Study (RI/FS) activities were expanded to seven OUs in the Southeastern Area and five OUs in the PDO Area.

In FY94, the Army completed the RI/FS for volatile organic compound (VOC)–contaminated groundwater at PDO OU2 and began RI fieldwork at the Mercury Detections in Rocky Spring Lake and at five OUs in the Southeastern Area.

During FY95, the Army upgraded the existing groundwater extraction and treatment system, more than doubling the system's extractive capacity. The installation completed a Remedial Action in the K Area part of the installation's Disposal Area, treating VOC-contaminated soil through low-temperature thermal desorption. In addition, a draft final ROD was prepared for enhanced passive aeration of the groundwater at PDO OU2.

In FY96, the Army established a BRAC cleanup team (BCT), the community formed a Local Redevelopment Authority (LRA), and the commander established a Restoration Advisory Board (RAB). The installation began removal of contaminated sediment from the Rowe Run and Southeast drainage sites, emergency delineation and removal at the old PDO Oil Burn Pit, and delineation of contaminated soil at the spill area in Area A of PDO OU5. The installation also completed Phase I of the Environmental Baseline Survey (EBS).

In FY97, the installation completed three Removal Actions at the spill site in Area A, the industrial wastewater sewers, and the Open Truck Storage Area. A Removal Action was initiated at the former PDO Oil Burn Pit using hydrogen peroxide injection for in situ treatment of chlorinated solvent-contaminated soil. The BCT developed sample-screening protocols to expedite select Phase I parcel transfer. A finding of suitability to lease for eight buildings was completed. The base met regularly with regulators and the LRA. The BCT completed the BRAC Cleanup Plan (BCP) and the CERFA letter report.

FY98 Restoration Progress

The installation is awaiting regulatory comments on the Phase II EBS. No funding was allotted for the BCP Version 2. The installation prepared draft RI reports for Southeastern Area OUs 2, 4, and 5. EPA is waiting for risk assessments before Army can complete the RIs.

The Army awarded a construction contract for the Rowe Spring treatment plant. The installation began fieldwork at PDO OU6 and Southeastern Area OU8 following a several month delay for peer review. Plans for a 334 early transfer did not meet LRA requirements. The Army signed a ROD for the Phase I parcel and prepared a Proposed Plan and a draft finding of suitability to transfer (FOST). Institutional controls were selected as the remedy for preventing human exposure to contaminated groundwater.

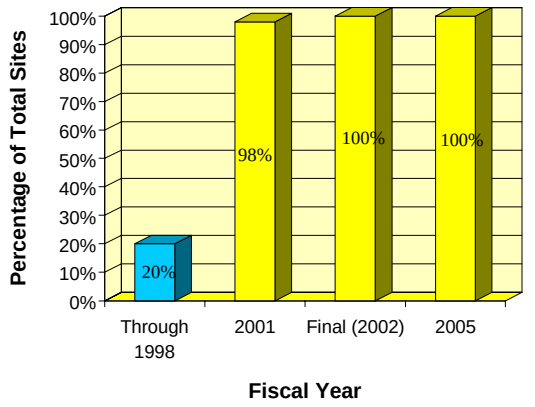
A Finding of No Significant Impact (FONSI) Environmental Assessment was signed in March 1998. Pilot studies as part of the Southeastern Area OU3 Focused Feasibility Study (FFS) were developed to review alternatives to traditional pump-and-treat remedies.

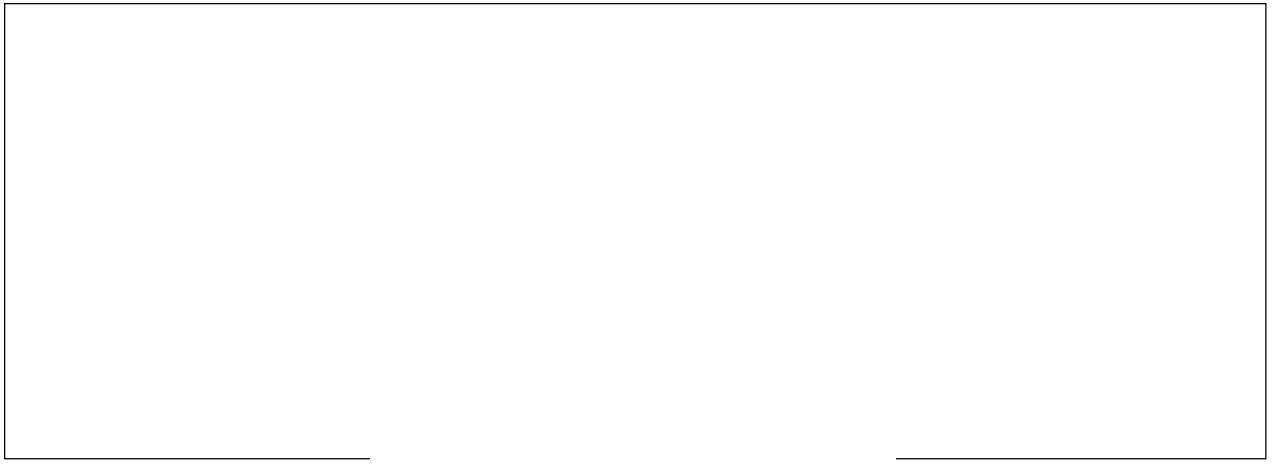
The RAB toured BRAC sites in June 1998 and reviewed the RI for PDO OU4 and the community relations plan. The BCT developed work plans for the PDO OU6 and Southeastern Area OU8 investigations and completed area of concern decision documents for select Phase I parcels. The BCT also prepared the Proposed Plan and signed the ROD for Phase I parcels and prepared the draft Phase I FOST.

Plan of Action

- Complete first phase of investigation for PDO OU6 and Southeastern Area OU8 in FY99
- Initiate construction of Rowe Spring treatment plant in FY99
- Complete pilot studies and FFS for Southeastern Area OU3 in FY99
- Begin PCB removal at DRMO scrap yard in FY99
- Begin long-term monitoring for PDO OUs 2, 4A, and 4B in FY99
- Complete RI and risk assessment for Southeastern Area OUs 2, 4, 5, and 6 in FY00
- Complete FOST for Phase I BRAC parcels
- Complete in situ treatment at former PDO Oil Burn Pit

Sites Achieving RIP or RC Per Fiscal Year





Size: 86,176 acres
Mission: House I Corps Headquarters; plan and execute Pacific, NATO, or other contingency missions; provide troop training, airfield, medical center, and logistics
HRS Score: 42.78 (Landfill No. 5); placed on NPL in July 1987; deleted from NPL in May 1995
35.48 (Logistics Center); placed on NPL in November 1989
IAG Status: IAG signed in January 1990
Contaminants: VOCs, PCBs, heavy metals, waste oils and fuels, coal liquification wastes, PAHs, solvents, and battery electrolytes
Media Affected: Groundwater and soil
Funding to Date: $42.1 million
Estimated Cost to Completion (Completion Year): $46.1 million (FY2029)
Final Remedy in Place or Response Complete Date for All Sites: FY2006

Fort Lewis, Washington

Restoration Background

Two Fort Lewis sites, Landfill No. 5 and the Logistics Center, were placed on the National Priorities List (NPL) after investigations revealed soil and groundwater contamination. Additional sites include landfills, disposal pits, contaminated buildings, and spill sites. Primary contaminants of concern include organic solvents, heavy metals, and fuels.

Cleanup at Fort Lewis has involved presumptive remedies, such as pump-and-treat, and innovative technologies, such as low-temperature thermal desorption. The Army and regulators signed the Record of Decision (ROD) for the Logistics Center in FY90. The final remedy, a groundwater extraction and treatment system, became operational in FY95. The installation closed a drinking water well at the Logistics Center as an Interim Action in FY91.

In FY92, the Army and regulators signed a ROD specifying No Further Action and long-term monitoring for Landfill No. 5. In FY94, a ROD was signed for Landfill No. 4 and the Solvent Refined Coal Plant. Fort Lewis completed the Remedial Design for contaminated soil at the Solvent Refined Coal Plant in FY95 and awarded the construction contract for the Remedial Action (RA). The installation also completed a pilot-scale study at Landfill No. 4. EPA removed Landfill No. 5 from the NPL in FY95. This was the first federal site, and the first DoD site, to be removed from the NPL.

In FY97, the installation completed the RA at the Solvent Refined Coal Plant and is awaiting site closeout, pending EPA review. It also initiated RA work at Landfill No. 4 using air-sparging and soil vapor extraction (SVE) for contaminated groundwater. Fort Lewis used air strippers for RA operations at the Logistics Center.

To expedite document review, the installation worked closely with EPA and state regulatory agencies. Fort Lewis established an Installation Restoration Program (IRP) Working Group with EPA Region 10, the Washington Department of Ecology, the U.S. Geological Survey, and the U.S. Department of Energy's Pacific Northwest National Laboratory. The objective of the group has been to accelerate site cleanups and to reduce IRP life-cycle costs. Heavy emphasis has been placed on the development of innovative remedial technologies to remediate the Logistics Center NPL site. The Army initiated field testing of one promising technology. In situ redox manipulation (ISRM) is being evaluated for potential full-scale use to remediate trichloroethene (TCE) in the groundwater. Other innovative remedial technologies being planned for field evaluations are phytoremediation and bioremediation.

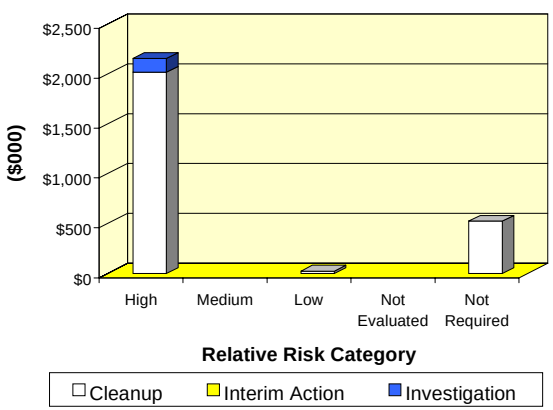
FY98 Restoration Progress

A funding shortfall precluded the execution of fence repair at the polychlorinated biphenyl (PCB)–contaminated site and the explosive ordnance disposal (EOD) range study. The installation determined that Landfill No. 1 requires additional sampling. The installation continued the groundwater RA at Landfill No. 4. It postponed surveying community interest in forming a Restoration Advisory Board (RAB) until FY99 due to limitations on program management funds.

Plan of Action

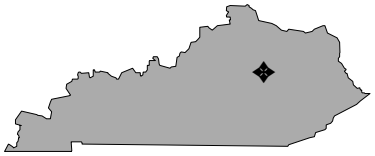
- Repair the fence at the PCB-contaminated site in FY99
- Conduct the EOD range study in FY99
- Conduct additional sampling at Landfill No. 1 in FY99
- Poll the local community in spring 1999 to determine interest in forming a RAB
- Complete the Logistics Center NPL site master remediation plan through the Fort Lewis IRP Working Group in FY99
- Conduct site closeout in FY99 at the old fire fighting training pit, stormwater outfalls, the Pesticide Rinse Area, and Vancouver Barracks
- Continue field evaluation of ISRM for treatment of TCE in the Logistics Center's groundwater in FY99
- Initiate phytoremediation field test for Logistics Center groundwater treatment in FY99
- Initiate TCE source investigation at Landfill No. 2 in FY99
- In FY99, continue Landfill No. 4 groundwater RA using air-sparging and SVE

FY99 Funding by Phase and Relative Risk



Lexington Facility-Lexington-Bluegrass Army Depot (Blue Grass Facility - LBAD) BRAC 1988

Size: 780 acres
Mission: Conducted light industrial operations, including paint stripping, metal plating, etching, and anodizing
HRS Score: NA
IAG Status: None
Contaminants: VOCs, SVOCs, heavy metals, PCBs, pesticides, herbicides, and asbestos
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $24.8 million
Estimated Cost to Completion (Completion Year): $27.9 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Lexington, Kentucky

Restoration Background

In December 1988, the BRAC Commission recommended closure of the Lexington Facility–Lexington-Bluegrass Army Depot (LBAD). The installation closed as scheduled in FY95. In FY90, the Army began environmental studies that identified 67 sites requiring further investigation. Recommended actions included additional soil, groundwater, and underground storage tank (UST) investigations. A RCRA Facility Assessment (RFA) identified 30 solid waste management units (SWMUs) and two areas of concern (AOCs).

Based on the RFA findings, the Army began fieldwork for a RCRA Facility Investigation (RFI) and a corrective measures study (CMS) in FY90. Sampling data from the initial phase of the RFI indicated contaminated groundwater, soil, and sediment at 29 sites. The major AOCs were the new landfill, the industrial and sanitary waste disposal landfill, the old landfill, industrial waste lagoons, industrial wastewater treatment plants (IWTPs), Area A, Area B, the north end of Building 135, and groundwater. The Phase I groundwater investigation demonstrated the need for soil cleanup, and the initial results increased the potential for long-term groundwater treatment. In FY94, the installation formed a BRAC cleanup team (BCT) and completed a draft Environmental Baseline Survey and a BRAC Cleanup Plan (BCP). The Army signed an interim lease with the Commonwealth of Kentucky for the entire 780 excess acres.

The installation completed the final Phase I RFI, the CMS, and the groundwater investigation documents in FY95 and submitted them to the Army and regulatory agencies for approval. During FY95, the installation also removed USTs, contaminated soil, polychlorinated biphenyl (PCB)–contaminated transformers, and asbestos. A Phase I finding of suitability to transfer (FOST) was signed for 22 buildings and a parking lot. The Army transferred these to the Commonwealth of Kentucky in 1995.

In FY96, the installation completed Interim Remedial Actions at Area A, Area B, the Coal Pile Run-Off Area, and other locations.

In FY97, it completed removal of contaminated soil and sludge from the industrial waste lagoons. Early actions took place at the sump and sand filter at Building 139 and at the oil-water separator at Buildings 8, 10, 19, and 43. The installation developed work plans for small sites during BCT meetings and worked with regulators to ensure consensus before initiating sampling.

EPA and the Kentucky Department of Environmental Protection (KDEP) concurred with the Phase I RFI and CMS documents. A Phase II installationwide groundwater investigation (RFI/CMS) was initiated. The Army signed a FOST for the Phase II transfer of 78 buildings and structures without underlying land. Interim measure work plans for a number of SWMUs were forwarded to KDEP and EPA for approval. The Army completed the cap on the three landfills; excavated contaminated soil from the lagoons, Area A, Area B, and IWTP; and conducted Remedial Actions at other AOCs.

FY98 Restoration Progress

The Army issued the draft Phase II RFI (soil) and provided the draft Statement of Basis to KDEP and EPA on the landfill site. The installation also issued several reports of findings and actions on Interim Actions that were completed.

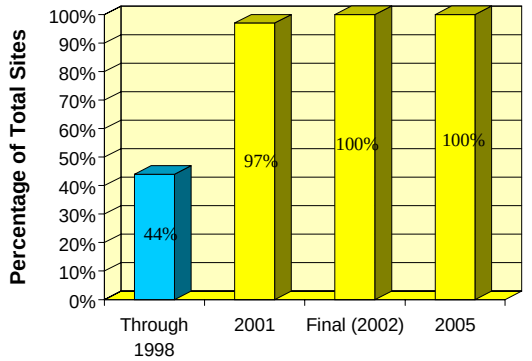
The BCT conducted several reviews of Interim Actions and Proposed Plans in FY98. The BCP underwent revisions in FY98 for an FY99 release. The transfer of the structures listed in the Phase II(b) FOST to the Commonwealth of Kentucky was delayed pending approval of the FOST.

LBAD has issued several public notices and sent a number of newsletters to solicit public comment concerning possible formation of a Restoration Advisory Board (RAB), but there was no public interest until FY98. In FY98, one community member expressed interest, and the Army began reevaluating the need for a RAB.

Plan of Action

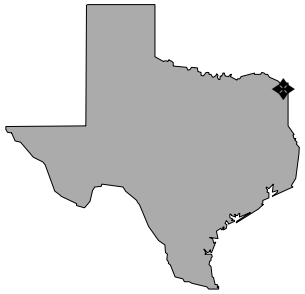
- Complete Phase II RFI (soil) activities in FY99
- Issue Statement of Basis for Phase I RFI/CMS No Further Action sites in FY99
- Complete Phase II(b) FOST in FY99
- Transfer the structures listed in the Phase II(b) FOST to the Commonwealth of Kentucky in FY99
- Complete a Phase II installationwide groundwater investigation and issue draft report in FY99
- Start Interim Action on plating shop in the north end of Building 135 in FY99
- Complete Version 3 of BCP in FY99
- Complete investigation of groundwater contamination in FY99
- Issue Statement of Basis on the landfills and the Phase I RFI/CMS No Further Action sites in FY99
- Complete the draft Phase II RFI/CMS for soils and groundwater in FY00
- Draft and complete Phase II CMS in FY00
- If required, design and install a groundwater monitoring system in FY00

Sites Achieving RIP or RC Per Fiscal Year



Lone Star Army Ammunition Plant NPL

Size: 15,546 acres
Mission: Load, assemble, and pack ammunition
HRS Score: 31.85; placed on NPL in July 1987
IAG Status: IAG signed in September 1990
Contaminants: VOCs, petroleum, heavy metals, and explosives
Media Affected: Groundwater and soil
Funding to Date: $16.8 million
Estimated Cost to Completion (Completion Year): $20.2 million (FY2009)
Final Remedy in Place or Response Complete Date for All Sites: FY2009



Texarkana, Texas

Restoration Background

Lone Star Army Ammunition Plant loads and packs munitions. From 1943 to 1944, the Old Demolition Area (ODA) was used to destroy faulty or nonstandard explosives. Environmental studies revealed explosives and metal contamination in the ODA. EPA therefore placed that area on the National Priorities List (NPL) in July 1987. The ODA is the only CERCLA site at the installation.

RCRA sites investigated include surface impoundments, landfills, fuel storage areas, and load lines. Investigations revealed soil contamination with solvents, metals, and explosives at some sites. At one site, groundwater is contaminated.

Interim Actions undertaken by the installation include closing two surface impoundments, installing industrial treatment facilities to treat wastewater before discharging it, and removing the bulk fuel storage area and the service station. In FY92, the installation began a RCRA Facility Investigation (RFI) for RCRA corrective action sites and completed a corrective action at one underground storage tank site.

In FY94, the installation used rotosonic drilling during EPA- and state-required field investigations of the ODA. This technique enhanced the quality of the core samples recovered, which in turn aided the installation in negotiations with regulatory agencies on Phase IV of the Remedial Investigation (RI). The University of Texas conducted a biodegradation study of installation soil that was contaminated with explosives and metals.

In FY95, the installation conducted soil boring and installed monitoring wells, accompanied by analytical sampling, for the ODA Phase IV RI. It also obtained regulatory approval for, and began sampling of, biota at the ODA. The installation conducted groundwater investigations under RCRA at the two closed surface impoundments and performed soil and groundwater investigations at the bulk fuel storage area.

In FY96, the Army collected samples of groundwater and surface soil at the ODA in accordance with EPA-approved plans. RI activities in the area were completed. The installation took soil borings and established groundwater wells for the RFI.

In FY97, the Army completed a background survey to determine ambient concentrations of contaminants for the installation. The survey report was submitted to the state after completion of all field activities. The state approved the report in September 1997.

The installation's technical review committee (TRC) includes representatives of the installation, the state, and EPA and leaders of the local community. The TRC meets quarterly to discuss current and proposed environmental actions under CERCLA.

FY98 Restoration Progress

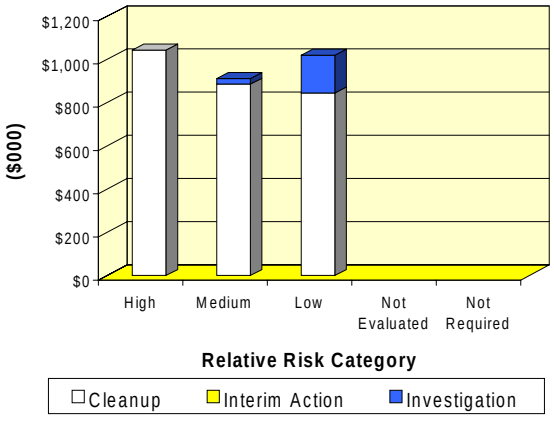
The installation submitted a draft Record of Decision (ROD) to EPA for review. A Focused Feasibility Study and a Proposed Plan were also submitted for the Old Demolition Area. The Army decontaminated and removed cisterns and prepared closure reports. Contaminated soil at Paint Filter Site and RDX Pit K 2 was excavated. The installation also completed soil removal and decontamination activities at nine sites and completed two Relative Risk Site Evaluations.

The Army delayed implementation of natural attenuation technologies scheduled for FY98 until it determines the full nature of the contaminants. The scheduled completion of RFI activities did not occur because additional fieldwork was required.

Plan of Action

- Complete RFI activities in FY99
- Implement natural attenuation technologies in FY99
- Complete removal of ordnance debris and construction of erosion control berms in FY99
- Begin RFI activities at the G and O Pond sites in FY99

FY99 Funding by Phase and Relative Risk



Size: 1,563 acres
Mission: Provide logistics support for assigned ships and service craft; perform authorized work in connection with construction, alteration, dry docking, and outfitting of ships and craft assigned; perform manufacturing, research, development, and test work
HRS Score: NA
IAG Status: None
Contaminants: Chlorinated solvents, solvents, acids, blasting grit, paint, heavy metals, industrial wastewater, and industrial liquid waste
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $46.4 million
Estimated Cost to Completion (Completion Year): $13.9 million (FY2009)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2009

Long Beach, California

Restoration Background

The Long Beach Naval Complex consists of the Long Beach Naval Shipyard (NSY), the Naval Station (NS) Long Beach, and the Long Beach Naval Hospital (NAVHOSP). The BRAC Commission recommended closure of the NAVHOSP, the NS, and associated housing areas in FY91, and closure occurred in FY94. Closure of the NSY and associated housing areas was recommended in July 1993 and occurred in September 1997.

NSY and NS operations that contributed to contamination include ship and vehicle repair and maintenance, utility maintenance and operation, support shops, storage of petroleum products and hazardous materials, laundry and dry cleaning, steam plant operations, and air compressor operations. Portions of housing areas associated with the NSY were used to dispose of ship wastes, drilling mud, and construction debris. The primary sites of concern are disposal pits into which a variety of wastes were deposited.

A Removal Site Evaluation was completed at NS Site 6A to support an interim lease to the Port of Los Angeles. It concluded that no action was necessary for industrial use of the site. The most difficult cleanup challenge occurred at Site 7, the NS and NSY harbor. To streamline the study process, Phases I and II of the Remedial Investigation and Feasibility Study (RI/FS) were combined.

In FY94, the installation formed a BRAC cleanup team (BCT), which completed a BRAC Cleanup Plan (BCP) and the Environmental Baseline Survey (EBS) for NS and NAVHOSP. The BCT continues to meet monthly and produces BCPs annually. The joint NS and NSY technical review committee was converted to a Restoration Advisory Board (RAB). A separate RAB for the San Pedro housing area and the Defense Fuel Support Point was formed in FY95.

In FY96, the City of Long Beach completed the land reuse plan for NSY. The installation completed the RI for NS Sites 1 through 6A and the Engineering Evaluation and Cost Analysis (EE/CA) and Action Memorandum (AM) for NS Site 3. The removal of arsenic-contaminated soil from Site 3 also was completed. At the former NS gas station, the installation began operating a soil vapor and liquid extraction and bioremediation system to clean up petroleum contaminants in soil and groundwater.

In FY97, the installation began an Interim Remedial Action (IRA) at Sites 2, 11, and 12 (Palos Verdes housing) and Site 5 (San Pedro housing). The groundwater investigation for Site 6A began, and cleanup of Site 6B NSY was completed. EE/CAs for four sites and an EBS for NSY housing were completed. NSY was closed, and an EBS was written for NS. Streamlined sampling and combined phases enhanced the process of delineating contamination.

FY98 Restoration Progress

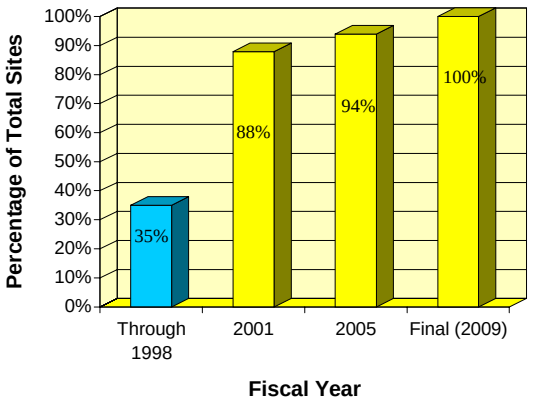
The installation completed an RI for Sites 8 through 13, an IRA at four sites, a Site Inspection for Site 14, and the FS for Sites 3 through 6A. The FS for Sites 8, 10, and 11 was drafted but postponed in favor of focusing resources on the Record of Decision (ROD) for Sites 3 through 6A and the FS, Proposed Plan (PP), and ROD for Sites 1 and 2. The FS for Sites 9, 12, and 13 was delayed because additional fieldwork was required. Because of changes in the reuse and conveyance schedules, phytoremediation was not implemented at Sites 1 and 2 and the IRA was postponed or partially omitted. By focusing on the Remedial Action (RA) process for Sites 1 and 2, the installation plans to achieve earlier ROD completion and property transfer dates. The installation issued a draft ROD for Sites 3 through 6A, an EE/CA for Site 14, and a draft FS for Sites 1 and 2. The RI for Site 7 and the PP for Sites 3 through 6A were finalized. The installation also held a 30-day public review of the PP for Sites 3 through 6A.

The RAB reviewed documents, provided input, and attended site tours and educational workshops. Working group meetings between the BCT and the project team occur monthly. Team-building sessions were held with regulatory participants to coordinate scheduling and forecast workloads.

Plan of Action

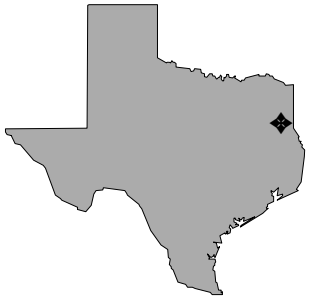
- Complete ROD for Sites 3 through 6A and FS for Site 7 in FY99
- Complete FS, PP, and ROD for Sites 1 and 2 in FY99
- Complete FS, PP, and ROD for Sites 8, 10, and 11 in FY99
- Complete FS and PP for Sites 9, 12, and 13 in FY99
- Complete AM for Site 14 in FY99
- Complete PP and ROD for Site 7 in FY00
- Complete ROD and RD for Sites 9, 12, and 13 in FY00
- Complete RA for Sites 12 and 13 and IRA for Site 14 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Longhorn Army Ammunition Plant NPL

Size: 8,493 acres
Mission: Loaded, assembled, and packed pyrotechnic and illuminating signal munitions
HRS Score: 39.83; placed on NPL in August 1990
IAG Status: IAG signed in October 1991
Contaminants: Explosives, heavy metals, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $64.5 million
Estimated Cost to Completion (Completion Year): $67.4 million (FY2006)
Final Remedy in Place or Response Complete Date for All Sites: FY2006



Karnack, Texas

Restoration Background

Longhorn Army Ammunition Plant (LHAAP) manufactured pyrotechnic and illuminating signal munitions and solid-propellant rocket motors. Environmental studies identified 50 sites, including storage areas, landfills, open burning grounds, industrial areas, burial pits, sumps, and wastewater treatment plants. Eighteen of these sites are eligible for the Installation Restoration Program (IRP). The installation divided the sites into five groups.

Follow-up studies at the installation identified volatile organic compounds (VOCs), heavy metals, and explosives in on-site groundwater, surface water, and soil. The studies also confirmed two sources of VOC contamination beneath the Active Burning Ground Site.

A FY84 Remedial Action (RA) included design and construction of a landfill cap for an unlined evaporation pond formerly known as the Rocket Motor Washout Pond. In FY91, the installation began a Remedial Investigation and Feasibility Study (RI/FS) at 13 sites. Phase I of the RI was completed in FY93. The Army completed Phase II investigations at 11 sites that required additional fieldwork in FY95.

In FY94, the Army also completed a pilot-scale study for groundwater extraction and treatment to remove trichloroethene (TCE) and methylene chloride at Burning Ground No. 3, which includes the capped, unlined evaporation pond. During FY95, the installation completed three Records of Decision (RODs), one for Burning Ground No. 3, another for two landfills, and a third for two sites at which no further action was necessary.

The installation's technical review committee (TRC) meets quarterly. The commander attempted to form a Restoration Advisory Board (RAB), but interest was not sufficient to sustain the effort. The Interagency Agreement (IAG) for the installation requires that both state and federal regulatory agencies review primary documents to ensure compliance. In FY96, construction began on the Burning Ground Treatment Facility and the caps for Landfills 12 and 16. The installation completed the Phase II RI. It also began evaluating alternatives to pumping and treating the groundwater at Site 16. A RA began for 84 wastewater sumps.

In FY97, the installation compiled data to complete the Group 1 RI and initiated Phase III of the RI for Group 2. It also completed construction of the Burning Ground Treatment Facility and began treatment of groundwater and soil. A Site Inspection report for Group 5 recommended no further action at two of the four sites. In addition, the Army initiated four Interim Actions and/or Removal Actions. The TRC began including Audubon Society members at monthly managers meetings.

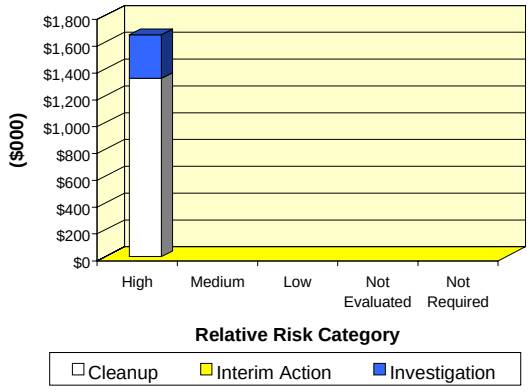
FY98 Restoration Progress

The installation completed a no further action ROD for Group 1 sites (1, 11, 27, and 54). The installation also completed treatment of 30,000 cubic yards of source material and continued to collect and treat groundwater at the Burning Ground. The Army completed the Landfill 12 cap. The Interim Remedial Action cap for Landfill 16 was delayed a month due to weather. Field studies were initiated for Groups 2 and 4. The TRC requested an application for Technical Assistance for Public Participation funding to determine the effects of on-post contamination in surface waters entering Caddo Lake.

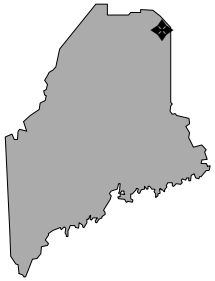
Plan of Action

- Complete capping of Landfill 16 in FY99
- Continue the collection and treatment of groundwater from the Burning Ground in FY99
- Complete fieldwork for Group 2 and Group 4 RI/FSs in FY99
- Complete accelerated RI/FS for Site 16 in FY99

FY99 Funding by Phase and Relative Risk



Size: 9,477 acres
Mission: Support B-52 bombers and KC-135 tankers
HRS Score: 34.49; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in April 1991; revision signed in 1994
Contaminants: VOCs, waste fuels, oils, spent solvents, PCBs, pesticides, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $113.3 million
Estimated Cost to Completion (Completion Year): $10.8 million (FY2048)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000



Limestone, Maine

Restoration Background

Loring Air Force Base was established in 1952 to support B-52 bombers and KC-135 tankers. In July 1991, the BRAC Commission recommended closure of the base. The Flightline and Nose Dock Areas, where industrial shops and maintenance hangars were located, are the primary areas at which wastes were released into soil and groundwater.

Environmental studies have been in progress at the base since FY84. Sites include spill areas, landfills, fire training areas, underground storage tanks (USTs), aboveground storage tanks, and low-level radioactive waste areas. In FY93, the sites were grouped into 13 operable units (OUs). Interim Remedial Actions initiated in FY93 included removal of free product at three sites, source removal at two sites, and Treatability Studies of bioventing at one site and of solvent extraction at another site.

In FY94, Remedial Actions (RAs) were completed for two OUs. This effort remediated four sites with a total of approximately 7 acres of solvent-contaminated, fuel-contaminated, and PCB-contaminated soil. An Environmental Baseline Survey identified 4,746 acres as CERFA-clean, and the installation received regulatory concurrence on the designations. A BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) were formed.

In FY95, Interim Actions consistent with the final remedy were completed at six sites and initiated at another six. A pilot study for recovery of fuels from bedrock was begun.

In FY96, under EPA's Superfund Innovative Technology Evaluation program, the installation demonstrated an innovative emission control system using soil vapor extraction at the Base Laundry. Landfill covers were completed at 2 sites, bioventing systems were installed at 8 sites, Interim Actions were completed at 15 sites, and numerous USTs were removed. PCB cleanups were initiated at an underground transformer site and for the base drainage system. Four Records of Decision (RODs), including the installation's first ROD for groundwater, were signed for 31 sites. A corrective action plan was submitted to the state regulatory agency to address contamination from numerous fuel tank sites.

In FY97, the installation implemented a decision for remediation of the Surface Drainage OU and initiated the cleanup plan for pipeline from the installation to Searsport. Early Removal Actions took place at OU5 and at two pump houses in OU10.

FY98 Restoration Progress

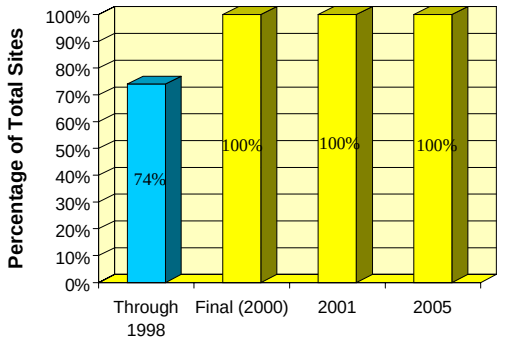
A ROD was completed for eight Installation Restoration Program sites. The BCT determined that the final 10 source control sites would be best handled in a FY99 source control ROD. It initiated the site closure process, and developed a strategy in coordination with the Local Redevelopment Authority, for eventual deed transfer of property. The BCT also conducted a program review and published an updated BRAC Cleanup Plan.

The installation completed the RA for basewide surface drainage; this action is the largest stream restoration effort in New England.A Remedial Investigation and Feasibility Study (RI/FS) for the Basewide Groundwater OU was completed. Cleanup of fuel spill sites was completed under Maine regulations. Investigative efforts for a pilot study at the base quarry revealed a buried drum disposal site. The BCT immediately coordinated and executed a Removal Action, excavating and disposing of over 300 drums, some of which contained hazardous wastes.

Plan of Action

- Complete ROD for remaining 10 source control sites in FY99
- Complete construction of cover at Landfill 3 in FY99
- Complete ROD for Basewide Groundwater OU in FY99
- Submit first five-year review in FY99
- Complete quarry pilot study efforts
- Complete fuel spill cleanup along 180-mile pipeline in FY99
- Implement long-term groundwater monitoring plan in FY99
- Implement wetland mitigation projects in FY99-FY00
- Initiate Operating Properly and Successfully determination in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 144 acres
Mission: Procure and produce ship weapons systems and components; perform engineering designs; and support research, development, and testing
HRS Score: NA
IAG Status: None
Contaminants: Heavy metals, solvents, cyanide, and petroleum/oil/lubricants
Media Affected: Groundwater, sediment, and soil
Funding to Date: $5.1 million
Estimated Cost to Completion (Completion Year): $28.1 million (FY2033)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Louisville, Kentucky

Restoration Background

In July 1995, the BRAC Commission recommended closure of the Louisville Naval Surface Warfare Center (NSWC). Appropriate functions, along with personnel, equipment, and support, were relocated, primarily to three Naval Activities: Naval Shipyard Norfolk, Virginia; NSWC Port Hueneme, California; and NSWC Crane, Indiana.

Operations that may have contributed to contamination at the installation include machining, welding, draining of lubricating fluids, painting, electroplating, degreasing and cleaning of metals, and paint stripping. Site types include waste storage and disposal areas, manufacturing operations and disposal areas, and other miscellaneous support and maintenance activity areas. Contaminants have migrated into nearby soil and groundwater.

In FY86, the installation was issued a RCRA Part B permit that included requirements for corrective action before the initial RCRA Facility Assessment (RFA). A Preliminary Assessment identified five sites. Two sites continued to the Site Inspection phase; the remaining sites required no further action. In FY91, another site was added. During FY96, the installation released a final Environmental Baseline Survey (EBS) report, EPA conducted a basewide RFA and combined the EBS and RFA to identify solid waste management units (SWMUs) and areas of concern (AOCs). Sixty-nine SWMUs and 18 AOCs were identified. Confirmatory sampling was recommended for 33 SWMUs and 14 AOCs, but none of the potential SWMUs or AOCs was included in the restoration program. A local reuse committee was formed and developed a land reuse plan.

During FY96, the installation established a Restoration Advisory Board and an information repository. The installation also completed its community relations plan and assembled an Environmental Restoration Management Alliance team, which is part of the BRAC cleanup team (BCT).

By FY97, approximately 80 percent of the installation's buildings had been leased to private entities. The installation also completed a finding of suitability to lease; decontaminated SWMU 7; and finished cleanup, repairs, and upgrades at eight SWMUs and AOC K. Breaks in the combined sewer system, AOC I, are being repaired.

FY98 Restoration Progress

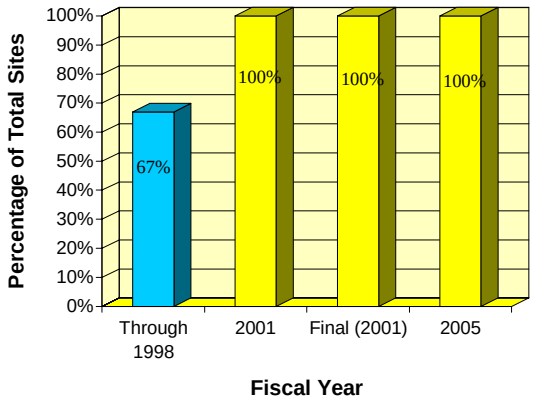
The installation prepared a draft findings report and submitted it for approval. An interim measures work plan for the decontamination of sumps and pits also was submitted, and the initial work was completed. The work plan for the SWMU 52 isolation fence was submitted and the work completed. The installation decontaminated paint booths, gun mounts for Buildings 68 and 78, a hydraulic spill area in Building L, and machines containing asbestos. Tanks 118C and 118G were decontaminated, and Tanks 60, 61, 95, and 98 were removed. Repairs to the combined sewer system (AOC I) also were completed. Unresolved issues with the Commonwealth of Kentucky regarding investigation strategies, risk assessment procedures, and determination of site background delayed the RCRA Facility Investigation (RFI). Because of this delay, the following items scheduled for completion in FY98 also had to be postponed: the corrective measures study (CMS) for SWMUs; Round 2 field sampling; the draft and final RFI report for Round 2 investigations; use of risk-based cleanup criteria; and assessment of natural attenuation parameters.

The installation submitted the Round 2 sampling and analysis plan and a risk assessment work plan to the Commonwealth of Kentucky and EPA for comment. A partnering seminar was held to initiate partnering between the Kentucky Division of Environmental Protection, EPA, and DoD. The BCT met bimonthly and worked to expedite the investigation and cleanup process.

Plan of Action

- Transfer and identify sites for the restoration program in FY99
- Complete CMS for SWMUs in FY99
- Complete Round 2 field sampling in FY99
- Complete draft and final RFI report for Round 2 investigations in FY99
- Use risk-based cleanup criteria in FY99

Sites Achieving RIP or RC Per Fiscal Year



Louisiana Army Ammunition Plant NPL

Size: 14,974 acres
Mission: Manufacture ammunition metal parts and maintain ammunition production facilities
HRS Score: 30.26; placed on NPL in March 1989
IAG Status: IAG signed in 1989
Contaminants: Oils, grease, degreasers, phosphates, solvents, and metal plating sludges, acids, fly ash, TNT, RDX, and HMX
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $52.7 million
Estimated Cost to Completion (Completion Year): $7.1 million (FY2000)
Final Remedy in Place or Response Complete Date for All Sites: FY2000

Doyline, Louisiana

Restoration Background

Sites identified at the Louisiana Army Ammunition Plant include lagoons, burning grounds, and landfills contaminated with explosives and plating wastes. The Army identified seven sites during a Preliminary Assessment and Site Inspection in FY78 and completed a preliminary Remedial Investigation and Feasibility Study (RI/FS) in FY82. The installation initiated full-scale RI/FS activities at four of the seven sites in FY85. The studies identified no off-site contamination; however, groundwater monitoring wells at the installation were contaminated with explosive compounds, such as TNT, RDX, and HMX.

The potential for off-site migration of contaminants required groundwater monitoring beyond the northern and southern boundaries of the installation. Groundwater monitoring at the installation and beyond its boundaries has continued until the present.

Between FY89 and FY90, the installation incinerated almost 102,000 tons of explosives-contaminated soil and treated more than 53 million gallons of contaminated water. The lagoons underwent RCRA closure and were revegetated. The installation must monitor the vegetated protective cap and maintain it regularly to ensure its integrity.

The Army identified two additional sites in FY93 and FY94, the Y-Line Etching Facility and the Load-Assemble-Pack Lines. In FY95, the installation began the RI at the Load-Assemble-Pack Lines and completed the RI at the Y-Line Etching Facility. In FY94, the Army completed a 5-year review of the Interim Remedial Action at the Area P lagoons, evaluating the effectiveness of interim measures. The findings of the review confirmed that the source of the contamination had been removed. The installation established a partnership with the U.S. Army Corps of Engineers Waterways Experiment Station to study the feasibility of using natural attenuation to treat groundwater contaminated with explosives.

In FY96, the installation received approval from EPA for the Record of Decision (ROD) concerning soil at the first seven sites. A separate operable unit (OU) will address the installationwide groundwater. In addition, the installation completed the first phase of the RI at the Load-Assemble-Pack Lines and began the FS for the Y-Line Etching Facility.

In FY97, the installation completed the RI/FS for the Y-Line Etching Facility. The RI/FS determined that there was no risk from contaminated soil at the site. The Army plans to implement a No Further Action ROD at the site. The groundwater, however, is contaminated with trichloroethene. Remedial options for the contaminated groundwater will be developed under the Installationwide Groundwater OU.

FY98 Restoration Progress

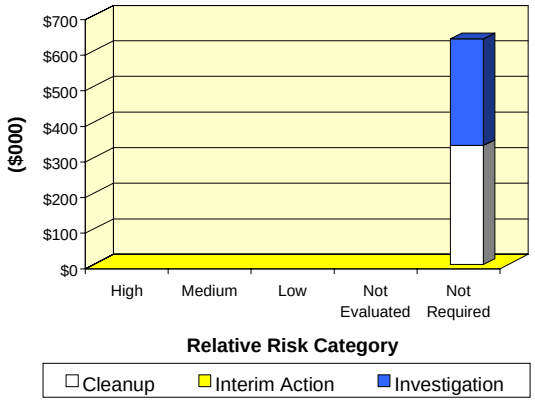
The installation initiated work on the RIs for the Ecological Risk Assessment (ERA) and Installationwide Groundwater OU. The Proposed Plan for Area Y is complete; however, a town meeting about the selected remedy must be held before the ROD is released. The installation performed additional water sampling to confirm that natural attenuation is occurring.

The installation's technical review committee meets quarterly to exchange information about the cleanup program, assist in the review and approval of documents, and discuss ongoing restoration progress, Remedial Design, and report preparation.

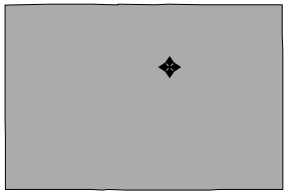
Plan of Action

- Complete the RI for the ERA in FY99
- Complete all fieldwork for the Groundwater OU RI in FY99
- Complete the natural attenuation study in FY99

FY99 Funding by Phase and Relative Risk



Size: 1,866 acres
Mission: House the 3400th Technical Training Wing; served as a technical training center
HRS Score: NA
IAG Status: IAG under negotiation
Contaminants: Waste oil, general refuse, fly ash, coal, metals, fuels, VOCs, solvents, and petroleum hydrocarbons
Media Affected: Groundwater and soil
Funding to Date: $41.0 million
Estimated Cost to Completion (Completion Year): $21.0 million (FY2003)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000



Denver, Colorado

Restoration Background

In 1991, the BRAC commission recommended closure of all but 108 acres at Lowry. It was recommended that the 1001st Space Systems Squadron, DFAS, and the Air Force Reserve Personnel Center remain at Lowry in cantonment areas. The installation was closed in September 1994.

Sites at the installation include fire training areas, landfills, a fly ash disposal area, coal storage yards, and underground storage tanks (USTs). Interim Remedial Actions (IRAs) have included removal of 20 USTs, removal of free product from the water table, closure of off-base wells, operation of an in situ bioventing system, and construction of an aboveground bioremediation land-treatment area. In FY94, the installation began a RCRA Facility Investigation and a basewide groundwater investigation to determine the extent of trichloroethene (TCE) contamination.

In FY95, the installation completed fieldwork for a facility assessment and conducted Phase II site assessments for eight UST sites. The installation began IRAs involving placement of extraction wells at the boundaries of the installation to intercept the TCE groundwater plume and installation of bioventing systems at two petroleum-contaminated sites. A Focused Feasibility Study was conducted to characterize a landfill before closure activities. An Environmental Baseline Survey (EBS) was completed. In addition, the installation's technical review committee was converted to a Restoration Advisory Board (RAB), and a BRAC cleanup team (BCT) was formed.

In FY96, the facility assessment, fieldwork for 18 areas of concern and Phase I of the basewide groundwater investigation were completed. Actions included initiation of Remedial Investigations (RIs) for five study areas and long-term monitoring and operations and maintenance of bioventing systems at two UST sites. The installation also completed removal of all USTs and construction of the hydraulic containment system for the TCE plume.

In FY97, a Local Redevelopment Authority (LRA) road project was used to cap part of a former coal storage yard. In addition, 207 acres was deeded to the LRA for residential redevelopment. Second-level site assessments and final definition of groundwater contamination Operable Unit (OU) 5 were accomplished. The EBS for the BRAC 95 parcel was completed, and the Environmental Impact Statement was initiated. The Remedial Design (RD) for Landfill OU2 was completed. The hydraulic containment system began operation, and construction began on an interim response (Source Reduction Area project) for OU5. Final actions at the Flash Disposal Area (OU3) were completed.

FY98 Restoration Progress

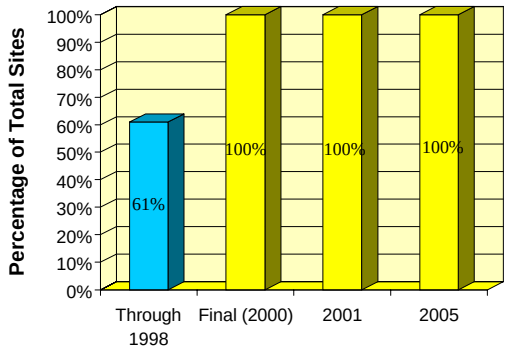
Second-level site assessments at removed UST locations were initiated. The dual-phase vapor extraction system at the TCE source area began operation, and demonstration of a flameless thermal oxidizer was accomplished. The cleanup of contaminated soil and storage tanks at the Auto Body Shop (OU4) was completed. Feasibility Studies (FSs) at three sites and the Landfill Zone were completed. Approximately 500 acres are suitable for transfer. Mercury and radiation testing was performed. RD for the remainder of the coal storage yard was initiated.

Ten RAB meetings were held to support information exchange between the citizen RAB members, the state, EPA, and the Air Force. A site visit was conducted, with the RAB visiting most of the sites of environmental concern on the former base. Technical Assistance for Public Participation (TAPP) training was provided for the RAB members and a TAPP application is being prepared. The BCT coordinated 10 findings of suitability to transfer, findings of suitability for early transfer, and 2 findings of suitability to lease. State regulators were involved in the creation of the governor's Executive Order on early transfers.

Plan of Action

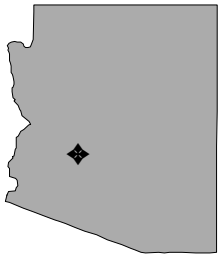
- Split OU5 sites into separate FS documents in FY99
- Complete RI/FS for basewide groundwater investigations and begin determining whether further RAs are required in FY99
- Begin RA construction and conduct closure activities at the Landfill Zone in FY99
- Award contract and begin work on Landfill Zone long-term operations and maintenance (LTOM) in FY99-FY00
- Determine need for, and begin, LTOM for Auto Hobby Shop
- Award contract and initiate RA for Firing and Skeet Ranges in FY99-FY00
- Initiate UST, aboveground storage tank, and OWS Site Removal Actions
- Initiate RAs at Coal Storage Zone East and Coal Storage Zone West
- Initiate IRAs at OU5
- Initiate LTOM for basewide groundwater for the SAR and BAHCS

Sites Achieving RIP or RC Per Fiscal Year



Luke Air Force Base NPL

Size: 4,198 acres
Mission: Provide advanced F-16 fighter training
HRS Score: 37.93; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in September 1990
Contaminants: Petroleum/oil/lubricants, waste solvents, waste oils, general refuse, lead, and chromium
Media Affected: Groundwater and soil
Funding to Date: $18.2 million
Estimated Cost to Completion (Completion Year): $0.1 million (FY2004)
Final Remedy in Place or Response Complete Date for All Sites: FY1999



Glendale, Arizona

Restoration Background

Historically, Luke Air Force Base has provided advanced training to fighter pilots. The current mission of the 56th Fighter Wing, the host unit at the installation, is to provide combat crew training for F-16 aircraft personnel in addition to aircraft maintenance, training, and engineering support.

Thirty-one sites were identified at the installation. These were later consolidated into two operable units (OUs). Site types include fire training areas, disposal trenches, landfills, spill sites, and surface drainage canals. Soil is the primary affected medium. Petroleum/oil/lubricants, waste solvents, and waste oils have been identified in disposal trenches and in the fire training area. Interim Actions have included removal of three underground storage tanks, use of soil vapor extraction (SVE) to clean up contaminated soil at the North Fire Training Area, and stabilization of the bank of a landfill adjacent to the Agua Fria River.

In FY91 and FY92, the installation completed final Remedial Investigation and Feasibility Study (RI/FS) work plans and field sampling plans. An interim RI report for OU1 and a final RI report for OU2 were submitted to, and approved by, the regulatory agencies. In FY93, a new site at the fuel handling area was added to OU1, and a final FS report was submitted to, and approved by, EPA and the state regulatory agency.

In FY94, the installation completed RI fieldwork and submitted a draft report to regulators. A Record of Decision (ROD) for OU2 was signed directing cleanup of one site by soil bioremediation and the continuing maintenance, and inspection for 30 years, of a concrete cap at another site. In FY95, the installation completed construction for the Phase I Remedial Action at OU2. The installation also began a Treatability Study of bioventing at OU1 and agreed with EPA and the state regulatory agency to perform a Focused Feasibility Study of such generic remedies as soil bioremediation, SVE, and institutional controls (ICs). A technical review committee was formed and converted to a Restoration Advisory Board (RAB). The RAB includes 24 members representing the community.

In FY96, soil at OU2 was composted to treat off-base contamination with benzo(a)pyrene, and soil was sampled to support a Phase II Remedial Design for composting on-base contamination. The installation also deployed an internal combustion engine (ICE) for SVE cleanup of soil contaminated with jet fuel in the bulk fuels storage area of OU1. In FY97, remediation of contamination at OU2 was completed. The RAB reviewed and commented on programming and budget execution plans, and RAB members visited the site where the ICE SVE technology was in use and received a briefing on the operation.

FY98 Restoration Progress

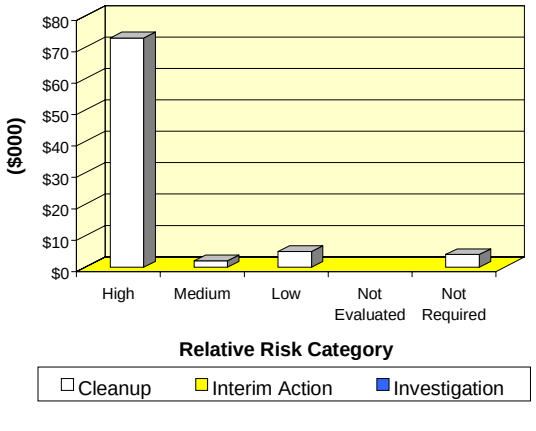
The installation and the RAB developed a community outreach program and video to highlight the installation's restoration progress for the public. The installation was awarded the General Thomas D. White Environmental Restoration Award for HQAETC.

An ICE was used at OU1, and the RI and the FS were completed. The ROD will be signed by the end of 1998. The groundwater sampling and analysis plan was revised, and work began on the project.

Plan of Action

- Initiate use of ICs at LF-03, LF-25, FT-07, DP-13, and SD-38 in FY99
- Begin delisting process for the installation in FY99
- Prepare RA reports and a final closeout report for OUs 1 and 2 in FY99

FY99 Funding by Phase and Relative Risk



Malta Rocket Fuel Area

NPL

Size: 165 acres
Mission: Tested rocket engines and exotic rocket fuels
HRS Score: 33.62; placed on NPL in July 1987
IAG Status: IAG signed in 1990
Contaminants: VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $2.7 million
Estimated Cost to Completion (Completion Year): $0 (FY1997)
Final Remedy in Place or Response Complete Date for All Sites: NA

Malta, New York

Restoration Background

Malta Rocket Fuel Area operated as a testing facility for exotic rocket fuels and rocket engines. Its primary site types include aboveground storage tanks, underground storage tanks, dry well areas, and surface disposal areas. Environmental studies have identified groundwater and sediment contaminated with volatile organic compounds (VOCs) at the Formerly Used Defense Site (FUDS) property.

In FY89, EPA issued a Unilateral Consent Order to eight potentially responsible parties (PRPs). In FY90, the State of New York, DoD, and a private corporation entered into an interim Participation Agreement to conduct the Remedial Investigation and Feasibility Study (RI/FS). The RI, completed in FY93, identified two VOCs, trichloroethene (TCE) and carbon tetrachloride, as the primary contaminants of concern in the groundwater. EPA recommended additional investigation under the RI, including test pit excavations, which were conducted in late FY93. In FY94, the U.S. Army Corps of Engineers (USACE) completed additional RI activities and submitted a revised RI report to EPA for review.

In FY95, the participating parties addressed EPA's comments, completed the RI report, began FS activities, and submitted a draft FS report to EPA for review. In addition, PRPs completed the removal of two gas cylinders and drums, and USACE awarded a contract for completing a PRP search report.

In FY96, the PRP search report was completed. USACE then formulated DoD's position and made recommendations to the Department of Justice. Participating PRPs completed the FS report.

In FY97, the Department of Justice concluded negotiations with other PRPs for DoD's share of liability. Settlement documents have been routed for final approvals.

FY98 Restoration Progress

The Department of Justice, on behalf of DoD, entered into a Consent Decree and made a payment from the Judgment Fund to the EPA Superfund. This action ended DoD's liability at the site and completed the USACE project.

FY99 Funding by Phase and Relative Risk

All sites are in the long-term monitoring phase.

Size: 6,545 acres
Mission: Maintain, repair, and refuel aircraft
HRS Score: 31.94; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in September 1990
Contaminants: VOCs, petroleum/oil/lubricants, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $133.4 million
Estimated Cost to Completion (Completion Year): $22.2 million (FY2021)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2001

Riverside, California

Restoration Background

In July 1993, the BRAC Commission recommended that March Air Force Base undergo realignment. It was recommended that the installation serve as an Air Reserve Base once realignment was completed. Base realignment was accomplished in April 1996.

Environmental studies at the installation began in FY84. A Preliminary Assessment and Site Inspection identified 28 sites, including three fire training areas, seven inactive landfills, several underground storage tanks, an engine test cell (Site 18), sludge drying beds at a sewage treatment plant, and various spill sites.

March is a joint-use base which uses both BRAC and Environmental Restoration Account funds to reach cleanup goals. For a basewide project, such as an Environmental Inpact Statement, the costs are evenly divided. Additional projects that are within defined boundaries are paid from the account affected.

An Engineering Evaluation and Cost Analysis, a Removal Action, and a groundwater extraction and treatment system were completed to prevent off-base migration of contaminated groundwater. The installation also began a Removal Action for the Panero hydrant refueling system and treatment of contaminated soil. In FY91, sites were grouped into three operable units (OUs).

In FY94, generic remedies, including modified RCRA caps and stream modifications, were initiated at some landfill sites. Modified vapor extraction and recovery systems were used to clean up contaminants in soil and groundwater. The technical review committee was converted to a Restoration Advisory Board. The installation also completed an Environmental Baseline Survey

In FY95, Removal Actions were conducted at five sites, and two landfills were closed. A soil vapor extraction pilot system was installed at Site 31 (Solvent Spill), and an air-sparging system wasinstalled at Site 18. The installation continued long-term monitoring at OU1 and OU3.

A Record of Decision (ROD) for OU1 was signed in FY96. Remedial Actions (RAs) involving construction of a dual-phase treatment system for groundwater trichloroethene (TCE)-contaminated soil began for Site 31 and the related groundwater plume at OU1. Six landfill sites on the western part of the base were cleaned up. The debris was consolidated at Site 6, allowing the Local Redevelopment Authority unrestricted use of an additional 100 acres. Interim Removal Actions (IRAs) were completed at Site 25 and continued at two sites within the flight line.

In FY97, the draft final Remedial Investigation and Feasibility Study (RI/FS) was submitted, and the Proposed Plan (PP) and ROD for OU2 were completed. Remedial Design (RD) began for a combined treatment facility for Sites 2, 8, and 27. The IRA at Site 30 was completed. Indicator analytes were used in groundwater sampling to expedite site characterization.

FY98 Restoration Progress

The draft basewide RI/FS was submitted, and fieldwork began on selected approved portions. The OU2 PP was approved and the draft final ROD forwarded to the remedial project managers for review. Basewide groundwater monitoring in support of the OU1 ROD and the OU2 and OU3 Removal Actions continued. The Groundwater Technical Working Group established requirements for obtaining Operating Properly and Successfully (OP&S) approval from EPA for the OU1 groundwater treatment facility. Upgraded groundwater treatment facilities were installed at Sites33 and 18. Source investigation was completed at Sites 2, 8, and 27.

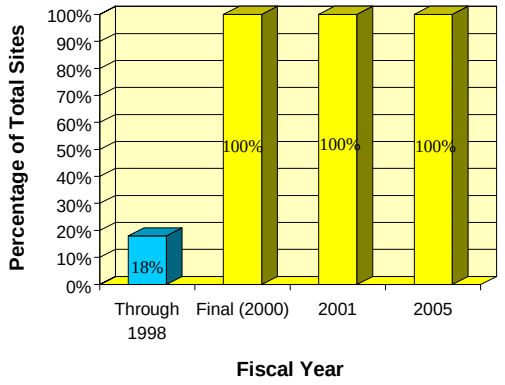
The installation began removing wells at bioventing sites. This process was not completed, because of contractor delays. Contract negotiations delayed initiation of lead shot removal at the isolated shooting range. EPA and the state EPA requested reconsideration of the proposed RD and RA in conjunction with OU3 groundwater approval. Remedial construction was delayed at the request of EPA and the state EPA.

Modeling and a Treatability Study (TS) were completed for OU2. EPA and the state EPA required a revised sampling and analysis plan before review of the TS. All basewide documents have been delayed until this plan is completed.

Plan of Action

- Continue field activities in support of the basewide RI/FS
- Obtain approval for the OU2 ROD
- Continue groundwater monitoring in support of the OU1 ROD
- Complete requirements for EPA OP&S approval
- Obtain approval of Memorandum of Agreement between Air Force Reserve Command (AFRC) and Air Force Base Conversion Agency (AFBCA) for transferring majority of environmental responsibility
- Complete the ROD for OU3 in FY99

Sites Achieving RIP or RC Per Fiscal Year



Mare Island Naval Shipyard — BRAC 1993

Size: 5,252 acres
Mission: Maintained and repaired ships and provided logistical support for assigned ship and service craft
HRS Score: NA
IAG Status: Federal Facility Agreement signed in September 1992
Contaminants: Heavy metals, VOCs, PCBs, pesticides, petroleum hydrocarbons, lead oxides, and unexploded ordnance
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $51.2 million
Estimated Cost to Completion (Completion Year): $84.5 million (FY2007)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005

Vallejo, California

Restoration Background

In July 1993, the BRAC Commission recommended closure of Mare Island Naval Shipyard and relocation of the Combat Systems Technical School's Command Activity to Dam Neck, Virginia. The installation closed on April 1, 1996.

Environmental studies since FY80 have identified 28 sites and 20 solid waste management units (SWMUs) at this installation. Sites 1 through 24 were divided into three operable units (OUs) on the basis of the type or location of the contamination and other available information.

The installation completed a Preliminary Assessment (PA) for 15 sites in FY83. In FY88, it completed a Site Inspection (SI) for one site and initiated Remedial Investigations and Feasibility Studies for 23 sites. In FY90, the installation completed an initial site characterization (ISC) for one underground storage tank (UST) site. In FY91, SIs were completed for 12 sites and PA/SIs were completed for 6 sites. In FY93, the installation completed Interim Remedial Actions (IRAs) for six UST sites and one other site. In FY94, ISCs were completed for seven UST sites and Removal Actions were completed for two sites. The installation also completed a land reuse plan, which includes an open recreational area, offices and light industrial areas, residences, heavy industrial areas, historic districts, and neighborhood centers.

In FY95, the installation initiated Removal Actions for five sites and completed a Removal Action for one site. It also began to develop corrective action plans for eight UST sites and completed an Environmental Baseline Survey, which designated 500 acres as CERFA-clean.

During FY96, the installation's BRAC cleanup team (BCT), which formed in FY94, completed a Removal Action for one site, began Removal Actions for two sites and a no further action (NFA) Record of Decision for one site, and completed Removal Actions for three sites and the Defense Reutilization and Marketing Office scrap yard. The BCT negotiated a Memorandum of Understanding (MOU) with the City of Vallejo, the U.S. Fish and Wildlife Service, and the Navy. The MOU outlined requirements for the cleanup program and a Habitat Conservation Plan.

In FY97, a Removal Action was initiated for one site. USTs were removed from sites, which then required NFA. The installation also instituted a thermal desorption demonstration project for polychlorinated biphenyls (PCBs) and used accelerated fieldwork techniques, such as magnetometer, geometrics, geoprobe, and an on-site field laboratory.

The installation formed a technical review committee in FY90 and converted it to a Restoration Advisory Board in FY94. An administrative record and an information repository were established in FY90. The installation completed its community relations plan in FY92 and updated it in FY94.

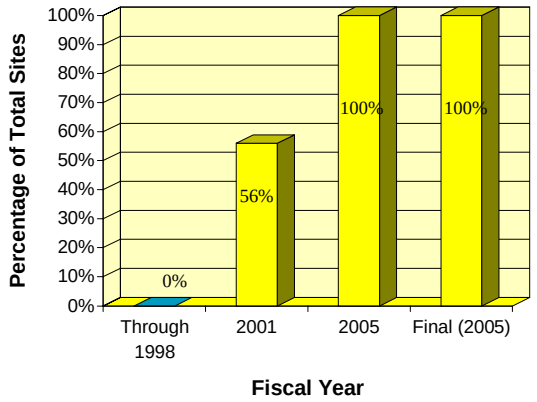
FY98 Restoration Progress

The installation completed removal actions at Site 5 and 8. Removal Actions were started at Sites 16 B-4 and 17 and SWMUs 52 and 54. All USTs were removed or closed in place. The installation also removed 43,000 lineal feet of fuel line. All radiological work was completed and approved by the regulatory agencies.

Plan of Action

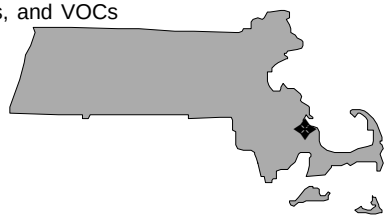
- Complete Removal Action at Sites 13, 16 B-4, and 17 in FY99
- Complete removal of all onshore UXO in FY99
- Complete PCB remediation program in FY99
- Receive regulatory approval for closure of 50 USTs in FY99
- Complete field sampling for 20 SWMUs in FY99
- Transfer Investigative Area E and Roosevelt Terrace in FY99

Sites Achieving RIP or RC Per Fiscal Year



Massachusetts Military Reservation — Otis Air National Guard Base and Camp Edwards — NPL

Size: 22,000 acres
Mission: Provide Army and Air National Guard training and support the East Coast Air Defense and Coast Guard Air and Sea Rescue Units
HRS Score: 45.93; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in April 1992 and amended in June 1995
Contaminants: Waste solvents, emulsifiers, penetrants, photographic chemicals, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $237.5 million
Estimated Cost to Completion (Completion Year): $673.8 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Falmouth, Massachusetts

Restoration Background

Environmental studies have identified 79 sites at this installation. Site types include chemical and fuel spill sites, storm drains, landfills, former fire-fighter training areas, coal yards, and underground drainage structures. Private and municipal wells near the installation were closed after off-base migration of groundwater contamination was detected.

Removal Actions for six sumps associated with the underground drainage structures were conducted in FY91. Contaminated liquids and sediment from these structures were removed and disposed of properly. In FY93, a groundwater extraction and treatment system was installed to contain a contaminant plume migrating from a former motor pool and storage yard. Remedial Investigation and Feasibility Study work also began. In FY94, in an Interim Remedial Action (IRA), the largest of four landfills was capped. The Installation Restoration Program began use of thermal desorption to treat more than 22,000 cubic yards of contaminated soil from several sites.

In 1995, an air-sparging system was implemented to remove subsurface soil contamination at Fuel Spill Site 12 (FS-12). Innovative technologies demonstrated at the installation include reactive wall treatment technology. In 1996, the environmental regulatory agencies and other stakeholders accepted the strategic plan delineating the cleanup strategy for the reservation. Ongoing restoration activities included the identification of remedial sites and the cleanup of 20,000 tons of contaminated soil. More than 180 underground drainage structures were removed. A private-well sampling program was initiated to monitor drinking water safety. As an extra precaution, replacement drinking water supplies have been provided.

In 1997, the Federal Facility Agreement was amended. The installation continued to remove underground drainage structures and conducted thermal treatment of contaminated soil, which led to final remediation and closure of Fire Training Area No. 1. A computer model for the groundwater extraction and treatment system was developed, and pilot testing of recirculation wells began at three locations. Fieldwork techniques, such as on-site laboratories and sampling techniques, sonic geophysical analysis, and microwells for ecological studies, were implemented. The reactive wall pilot program continued.

FY98 Restoration Progress

A treatment system using extraction, treatment, and reinjection (ETR) was selected for Chemical Spill 10 (CS-10) and the Ashumet Valley groundwater plumes. Recirculation wells were selected for the Storm Drain 5 (SD-5) South plume, and a dual-track ETR system and monitored natural attenuation demonstration was selected for the Landfill 1 Plume.

Geologic borings and monitoring well installations were conducted to define the extent of the SD-5, CS-10, and Ashumet Valley plumes. Monitoring wells were installed to define the Chemical Spill 19 source area. Over 40 monitoring wells were installed as part of the FS-1 plume investigation.

The FS-12 source area remediation project was completed. The Air Force Center for Environmental Excellence (AFCEE) continued to operate groundwater plume ETR systems for the FS-12 and SD-5 North plumes. Ecological studies were conducted for baseline information gathering on the FS-12, SD-5, and CS-10 plumes. AFCEE continued to operate two pairs of recirculation wells on the CS-10 plume to remove contamination from a high concentration zone.

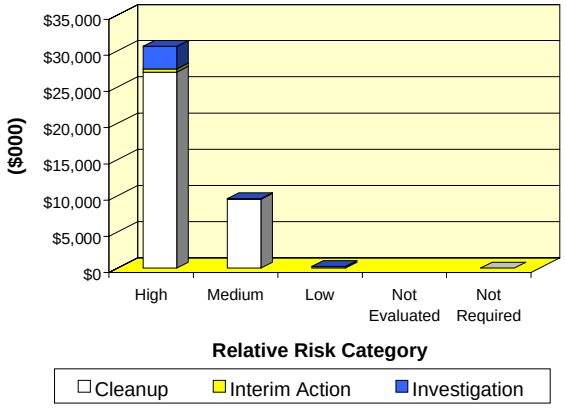
The reactive wall of iron filings was installed at the CS-10 source area. Two variations of recirculating well technologies were tested.

Seven citizen advisory teams met on a regular basis. Over 100 public meetings were conducted.

Plan of Action

- Design and construct ETR systems for the CS-10 and Ashumet Valley plumes
- Evaluate feasibility of ETR systems for the western portion of the CS-10 plume, the FS-1 plume, and the Southwest Operable Unit area groundwater contamination
- Continue to issue Proposed Plans, Engineering Evaluation and Cost Analysis reports, decision documents, and Records of Decision
- Continue analysis of monitored natural attenuation for the Landfill 1 groundwater plume
- Continue private well testing for area residents and evaluate the need for further conversions to municipal water supplies
- Continue evaluating the reactive wall project
- Have all treatment systems in place by FY01

FY99 Funding by Phase and Relative Risk



Size: 5,716 acres
Mission: Navigation and Electronic Warfare officer training; SAC Bombing and Refueling Squadron
HRS Score: 28.90; placed on NPL in July 1987
IAG Status: IAG signed in 1989
Contaminants: Solvents, jet fuel, petroleum hydrocarbons, and lead
Media Affected: Groundwater and soil
Funding to Date: $150.5 million
Estimated Cost to Completion (Completion Year): $114.4 million (FY2069)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Sacramento, California

Restoration Background

In December 1988, the BRAC Commission recommended that Mather Air Force Base be closed. Before becoming inactive in FY93, the installation housed the 323d Flying Training Wing, a reserve air refueling group, and an Army National Guard aviation unit.

Studies have identified 88 sites at the installation, which were consolidated into six operable units (OUs): OU1, Aircraft Control and Warning System; OU2, Groundwater; OU3, Soil; OU4, Landfill; OU5, Basewide; and OU6. Prominent site types include landfills, underground storage tanks (USTs), fire training areas, a trichloroethene (TCE) disposal site, a weapons storage area, wash-rack areas, spill areas, and waste pits.

Interim Actions included removing USTs and contaminated soil, supplying an alternative water supply to nearby residents, removing sludge from a former wastewater treatment plant, and removing petroleum product from soil by vapor extraction.

In FY90, a RCRA Facility Assessment identified 48 solid waste management units (SWMUs) and two areas of concern (AOCs). By FY94, Remedial Investigation and Feasibility Study (RI/FS) activities were completed at OU4.

In FY94, the regulatory agencies approved the final draft Record of Decision (ROD) for OU1, and a Restoration Advisory Board (RAB) and a BRAC Cleanup Team (BCT) were formed.

In FY95, the regulatory agencies approved the final draft ROD for OU4. Construction was completed and Remedial Action (RA) began for OU1. Removal Actions were initiated to remediate petroleum contamination at several other sites. An Environmental Impact Statement has been prepared for the disposal and reuse of property at the installation.

In FY96, the regulatory agencies approved the final ROD for OU2 and OU3. Three of the installation's landfills were consolidated, and engineered caps were installed at two of the landfills. The installation also completed the RI for OU5.

By FY97, the installation had removed all identified substandard USTs. Two oil-water separator sites were closed. Construction began on the pump-and-treat system for OU2. Soil vapor extraction (SVE) and bioventing in situ soil treatment systems were installed at 11 sites. The Proposed Plan and draft ROD for OU5 were released.

FY98 Restoration Progress

The ROD for OU5 was finalized and signed. RA was selected at 7 of the 15 sites addressed in the OU, including former firing ranges, a sewage treatment facility, a solvent disposal site, and sewer lines in the Main Base Area.

A groundwater pump-and-treat facility for the Main Base/SAC Area plumes began operating. A soil gas investigation was conducted over a large area of the main base. Construction of the groundwater pump-and-treat system for the Site 7 plume began. Construction was completed to cap OU4, and a passive landfill gas control system was installed at Site 4.

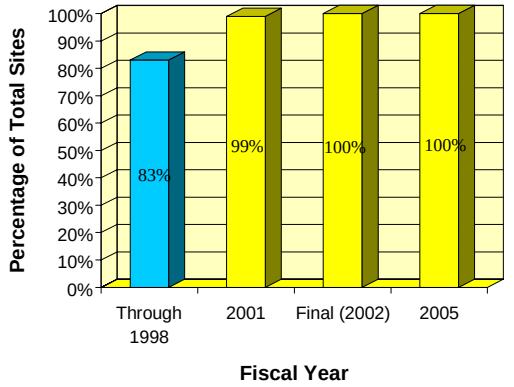
In situ soil treatment using SVE and bioventing was installed at five sites and installation began at five additional sites. A Removal Action memorandum for drainage ditch Site 85 was signed, which allowed excavation of contaminated sediments to begin. Contaminated sediment was also removed from drainage ditch Sites 13 and 15. Four USTs were discovered and removed.

A finding of suitability to transfer (FOST) was prepared and approved for a part of the Economic Development Conveyance (EDC) Parcel.

Plan of Action

- Document RI and begin an FS for OU6
- Begin and complete the Phase II expansion into off-base areas of the Main Base/SAC plumes treatment system
- Begin Phase III expansion of the Main Base/SAC plumes treatment system
- Complete construction and begin operation of the pump-and-treat system for the Site 7 groundwater plume
- Complete remediation of gun range Sites 86 and 87
- Complete construction and begin operation of in situ soil treatment systems at Sites 7, 11, 37, 39, 54, and 59
- Construct foundation and begin capping of waste pit at Site 7
- Complete CERCLA five-year review for OU1
- Update base cleanup plan for Mather
- Prepare and complete a FOST to transfer the entire EDC Parcel area

Sites Achieving RIP or RC Per Fiscal Year



Size: 4,616 acres
Mission: Provide airlift services for troops, cargo, equipment, passengers, and mail
HRS Score: 31.94 (Area D/American Lake Garden Tract); placed on NPL in September 1984
42.24 (Washrack/Treatment Area); placed on NPL in July 1987; deleted from NPL in September 1996
IAG Status: Federal Facility Agreement signed in August 1989; Consent Decree with State of Washington signed in February 1992
Contaminants: VOCs, SVOCs, metals, petroleum/oil/lubricants, pesticides, and radioactive waste
Media Affected: Groundwater and soil
Funding to Date: $18.3 million
Estimated Cost to Completion (Completion Year): $8.7 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY1996

Tacoma, Washington

Restoration Background

Environmental studies identified 65 sites at the installation. Sites include fire training areas, spill areas, landfills, and waste pits. Two sites were placed on the National Priorities List (NPL): the Area D/American Lake Garden Tract (ALGT) and the Washrack/Treatment Area (WTA). Work began at the ALGT site in FY82, after trichloroethene (TCE) was detected in off-site residential wells. An on-site former landfill that was active in the 1960s and 1970s was identified as the source of the TCE. The installation initiated the Remedial Investigation and Feasibility Study (RI/FS) for the ALGT site in FY87 and completed it in FY91. The installation designed a groundwater extraction and treatment system in FY92 and FY93. In early FY94, the installation completed construction and began operating the groundwater treatment system.

The RI/FS for the WTA site, a former outdoor aircraft wash area, was performed from FY90 to FY92. The Record of Decision (ROD) for one part of the WTA site required only groundwater monitoring of the leach pits. The ROD for the other part of the site specified that fuel floating on the shallow water table should be removed and fuel-contaminated soil evaluated for cleanup. In FY93, the installation began a pilot test for passive fuel removal and evaluation of natural attenuation, with positive conclusions.

In FY95, McChord completed studies at two State of Washington (WA) listed sites (SS-34 and WP-44) to evaluate the feasibility of bioremediation. The state agreed with the study's conclusions that bioremediation with long-term monitoring (LTM) was appropriate for the two sites. The installation also implemented LTM of the natural attenuation at the WTA site and requested that EPA remove the site from the NPL.

In FY96, the installation designated no further action for the last four active sites. All 65 sites at the installation were classified as Remedy in Place. EPA removed the WTA site from the NPL on September 26, 1996. Also in FY96, Restoration Advisory Board (RAB) contact cards were mailed to more than 10,000 local residences. Only two residents were interested in starting a RAB. In FY97, McChord began evaluating natural attenuation of chlorinated solvents at ALGT.

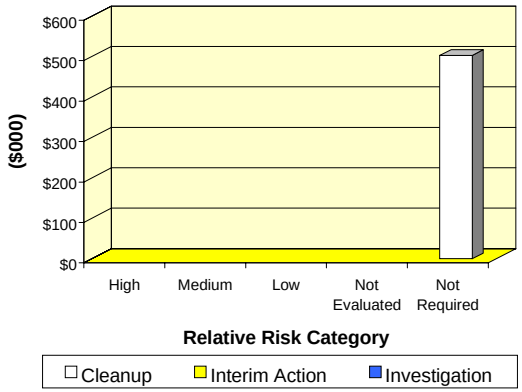
FY98 Restoration Progress

The installation continued operating the ALGT groundwater treatment system. It also continued the LTM program, after making some cost reductions. Evaluation of natural attenuation of chlorinated solvents at ALGT was completed. The base has tentatively negotiated a reduction in the number of extraction wells at ALGT from three wells to one, in preparation for the five-year review of the treatment system. Progress has been made on obtaining written concurrence from the State of Washington for closeout of 27 sites.

Plan of Action

- Reduce operations at the groundwater treatment system at ALGT in FY99 and complete five-year review
- Continue the installation's LTM program in FY99 while reducing costs
- Obtain written concurrence from Washington regulatory agencies for closeout of 27 sites in FY99
- Reassess local community's interest in forming a RAB by mailing out 10,000+ public participation forms

FY99 Funding by Phase and Relative Risk



Size: 3,688 acres
Mission: Provide logistics support for aircraft, missile, space, and electronics programs
HRS Score: 57.93; placed on NPL in July 1987
IAG Status: IAG signed in 1989
Contaminants: Solvents, metal plating wastes, caustic cleaners and degreasers, paints, waste lubricants, photochemicals, phenols, chloroform, spent acids and bases, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $388.7 million
Estimated Cost to Completion (Completion Year): $409.5 million (FY2033)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2016

Sacramento, California

Restoration Background

Environmental contamination at McClellan Air Force Base has resulted from sumps near industrial operations, landfills, leaks near industrial waste lines, surface spills, and underground storage tanks (USTs). A study in FY79 detected groundwater contamination that led to the closure of two on-base and three off-base drinking water wells. In addition to 373 acres of contaminated soil in the vadose zone, three large plumes of contaminated groundwater have been identified over 660 acres.

Sites at the installation were grouped into 11 operable units (OUs), including an installationwide Groundwater OU. Preliminary Assessments and Site Inspections for all OUs, and the Remedial Investigation (RI) for five OUs, have been completed. A streamlining effort resulted in the development of a basewide Engineering Evaluation and Cost Analysis (EE/CA) for implementing soil vapor extraction (SVE) at the base.

In FY93, the installation was selected as a national test site for technologies to clean up chlorinated solvents and inorganic contaminants in soil and groundwater. More than 800,000 pounds of contaminants has been removed from the soil and groundwater. The installation also converted its technical review committee to a Restoration Advisory Board (RAB). The first interim Record of Decision (ROD), signed in FY93, addressed polychlorinated biphenyl (PCB) contamination at OU B1.

In FY95, the Groundwater OU interim ROD was signed. The installation has implemented 213 Interim Remedial Actions, including a landfill cap, construction of a groundwater treatment plant, and demolition of an electroplating facility. The UST program has removed or abandoned in place 210 USTs.

In FY97, eight SVE systems were in operation, as was a groundwater treatment system that pumped 700 gallons per minute of contaminated groundwater from 32 extraction wells. A dual-phase extraction system was installed to treat volatile organic compound (VOC)–contaminated soil and groundwater. Thirty-six on- and off-base groundwater wells were decommissioned, eliminating possible conduits for additional soil and groundwater contamination. Thirteen USTs were removed, and 33,000 feet of linear piping associated with the industrial waste line was inspected and 4,000 feet repaired. A treatment optimization strategy for groundwater cleanup was initiated. This strategy has saved $3 million to date. A landfill cleanup strategy that will save McClellan over $130 million in cleanup costs was developed.

FY98 Restoration Progress

The Phase II groundwater action design was completed, an installation contract was awarded, and construction started. Three EE/CAs for SVE systems were completed, and fieldwork for an additional 10 EE/CAs began. RIs were completed for five OUs, and a Phase I RI was completed for all 11 OUs.

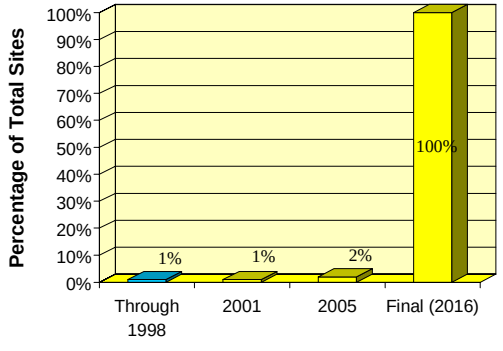
The Air Force Base Conversion Agency obtained congressional approval for payment of EPA-stipulated penalties ($15,000).

Several RAB members were trained. The installation's Environmental Management Directorate is working with RAB members to procure a Technical Assistance for Public Participation contractor. The installation's BRAC cleanup team meets monthly.

Plan of Action

- Install 13 SVE systems by the end of FY99
- Complete all RIs by FY99
- Pay EPA-stipulated penalties in FY99
- In FY99, complete a ROD for remediation of VOCs that allows final actions for soil before the installationwide ROD, addressing restoration of all 11 OUs, is completed in FY03
- Design and install Phase III of the groundwater actions by the end of FY00
- Complete installation of all required SVE systems (seven additional systems) in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 13,680 acres
Mission: Serve as administrative post to various DoD tenants
HRS Score: 52.0; placed on NPL in July 1998
IAG Status: None
Contaminants: Heavy metals, petroleum hydrocarbons, VOCs, and UXO
Media Affected: Groundwater and soil
Funding to Date: $59.9 million
Estimated Cost to Completion (Completion Year): $8.0 million (FY2004)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2001

Fort Meade, Maryland

Restoration Background

In November 1980, Fort Meade began investigating its sanitary landfill. In 1996, the Army officially closed the landfill; the remaining cells were capped or are in the process of being capped.

In December 1988, the BRAC Commission recommended closing the Fort Meade range and training areas, including the airfield, to realign Fort Meade from an active Army post to an administrative center. The National Security Agency is now the primary tenant. In July 1995, the commission recommended additional realignment, reducing Kimbrough Army Community Hospital to a clinic and eliminating in-patient services. The Army has transferred 8,100 acres to the Department of the Interior; the remaining 366 acres hold Tipton Army Airfield.

Investigations beginning in FY88 identified several areas of concern at the installation, including landfills, petroleum and hazardous waste storage areas, aboveground and underground storage tanks, asbestos-containing material in structures, and unexploded ordnance (UXO).

In FY90, the installation removed contaminated soil and determined the extent of groundwater contamination at the former post laundry facility. In FY91, Fort Meade investigated the troop boiler plant because of a leaking aboveground fuel oil tank. Subsequently, the installation removed the tank and established a pump-and-treat system. The Army shut down the system in 1997 because it collected an insufficient amount of product. The site is monitored periodically.

In December 1991, groundwater contamination resulting from a leaching acid neutralization pit at a former battery shop was discovered. The installation removed the building and pit and has monitored groundwater since the removals. Cleanup of a former storage and salvage yard led to the discovery of buried drums in 1994. Approximately 120 drums were removed and found to contain petroleum products. Additional investigation is under way.

The installation conducted UXO surveys in FY94 and FY95. A risk assessment for UXO also was completed. The Army conducted Remedial Design and Remedial Action (RA) activities concurrently with investigations at six sites. The installation formed a BRAC cleanup team (BCT) in FY94 and a Restoration Advisory Board (RAB) in FY95.

In FY96, a Preliminary Assessment of a historically active warehouse area led to the discovery of groundwater contaminated by fuel oil and substances from former spill areas. The Army transferred the 100-acre site to the Architect of the Capitol. Fort Meade also began an installation-wide Ecological Risk Assessment (ERA) and continued Remedial Investigation and Feasibility Study (RI/FS) activities at eight sites. It also began preparing a NEPA document to address BRAC 95 realignment actions.

In FY97, the installation removed and disposed of the pit and soil from the fire training area and completed a UXO project at Tipton Airfield. It also completed the Environmental Baseline Survey, the finding of suitability to lease, the report of availability for BRAC properties, and cleanup at the medical waste site. EPA proposed placing Fort Meade on the National Priorities List (NPL) in April 1997. The Army provided comments disputing the proposed listing.

FY98 Restoration Progress

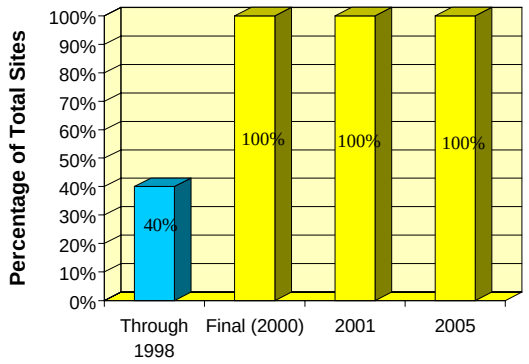
A Site Inspection led to the discovery of a former incinerator site. The installation continued groundwater well monitoring at the sanitary landfill, completed and engineered a cap for Cell 2 of the sanitary landfill, and continued operating a pump-and-treat system for removal of fuel oil from the Upper Patapsco aquifer. The installation also awarded contracts for investigating solid waste management units, two NIKE sites, a drum disposal site, the old industrial corridor at Fort Meade, and an old incinerator site. Fort Meade was placed on the NPL in July 1998.

The Army leased a portion of Tipton Army Airfield to Anne Arundel County, removed miscellaneous ordnance materials located during the UXO removal, and completed a decision document detailing UXO safety precautions. The installation issued a final RI report for four sites and a draft RI for two sites, and entered formal partnerships with EPA Region 3 and state regulators.

Plan of Action

- Conduct a quarterly monitoring program at the post laundry facility in FY99
- Complete Proposed Plan and No Further Action Record of Decision for Tipton Airfield in FY99
- Issue final RI report for two sites at Tipton Airfield in FY99
- Complete ERA work at the clean fill dump in FY99
- Complete RI work at the ordnance demolition area in FY99
- Continue RA at the troop boiler plant in FY99
- Continue the RI/FS at the Defense Reutilization and Marketing Office drum site in FY99
- Complete capping and final closure of the active sanitary landfill in FY99
- Begin RI/FSs at the battery shop, the Architect of the Capitol site, and the old incinerator site in FY99

Sites Achieving RIP or RC Per Fiscal Year



Mechanicsburg Naval Inventory Control Point

Formerly Mechanicsburg Ships' Parts Control Center

NPL

Size: 824 acres
Mission: Provide inventory management and supply support for weapons systems
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: PCBs, heavy metals, pesticides, VOCs, SVOCs, and dioxin
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $23.3 million
Estimated Cost to Completion (Completion Year): $16.0 million (FY2008)
Final Remedy in Place or Response Complete Date for All Sites: FY2008

Mechanicsburg, Pennsylvania

Restoration Background

Historical defense industrial and inventory disposal operations have caused contamination at this installation. Environmental investigations conducted since FY84 have identified 15 CERCLA sites.

In FY89, the installation completed a Remedial Investigation and Feasibility Study (RI/FS) for Site 9, the Storm Water Drainage Ditch. Subsequently, Removal Actions were conducted to remove polychlorinated biphenyl (PCB)–contaminated soil from a portion of the ditch and to install fencing and a gabion dam. In FY92, the installation completed an RI/FS for Site 3. In FY93, it completed an RI at Site 1. The Human Health Risk Assessment for Site 1 began in FY94. The Remedial Design (RD) for Site 9 was completed in FY93, and additional contaminated soil and sediment were removed in the Remedial Action (RA). The installation also completed RD/RA at Site 10 to remove leaking underground storage tanks and contaminated soil.

In FY93, at Site 3, the Ball Road Landfill and Burn Pits, the installation began removing contaminated soil and treating it by bioremediation for petroleum products and organic compounds. In FY95, a Time-Critical Removal Action was conducted at the Tredegar Industries, Inc., property next to the installation. Approximately 600 tons of PCB-contaminated soil was removed.

In FY96, the installation initiated a basewide Ecological Risk Assessment (ERA) and started work on the site management plan. The installation prepared a design for groundwater modeling of a landfill at Site 3 and began to conduct the Focused FS. Additional sampling of the biocell soil was performed at Site 3, and long-term monitoring continued at Site 9. In FY97, the Human Health Risk Assessment at Site 1 was completed, an Interim Remedial Action was initiated at Site 11, and an on-board review of work plans for RIs at Sites 12 through 15 was implemented. The installation continued negotiations with EPA toward a final Federal Facility Agreement (FFA).

A technical review committee (TRC) was formed in FY88. To establish greater community involvement, the installation changed the TRC to a Restoration Advisory Board in FY95.

FY98 Restoration Progress

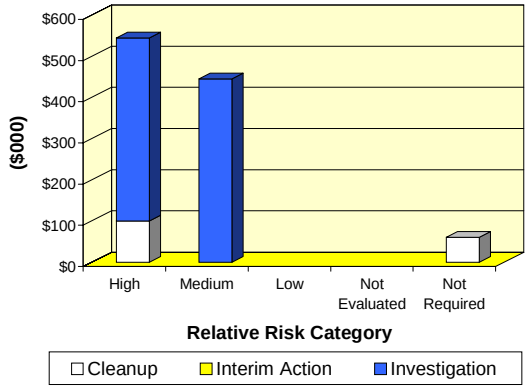
The site management plan was completed and the fourth and fifth annual sediment and groundwater monitoring plans were finalized. An RA began at Site 3, and the installation completed soil modeling, a final FS, and an Action Memorandum for soil removal. The FS, the Proposed Remedial Action Plan, and the Record of Decision (ROD) for Site 1 were completed, as was the sediment control project at Site 11.

The completion of the basewide ERA was delayed by regulatory requests for additional work at Site 9. The RI/FS for Sites 12 through 15 was rescheduled to allow the installation to focus on work at Sites 1, 3, 9, and 11.

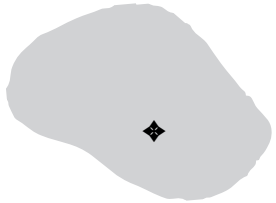
Plan of Action

- Complete Site 3 soil Removal Action in FY99
- Complete ROD for Site 3 in FY00
- Convert the administrative record to CD-ROM format in FY99
- Complete fieldwork for Site 9 ERA in FY99
- Complete Site Inspection and begin RI/FS work for Sites 12 through 15 in FY99
- Complete FFA in FY99
- Start fieldwork for Sites 12 through 15 in FY00

FY99 Funding by Phase and Relative Risk



Size: 1,535 acres
Mission: Provided aviation support services
HRS Score: NA
IAG Status: None
Contaminants: Heavy metals, pesticides, PCBs, and petroleum/oil/lubricants
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $15.2 million
Estimated Cost to Completion (Completion Year): $0 (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Midway Island

Restoration Background

In 1940, a Naval Station was established at Midway Island. In 1978, the station was redesignated as the Naval Air Facility. The Navy operated and maintained these facilities and provided services and materials to support aviation activities. Since FY88, environmental studies at Midway Naval Air Facility have identified 42 sites. Site types include landfills, disposal and storage areas, a former power plant, a rifle range, and pesticide spill areas.

In July 1993, the BRAC Commission recommended closure of the facility, and the installation was transferred to the U.S. Fish and Wildlife Service for use as a national wildlife refuge. The installation was closed in FY93.

In FY93, the installation formed a BRAC cleanup team (BCT) that includes representatives from the Navy and EPA Region 9. The BCT meets quarterly to review the facility's cleanup status and develop the strategy for future cleanup. The BCT and the BRAC project team formed the cornerstone of successful environmental cleanup at Midway. Reuse of property has been expedited as an eco-tourism business for the island.

Representatives of the Navy, EPA, and other federal agencies have formed a partnership that has successfully reduced cleanup costs through cooperative decision-making. Because Midway Island is remote and sparsely populated, no local community issues affect it. The installation does not have a Restoration Advisory Board because there are no regulatory agencies with authority over the area or an affected community. An information repository was established at the University of Hawaii at Manoa in FY95.

An Environmental Baseline Survey was completed in FY94, and a Human Health Risk Assessment was completed for all 42 sites in FY95. In FY97, demobilization of the Navy from the Midway Naval Air Facility occurred. The baseline Ecological Risk Assessment for one site was completed. Remedial Investigations and Feasibility Studies were performed for five sites. Removal Actions were completed to remove contaminated soil from eight sites, cap landfills at two sites, remove drums from four sites, remove marine debris from four sites, and cap abandoned outfalls at one site. The complete remediation of soil and groundwater at 15 underground storage tank sites was accomplished. Technological initiatives included use of an on-site laboratory and implementation of a soil vapor extraction and bioslurping system. A direct-push geoprobe was utilized for site characterization.

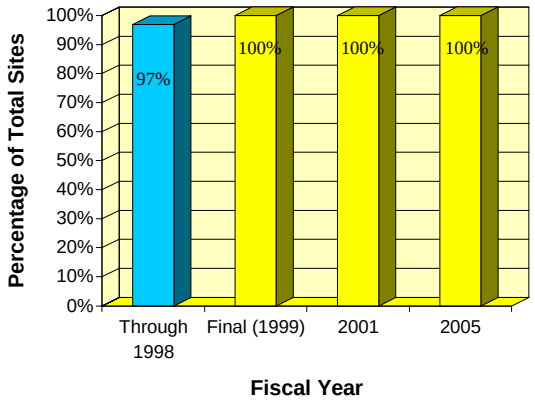
During FY97, the BCT agreed on closure of all restoration sites and maintenance of two sites (Site 1 and 2 landfills) until summer FY98. The BCT terminated the operation of the fluid injection vacuum extraction cleanup system for petroleum, oil, and lubricants from underground and aboveground storage tanks. On 22 May 1996, custody of, and accountability for, Midway Island was transferred from the U.S. Navy to the U.S. Fish and Wildlife Service (USFWS) with the signing of the transfer document by Assistant Secretary of the Navy Robert Pirie and Assistant Secretary of the Interior Bonnie Cohan. The transfer resulted from the dedicated efforts and close personal relationships established over the past 3 years between the Navy, EPA Region 9, and the USFWS. The BCT also finalized the last BRAC Cleanup Plan. By the end of FY97, all environmental work at Midway was complete, with the exception of long-term monitoring (LTM) at Sites 1 and 2. The Executive Order transferring legal enforcement authority to the USFWS was signed on 31 October 1996. Final base closure was completed on 30 June 1997.

Restoration Progress

The final round of LTM was conducted at the Bulky Waste Landfill (Site 1) and the Runway Landfill (Site 2). Preliminary data indicate that no further action is required. The eco-tourist concessionaire contractor discovered an abandoned aviation gasoline pipeline in December 1997. Several drums of asphalt were also discovered at the end of the runway. The aviation gasoline line was properly cleaned and abandoned in place and the drums were removed and properly disposed of off the island.

LTM is complete and the transfer of Midway is fully accomplished.

Sites Achieving RIP or RC Per Fiscal Year



Milan Army Ammunition Plant NPL

Size: 22,436 acres
Mission: Load, assemble, pack, ship, and demilitarize explosive ordnance
HRS Score: 58.15; placed on NPL in July 1987
IAG Status: IAG signed in 1989
Contaminants: Munitions-related wastes and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $81.4 million
Estimated Cost to Completion (Completion Year): $239.8 million (FY2034)
Final Remedy in Place or Response Complete Date for All Sites: FY2007

Milan, Tennessee

Restoration Background

Preliminary Assessment and Site Inspection activities conducted at Milan Army Ammunition Plant in FY87 identified 25 sites requiring further investigation. The installation divided the sites into five operable units (OUs): three OUs associated with the O-Line Ponds Area, one OU for the northern area, and one OU for the southern area. Installation soil and groundwater are contaminated with lead, other heavy metals, and explosive compounds. Contamination exists throughout the loading, assembling, and packing lines and at the open burn and open detonation area.

A Remedial Investigation and Feasibility Study (RI/FS) began in FY88. EPA and state regulatory agencies approved the RI report in FY92. The report recommended no further action at three sites, Remedial Design and Remedial Action for the O-line ponds and associated groundwater, and collection of additional RI data for the remaining sites.

In FY91, the City of Milan discovered explosive-compound contamination in its municipal water supply wells. In FY93, representatives of the Army, the City of Milan, EPA, and the State of Tennessee completed a contingency plan to protect the municipal water supply. The Army provided $9 million to the City of Milan for development of new municipal water sources. In FY95, the Army and regulators signed a Record of Decision (ROD), and construction continued on the new municipal water system. To help prevent further off-site migration of contaminated groundwater, the installation constructed and began operating a granular activated carbon and ultraviolet oxidation system. The installation also capped the abandoned O-line ponds and removed contaminated drinking water wells.

The commander formed a Restoration Advisory Board (RAB) in FY94. An innovative technology demonstration began in FY95 to analyze the effectiveness of phytoremediation for the treatment of explosives-contaminated groundwater. The demonstration was later expanded and extended.

In FY96, the installation completed the design of a carbon treatment system for groundwater at the Northern Boundary Site (OU3). In addition, the installation initiated innovative bioremediation efforts that use open-windrow composting of explosives-contaminated soil in the Northern Industrial Area. The installation also initiated fieldwork for an RI to address on-post soil source areas and off-post groundwater contamination.

In FY97, the installation started construction of a groundwater treatment plant for the Northern Boundary Site (OU3). The installation also completed the OU2 capping project and began the presumptive carbon treatment remedy. Project managers met every 2 months to discuss issues that could slow cleanup or add cost. The installation provided tours of the phytoremediation demonstration project to the public and RAB. The State of Tennessee worked closely with the installation to make the groundwater treatment plants operational.

FY98 Restoration Progress

The installation began constructing the bioremediation and composting facility and continued construction of the OU3 Northern Boundary groundwater treatment plant. An industrial landfill was completed, which will become the disposal location for treated soil after composting. The Army constructed additional monitoring wells to help complete the installation groundwater study. Funding delays delayed completion of the ROD for the OU4 Western Boundary Area and the RI for OU5.

The Army completed the study for the phytoremediation demonstration project, which is under evaluation for full-scale application at Milan and other installations.

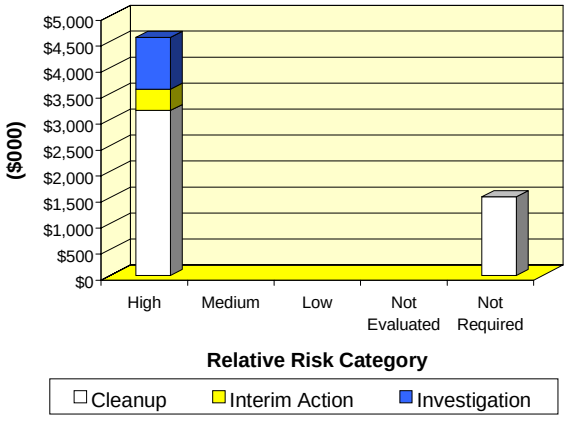
The City of Milan completed a new drinking water system with associated treatment plant. This new system provides potable water to city residents affected by explosives contamination in the groundwater. The OU1 groundwater treatment plant continued to operate successfully throughout FY98. Construction of a third extraction well was completed; this well allowed greater capture area of the explosives-contaminated plume. The Army, EPA, and the state signed a final ROD for three sites, recommending no further action.

The installation has continued to solicit new members for the RAB. RAB members received a briefing on the Technical Assistance for Public Participation Program.

Plan of Action

- Complete OU3 groundwater treatment plant and soil composting facilities in FY99
- Complete ROD for OU4 Western Boundary Area, Region 1 in FY99
- Complete FS and issue draft ROD for OU5, Southern Study Area in FY99
- Complete RI/FS for installation groundwater study in FY99
- Complete FS and Proposed Plan for OU3/4 Nonindustrial Area Soil in FY99
- Complete construction of the bioremediation and composting facility and begin operational testing in FY99

FY99 Funding by Phase and Relative Risk



Minneapolis-St. Paul Air Reserve Base

Also known as Small Arms Range Landfill and formerly known as Twin Cities Air Force Base

NPL

Size: 280 acres
Mission: Provide tactical airlift support
HRS Score: 33.70; placed on NPL in July 1987; deleted from NPL in December 1996
IAG Status: None
Contaminants: Petroleum/oil/lubricants, spent solvents and cleaners, battery acid, paint wastes, PCBs, and chlorinated hydrocarbons
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $4.3 million
Estimated Cost to Completion (Completion Year): $0 (FY1998)
Final Remedy in Place or Response Complete Date for All Sites: FY1998

Minneapolis, Minnesota

Restoration Background

The Minneapolis-St. Paul Air Reserve Base in Minneapolis, Minnesota, is a small base that has provided support to the military since 1955. The primary area of environmental concern at the installation has been the Small Arms Range Landfill, located on a noncontiguous property 2 miles from the main installation on the Minnesota River. The landfill was used as a solid waste disposal area from 1963 to 1972 and contains primarily general refuse. However, the landfill also may have been used to dispose of industrial wastes.

The landfill has undergone a Preliminary Assessment and Site Inspection, followed by a Remedial Investigation and Feasibility Study. A Proposed Plan was completed in FY91, and the Record of Decision (ROD) was signed in early FY92. The Remedial Design and Remedial Action (RA) for the landfill, including design and construction of a groundwater and surface water monitoring program coupled with natural attenuation, was completed in FY92. In FY94 and FY95, the volatile organic compound levels detected in groundwater samples from the landfill were all below the levels established in the ROD.

The installation had one other site of interest (not listed on the National Priorities List [NPL]), a former spill area. The RA implemented in FY91 included a groundwater extraction and treatment system to contain, extract, and treat free product at the site.

In FY96, the installation published in the *Federal Register* a notice of intent to delete the base from the NPL. In December 1996, the site was deleted from the NPL. In FY97, remedial operations and monitoring at the former spill area continued, and an updated fact sheet was completed for all sites. A 5-year statutory review to complete site closure began in 1997 and will continue as long as EPA concludes that hazardous waste is present on site.

The installation printed an annual public notice in the local newspaper to promote interest in formation of a Restoration Advisory Board.

FY98 Restoration Progress

Remedial operations and monitoring at the former spill site continued.

The installation received regulatory concurrence on final closure of all restoration sites within the installation. Remedial systems formerly in operation at the spill area site have been dismantled. The installation has finished all environmental restoration activity.

Plan of Action

No further action is required for any sites at this installation.

FY99 Funding by Phase and Relative Risk

No future costs are expected at this installation.

Moffett Field Naval Air Station

Including Crows Landing Naval Auxiliary Landing Field

NPL/BRAC 1991

Size: 3,097 acres

Mission: Provided support for antisubmarine warfare training and patrol squadrons and served as Headquarters for Commander Patrol Wings of the Pacific Fleet

HRS Score: 32.90; placed on NPL in July 1987

IAG Status: Federal Facility Agreement signed in September 1990

Contaminants: PCBs, petroleum products, DDT, chlorinated cleaning solvents, and heavy metals

Media Affected: Groundwater and soil

Funding to Date: $66.2 million

Estimated Cost to Completion (Completion Year): $60.4 million (FY2033)

Final Remedy in Place or Response Complete Date for BRAC Sites: FY2006

Sunnyvale, California

Restoration Background

In July 1991, the BRAC Commission recommended the closure of Moffett Field Naval Air Station. The installation was closed on July 1, 1994, and its activities were transferred to the National Aeronautics and Space Administration (NASA).

Environmental studies since FY84 identified 34 sites at the installation. Site types include landfills, underground storage tanks (USTs), a burn pit, ditches, holding ponds, french drains, maintenance areas, and fuel spill sites. Contaminants include polychlorinated biphenyls (PCBs), petroleum products, DDT, chlorinated solvents, and heavy metals. These contaminants have been released into groundwater and soil. The installation was divided into seven operable units (OUs). In FY90, initial site characterizations were completed for 3 UST sites, and 14 USTs were removed.

From FY90 to FY94, the installation removed four leaking USTs from one site, removed USTs from a second site, conducted groundwater remediation at three sites, and completed Remedial Investigations (RIs) for OUs 1, 2, and 5 and one other site. The installation also excavated and treated contaminated soil at one site and removed contaminated soil from another.

During FY95, the installation completed a Site Inspection (SI) for one site, RIs for OU6 and three other sites, Feasibility Studies (FSs) for OUs 1 and 5, a Record of Decision (ROD) for no further action (NFA) for seven sites, and a Remedial Action (RA) for one site. The installation designed, constructed, and tested a bioventing treatment system for one site, a soil vapor extraction system for another site, and a recirculating in situ treatment (RIST) system for a third site.

The installation completed a Phase I Ecological Risk Assessment (ERA) in FY95. In FY96, it initiated FSs for two sites and OU6; signed a ROD and initiated a Remedial Design (RD) for one site; initiated an RD for one site; began a ROD for NFA and removed all inactive USTs from one site; and began negotiations for NFA at four sites. An RD and groundwater treatment using a permeable reaction cell were completed for one site. The installation also initiated a Phase II ERA during FY96 while completing a finding of suitability to transfer and an Environmental Business Plan.

During FY97, the ROD for OU1 was signed, and the RD and RA for Site 2 were completed. This action at Site 2 involved consolidation of waste into another installation landfill. The FS for OU6 was completed along with the Phase II ERA. The installation used a three-dimensional seismic reflection survey and a micropurge sampling technique to improve groundwater sampling and treatment. A design construction integration plan was employed at the installation.

The installation completed a community relations plan in FY89 and established an information repository. In FY94, the installation formed a BRAC cleanup team (BCT) and completed a BRAC Cleanup Plan (BCP). It converted its technical review committee to a Restoration Advisory Board (RAB) in FY95 and updated the BCP in FY97.

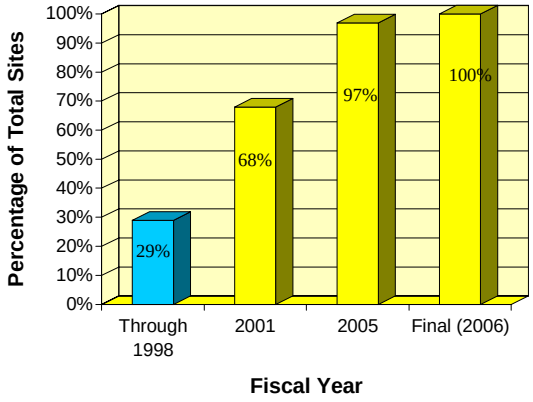
FY98 Restoration Progress

The installation completed construction of one RA at OU5 and continued construction activities at two other RA sites. Heavy rains delayed completion of construction for these two RAs. The facility completed the intensive monitoring portion of the permeable iron cell pilot test and began bench-scale studies of an innovative technology to create in situ reactive zones using the same treatment principles. Transfer of the Naval Air Manor property to a local city was completed. FS activities for two sites continued. The delay in completing the FSs and associated RDs was caused by increased coordination with the BCT and local community to find more cost-effective and suitable methods for cleanup at these sites. The RAB met every 2 months and was active in discussions of the cleanup methods presented in the FSs.

Plan of Action

- Complete RA for two sites and begin operations and maintenance in FY99
- Complete FS, sign ROD, and begin RD at the Site 22 landfill in FY99
- Complete FS at one site and begin basewide ROD in FY99
- Complete field-scale test of in situ reactive zone treatment system in FY99
- Construct RA at Site 22 in FY00
- Sign basewide ROD in FY00
- Complete RD and RA at ecological areas in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 727 acres
Mission: House the Headquarters of the Army Communications and Electronics Command
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, VOCs, SVOCs, PCBs, heavy metals, radionuclides, asbestos, and lead paint
Media Affected: Groundwater and soil
Funding to Date: $13.2 million
Estimated Cost to Completion (Completion Year): $11.2 million (FY2005)
Final Remedy in Place and Response Complete Date for BRAC Sites: FY1999
Final Remedy in Place and Response Complete Date for Non-BRAC Sites: FY2000

Monmouth County, New Jersey

Restoration Background

In July 1993, the BRAC Commission recommended realignment and partial closure of Fort Monmouth. The realignment involves closing the Evans Area (215 acres), transferring a portion of the Charles Wood Area (36 acres) to the Navy, and relocating personnel from the Evans Area and Vint Hill Farms Station to the Main Post and Charles Wood Area. Fort Monmouth BRAC property has been divided into three parcels, the Charles Wood Housing Area and two parcels at the Evans Area, to accelerate transfer.

Environmental studies identified 37 sites in three areas. In FY94, an enhanced Preliminary Assessment (PA) of the BRAC parcels identified 32 sites at the Evans Area and 8 sites at the Olmstead Housing Area. Prominent site types include landfills, underground storage tanks (USTs), hazardous waste storage areas, polychlorinated biphenyl (PCB) spill areas, asbestos areas, and radiological storage and spill areas. Primary contaminants released into groundwater and soil include chlorinated solvents, petroleum hydrocarbons, and heavy metals.

In FY94, the installation formed a BRAC cleanup team and completed version I of the BRAC Cleanup Plan. In FY95, one site at the Evans Area and two sites at the Olmstead Housing Area were determined to require no further action. The Army transferred a portion of the Charles Wood Housing Area (36 acres) to the Navy.

In FY96, the installation commander formed a Restoration Advisory Board (RAB). The installation completed Site Inspections (SIs), the final SI report for all sites, and a radiological site characterization work plan. The installation's land reuse plan and the survey for asbestos-containing material were completed.

In FY97, the Army developed remediation plans for nine sites. Work began on the removal of fuel oil USTs. Radiological decommissioning fieldwork continued in the vacant parcels. The Army prepared a draft final Supplemental Site Inspection Report (SSIR). In addition, a draft finding of suitability to transfer (FOST) and a draft updated Environmental Baseline Survey (EBS) report were prepared for the early conveyance of the parcel of land north of Laurel Gully Brook (93 acres).

FY98 Restoration Progress

Final coordination efforts with the New Jersey State Historic Preservation Officer were completed, which identified the need for a second phase of field surveys. A draft second supplemental Environmental Assessment (EA) and a finding of no significant impact (FONSI) were prepared, which addressed realignment of the joint U.S. Communications-Electronics Command and U.S. Army Chemical and Biological Defense Command "Radiac" mission. The final SSIR was completed and distributed in September 1998.

Removal Actions were initiated at the sewage treatment plant, underground neutralization tanks, PCB spill sites, metal plating facility, and 36 USTs.

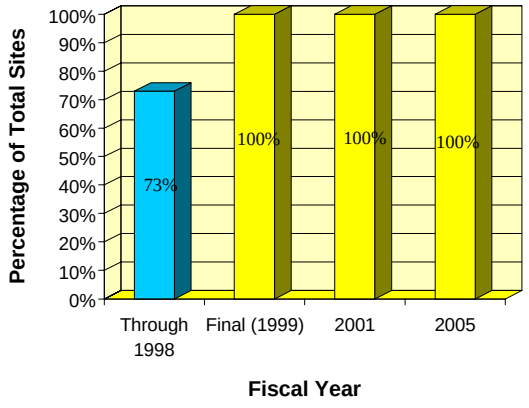
Soil sample analysis at the antenna field in Parcel E was completed. Radiological surveys of buildings in Parcels C and D are ongoing and will continue as building contents are removed. A draft FOST and an updated draft EBS report for Parcels A and B were prepared in support of the transfer of these parcels. Regulatory review comments were received at the end of FY98.

The Army conducted a peer review of one site at the BRAC portion of Fort Monmouth. Several recommendations were provided regarding sitewide groundwater contamination, and the installation is in the process of implementing several of the recommendations.

Plan of Action

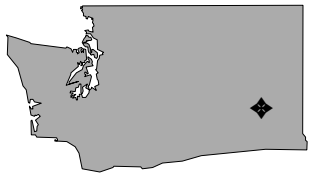
- Complete second phase of radiological surveys in FY99
- Complete final second supplemental EA and FONSI in FY99
- Complete Removal Action of soils at metal plating facility and PCB spill sites in FY99
- Complete cleanup activities at the sewage treatment plant, neutralization tanks, PCB spill sites, and metal plating facility in FY99
- Complete cleanup activities at all USTs in FY99
- Construct a new facility to replace the "Shield" in FY99 to FY00
- Complete the final updated EBS and FOST for Parcels A and B and transfer property in FY99
- Prepare an updated EBS and FOST for Parcel E and begin preparing an initial draft updated EBS and FOST for Parcels C and D in FY99
- Submit reporting documentation on the Removal Actions and UST removals to the regulatory agencies in FY99
- Complete Feasibility Study for the groundwater in Parcel C in FY00

Sites Achieving RIP or RC Per Fiscal Year



Moses Lake Wellfield Contamination Site — Formerly Larson Air Force Base — NPL

Size: 9,607 acres
Mission: Served as tactical air command, air transport, and strategic air command base; provided pilot training
HRS Score: 50.00; placed on NPL in October 1992
IAG Status: IAG under negotiation with EPA
Contaminants: VOCs, jet fuel, possibly tetraethyl lead and low-level radioactive materials
Media Affected: Groundwater and soil
Funding to Date: $3.0 million
Estimated Cost to Completion (Completion Year): $1.6 million (FY1999)
Final Remedy in Place or Response Complete Date for All Sites: FY1998



Moses Lake, Washington

Restoration Background

Larson Air Force Base served as a tactical air command base, then as a military air transport facility and a Strategic Air Command base. The installation was sold to the Port of Moses Lake in 1966 and is now operated by Grant County Airport, which is a regional aviation, industrial, and educational facility. The Moses Lake Wellfield is a city-owned water supply for residents of the former Larson Air Force Base housing area. The Wellfield property is located on the former base. This drinking water supply system is separate from other city drinking water systems. The city has performed Remedial Actions (RAs) at the Wellfield, and concentrations of trichloroethene (TCE) have been reduced below the levels established in the Federal Drinking Water Standards. A privately owned water supply system for the Skyline community remains contaminated with TCE. The Skyline property adjoins the former base. Other private wells may be contaminated at levels above the Federal Drinking Water Standards.

Beginning in FY87, environmental assessments identified four sites that required further investigation: 11 underground storage tanks (USTs) and associated potentially contaminated soil; a TCE-contaminated groundwater plume; an area potentially containing low-level radioactive waste; and two disposal areas potentially containing tetraethyl lead.

In FY88, TCE was detected in the Moses Lake Wellfield. A Phase I Remedial Investigation (RI) was initiated in FY91 by the U.S. Army Corps of Engineers (USACE), Seattle District, to identify potential source areas that would require further characterization. In FY93, the Phase I RI was completed. In FY94, three additional rounds of groundwater sampling were conducted under an addendum to the Phase I RI. The Port of Moses Lake conducted an Interim Response Action, providing bottled water to the Skyline community. In FY92, 11 USTs were excavated and removed from the site.

In FY94, USACE, Seattle District, under contract to EPA, completed an Engineering Evaluation and Cost Analysis (EE/CA) to evaluate the Skyline drinking water system. The EE/CA was distributed for public comment, and a public meeting was conducted.

In FY95, USACE, Omaha District, completed a search for potentially responsible parties (PRPs) and a cost allocation effort. USACE, Seattle District, also completed the addendum to the Phase I RI, including additional groundwater sampling.

In FY97, the Omaha District Office of Counsel, in coordination with its Department of Justice attorney, negotiated with EPA Region 10 to decide who (EPA, USACE, or PRPs) will take the lead in the coming RI/FS.

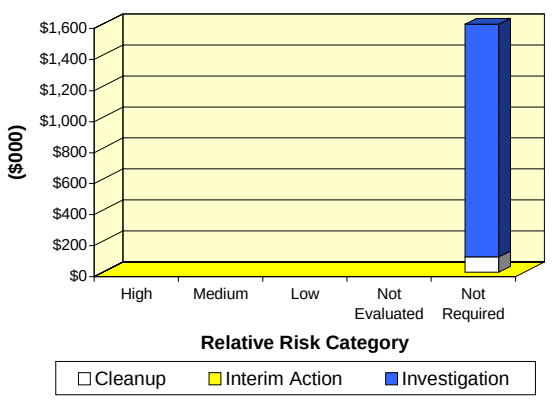
FY98 Restoration Progress

USACE, Omaha District, in coordination with its Department of Justice attorney, began negotiating with EPA on an Interagency Agreement (IAG) for the RI/FS. In June 1998, the project was turned over to the USACE, Seattle District, for execution of the technical RI/FS. Negotiations for the IAG continued with EPA.

Plan of Action

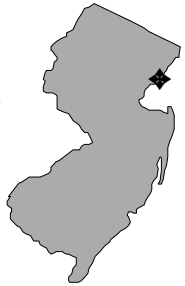
- Negotiations will continue until an IAG is finalized between EPA and USACE, Seattle District
- In FY99, an RI/FS will be initiated to determine the extent of the TCE plume and the private residences whose water supplies are contaminated with TCE as well as other contaminates, the presumptive remedy for the tetraethyl lead disposal sites, and the remedy for the low-level radioactive wastes

FY99 Funding by Phase and Relative Risk



Military Ocean Terminal, Bayonne — BRAC 1995

Size: 679 acres (437 acres upland, 242 acres of water)
Mission: Manage movement of DoD cargo
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, BTEX, VOCs, SVOCs, dieldrin, heavy metals, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $3.6 million
Estimated Cost to Completion (Completion Year): $9.4 million (FY2007)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2004



Bayonne, New Jersey

Restoration Background

In July 1995, the BRAC Commission recommended that Bayonne Military Ocean Terminal be closed. The installation is scheduled to close by July 2001.

Contaminated areas identified in previous environmental studies include underground storage tanks (USTs), a fire training area, a landfill, storage areas, a battery acid pit, and polychlorinated biphenyl (PCB) spill areas. Groundwater and soil are contaminated with petroleum hydrocarbons and volatile organic compounds (VOCs).

In FY89, Remedial Investigation (RI) activities began at 10 sites. Interim Actions at the installation included closing the landfill, removing 450 tons of diesel-contaminated soil, and removing or recertifying PCB-containing transformers.

In FY95, the installation conducted an Environmental Baseline Survey (EBS). In FY96, the installation formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). The installation also began an Environmental Impact Statement (EIS), a Cultural and Natural Resources Investigation, and the basewide RI.

In FY97, the installation completed Version 1 of the BRAC Cleanup Plan (BCP) and a final Environmental Condition of Property Statement for a planned parcel transfer to the U.S. Coast Guard. The cultural resources inventory was completed and received regulatory concurrence. The Army also completed the EBS.

FY98 Restoration Progress

The site-specific RI and the draft decision document (DD) for the Light Rail Parcel (LRP) were completed, as was the Relative Risk Site Evaluation for all sites. A draft finding of suitability to lease (FOSL) document for the master lease of the base (excluding U.S. Coast Guard property) was completed. The installation removed three > 100,000-gallon abandoned USTs and contaminated soil from around the tanks at Lot 44.

The draft community relations plan (CRP) was completed in July 1998. The final RI report was completed in September 1998; however, additional sampling and analysis at some of the remaining CERFA Category 5 through 7 sites will be performed as agreed on with state regulators. Funding issues have delayed removal of PCB-contaminated soil at the Operable Unit 2 LRP New Jersey Transit project and initiation of the radiation survey. The installation did not complete the EIS, because of proposed changes to the existing reuse plan by the new mayor and the Local Reuse Authority. Therefore, the planned Natural Resources Inventory was also not completed.

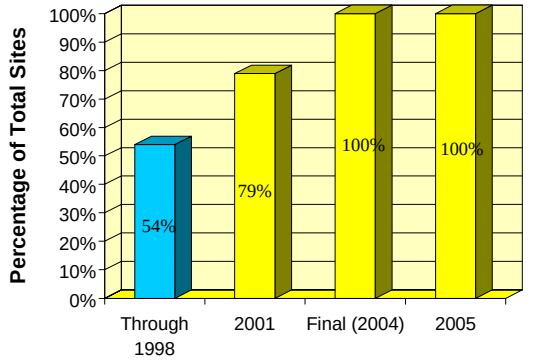
Institutional controls (ICs), including a Declaration of Environmental Restriction and Classification Exception Area and natural attenuation (long-term monitoring [LTM]) will be used in lieu of active remediation at the OU2 LRP for low levels of soil and groundwater contamination. The ICs are consistent with the reuse plan for this area, capping the area with asphalt for a parking lot. Use of the ICs saved the Army $500,000 and 1 year of effort for the cleanup.

The RAB received an installation tour and training through technical presentations. The RAB also was briefed on all environmental documents developed in FY98. The BCT meets regularly to discuss cleanup programs, set schedules, and resolve issues. The BCT also finalized the RI with the state regulatory agency and received concurrence for no further action (NFA) at 24 of 66 sites.

Plan of Action

- Remediate contaminated soil and remove free product from the groundwater at the Lot 44 UST area in FY99
- Complete an addendum to the final RI report in FY99
- Complete the final CRP, RI/FS, final installationwide FOSL, and Natural Resources Inventory in FY99
- Complete soil removal at the LRP and 17 PCB-contaminated sites in FY99
- Complete RD for two sites, including Lot 44 in FY99
- Initiate the radiation survey in FY99
- Conduct additional RI sampling and analysis at 12 CERFA Category 7 (unevaluated sites) in FY99
- Complete the NEPA EIS in FY99 or the beginning of FY00
- Complete the final DD for the LRP and the DDs for 17 PCB Removal Action sites and 24 NFA sites in FY99 or the beginning of FY00
- Begin LTM for the LRP, Lot 44, and Lot 53 in FY00
- Initiate RD for 11sites in FY00
- Initiate a lead-based paint survey/risk assessment in FY00
- Complete the BCP Version 2 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Mountain Home Air Force Base NPL

Size: 6,000 acres
Mission: Provide composite combat air power worldwide
HRS Score: 57.80; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in January 1992
Contaminants: VOCs, petroleum/oil/lubricants, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $8.1 million
Estimated Cost to Completion (Completion Year): $0 (FY1996)
Final Remedy in Place or Response Complete Date for All Sites: FY1994

Mountain Home, Idaho

Restoration Background

Environmental studies conducted since FY83 have identified 32 sites at Mountain Home Air Force Base. Sites include landfills, fire training areas, a fuel hydrant system spill area, disposal pits, surface runoff areas, wash racks, ditches, underground storage tanks (USTs), petroleum/oil/lubricant (POL) lines, and a low-level radioactive material disposal site. To improve and accelerate site characterization, the installation grouped the sites into operable units (OUs).

Removal Actions in FY91 and FY92 included clean closure and removal of 12 USTs. In FY93, the installation recommended no further action for 15 of 21 sites in OU1. In FY92, Remedial Investigation (RI) activities were initiated for OU3 and OU6. A no further action Record of Decision (ROD) was signed for OU2 and OU4, and an Interim Remedial Action (IRA) was conducted at OU5 (low-level radioactive material site). The IRA consisted of excavating 2 cubic yards of contaminated soil, a pipe, and six 55-gallon drums. Also in FY93, the installation capped 3 acres of one landfill at OU2. The installation completed RI activities for OUs 1, 3, 5, and 6; the lagoon landfill; and Fire Training Area 8 in FY95. A ROD was signed for these areas in FY96.

The regional groundwater was monitored to resolve uncertainties in the groundwater transport model. The perched water at Site ST-11, the flightline fuel spill site, is under long-term monitoring. In FY96, the installation submitted a request to EPA to delete the installation from the National Priorities List (NPL). EPA indicated that it preferred to wait until a required five-year review had taken place at Site ST-11 before beginning the delisting process. The installation will continue to urge delisting of the installation from the NPL.

The installation converted its technical review committee to a Restoration Advisory Board (RAB) in FY94. It holds semiannual RAB meetings and continues to advertise the meetings in the local newspaper to increase public involvement.

FY98 Restoration Progress

The installation continued to monitor regional groundwater for the groundwater transport model. The perched water at ST-11 also continued to be monitored. The proposed Treatability Study for enhancing natural attenuation at Site ST-11 was determined to be infeasible by the Omaha District Corps of Engineers. Deletion of the installation from the NPL is being pursued. These activities are expected to continue until September 2000.

Plan of Action

- Continue to monitor regional groundwater in FY99
- Continue to monitor the perched water at Site ST-11 in FY99
- Continue to pursue deletion of the installation from the NPL in FY99
- Update the community relations plan

FY99 Funding by Phase and Relative Risk

All sites are in the long-term monitoring phase.

Myrtle Beach Air Force Base

Size: 3,937 acres
Mission: Housed tactical fighter wing
HRS Score: NA
IAG Status: None
Contaminants: Spent solvents, fuel, waste oil, VOCs, metals, asbestos, paints, and thinners
Media Affected: Groundwater and soil
Funding to Date: $38.9 million
Estimated Cost to Completion (Completion Year): $22.6 million (FY2011)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Myrtle Beach, South Carolina

Restoration Background

In July 1991, the BRAC Commission recommended closure of Myrtle Beach Air Force Base. On March 31, 1993, the installation closed. Sites identified at the installation include landfills, weathering pits, fire training areas, drainage ditches, hazardous waste storage areas, maintenance areas, underground storage tanks (USTs), explosive ordnance areas, fuel storage areas, a small-arms firing range, and a lead-contaminated skeet range. Contaminants include petroleum hydrocarbons, heavy metals, and volatile organic compounds (VOCs). The installation has conducted Preliminary Assessments, Site Inspections, Remedial Investigations (RIs), and Feasibility Studies (FSs) for the identified sites.

Interim corrective measures (ICM) were initiated to treat a 50-acre trichloroethene (TCE)-contaminated groundwater plume. The installation also began Remedial Design (RD) and Treatability Studies for the small-arms firing range and firing-in buttress sites. RCRA Facility Investigations (RFIs) have been implemented for the drainage ditches, the Old Entomology Shop, the Armament Shop, and the Old Engine Test Cell. A joint management team, formed in FY91, assumed the role of a BRAC cleanup team in FY93.

In FY94, cleanup was completed at the skeet range. Interim measures include removal of contaminated soil at the weathering pit, removal of 28 USTs and 20 oil-water separators, and evaluation of the integrity of 18 other oil-water separators. In FY95, the installation began a pilot program to determine the applicability of bioremediation at a site contaminated with petroleum/oil/lubricants (POL). The installation prepared a BRAC Cleanup Plan (BCP) that outlined restoration strategies and efforts for all environmental programs at the installation.

The installation's Restoration Advisory Board (RAB), which formed in FY94, has reviewed funding, relative risk, and site cleanup information.

The BCP was updated in FY96. By the end of FY96, 48 percent of the base had been transferred by deed.

In FY97, the installation completed the RI/FS reports, and selected cleanup technologies, for several sites. It also determined the extent of lead contamination in soil at the small-arms firing range and submitted clean-closure plans to the state regulatory agency for two hazardous waste management units, corrective action plans (CAPs) for the hazardous waste tank facility, and draft CAPs for the UST sites. The installation completed a CAP for the Old Entomology Shop and expanded the CAP for the 50-acre TCE plume. Also in FY97, eight early Removal Actions took place, and the installation completed an RRSE for all sites.

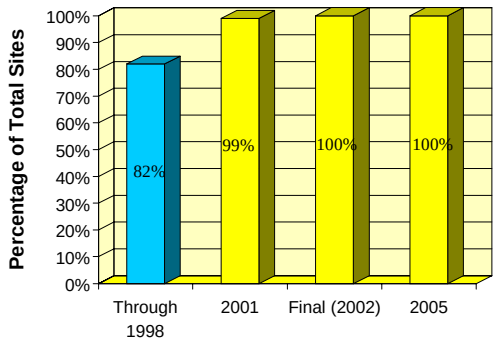
FY98 Restoration Progress

ICM was completed for soil removal at the small-arms firing range and waste tank sites and is 50 percent complete at the Old Entomology Shop. Landfill caps were implemented at four sites. Additional data were collected, and supplemental RFI reports were completed for 12 sites. The installation implemented a CAP for air sparging at the MOGAS (motor gasoline) site and continued gathering data for a pilot study at the POL site. The CAP for four UST sites was finalized, and soil removal began at two of the sites. The RFI work plan was completed for two new sites, and a new site was scoped. A basewide monitoring plan was produced and implemented for all sites.

Plan of Action

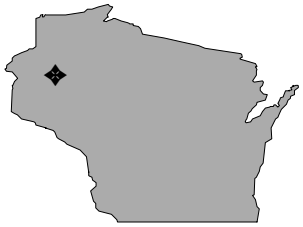
- Complete ICM for the Old Entomology Shop, the New Entomology Shop, and the Armament Shop
- Design and begin installation of the groundwater remediation system at an off-base site
- Complete the corrective measures study and RD for three fire training areas, a weathering pit, and the POL site
- Implement RFI work plan for three sites and begin RD for two of the sites
- Continue monitoring of all sites

Sites Achieving RIP or RC Per Fiscal Year



National Presto Industries — Formerly Eau Claire Ordnance Plant No. 1 — NPL

Size: 320 acres
Mission: Manufacture ordnance
HRS Score: 43.7; placed on NPL in June 1986
IAG Status: None
Contaminants: VOCs, including TCE
Media Affected: Groundwater and soil
Funding to Date: $3.2 million
Estimated Cost to Completion (Completion Year): $0 (FY1990)
Final Remedy In Place or Response Complete Date for All Sites: NA



Eau Claire, Wisconsin

Restoration Background

Between 1981 and 1985, EPA and the Wisconsin Department of Natural Resources (WDNR) conducted groundwater studies in the general area west of the National Presto Industries (NPI) site (formerly Eau Claire Ordnance Plant No. 1). Volatile organic compounds (VOCs) were detected in groundwater samples. EPA issued an Administrative Order on Consent requiring NPI to design and install an on-site groundwater treatment facility.

In FY91, EPA issued a unilateral order requiring NPI to construct a drinking water system in an area of the town of Hallie. The drinking water system was completed in FY92. Also, in FY92, the U.S. Army Corps of Engineers, Omaha District, awarded a contract for potentially responsible party (PRP) investigation activities, including research into historical activities at the site and evaluation of technical data relating to potential DoD liability. Results of this investigation indicate that DoD has limited, if any, liability.

In FY94, under a Consent Order signed by NPI and EPA, removal activities began at Lagoon No. 1. Final closure of the lagoon is awaiting completion of source removal and issuance of the Record of Decision (ROD). The Remedial Investigation (RI) report identified five source areas and four plumes of groundwater contamination. An on-site groundwater extraction and treatment facility became operational in FY94.

In FY95, Removal Action was conducted at Lagoon No. 1 to remove waste forge compound liquids and solids. In addition, the Remedial Investigation and Feasibility Study (RI/FS) was completed, and a Proposed Plan was issued. A public meeting was held to outline the alternatives included in the RI/FS.

WDNR issued a statement on the desired environmental restoration levels; WDNR did not concur in EPA's Proposed Plan.

In FY96, Congress appropriated an additional $15 million for NPI's CERCLA cleanup, and the Army transferred that funding to NPI at the direction of Congress. A ROD was issued with state concurrence. WDNR issued a unilateral order to NPI.

In FY97, an intermediate design for the Melby Road disposal site was submitted along with an Engineering Evaluation and Cost Analysis and a Remedial Action Plan for Lagoon No. 1. In addition, a revised Remedial Design work plan was completed and presented. Work plans also were submitted for the soil vapor extraction (SVE) monitoring wells and ditch and dry well soil sampling. NPI continued to operate several operable units on site. It will continue to extract and treat groundwater for an unknown period.

FY98 Restoration Progress

Closure of the Melby Road disposal site was completed. Ditch 3 and Dry Wells 2 and 5 were remediated.

Plan of Action

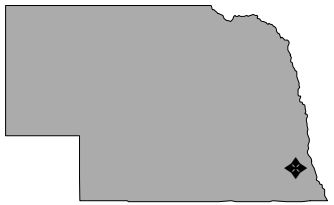
- Continue monitoring and continue operation of SVE and groundwater systems in FY99
- Complete closure and backfilling of Lagoon No. 1 in FY99

FY99 Funding by Phase and Relative Risk

All sites are in the long-term monitoring phase.

Nebraska Ordnance Plant — NPL

Size: 17,214 acres
Mission: Performed ordnance storage and manufacturing activities
HRS Score: 31.94; placed on NPL in August 1990
IAG Status: IAG signed in September 1991
Contaminants: Explosives, VOCs, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $52.6 million
Estimated Cost to Completion (Completion Year): $49.8 million (FY2031)
Final Remedy in Place or Response Complete Date for All Sites: FY2005



Mead, Nebraska

Restoration Background

From 1942 to 1956, the Nebraska Ordnance Plant produced munitions at four bomb-loading lines, stored munitions, and produced ammonium nitrate. The property also contained burn areas, an Atlas Missile facility, and a sewage treatment plant. Most of the property is now owned by the University of Nebraska and used as an agricultural research station. Other parts of the property are owned by the Nebraska National Guard and private entities. The U.S. Army Corps of Engineers (USACE) has identified soil contaminated with polychlorinated biphenyls (PCBs) and munitions, and on-site and off-site groundwater contaminated with explosives and volatile organic compounds (VOCs).

In FY94, USACE completed a Remedial Investigation and Feasibility Study (RI/FS) for soil contamination and prepared a draft final RI/FS report for groundwater. A Time-Critical Removal Action for PCBs was completed.

In FY95, a Record of Decision (ROD) on incineration of contaminated soil at Operable Unit (OU) 1 was approved. USACE completed the Proposed Plan and the FS report for groundwater contamination at OU2 and Phase I RI fieldwork at OU3. EPA approved the final Engineering Evaluation and Cost Analysis (EE/CA) and the design for Removal Actions for two trichloroethene (TCE)-contaminated groundwater plumes. USACE installed activated carbon canister treatment systems to treat contaminated drinking water in on-site wells and completed field investigations to identify explosives waste. A draft EE/CA of the investigation was submitted.

In FY96, USACE completed the Remedial Design (RD) for the OU1 incinerator. The draft final ROD for contaminated groundwater at OU2 was completed. USACE completed the PCB Removal Action, the ordnance and explosives EE/CA and Action Memorandum, and the decision documents for the Removal Action at OU2. The Phase II RI field investigation for OU3 also was completed.

In FY97, USACE converted the technical review committee to a Restoration Advisory Board (RAB). The RAB provided information to the public on incinerator issues. Full public acceptance was achieved by the end of the trial burn testing. Meetings with the Lower Platte Natural Resource District addressed potential beneficial reuse of treated groundwater.

Construction for the Remedial Action (RA) at OU1 was completed. The draft final RI and draft final Baseline Risk Assessment for OU3 were finished. The design for building demolition and debris removal at the Load Line Buildings was completed. An ordnance and explosives Removal Action was accomplished. USACE provided point-of-use water treatment to residences whose water was affected by the groundwater plume and awarded the contract for the groundwater containment Removal Action.

FY98 Restoration Progress

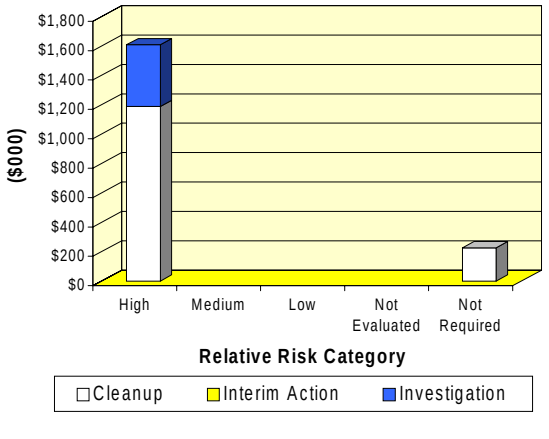
USACE completed operations of the OU1 incinerator, treating over 16,000 tons of explosives-contaminated soil. The final RA report was approved by EPA in September.

Construction on the OU2 groundwater containment RA began and was nearing completion at the end of the FY98. The 60 percent design for the full-scale system was submitted. USACE coordinated with local stakeholders, local and state government, and the RAB to ensure that the groundwater containment system can accommodate any beneficial reuse of extracted groundwater. The OU3 RI was submitted and approved. However, the Army agreed to do further characterization of several areas. Asbestos removal at the Load Line Buildings was completed. Demolition is approximately 50 percent complete.

Plan of Action

- Begin operation of OU2 containment RA in FY99
- Complete RD of full-scale groundwater RA in FY99
- Complete additional characterization fieldwork for OU3 in FY99
- Complete demolition of Load Line Buildings in FY99
- Award contract for construction of groundwater RA in FY00
- Submit OU3 FS in FY00

FY99 Funding by Phase and Relative Risk



Size: 70 acres
Mission: Repair inertial navigation systems and manage AF metrology and calibration process
HRS Score: NA
IAG Status: None
Contaminants: VOCs and SVOCs
Media Affected: Groundwater and soil
Funding to Date: $2.3 million
Estimated Cost to Completion (Completion Year): $1.4 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Heath, Ohio

Restoration Background

Since 1962, Newark Air Force Base has repaired the inertial guidance and navigational systems used by most aircraft and missiles. The installation also provided specialized engineering assistance to the Air Force and DoD on problems related to inertial guidance and navigation. In July 1993, the BRAC Commission recommended that the installation be closed and the workforce be privatized in place.

Past waste management activities related to solvents such as freon 113 and 1,1,1-trichloroethane affected groundwater at the installation. Environmental investigations conducted at the installation since FY84 identified five sites that required additional study. In FY89, Site Inspection (SI) activities were completed for another seven sites, consisting of spill sites, a fire training area, and landfill areas.

In FY90, the installation began a Remedial Investigation (RI) and Feasibility Study (FS) for the seven sites identified in the SI.

In FY91, No Further Action decision documents were prepared for five of the seven sites.

In FY94, the installation formed a BRAC cleanup team (BCT) and completed an Environmental Baseline Survey.

In FY95, the installation formed a Restoration Advisory Board (RAB). Bimonthly meetings focused on promoting accelerated remediation and property transfer. Work began on a supplemental RI, which concluded in August 1996 with publication of a final report. This report determined that no further action was needed for five of the seven sites studied. Remedial activities included removal of 17 underground storage tanks, removal of 300 cubic yards of soil from the former hazardous waste storage site (Facility 87), and operation of a soil vapor extraction (SVE) system at Facility 87. The RAB and the BCT suspended meetings in September 1996.

In September 1997, a contract was awarded to extend the city water system onto the base and to close three drinking water wells.

FY98 Restoration Progress

The decontamination of Facilities 102 and 114 (hazardous waste/materials storage buildings) was completed in August. The extension of the city water line on base was constructed. The contract was modified in September to include additional requirements.

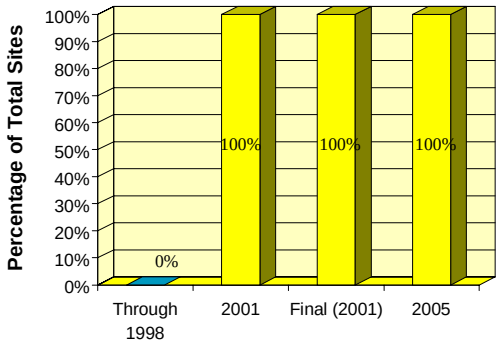
The transfer of a 13-acre parcel to the local airport authority was delayed due to an issue concerning potential risk from groundwater contamination. Additional environmental work is being considered to meet the requirements for property transfer.

The SVE system at Facility 87 was removed in September. In August, Ohio EPA requested withdrawal and resubmittal of the Amended Closure Post/Closure Plan for Facility 87, which was submitted in 1997.

Plan of Action

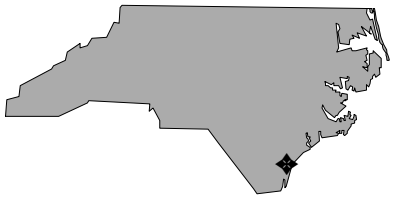
- Complete construction and activation of the city water line and closure of three drinking water wells by August 1999
- Submit revised Amended Closure/Post Closure Plan for Facility 87 by April 1999
- Continue quarterly groundwater sampling of monitoring wells at Facility 87
- Begin RI/FS of Site LF002 (13-Acre Landfill)
- Conduct FS at Facility 87

Sites Achieving RIP or RC Per Fiscal Year



New Hanover County Airport NPL

Size: 4 acres
Mission: Served as World War II bomber command and Vietnam-era aerospace defense command
HRS Score: 39.39; placed on NPL in March 1989
IAG Status: None
Contaminants: VOCs and SVOCs
Media Affected: Groundwater
Funding to Date: $1.7 million
Estimated Cost to Completion (Completion Year): $0.9 million (FY2009)
Final Remedy in Place or Response Complete Date for All Sites: FY2009



Wilmington, North Carolina

Restoration Background

In FY87, a Preliminary Assessment and a Site Inspection identified groundwater contamination caused by fire training activities conducted at New Hanover County Airport from FY68 through FY79. Fire training activities involved burning jet fuel, gasoline, fuel oil, and kerosene. The site included a burn pit, a mockup of an aircraft, and a 10,000-gallon aboveground storage tank that supplied fuel to the burn areas. The site also contained several other fire training stations, including a fire smokehouse, a railroad tanker car, and several automobiles. As a result of fire training activities, groundwater was contaminated with benzene.

EPA has identified DoD New Hanover County, Cape Fear Community College, and the City of Wilmington as potentially responsible parties (PRPs) for the site.

A Removal Action completed in FY91 involved removal of waste materials, contaminated water, contaminated surface and subsurface soil, and structures associated with the fire training activities. Soil samples were collected to confirm that no contaminated soil remained on site. As a result of the confirmatory sampling, the recommendation was that no further action be taken at the site.

In FY92, EPA completed the Remedial Investigation and Feasibility Study for groundwater contamination, and the Record of Decision (ROD) for cleanup was signed. In FY94, PRPs began Remedial Design (RD) work at the airport to collect additional data on groundwater quality. In FY95, two monitoring wells were installed to confirm that contamination had not migrated to the lower groundwater aquifer. A 60 percent RD document was sent to EPA with a recommendation that air-sparging be used as a more cost-effective treatment technology.

In FY96, the PRPs continued their efforts to obtain EPA approval of the pilot test of air-sparging technology. The U.S. Army Corps of Engineers (USACE) continued to obtain funding for DoD's share of design costs.

In FY97, the PRPs used a low-volume / low-flow sampling technique to reevaluate metal contamination in the groundwater. The reevaluation showed that metals were no longer a contaminant of concern. This finding was instrumental in obtaining approval from EPA and the State of North Carolina for implementation of the air-sparging pilot study.

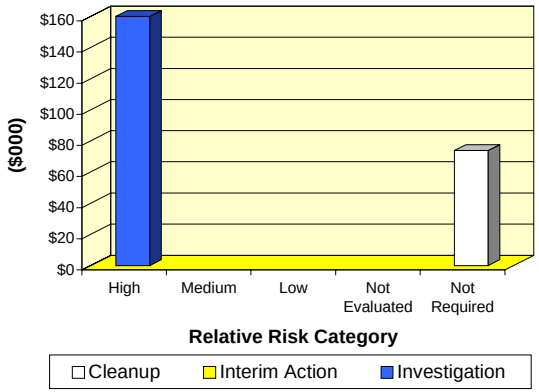
FY98 Restoration Progress

The PRPs conducted geoprobe studies to determine the direction of groundwater flow. The air-sparging pilot test was completed, and the draft report is in progress. An evaluation of the efficacy of the technology was also completed.

Plan of Action

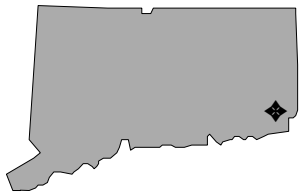
- Install additional wells and piezometers to aid in RD in FY99
- Revise the RD in FY99
- Begin full-scale utilization of the air-sparging technology in FY99
- Amend and implement ROD in FY99 and complete ROD in FY04
- USACE and Department of Justice will evaluate possible settlement of DoD liability in FY99

FY99 Funding by Phase and Relative Risk



New London Naval Submarine Base NPL

Size: 547 acres
Mission: Maintain and repair submarines; conduct submarine training and submarine medical research; provide a home port for submarines
HRS Score: 36.53; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in January 1995
Contaminants: Dredge spoils, incinerator ash, petroleum/oil/lubricants, PCBs, spent acids, pesticides, solvents, construction debris, metals, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $36.1 million
Estimated Cost to Completion (Completion Year): $56.2 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Groton, Connecticut

Restoration Background

Environmental studies began at the New London Naval Submarine Base in FY82. Significant sites include the Area A Landfill, a number of smaller disposal areas, and fuel and chemical storage areas. Twenty-two CERCLA sites have been identified along with underground storage tanks (USTs), which have been grouped into two UST sites.

The installation was placed on the National Priorities List (NPL) because of polychlorinated biphenyl (PCB) contamination at the Area A Landfill (Site 2). The landfill was used to dispose of scrap wood, metal, waste chemicals, waste acid, and drums containing solvents. In FY93, the Navy constructed a fence around the landfill and limited potential direct-contact exposures as part of an Interim Remedial Action (IRA).

Several Removal Actions have been implemented. In FY91, 19 gas cylinders were removed from Site 8, the Goss Cove Landfill. In FY94, the installation removed 2,000 cubic yards of soil contaminated with PCBs and lead from Site 6. At Site 15, lead-contaminated soil was removed. At Site 9, the installation removed PCB-contaminated oil, sludge, and water from a waste oil tank. The tank was cleaned and abandoned in place.

The installation used an innovative technology to remove lead-contaminated soil from Site 17. At UST Sites 1 and 2, the base began installing air-sparging (AS) and soil vapor extraction (SVE) systems to remove gasoline from the subsurface and to bioremediate less volatile fuels.

In FY95, a Record of Decision (ROD) was signed for Site 2. Under the ROD, the installation agreed to cap the landfill as an IRA. In addition, the draft Remedial Investigation and Feasibility Study (RI/FS) report was completed for Sites 1 through 11, 13 through 15, and 20.

In FY96, the installation began the FSs for Sites 3 and 8 and received funding for the Remedial Design (RD) at Site 3. The installation also completed installing, and began operating, the AS/SVE systems at UST Sites 1 and 2 and initiated a Phase II Site Inspection (SI) at the Fuel Farm (Site 23). During FY97, the RI for Sites 1 through 11, 13 through 15, and 20 was completed, and the corrective action design and Phase II SI at Site 23 were completed. The Area A Landfill was capped. Removal Actions were completed at Site 4 and the Over Bank Disposal Area of Site 3.

The installation formed a technical review committee (TRC) in FY89, and converted it to a Restoration Advisory Board (RAB) in FY94. The RAB meets quarterly.

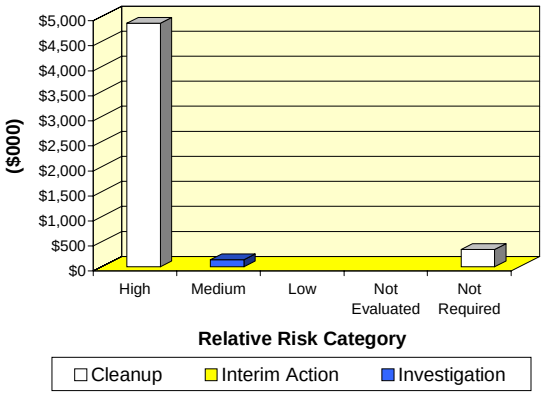
FY98 Restoration Progress

RODs were signed for Site 3 and Site 6. The RD for Site 3 was not completed because further investigative work was required to determine the extent of contamination. Additional ecological investigation was required for the Site 8 FS, and the RD was subsequently delayed. After Removal Actions at Site 4 and Site 15, the risk assessments were revised to reflect the judgment that the sites no longer posed an unacceptable risk. Thereafter, No Further Action RODs were signed for the two sites. Quarterly groundwater sampling was initiated at Site 6. An FS was completed at Site 8. A draft RI was completed at the lower base, which includes Sites 10, 11, 13, 17, 21, 22, 24, and 25. This project took longer than originally anticipated, delaying the FS scheduled for Sites 10, 11, 13, 21, and 22. Funding was not available for the RI for the basewide groundwater operable unit, delaying the FS scheduled for Site 7.

Plan of Action

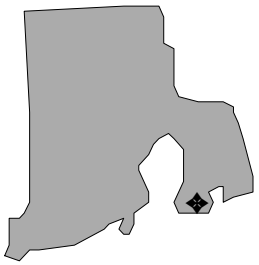
- Complete RI for lower base sites and basewide groundwater operable unit in FY99
- Continue groundwater monitoring at Sites 2 and 6 in FY99
- Continue AS/SVE at UST Sites 1 and 2 in FY99
- Complete FS, Proposed Remedial Action Plan (PRAP), and ROD at Site 20 in FY99
- At Site 8, complete PRAP and ROD in FY99, and RD in FY00
- Complete RD at Site 3 in FY99 and begin RA in FY00

FY99 Funding by Phase and Relative Risk



Newport Naval Education and Training Center — NPL

Size: 1,400 acres
Mission: Provide logistical support and serve as a training center
HRS Score: 32.25; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in March 1992
Contaminants: PCBs, petroleum/oil/lubricants, VOCs, and SVOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $49.6 million
Estimated Cost to Completion (Completion Year): $41.3 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2008



Newport, Rhode Island

Restoration Background

The Newport Naval Education and Training Center was used as a refueling depot from the early 1900s until after World War II, when the installation was restructured to support research and development activities and provide specialized training. Major contaminants at the installation include petroleum/oil/lubricant sludge associated with a number of tank farm sites, waste acids, solvents, and polychlorinated biphenyls (PCBs) in landfills used to dispose of general refuse and shop wastes.

Phase I Remedial Investigation and Feasibility Study (RI/FS) activities were completed in FY91. The Phase II RI for the McAllister Point Landfill site was completed in FY93, and the Navy obtained a Record of Decision (ROD) to cap the 11-acre landfill. The Remedial Design (RD) for the cap and the Phase II RI for the Old Fire Fighting Training Area site were completed in FY94.

In FY92, an interim ROD was signed for extraction and treatment of groundwater at Tank Farm No. 5 to prevent the migration of contaminants, and the treatment system began operating in FY94. The installation also completed RIs for two underground storage tanks (USTs) and began to remove the contents of the tank and petroleum-contaminated soil at another UST located on Tank Farm No. 5. The installation completed a Treatability Study for cement fixation and stabilization of lead-contaminated solids excavated from the Melville North Landfill. White rot fungus was used to destroy petroleum contamination in soil.

In FY96, Ecological Risk Assessments (ERAs) began for Sites 1 and 19. RIs were initiated for Sites 2, 9, and 13. Some petroleum-contaminated spots in soil were removed. During FY97, the installation completed an FS and RI for Site 2, installed a RCRA cap at Site 1, and removed contaminated soil at Site 19. After completing the Study Area Screening Evaluation (SASE) at Site 19, the installation initiated an onshore Removal Action to improve site management techniques. Monthly project manager meetings were held with regulatory agencies.

The installation formed a technical review committee in FY88 and converted it to a Restoration Advisory Board (RAB) in FY95. The RAB meets monthly. A community relations plan was completed in FY90. Information repositories were established in FY90, and an administrative record was established in FY92. The installation also established an ecological advisory board.

FY98 Restoration Progress

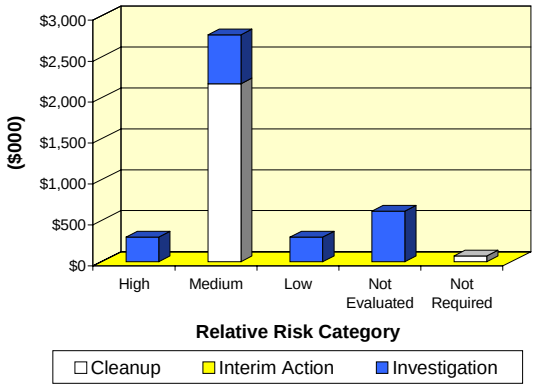
The ERAs for Sites 1 and 19 were completed, and FSs for the offshore areas began. The installation continued long-term monitoring (LTM) of groundwater and gas of the Site 1 RCRA landfill cap. The SASE work plans were completed for Sites 8 and 17. A Remedial Action work plan, including a soil analysis, was prepared for Site 2. The installation began an ERA for the offshore area at Site 9 and continued onshore RI investigations. The groundwater pump-and-treat system for Site 13 was completed, and quarterly monitoring of groundwater ended. The FS for Site 13 was completed, and the site was found to require no further action. The installation also removed 2,800 cubic yards of contaminated soil from the southern portion of Site 19 and began removing PCB-contaminated soil. The FS for Site 12 was delayed by funding shortages. The Removal Action was initiated at the Melville North Landfill.

The Federal Facility Agreement schedule was modified for Sites 1, 8, and 17. The installation conducted a partnering session with EPA and the Rhode Island Department of Environmental Management. The local community continues to be involved in preparing Federal Facility Agreement schedules for site cleanup.

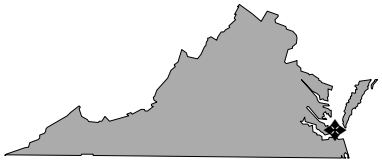
Plan of Action

- Complete FS and prepare Proposed Remedial Action Plan (PRAP) and ROD for Site 1 offshore area in FY99
- Continue LTM at Site 1 RCRA cap in FY99
- Collect additional data at Site 1 offshore area for development of RD in FY99
- Complete Removal Action for Site 2 in FY99
- Complete Site 9 offshore ERA in FY99
- Prepare PRAP and ROD for Site 13 in FY99
- Complete Site 19 onshore Removal Action and offshore FS in FY99
- Begin PRAP for Site 19 offshore area in FY99
- Continue SASE for Sites 8 and 17 in FY99
- Begin SASE for Sites 4 and 12 in FY99

FY99 Funding by Phase and Relative Risk



Size: 4,631 acres
Mission: Provide services and materials to support the aviation activities and operating forces of the Navy
HRS Score: 50.00; placed on NPL in April 1997
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Petroleum products, PCBs, solvents, heavy metals, acids, paints, asbestos, and pesticides
Media Affected: Surface water and sediment
Funding to Date: $69.6 million
Estimated Cost to Completion (Completion Year): $35.3 million (FY2021)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Norfolk, Virginia

Restoration Background

Environmental studies conducted at Norfolk Naval Base since FY83 have identified 22 sites and 173 solid waste management units (SWMUs). Further actions are required at 10 sites, 4 site screening areas, and 6 areas of concern (AOCs). Contamination has resulted from maintenance operations for the aircraft, equipment, and vehicles used to carry out the base's mission, and from operation of support facilities, such as hobby shops. Site types at the installation include landfills, ordnance storage areas, waste disposal areas, fire training areas, fuel spill areas, and underground storage tanks. The installation was proposed for the National Priorities List (NPL) mainly because of the potential for migration of contaminated surface water into groundwater and soil.

During FY89, the installation completed a Remedial Investigation and Feasibility Study (RI/FS) for Site 4. In FY91, an Expanded Site Inspection was completed for Site 6 and a Remedial Design (RD) was completed for Site 4. During FY94, the installation removed drums and debris at Area B of Site 1 and completed an RI/FS and signed a decision document for Site 1.

The installation formed a technical review committee in FY89 and converted it to a Restoration Advisory Board (RAB) in FY94. A community relations plan was completed in FY93. The installation established several information repositories in FY92, and an administrative record in FY93.

In FY96, a Preliminary Assessment and Site Inspection (PA/SI) was initiated for Site 21, and an RI/FS was initiated for three sites. Construction of a treatment facility continued. A baseline Ecological Risk Assessment was completed for Site 3, and construction of an air-sparging (AS) and soil vapor extraction (SVE) system began for the site.

In FY97, the installation completed a draft Federal Facility Agreement (FFA), signed two decision documents before proposed NPL listing, completed an RD, and initiated a Remedial Action (RA) for Sites 6 and 20. An RA was initiated for SWMU 1, the RA for Site 1 was completed, and the pump-and-treat system for the Fuel Farms was finished. The use of geoprobe, ground-penetrating radar, on-site laboratories, Hydropunch, and a Global Positioning System survey accelerated fieldwork.

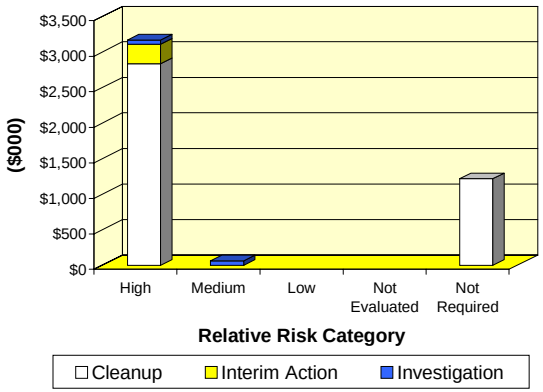
FY98 Restoration Progress

The AS/SVE systems and an RI/FS were completed, and an RD was initiated for Site 2. RAs were completed at Sites 3 and 20, and long-term monitoring (LTM) and operations and maintenance started at Sites 1, 3, and 20. An Engineering Evaluation and Cost Analysis (EE/CA) was completed for Site 5, and a Record of Decision (ROD) was signed for a landfill cap at Site 6. The RI/FS planned for Site 5 was replaced by a PA/SI and an EE/CA. The installation completed an RA at Site 21. An Interim Remedial Action was started on Site 22, but was not completed due to unexpected site conditions. A PA/SI was started at six AOCs, and an RA was completed at SWMU 1. The Removal Actions planned for SWMUs 4 and 6 were delayed and the funds used on the AOC study, which was determined to be of higher priority. Three RAB meetings were held in FY98. Negotiations for the FFA are nearing completion.

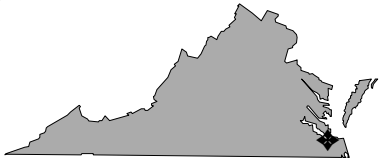
Plan of Action

- Sign ROD and initiate RA for Site 2 in FY99
- Complete RA for Site 5 in FY99
- Initiate RA for Site 6 in FY99
- Sign FFA in FY99
- Sign ROD for Site 22 in FY00

FY99 Funding by Phase and Relative Risk



Size: 800 acres
Mission: Maintain, repair, and overhaul nuclear submarines and nuclear and nonnuclear surface craft
HRS Score: 50.0; proposed for NPL in March 1998
IAG Status: Federal Facility Agreement to be negotiated in FY99
Contaminants: Heavy metals, PCBs, VOCs, SVOCs, petroleum/oil/lubricants, and solvents
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $7.3 million
Estimated Cost to Completion (Completion Year): $21.5 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



Portsmouth, Virginia

Restoration Background

Norfolk Naval Shipyard (NNSY) is located on the western bank of the Southern Branch of the Elizabeth River. In 1983, an Initial Assessment Study (IAS) identified 19 sites, 8 of which were determined to require further investigation. These sites were determined to have resulted from past land filling, disposal operations, and the operation of a plating shop. The plating shop site has since been determined not to pose a risk to human health or the environment, and therefore does not require any additional action other than monitoring. A RCRA Facility Investigation (RFI) was performed in 1986. An RFI supplement issued in 1987 identified 121 solid waste management units (SWMUs) and areas of concern (AOCs). The installation was proposed for inclusion on the National Priorities List (NPL) in March 1998 due to the potential impact of surface water runoff on Paradise Creek, which is adjacent to the disposal areas.

An administrative record was established in FY92, and a community relations plan was completed in FY94. The installation formed a technical review committee in FY94 and converted this to a Restoration Advisory Board (RAB) in FY96.

FY98 Restoration Progress

The installation initiated a Remedial Investigation and Feasibility Study (RI/FS) for Operable Units (OUs) 1 and 2, which comprise six disposal areas and waste holding and accumulation areas. A Human Health Risk Assessment (HHRA) and an Ecological Risk Assessment (ERA) are under way. These assessments utilized EPA guidance documents and personnel support. The contamination present at OUs 1 and 2 was generated primarily before the 1980s by activities supporting the shipyard mission of repair of nuclear and nonnuclear naval surface craft and submarine overhaul and repair. Investigation activities were accelerated by use of such technologies as a Global Positioning System, geoprobe, hydropunch, mobile on-site laboratory, and ground-penetrating radar.

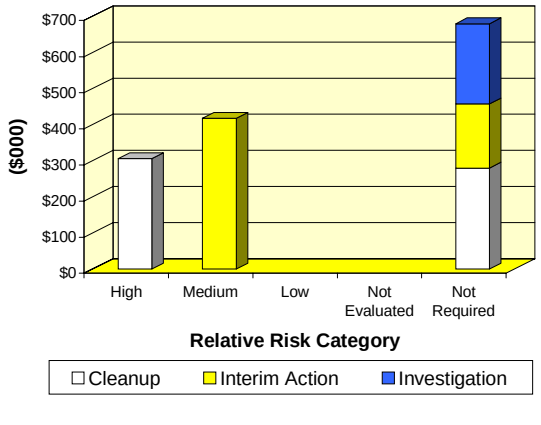
The construction of a free-product recovery system was initiated as an Interim Remedial Action (IRA) to address petroleum contamination identified at Site 5, the Oil Reclamation Area. This contamination is believed to be the result of a leaking underground storage tank used from 1968 until the early 1980s for storing used oil before off-site shipment for recycling and disposal. The installation initiated an investigation to identify the nature and extent of potential dense nonaqueous-phase liquid contamination suspected to be present at the Oil Reclamation Area. A Site Screening Assessment (SSA) was initiated to better characterize the status of sites, SWMUs, AOCs, and any other areas with the potential to impact human health or the environment.

The RAB met four times. During these meetings, the RAB and regulatory agencies were informed about the status of RI/FS activities, the construction of an IRA system, and the results of the RI/FS for the plating shop. The last RAB meeting included a site visit to observe IRA construction at Site 5.

Plan of Action

- Initiate IRA for Site 5, the Oil Reclamation Area, in FY99
- Complete delineation of nature and extent of potential contamination adjacent to Site 5 in FY99
- Complete RI/FS for OUs 1 and 2, including the HHRA and the ERA, in FY99
- Issue final RI for Site 17 in FY99
- Complete SSA in FY99
- Initiate Federal Facility Agreement (FFA) if placed on the NPL in FY99
- Assist Department of Justice in resolving potentially responsible party issues associated with the Atlantic Wood Industries Superfund site located adjacent to NNSY property in FY99

FY99 Funding by Phase and Relative Risk



Norton Air Force Base

NPL/BRAC 1988

Size: 2,211 acres
Mission: Support C-141 airlift operations
HRS Score: 39.65; placed on NPL in July 1987
IAG Status: IAG signed in 1989
Contaminants: Waste oils and fuel, spent solvents, paints, refrigerants, heavy metals, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $100.1 million
Estimated Cost to Completion (Completion Year): $10.5 million (FY2029)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

San Bernardino, California

Restoration Background

In December 1988, the BRAC Commission recommended closure of Norton Air Force Base. The installation closed in March 1994. The most significant sources of contamination at this installation are a trichloroethene (TCE) groundwater plume and contaminated soil areas. Sites include underground storage tanks (USTs), landfills, fire training areas, spill areas, and waste disposal pits.

In FY82, Remedial Investigation and Feasibility Study (FS) activities began for 22 sites. The installation also began two Treatability Studies in conjunction with removal of polychlorinated biphenyl (PCB)-contaminated soil. Since FY93, a groundwater extraction and treatment system has been used to treat groundwater at the TCE plume area.

In FY94, the installation removed 45 USTs; 3 of the UST sites required further action. The installation also conducted confirmation studies at 43 areas of concern (AOCs) and at 3 of the original 22 sites. The studies indicated that 19 AOCs require further investigation.

In FY95, the Central Base Area Operable Unit (OU) groundwater extraction and treatment system was expanded and the base boundary groundwater extraction and treatment system became operational. The installation also formed a Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT). The BCT redefined OUs as zones and initiated interim actions to shorten cleanup time.

During FY96, restoration activities were completed at 10 of the 22 sites. No-further-remedial-action-planned documents were completed for Sites 3, 4, 7, 11, 15, and 18. Closure reports were completed for Sites 6 and 9. An Action Memorandum concluded that no further action is necessary at Site 22. Of the remaining 12 sites, 11 are undergoing Engineering Evaluations and Cost Analyses, Remedial Design (RD), or Remedial Action (RA). The Air Force identified 73 AOCs that required survey or investigation, all of which are completed. Installation of the Base Boundary groundwater extraction and treatment system was completed. Soil removal was completed at 23 UST sites and the removed soil was treated in bioremediation cells. Closure of the Defense Reutilization and Marketing Office occurred. Fieldwork for the Industrial Waste Treatment Plant closure was completed, and a closure report was submitted. Closure of the Air Combat Camera Services began, and the closure plan for the Industrial Waste Line project was reviewed by the state.

In FY97, a Record of Decision (ROD) was signed for Site 19. The RD for the landfill cap at Site 2 was completed. The installation also completed the Air Combat Camera Services closure report. The RA was completed at Sites 1, 8, 13, and 14 through excavation and disposal. The installation also completed RAs for Sites 16 and 21.

FY98 Restoration Progress

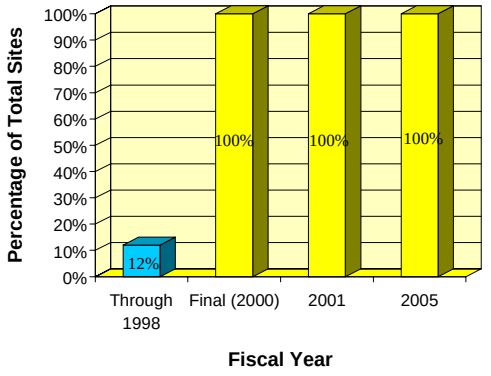
The RA at Site 5 was completed. The closure report is being prepared to complete action at this site. RA was completed at Site 2 (the former base landfill) and RAO for gas collection began. The Action Memorandum was completed for Site 17.

Operation and maintenance (O&M) continued for two pump-and-treat systems. The TCE source area soil vapor extraction project concluded. The basewide groundwater monitoring program continued, including an off-base water supply contingency plan. The Ecological Risk Assessment was also completed.

Plan of Action

- Complete RA completion report for Site 5
- Complete RA (landfill cap) for Installation Restoration Program Site 2 and begin O&M of landfill gas system
- Continue O&M of base boundary pump-and-treat system
- Continue monitoring of TCE plume
- Complete basewide FS and prepare proposed plan for basewide ROD

Sites Achieving RIP or RC Per Fiscal Year



Size: 422 acres
Mission: Military Traffic Management Command, Western Area
HRS Score: NA
IAG Status: None
Contaminants: POLs, TCE, solvents, lead, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $13.6 million
Estimated Cost to Completion (Completion Year): $3.5 million (FY2005)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1996

Oakland, California

Restoration Background

In July 1995, the BRAC Commission recommended closure of Oakland Army Base (OARB) by July 2001 and relocation of the mission of the Military Traffic Management Command, Western Area and the 1302d Major Port Command.

In 1989, OARB initiated Installation Restoration Program (IRP) activities at potentially contaminated areas. These areas included underground storage tanks (USTs) that contained diesel and fuel oil, gasoline, waste oil, and waste liquid.

Other areas of concern include Berth 6 and Berth 6 1/2 storm drains, where bedding materials are contaminated with diesel fuel, waste oil, toluene, xylene, and lead; oil and grease in the groundwater at Building 991; lead-contaminated soil at the West Grand Avenue Overpass and Roadside Areas in Operable Unit (OU) 1; trichloroethene (TCE)–contaminated soil and groundwater at Building 807; and soil contaminated with polychlorinated biphenyls (PCBs) at Building 648.

By FY94, the installation had removed 33 of the 38 identified tanks. Several of the excavated UST sites required soil removal and groundwater monitoring.

In FY95, the Army surveyed former living quarters and recreational areas where children played for lead-based paint. Analysis of paint samples from the interior and exterior of the Capehart Housing units, playgrounds, and the interior and exterior of the EM Quarters showed lead contamination above the action levels in several areas. When the reuse is determined for this area, appropriate action to protect human health will be determined.

In FY96, the Army conducted an asbestos survey of the EM Quarters, the Capehart Quarters, and the Child Development Center. Of 31 samples taken, indicated the presence of asbestos in floor tiles, roofs, and dry wall, but none of the materials presented a hazard to residents and workers.

The Army formed a BRAC cleanup team (BCT), which includes representatives of EPA Region 9 and California EPA, and the BRAC environmental coordinator. The commander also formed a Restoration Advisory Board (RAB). Key RAB participants include BCT members, community members, and technical consultants. The installation issued a BRAC Cleanup Plan (BCP), conducted a base-wide Environmental Baseline Survey (EBS), and issued the EBS report.

In FY97, the Army initiated Remedial Investigations and Feasibility Studies (RIs/FSs) for OUs 1, 2, 3, and 7, as planned. Funding was obtained, and activities were initiated, for the UST closure program. The Army is using a Total Environmental Restoration Contract for all new projects to expedite the restoration process. The Army proposed 18 acres as CERFA-uncontaminated, but the regulatory agencies did not concur.

The BCT attended monthly remedial project manager and RAB meetings, observed Preliminary Assessment and Site Inspection (PA/SI) field activities, and educated the new state member. The BCT also worked with regulators to expedite review of environmental documents by alerting regulators to upcoming review periods and convening working meetings to reduce the number of regulatory comments.

FY98 Restoration Progress

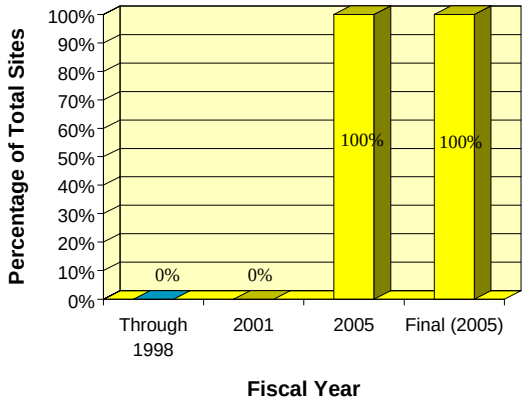
The installation completed all phases of the PA/SI and continues to conduct RI/FSs for three OUs. The RI/FS for OUs 4, 5, and 6 was delayed while additional information was collected to decide whether a RI/FS is warranted.

The RAB performed document reviews, toured the base, and observed sampling activities. The BCT met monthly with regulators and the RAB to discuss RI work plans, risk assessment work plans, and sample event results.

Plan of Action

- Complete RI/FS for OUs 1, 2, 3, and 7 in FY99
- Begin RI/FS, as necessary, for OUs 4, 5, and 6 in FY99
- Prepare decision documents for OUs 2, 3, and 7 in FY99; for OUs 1, 4, and 5 in FY00; and for OU6 in FY01
- Begin Remedial Action (RA) for OUs 2, 3, and 7 in FY99; finish RA for OU7 in FY99 and for OUs 2 and 3 in FY00
- Complete RAs at OUs 1, 4, 5, and 6 in FY01
- Remove all existing USTs in FY01

Sites Achieving RIP or RC Per Fiscal Year



Oakland Fleet and Industrial Supply Center — BRAC 1995

Size: 251 acres
Mission: Receive, store, and issue military supplies and materials to fleet units and shore activities in the Pacific Basin
HRS Score: NA
IAG Status: Federal Facility Site Remediation Agreement signed in September 1992
Contaminants: Petroleum products, VOCs, SVOCs, PCBs, pesticides, and metals
Media Affected: Groundwater and soil
Funding to Date: $10.0 million
Estimated Cost to Completion (Completion Year): $9.7 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2008

Oakland, California

Restoration Background

In July 1995, the BRAC Commission recommended the closure of the Oakland Fleet and Industrial Supply Center. Operations at the installation include vehicle maintenance and repair and storage of hazardous wastes. The installation is scheduled to close in September 1998.

Since FY88, environmental investigations have identified 25 Installation Restoration (IR) sites and 3 underground storage tank (UST) sites at the installation. Soil and groundwater contamination at the installation is attributable to the typical operations of supply center facilities, including hazardous waste storage, transformer storage, and other storage and maintenance activities.

The installation completed an initial site characterization for USTs 1, 5, and 8 in FY89. In FY93, it completed Interim Remedial Actions (IRAs) for USTs 1 and 5. An IRA for UST 8 was completed in 1995, and a corrective action plan was started.

In FY92, a partnering agreement was established among representatives of the Navy, the Department of Toxic Substances Control, and the Regional Water Quality Control Board. This partnership has accelerated the cleanup process at the installation.

During FY95, the installation completed Removal Actions for 11 IR sites and a Remedial Action Plan for no further action on 11 IR sites. The installation also completed Phase I Remedial Investigations (RIs) for five sites and Expanded Site Inspections for seven sites. A Baseline Risk Assessment was also completed for four sites.

The installation converted its technical review committee to a Restoration Advisory Board (RAB) in FY95. The RAB has 18 members and meets every 2 months. The installation completed a community relations plan in FY94, compiled an administrative record in FY92, and established two information repositories in FY94.

In FY96, the installation established a BRAC cleanup team while completing a Time-Critical Removal Action for six sites. The installation also initiated the revision of an RI report on UST Sites 1, 5, and 8 in consideration of the California Regional Water Quality Board guidance on closure of low-risk fuel sites.

In FY97, the RI for the offshore sediment Operable Unit (OU) and the Phase II Remedial Investigation and Feasibility Study (FS) for 10 sites were initiated.

FY98 Restoration Progress

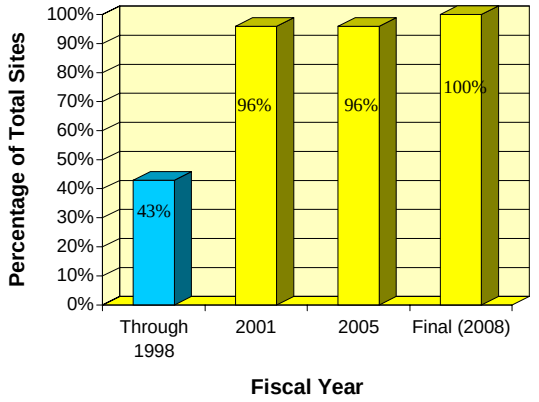
Two rounds of semiannual groundwater monitoring for UST sites were completed and a report initiated. The report is expected to result in closure of several UST sites. A separate OU was designated for IR Site 2 and adjacent Site 21. Site 2 is expected to be the only IR site requiring Remedial Action. Additional investigation and a Removal Action were completed at the site. The Phase II RI was completed for nine sites, and a recommendation made to the regulatory agencies for no further action in lieu of an FS. An RI was completed, and a Focused FS was taken through the draft stage for the offshore sediment OU. Regulatory agencies agreed to a no-action designation for the offshore sediment OU, and a Record of Decision (ROD) is being prepared.

Findings of suitability to transfer (FOSTs) were initiated for 79 onshore parcels not requiring RODs and for the offshore sediment OU. Port of Oakland development schedules continue to drive the restoration effort.

Plan of Action

- Complete a ROD for all but two IR sites, designated OU2, in FY99
- Complete RI/FS for OU2 in FY99
- Issue final groundwater monitoring report and obtain closure of several UST sites in FY99
- Complete the ROD for the offshore sediment OU in FY99
- Transfer all land and the offshore property, with the exception of OU2, in FY99
- Complete ROD for OU2 in FY00

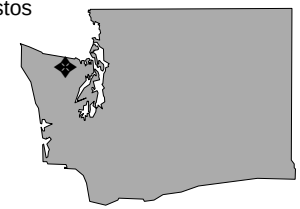
Sites Achieving RIP or RC Per Fiscal Year



Old Navy Dump/Manchester Annex

NPL

Size: 350 acres
Mission: Originally provided harbor defense for Puget Sound; during World War I, tested torpedoes and stored fuel; later served as a fire training school for the Navy and housed an antiaircraft artillery battery
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: IAG signed in July 1997
Contaminants: PCBs, heavy metals, petroleum hydrocarbons, dioxins and furans, and asbestos
Media Affected: Surface water, sediment, and soil
Funding to Date: $3.5 million
Estimated Cost to Completion (Completion Year): $6.9 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Kitsap County, Washington

Restoration Background

The Navy owned the Old Navy Dump/Manchester Annex from 1919 to 1960. During that time, a net depot, a fire training area, and a landfill were established at the site. Activities at the property included maintenance, painting, sandblasting, and storage of steel cable net. Domestic waste, wood, and metal waste from the site and the Puget Sound Naval Shipyard were disposed of in a landfill. Currently, the National Oceanic and Atmospheric Administration, the National Marine Fisheries Service, an EPA laboratory, and a portion of Manchester State Park occupy the site.

Preliminary Assessments and Site Inspections (PAs/SIs) conducted at the site since FY87 identified past releases of hazardous substances from the three areas. Contaminants include heavy metals, polychlorinated biphenyls (PCBs), petroleum hydrocarbons, dioxins and furans, and asbestos. The contaminants have been detected in soil at the landfill and at the fire training area, as well as in surface water and sediment at the site.

In FY94, the U.S. Army Corps of Engineers (USACE) completed the PA/SI process, and the Manchester Work Group, equivalent to a Restoration Advisory Board, was established to facilitate restoration efforts. The group includes representatives of EPA, the Washington State Department of Ecology, the U.S. Fish and Wildlife Service, tribal governments, and the local community.

During FY95, Phase II Remedial Investigation and Feasibility Study (RI/FS) fieldwork began, and a potential unexploded ordnance area was identified. USACE, Huntsville Division, determined that the area is not accessible to the general public and thus should be considered for no further action. Also in FY95, the Manchester Work Group published quarterly newsletters to solicit the interest of community groups and individuals.

In FY96, USACE completed all field investigation work and the draft RI/FS report. After initial data collection, it was determined that, Interim Remedial Actions (IRAs) are not appropriate for the site. Additional rounds of groundwater sampling for Phase I and II investigations were conducted.

In FY97, the Interagency Agreement (IAG) was signed, and the RI/FS was completed. USACE prepared a Proposed Plan for Remedial Action (RA), issued a Record of Decision (ROD), and initiated the Remedial Design (RD) and RA. The RI/FS process was accelerated by concurrent preparation of the draft final RI/FS and the draft Proposed Plan and by use of a landfill cap as a presumptive remedy. The RD/RA was expedited by simultaneous work on the draft final ROD and the draft RD/RA scope of work.

A public meeting was held in FY97 to solicit public input on the proposed cleanup plan. Two meetings were held to inform site employees of the plan and identify their concerns.

FY98 Restoration Progress

The RD/RA scope of work was completed. Based on the findings of the scope of work, additional data collection was performed, and the results were documented in an Auxiliary Data Collection Technical Memorandum.

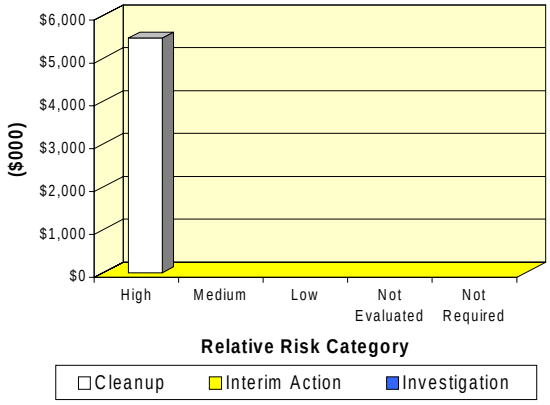
The 35 percent RD was completed and submitted for work group review. The work group continued to meet throughout the RD process to identify and resolve issues with the various stakeholders.

Cleanup of the Fire Training Area simulator structures was completed. Dioxin-contaminated debris and soil was excavated from within the simulator structures and disposed of off site. The concrete simulator structures were demolished and disposed of off site. USTs adjacent to the simulators were cleaned and closed in place. The site was restored by backfilling with clean fill and grading to create parking lot for National Marine Fisheries Service employees.

Plan of Action

- Complete final RD in FY99
- In FY99, award RA construction contracts for the following work; excavate landfill debris from Clam Bay intertidal zone and construct shoreline protection system; place clean sediment over intertidal Clam Bay sediment areas that exceed cleanup levels; install cap over upland portion of landfill, and hydraulic cutoff system along upgradient edge of cap; clean and fill in place remaining USTs
- Complete RA construction work in FY00
- Submit RA report and begin long-term monitoring and operations and maintenance in FY01

FY99 Funding by Phase and Relative Risk



Ordnance Works Disposal Areas

Formerly Morgantown Ordnance Works

NPL

Size: 825 acres
Mission: Manufactured chemicals for ordnance
HRS Score: 35.62; placed on NPL in June 1986
IAG Status: None
Contaminants: PCBs, PAHs, inorganic compounds, arsenic, and mercury
Media Affected: Groundwater and soil
Funding to Date: $2.0 million
Estimated Cost to Completion (Completion Year): $0.4 million (FY2003)
Final Remedy in Place or Response Complete Date for All Sites: NA

Morgantown, West Virginia

Restoration Background

On the basis of environmental studies, sites at the Ordnance Works Disposal Areas in Morgantown were grouped into two operable units (OUs). OU1 consists of an old landfill, a shallow disposal area from which topsoil has been removed, and two lagoons from which sludge has been excavated. OU2 consists of all other sites, particularly those located in processing areas.

The Remedial Investigation and Feasibility Study (RI/FS) for OU1 was completed in early FY88. The Record of Decision for OU1, which was signed in FY89, stipulated that soil contaminated with polyaromatic hydrocarbon (PAH) compounds was to be excavated and treated in a bioremediation bed. Soil washing was selected as an alternative remedy if bioremediation proved infeasible.

In FY90, EPA issued Consent Orders for both OUs. In the same year, the potentially responsible parties (PRPs) signed a participation agreement for OU2. In FY94, a pilot-test work plan was approved for the cleanup of soil contamination at OU1, and remedial work began. In FY95, the draft work plan for OU1 Phase II Interim Remedial Actions was submitted to EPA for review.

In FY95, the draft RI report for OU2 was submitted to EPA for review. OU2 areas contained elevated levels of organic and inorganic contaminants. Removal Actions were required for five areas of OU2, two at the main processing building and three at the coke ovens and the by-products area. A Time-Critical Removal Action was proposed for limited areas. This proposal of a Removal Action after the RI phase eliminated the need for an FS. In FY96, the U.S. Army Corps of Engineers (USACE) reached an agreement on allocating the cost of remediation at OU1.

During FY97, the PRP group, which includes the USACE, completed the Removal Actions at OU2 and received EPA concurrence on completion. To improve site management at OU1, the PRP group submitted a Focused Feasibility Study (FFS) to EPA for the OU1 remedy.

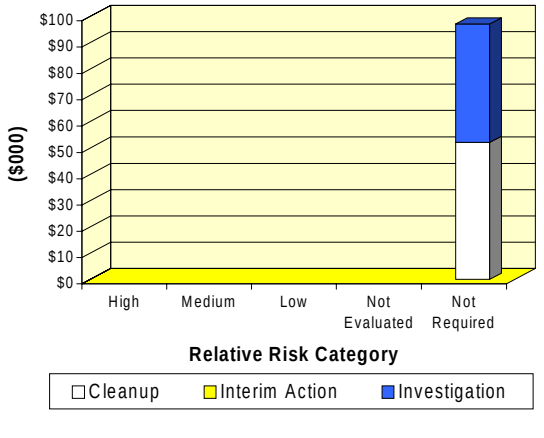
FY98 Restoration Progress

In August, after state concurrence, EPA approved the remedy proposed for OU1 in the FFS.

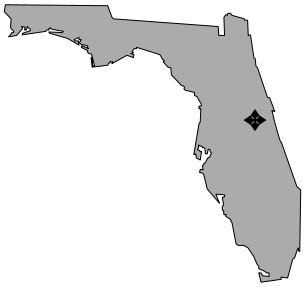
Plan of Action

- Initiate Consent Decree negotiations in FY99
- In FY99, submit the Proposed Plan for the site, consisting of off-site thermal treatment and on-site landfill capping

FY99 Funding by Phase and Relative Risk



Size: 2,071 acres
Mission: Serve as Naval Training Center; formerly used as Army Air Force and Air Force bases
HRS Score: NA
IAG Status: None
Contaminants: Asbestos, paint, petroleum/oil/lubricants, photographic chemicals, solvents, and low-level radioactive wastes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $19.6 million
Estimated Cost to Completion (Completion Year): $8.7 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Orlando, Florida

Restoration Background

The Orlando Naval Training Center has four areas: the Main Base, Area C, Herndon Annex, and McCoy Annex. Most of the operational and training facilities are located on the Main Base, a 1,093-acre parcel. Area C, west of the Main Base, contains warehouse and laundry operations on 46 acres. Herndon Annex occupies 54 acres containing warehouse and research facilities. McCoy Annex occupies 882 acres and contains housing and community facilities. From 1941 to 1968, the installation served as an Army Air Base and an Air Force Base. Since 1968, it has been a Naval Training Center. In July 1993, the BRAC Commission recommended closure of the installation and relocation of its activities to Great Lakes Naval Training Center, Illinois, and New London Naval Submarine Base, Connecticut. The installation is scheduled to close in 1999.

Environmental investigations, beginning in FY85, identified 10 CERCLA sites and 4 underground storage tank (UST) program sites. The installation identified 53 areas of concern (AOCs) and more than 300 tank systems requiring removal or assessment.

In FY92, the installation replaced three tanks at a UST site. Corrective action plans (CAPs) for the three remaining UST sites were completed in FY93. In FY94, the installation completed the site screening fieldwork for 10 sites and began to prepare Remedial Investigation and Feasibility Study (RI/FS) work plans for all landfills. In FY95, the installation began RI/FS activities at the Main Base Landfill site, completed a CAP for one UST site, and began an Interim Remedial Action (IRA) for groundwater at another UST site. The installation removed 55 tanks and completed 45 UST assessment reports.

Partnerships with the State of Florida and EPA facilitated the signing of an alternative procedure agreement with the state in FY93. In FY94, the installation formed a Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT). In FY95, the installation completed its land reuse plan and community relations plan. The installation also completed an Environmental Baseline Survey that identified 1,133 acres as CERFA-clean.

During FY96, the installation completed site screenings of 12 AOCs and began screening an additional 12. A Preliminary Assessment and Site Inspection (PA/SI) was completed and the RI/FS was initiated at the Laundry Area C site. PA/SI activities were completed at two other sites. The installation completed a CAP for one UST.

In FY97, RI/FS activities began at the McCoy Annex Landfill, the Old Pesticide Shop, and the Groundskeeper Storage Area. An IRA at one UST site (McCoy Gas Station) was completed.

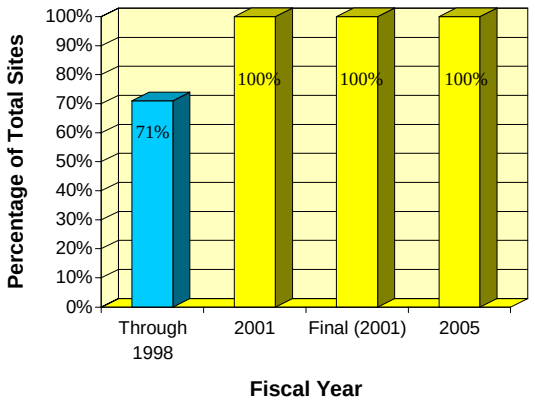
FY98 Restoration Progress

Findings of suitability to lease (FOSLs) were completed for 525 acres and findings of suitability to transfer were completed for approximately 1,055 acres. Site screenings were completed at the remaining 20 AOCs, and site screening reports were completed for another 10. The BCT transferred 214 acres, completed a Record of Decision (ROD), and removed and assessed 55 tanks. Soil was removed from Study Areas 27 and 52 and Operable Unit (OU) 3. Due to findings of contamination in soil, additional IRAs will be implemented in FY99 for all remaining AOCs. Fieldwork for the final 13 AOCs began.

Plan of Action

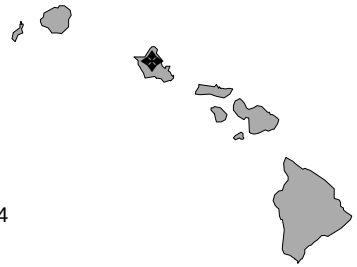
- Remove 27 petroleum storage tanks, thus completing all tank removal actions required for base closure in FY99
- Complete FOSLs for McCoy Annex (125 acres) and Herndon Annex (54 acres) in FY99
- Complete public benefit conveyance for Greater Orlando Airport Authority (170 acres) in FY99
- Complete seven IRAs to remove soil contamination at study areas in FY99
- Complete IRA for five UST sites in FY99
- Complete ROD for OU3 in FY99
- Complete four groundwater contamination study area reports in FY00
- Complete RODs for OUs 2 and 4 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Naval Computer and Telecommunications Area Master Station, Pacific — NPL

Size: 2,400 acres
Mission: Operate and maintain communications facilities and equipment for Naval shore installations and fleet units in the eastern Pacific
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Draft Federal Facility Agreement
Contaminants: PCBs, metals, and petroleum hydrocarbons
Media Affected: Soil
Funding to Date: $6.2 million
Estimated Cost to Completion (Completion Year): $45.7 million (FY2031)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Wahiawa, Hawaii

Restoration Background

This installation operates six facilities on the island of Oahu but conducts industrial operations primarily at the main station and receiver site in Wahiawa and the Naval Radio Transmitting Facility in Lualualei. The restoration program has focused on those two facilities, where maintenance and operation of electrical transformers and switches have been the primary sources of contamination. The installation was placed on the National Priorities List (NPL) because polychlorinated biphenyl (PCB)–contaminated soil was detected in work and residential areas. Contamination with metals and petroleum hydrocarbons also resulted from the station's operation and maintenance activities.

Environmental investigations began at the installation in FY86. A total of 24 CERCLA sites and 5 underground storage tank (UST) sites have been identified to date. Site Inspections have been conducted for Sites 1, 5, 11, and 14 through 19. Expanded Site Inspections (ESIs) were conducted for Sites 1, 5, and 11.

In FY92, the installation conducted a Removal Action at Site 14 to remove PCB-contaminated soil in the vicinity of eight transformers. The results of a risk assessment prepared after the Removal Action indicated that no further action was required. The ESI identified elevated levels of lead and mercury at the Old Wahiawa Landfill and the Building 6 Disposal Area.

In FY95, the installation completed planning documents for the Remedial Investigation and Feasibility Study (RI/FS) at Sites 1, 5, 6, 10, 12, 13, 17, 18, and 20. RI/FS activities included screening risk assessments to determine whether further action was required. This approach was intended to accelerate the cleanup process at the installation.

In FY95, the Navy completed a draft Federal Facility Agreement (FFA) with EPA. The Navy acknowledged a receipt of the draft FFA and its willingness to begin negotiations on the agreement. Since then, however, the Navy has given the FFA low priority because the cleanup program has been progressing at the installation.

In FY96, the Navy conducted RI/FS activities at Sites 1 and 5 and determined that no further action was required at UST Site 6. In the same year, initial site characterization was conducted at UST Site 8.

During FY97, the installation continued RI/FS activities at Sites 1 and 5 and began RI/FS activities at Sites 2 and 22. A draft Engineering Evaluation and Cost Analysis (EE/CA) was prepared for a Removal Action at transformer locations at Sites 17, 18, and 20.

Because the installation consists of two primary facilities, two Restoration Advisory Boards (RABs) were established. Both the Wahiawa and the Waianae/Lualualei RABs have approximately 25 members representing the community. Members of the community have been instrumental in discovering sites and have located numerous wells in the vicinity of the installation. The final community relations plan was completed in FY95.

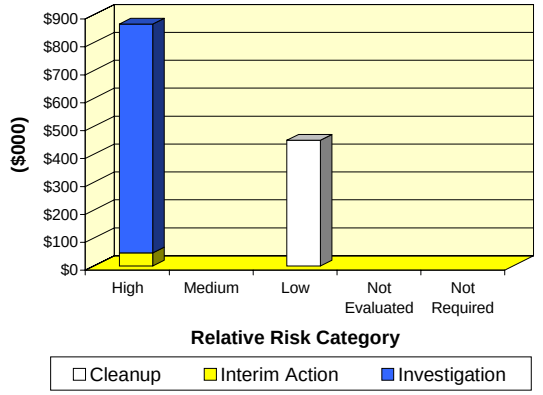
FY98 Restoration Progress

The installation continued RI/FS activities at Sites 1, 2, 5, and 22. The RI/FS was not completed as scheduled because additional fieldwork was required for Sites 1 and 2. An EE/CA, an Action Memorandum (AM), and planning documents were completed for the Removal Actions at transformer locations at Sites 17, 18, and 20. The installation initiated fieldwork for this Removal Action. Petroleum contamination was identified at UST Site 5.

Plan of Action

- In FY99, complete RI/FS at Sites 1, 2, 5, and 22 after analytical data for Sites 1 and 2 have been incorporated
- Complete Removal Action fieldwork at Sites 17, 18, and 20 in FY99
- In FY99, initiate Removal Site Evaluation, EE/CA, and AM at a portion of Site 18 not addressed in the current Removal Action
- Initiate a technology demonstration for treating soil from Sites 17, 18, and 20 in FY00
- Initiate a Removal Action to treat soil from Sites 17, 18, and 20 in FY00
- Initiate remediation for soil contamination at UST Site 5 in FY99
- Complete investigation for UST Site 8 in FY99

FY99 Funding by Phase and Relative Risk



Size: 16,000 acres
Mission: Produced and stored military weapons
HRS Score: 51.22; placed on NPL in May 1994
IAG Status: Under negotiation
Contaminants: VOCs, SVOCs, heavy metals, chlordane, UXO, and explosives
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $5.4 million
Estimated Cost to Completion (Completion Year): $9.5 million (FY2026)
Final Remedy in Place or Response Complete Date for All Sites: FY2007

Pantex Village, Texas

Restoration Background

The former Pantex Ordnance Plant, 13 miles northeast of Amarillo, Texas, began operations in 1942 as an Army Ordnance Corps facility. The property is owned by the U.S. Department of Energy (DOE) and Texas Tech University. Operations conducted there include fabrication, assembly, testing, and disassembly of nuclear ammunition and weapons. Sources of contamination have included burning of chemical waste in unlined pits, burial of waste in unlined landfills, and discharge of plant wastewaters into on-site surface water.

Environmental studies of the southern 5,000 acres, owned by Texas Tech University, began in FY88. A Preliminary Assessment and Site Inspection in FY90 identified nine areas of emphasis (AOEs) for investigation. It was suspected that some AOEs contained ordnance and explosives (OE). An Interim Remedial Action was conducted at three AOEs to remove OE from soil to a depth of 3 feet.

In FY94, a Phase I Remedial Investigation and Feasibility Study (RI/FS) began for two AOEs. RI/FS activities included sampling of surface and subsurface soil, sediment, surface water, and groundwater. The analysis indicated that explosives, mercury, lead, chromium, and chlordane were the primary contaminants of concern. The installation began an Engineering Evaluation and Cost Analysis (EE/CA) of four AOEs where Non-Time-Critical Removal Actions might be necessary.

In FY95, the final Phase I RI report was completed for the hazardous, toxic, and radioactive waste (HTRW) project, and the draft EE/CA report was completed for the OE project. In addition, a public meeting was held to present information about environmental restoration projects at the installation. DOE and Texas Tech University established a partnership with the Texas Natural Resource Conservation Commission (TNRCC) to continue quarterly groundwater sampling.

In FY96, a contract was awarded for preparation of a potentially responsible party (PRP) search work plan. The PRP work plan will address property owned by DOE and Texas Tech University.

Representatives of Texas Tech University, DOE, the community, and TNRCC met to review the site's status and discuss concerns. TNRCC did not agree with the recommendation of the EE/CA report. Therefore, the cleanup remedy recommended in the report was not implemented.

In FY97, contracts were awarded for the DOE PRP and the Texas Tech property record search. The phase II HTRW investigation began for the Texas Tech property. The DOE record search was completed, and a final report was submitted.

FY98 Restoration Progress

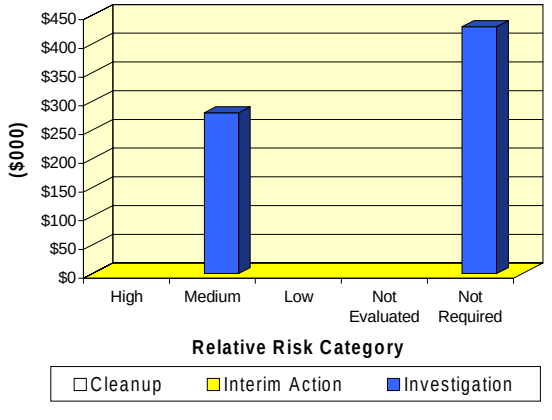
The HTRW investigation for Texas Tech was completed, and the findings report is scheduled to be completed by December 1998. The PRP record search for Texas Tech also was completed.

Selection and implementation of a cleanup remedy were delayed because TNRCC has not provided a written response to the EE/CA report.

Plan of Action

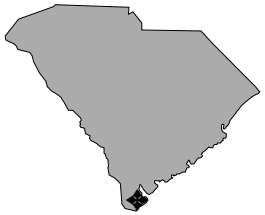
- In FY99, meet with DOE and Texas Tech to determine PRP responsibility
- In FY99, implement the cleanup recommended in the EE/CA report for the OE project, after obtaining approval of TNRCC
- Complete findings report on HTRW investigation for Texas Tech in FY99

FY99 Funding by Phase and Relative Risk



Parris Island Marine Corps Recruit Depot NPL

Size: 8,043 acres
Mission: Receive, recruit, and combat-train enlisted personnel upon their enlistment in the Marine Corps
HRS Score: 50.00; placed on NPL in December 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Industrial wastes, pesticides, paint, petroleum/oil/lubricants, solvents, ordnance compounds, metals, acids, and electrolytes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $6.2 million
Estimated Cost to Completion (Completion Year): $15.7 million (FY2018)
Final Remedy in Place or Response Complete Date for All Sites: FY2008



Parris Island, South Carolina

Restoration Background

The Parris Island Marine Corps Recruit Depot (MCRD) was listed on the National Priorities List (NPL) in December 1994. The listing was due, primarily, to contamination at two landfill sites. Environmental investigations at that time identified 48 potential CERCLA and RCRA sites at the installation. Most of the sites are landfills or spill areas where groundwater and sediment are contaminated with solvents and petroleum/oil/lubricants. In FY86, an Initial Assessment Study identified 16 sites, 10 of which were designated Response Complete (RC). In FY87, a Site Inspection (SI) was initiated for all sites. EPA prepared a RCRA Facility Assessment (RFA) for the installation in FY90. The RFA identified 44 solid waste management units (SWMUs) and four areas of concern (AOCs). All CERCLA sites identified previously were included as SWMUs or AOCs. All the SWMUs identified in the RFA are being addressed under the CERCLA process. Of the originally identified 48 potential sites, the Navy, Marines, and EPA designated 25 as official sites. Ten of these sites have been designated RC. At two sites, all tanks were removed and cleanup was completed. Five sites required no further action. In FY93, the installation completed an Expanded Site Inspection at the Causeway Landfill.

During FY95, the installation began Remedial Actions involving tank removals, soil removal, free-product recovery, and soil vapor extraction at one underground storage tank (UST) site. Four storage tanks were removed. An Interim Remedial Action (IRA) was conducted at one landfill site. A fence restricts access to the landfill. Twelve sites that had been designated RC were reopened, with three reclassified as RC soon after. The installation began negotiations to prepare a Federal Facility Agreement (FFA). Also, in partnership with the Navy Environmental Health Center, the installation began to develop a community relations plan (CRP). The Agency for Toxic Substances and Disease Registry performed the initial Public Health Assessment for the installation.

During FY96, the installation began Remedial Investigation and Feasibility Study (RI/FS) activities at four sites and completed Preliminary Assessment (PA) and SI activities at three. The installation also began an IRA at a spill area, completed an assessment of contamination at UST 2, and began preparing a corrective action plan (CAP) for that site. A draft FFA was prepared. In addition, the installation began to compile an administrative record and submitted its draft CRP to the regulatory agencies for approval.

In FY97, the CAP was completed and the corrective action for UST 2 was implemented. The installation also completed the IRA and began long-term monitoring for UST 1.

FY98 Restoration Progress

Completion of two RI/FSs was delayed because of the presence of hatchlings (bald eagle, osprey) nesting at two of the landfills and because of the large number of samples that had to be taken on incoming or outgoing tides. RI/FS activities began at six sites, which were investigated concurrently to save money on mobilization and demobilization and to allow continued work during down times at individual sites. The data are being tabulated and will be reviewed in early FY99.

Limited additional sampling is being conducted at Sites 9 and 15 to clarify conditions. A pump-and-treat system established at Site 45, the former dry cleaners, is now running and removing contaminated groundwater.

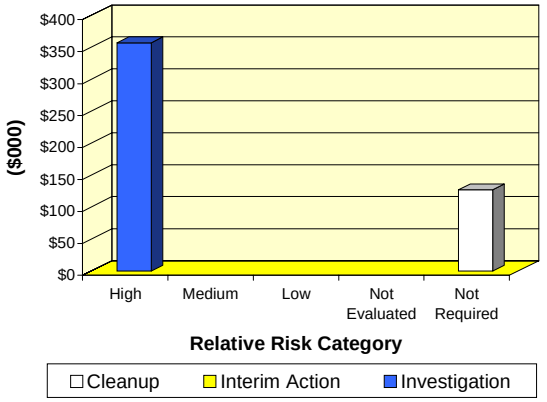
The installation's partnering team has met every 6 to 8 weeks, or as needed, to discuss and reach agreement on the approach to investigating and cleaning up the sites at MCRD, Parris Island. FFA negotiations have been put on hold to allow the partnering team to make progress with site investigations. The FFA is still discussed at partnering meetings, but the team has decided to concentrate on the RI/FS and allow decisions and agreements concerning the investigation process to become the starting point for the FFA. It is hoped that as RI/FS work nears completion, the areas of contention in the FFA negotiations will resolve themselves.

No Restoration Advisory Board (RAB) has been established at the installation. Efforts have been made to generate community interest in the small town of Beaufort and the nearby community of Hilton Head, South Carolina. Flyers have been distributed and advertisements placed in local newspapers, but there has been no response or interest in forming a RAB. The CRP was completed.

Plan of Action

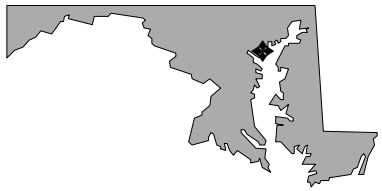
- Complete several RI/FSs in FY99
- Conduct an RI/FS at Site 21, the Weapons Power Plant oil-water separator in FY99
- Complete IRA for Site 45, the former dry cleaners, in FY99 and conduct an RI/FS at the site in FY00

FY99 Funding by Phase and Relative Risk



Patuxent River Naval Air Station NPL

Size: 6,800 acres
Mission: Test and evaluate naval aircraft systems
HRS Score: 36.87; placed on NPL in May 1994
IAG Status: None
Contaminants: Heavy metals, pesticides, organics, petroleum/oil/lubricants, solvents, and UXO
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $18.5 million
Estimated Cost to Completion (Completion Year): $97.7 million (FY2018)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Lexington Park, Maryland

Restoration Background

Environmental studies at this installation began in FY84. Since the installation was placed on the National Priorities List (NPL) in 1994, some sites have been combined with other sites or eliminated, resulting in 46 sites in the Installation Restoration Program. Three sites were placed on the NPL: a Fishing Point Landfill site (Site 1), the Former Sanitary Landfill (Site 11), and the Pest Control Shop (Site 17). Wastes managed at Site 1 included mixed solid wastes, petroleum/oil/lubricants (POL), paints, thinners, solvents, pesticides, and photographic laboratory wastes. Wastes handled at the Former Sanitary Landfill include mixed solid wastes, POL, paints, thinners, solvents, and pesticides. Pesticides were handled at the Pest Control Shop.

Metals and pesticides, semivolatiles, and volatiles were released primarily from landfills and spills, causing contamination of soil, groundwater, surface water, and sediment at the various Installation Restoration (IR) sites. Remedial Investigation and Feasibility Study (RI/FS) activities began at several sites in FY92. These RI/FS activities included installation of shallow and deep monitoring wells; collection of soil borings; and collection of groundwater, soil, sediment, and fish. Hydrogeologic testing also was conducted. Between FY86 and FY98, the installation initiated and completed the removal of drums, polychlorinated biphenyl (PCB)–contaminated soil, pesticide-contaminated soil, and ordnance.

In FY94, Interim Remedial Actions (IRAs) included an ordnance sweep to remove remaining unexploded ordnance (UXO). Shoreline stabilization has prevented erosion of a Fishing Point landfill into the Chesapeake Bay. During FY96, the installation began a five-phase RI/FS for 16 sites. A Record of Decision (ROD) was signed for Site 11. The installation also installed a cap at Site 11 and removed a drywell and sediment at Site 24. The predesign and design phases began for an IRA at Sites 6 and 17. In FY97, the installation began a site screening process for five sites.

Sixteen underground storage tanks (USTs) identified between FY87 and FY93 were grouped into six areas for further investigation. Interim Actions at two of the areas included groundwater treatment and recovery of free product. The Corrective Measures Design was implemented at UST 1, along with a Removal Action at UST 5. The installation also prepared a corrective action plan for UST 6. In FY97, one early action was performed, and a landfill cap was installed. A corrective action at UST 4 and two Interim Actions at UST 6 also were implemented. IRAs were completed at Sites 11 and 24. A geoprobe was used to collect subsurface samples.

In FY90, the installation formed a technical review committee. The installation completed a community relations plan in FY91 and established a Restoration Advisory Board (RAB) in FY94. The RAB continues to meet at least quarterly. The Navy regularly updates an administrative record and two information repositories, both of which were established in FY95.

FY98 Restoration Progress

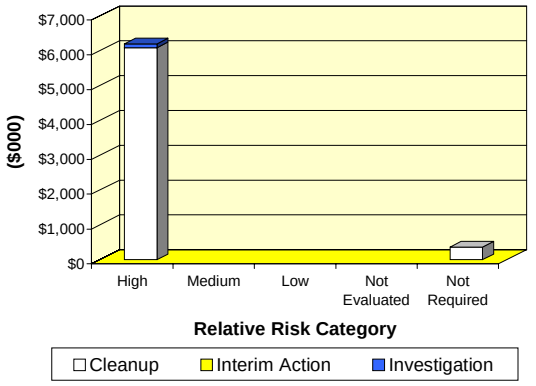
The installation completed a Removal Action at the Former Drum Disposal Area (Site 34), began the Remedial Design (RD) for the Fishing Point landfill sites (Sites 1 and 12), and initiated a Remedial Action (RA) for the Pesticide Shop (Site 17). The draft final Site Inspection (SI) document was submitted for regulatory review. The Site 17 RD was completed. The RD at Site 6 was not completed as scheduled because costs for the Site 17 RA were higher than anticipated. Corrective actions at UST 1 were delayed when a comprehensive fuel system study recommended replacing the existing JP-5 system and centralizing operations. Corrective actions were completed at UST 5.

The installation began formal partnering efforts with EPA Region 3, the installation's personnel, the Engineering Field Activity Chesapeake remedial project manager, the Maryland Department of the Environment, and IR contractors. The RAB was given a tour of the Site 11 landfill project and base mission.

Plan of Action

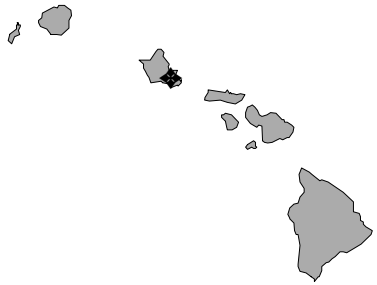
- Complete Proposed Plan (PP) and ROD for one site in FY99
- Complete ROD and RA for one site in FY99
- Complete FS and RD for two sites in FY99
- Complete PP and ROD for two sites in FY99
- Initiate RA for two sites in FY99
- Complete SI for five sites in FY99
- Complete RI/FS for three sites in FY99
- Complete RI for three sites in FY99
- Initiate and complete a Removal Action at one site in FY99
- Initiate SI for three sites in FY99
- Convert administrative record to CD-ROM in FY99
- Complete RA for two sites and FS for three sites in FY00
- Complete RI/FS for three sites in FY00
- Initiate RA for two sites in FY00

FY99 Funding by Phase and Relative Risk



Pearl Harbor Naval Complex NPL

Size: 2,162 acres
Mission: Provide primary fleet support in the Pearl Harbor area
HRS Score: 70.82; placed on NPL in October 1992
IAG Status: Federal Facility Agreement signed in March 1994
Contaminants: VOCs, SVOCs, heavy metals, PCBs, pesticides, petroleum hydrocarbons, and solvents
Media Affected: Groundwater and soil
Funding to Date: $81.6 million
Estimated Cost to Completion (Completion Year): $132.4 million (FY2019)
Final Remedy in Place or Response Complete Date for All Sites: FY2013



Pearl Harbor, Hawaii

Restoration Background

The Pearl Harbor Naval Complex consists of six installations: the Fleet and Industrial Supply Center, the Naval Station, the Naval Magazine, the Naval Shipyard, the Public Works Center, and the Inactive Ship Maintenance Detachment. Fuel supply activities, landfills, and other support operations have contaminated the soil and groundwater with volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals.

The installation has conducted environmental investigations and cleanups under CERCLA and RCRA at more than 30 sites since FY83. Between FY91 and FY93, Interim Remedial Actions (IRAs) included excavation of polychlorinated biphenyl (PCB)– and dieldrin-contaminated soil at the Pearl City Junction and excavation of PCB-contaminated soil at transformer locations at the Armed Services Special Educational Training Services School and off-site disposal. Five underground storage tanks and tetrachloroethene-contaminated soil were removed from the Aiea Laundry site (Site 31) in FY94. In FY95, the installation initiated one Site Inspection (SI) and two Remedial Investigations and Feasibility Studies (RI/FSs). Approximately 7,000 cubic yards of soil was excavated, removed, treated by thermal desorption, and backfilled at the Site 22 oily waste disposal pit. Planning began for a full-scale extraction test for groundwater and free product at Site 36. Pilot-scale testing was completed for a soil vapor extraction (SVE) system at Site 31.

A technical review committee (TRC), formed in FY90, was converted to a Restoration Advisory Board (RAB) in FY95. The installation established three information repositories in FY90 and an administrative record in FY92. A community relations plan was completed in FY92 and updated in FY95. Several fact sheets have been prepared for TRC and RAB meetings.

During FY97, IRAs were initiated at Sites 37 (Building 8) and 46 (Oscar 2 Pier) and completed at Sites 8 (Ford Island Landfill) and 36 (NEX Gas Station). Long-term monitoring (LTM) began at one site. Removal Actions were conducted at Sites 8 and 36. SIs were performed for Sites 40 through 42. The Preliminary Assessment and the SI were finished for Sites 40 and 41. Remedial Actions and RI/FSs were completed. At Site 34, a solvent extraction technology was used to remove PCBs from concrete. PCBs also were removed from contaminated sediment in the catch basin at Site 13. The capping of landfill Site 8 marked completion of cleanup at that site; groundwater monitoring will continue for 5 years. A Removal Site Evaluation (RSE) and a design package were used at Site 45 to address petroleum contamination. The RI/FS for Site 19, the Removal Action design for Sites 4 and 34, and the Site Summary Process for the complex continued.

FY98 Restoration Progress

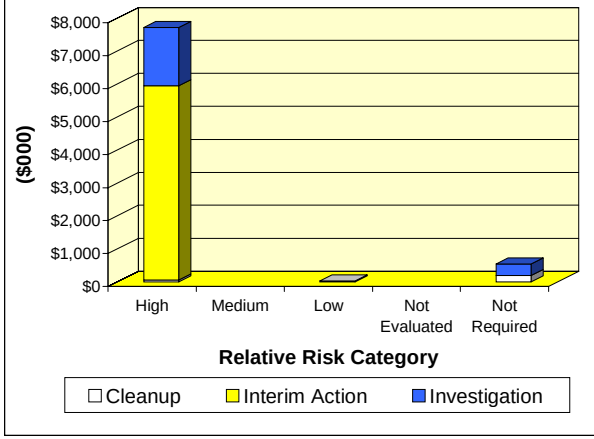
Fieldwork for the Ford Island Site Summary Report (SSR), which identified 52 PCB transformer locations, the aviation gasoline distribution system, the drainage system/oil-water separator in four structures, a former hazardous waste storage area, and a former indoor firing range as potential areas of concern, concluded, and the draft final SSR was submitted. The regional subsurface oil investigation affecting Sites 20, 21, 23, 24, 25, 29, 35, 36, and 45 is in RI/FS Phase II. Fieldwork for Sites 22 and 27 was completed, and the RI/FS planning documents were implemented for these sites. Final Engineering Evaluation and Cost Analysis (EE/CA) and design documents for Site 4 were completed and the Removal Action began. Draft planning documents for an RSE at Sites 20, 21, and 29 were completed and regulatory comments received.

The Removal Actions at Sites 10 and 45 are being performed through partnership with the Superfund Innovative Technology Evaluation (SITE) program. The Removal Actions at Sites 39 and 42 were completed. The construction for Removal Actions at Sites 37 and 46 was completed, and LTM and long-term operations began. The IRAs for Solid Waste Management Units 1 and 6 were not executed because of lack of funding.

Plan of Action

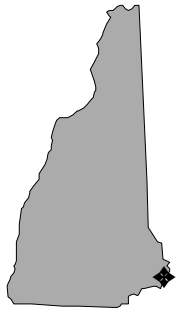
- In FY99, complete Ford Island SSR, begin Waipio Peninsula SSR, implement Removal Action at Site 31, and continue SVE of chlorinated solvents
- Prepare final planning documents for Sites 20, 21, and 29; begin RSE fieldwork; and prepare EE/CA, Action Memorandum (AM), and design documents in FY99·
- Begin Removal Action for PCB-contaminated soil at Site 34 and complete Treatability Study in FY99
- Initiate implementation of Removal Action for Site 4 in FY99 and complete fieldwork in FY00
- Continue Removal Action at Site 10 with SITE program demonstration of electrokinectics
- Continue Removal Action at Site 45 with SITE program demonstration of product removal technologies and complete EE/CA, AM, and design documents in FY99; begin construction in FY00
- Initiate RSE for Site 43 in FY00

FY99 Funding by Phase and Relative Risk



Pease Air Force Base

Size: 4,257 acres
Mission: Served as Strategic Air Command bomber and tanker base
HRS Score: 39.42; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in 1991
Contaminants: VOCs, spent fuels, waste oils, petroleum/oil/lubricants, pesticides, and paints
Media Affected: Groundwater and soil
Funding to Date: $139.2 million
Estimated Cost to Completion (Completion Year): $40.5 million (FY2046)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000



Portsmouth/Newington, New Hampshire

Restoration Background

In December 1988, the BRAC Commission recommended closure of Pease Air Force Base. In FY91, the installation was closed as scheduled. Environmental studies at the installation identified the following site types: fire training areas, burn pits, industrial facilities, landfills, and underground storage tanks (USTs). Groundwater and soil are contaminated with petroleum products, namely, JP-4 jet fuel, and industrial solvents, such as trichloroethene (TCE).

The installation completed several Interim Remedial Actions, including pilot groundwater Treatability Studies (TSs), at four sites, soil removal at three sites, and test pit operations at two sites. It also completed three soil vapor extraction (SVE) TSs and one bioventing TS and removed 158 USTs and associated contaminated soil. A BRAC cleanup team (BCT) was formed in FY93.

During FY95, six Records of Decision (RODs) were signed. Cleanup actions were completed at seven locations, and a remediation system was put into operation at Fire Training Area 2. Innovative technologies implemented at the base include landfill consolidation and natural attenuation of groundwater. A Restoration Advisory Board (RAB) was formed from the installation's technical review committee. A citizens group, Seacoast Citizens Overseeing Pease Environment (SCOPE), has participated in meetings and assisted in developing cleanup options at the installation.

In FY96, steps were taken to transfer the remaining property to the Local Redevelopment Authority under a public benefit transfer. LF-5 capping was completed, construction of the SVE and air-sparging system at Site 45 began, and wetland restoration at LF-6 was completed. Construction also began on the bioventing system at Site 13, the SVE and air-sparging system in Zone 2, and the groundwater recovery system in Zone 3. The installation began implementing the groundwater containment system at Site 32. The final Remedial Investigation and Feasibility Study (RI/FS) work was completed for the Brooks and Ditches Operable Unit (OU).

In FY97, the final ROD for the Brooks and Ditches OU was signed. The remaining remediation systems were brought on line, and operations and maintenance and long-term monitoring were initiated at the remaining sites. Trend analyses of site responses to cleanup activities were initiated to facilitate site closeout. System startup reports were issued, quarterly data submissions made, and the first annual report issued for Site 8. A new area of contamination, Site 46, Communications Building 22, was discovered in June 1997 through an environmental site assessment conducted by a developer of the parcel. The Air Force immediately began site characterization and RI. The BCT completed a finding of suitability to lease and a Supplemental Environmental Baseline Survey document in support of a public benefit conveyance.

FY98 Restoration Progress

RA system operations and monitoring, long-term monitoring, and cleanup progress trend analysis continued. RA system improvements (optimization) were made to several systems. A source soil removal action and additional characterization work were completed. Confirmatory soil sampling was conducted at Site 45 for demonstrating compliance with the Site 45 ROD soil cleanup goals. An Operating Properly and Successfully document was completed for LF-5, making it one of only six for federal facilities in the nation and making it a model for other bases.

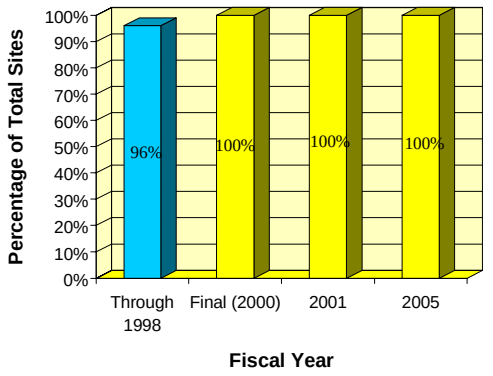
Activities planned for Site 49, including implementation of an Interim Remedial Action concurrent with completion of the RI/FS, were delayed as a result of a peer review process for a Site 49 project. An Interim Action and pilot study project for the site was not approved by the peer review team, which instead made a formal RI/FS process a prerequisite for any RA work. An Engineering Evaluation and Cost Analysis (EE/CA) project was initiated for Site 49, and a streamlined RI/FS was initiated. These activities have delayed the ROD for Site 49.

Plans to implement a source area treatment for TCE in groundwater at Site 73 were delayed because of the time required to execute a contract modification for the specific work task. The RAB remained active and voted against disbanding in the near future.

Plan of Action

- Continue RA system operations, monitoring, long-term monitoring, and trend analysis
- Implement a source area treatment for TCE in groundwater at Site 73 in FY99
- Implement result of the EE/CA for Site 49 in FY99-FY00
- Complete the ROD for Site 49 in FY00

Sites Achieving RIP or RC Per Fiscal Year



Camp Pendleton Marine Corps Base NPL

Size: 125,000 acres
Mission: Provide housing, training facilities, logistic support, and administrative support to Fleet Marine Force Units
HRS Score: 33.79; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in October 1990
Contaminants: Pesticides, herbicides, heavy metals, PCBs, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $96.9 million
Estimated Cost to Completion (Completion Year): $106.0 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2012

Oceanside, California

Restoration Background

Environmental contamination at Camp Pendleton Marine Corps Base resulted from maintenance of vehicles and equipment and from such support facilities as gas stations, hospitals, laundries, pest control services, and hobby shops. Wastes generated by these operations were disposed of in various locations throughout the installation. Site types at the installation include landfills, surface impoundments, pesticide storage areas, fire training areas, vehicle maintenance areas, and underground storage tanks (USTs). The installation was placed on the National Priorities List (NPL) after the herbicide 2,4,5-TP (Silvex) was detected in two groundwater wells used for drinking water.

Of the 200 sites identified at the installation, 61 are CERCLA sites, 109 are RCRA sites, and 30 are UST program sites. The installation has completed Remedial Investigations and Feasibility Studies (RI/FS) for 55 CERCLA sites. RI/FSs for four CERCLA sites are under way. The installation has completed Interim Removal Actions at three sites, two of which were the highest risk sites on the installation. Two operable unit (OU) Records of Decision (RODs) have been signed.

The installation formed a technical review committee (TRC) and prepared a community relations plan in FY92. Although the TRC is active, interest has been insufficient to support formation of a Restoration Advisory Board.

During FY96, the installation completed RI for 21 sites and an FS for 13 sites and signed the final ROD for no further action (NFA) at OU1. All parties to the Federal Facility Agreement (FFA) signed the final ROD. The FFA project team identified five Removal Actions, closed six sites, accelerated the remediation schedule by 2 years, and decreased the investigation budget by $3 million for the fiscal year. The installation completed an Engineering Evaluation and Cost Analysis and an Action Memorandum for the pest control wash rack and scrap yard sites and for Site 7 (the Box Canyon Landfill); initiated Interim Remedial Actions (IRAs) for three sites; completed the initial site characterization at 25 UST sites; and completed the investigation phase and prepared a corrective action plan (CAP) for four UST sites. During FY97, RIs were completed at 34 sites and a ROD was signed for 13 sites. IRAs were completed at the pest control wash rack and scrap yard sites. Soil stabilization aided in the cleanup of both of these pesticide-contaminated sites. A total of 6 acres was cleaned up to NFA standards. The FFA team used concurrent document review to expedite the review process in order to complete the IRAs, and obtained all ROD signatures before the end of FY97.

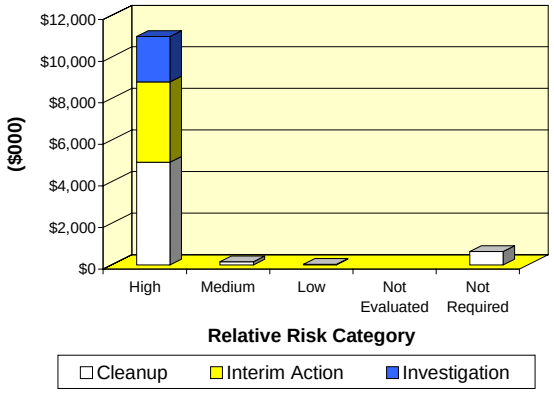
FY98 Restoration Progress

The installation completed Phase I of the Box Canyon Landfill, capping 5 acres of land. A Phase II RI was completed for four sites and an FS for six sites. A public meeting was held for OU3. Twenty-five sites were proposed for NFA, and six sites were proposed for Remedial Action (RA). The OU3 ROD was issued and reviewed. Regulatory concurrence was delayed by 4 months, and was not achieved by the end of the fiscal year, due to changes in state regulatory approaches. The installation completed a CAP for seven program sites and received regulatory approval for all completed CAPs. Operations and maintenance (O&M) for remediation of three gas station sites and two UST sites are ongoing. The installation completed the Remedial Design (RD) and RAs for seven UST sites. Site assessment (SA) began for four UST sites.

Plan of Action

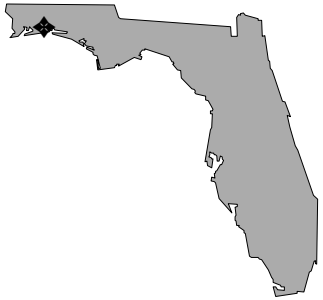
- Complete and sign OU3 ROD and initiate OU RA in FY99
- Complete OU4 RI/FS and Proposed Plan in FY99
- Install remediation system for UST 12 and 13 cleanup and abatement order (CAO) 96-49 sites and perform O&M in FY99
- At UST 14, remediate six sites and prepare CAP in FY99
- Perform LTM for four UST 24 and two UST 26 sites in FY99
- Prepare CAP for one UST 27 site and one UST 53 site in FY99
- Install remediation system and perform O&M for UST 43 area gas station in FY99
- Apply for closure of approximately 40 UST 62 sites in FY99
- Install remediation system for 13 UST 100 sites in FY99
- Perform O&M and LTM for 10 UST 13 sites and 20 UST 22 sites in FY99 and for 10 UST 13 sites, 20 UST 22 sites, and 13 UST 100 sites in FY00
- Complete OU3 RA in FY00
- Initiate RA, complete RD, and sign ROD for OU4 in FY00
- Complete CAP implementation and O&M at UST 14 in FY00
- Apply for closure of approximately 40 UST 62 sites, 4 UST 24 sites, 2 UST 26 sites, 1 UST 27 site, and 1 UST 53 site in FY00
- Perform O&M for CAO 96-49 UST 12 and 13 sites and for UST 43 area gas station in FY00

FY99 Funding by Phase and Relative Risk



Pensacola Naval Air Station NPL

Size: 5,874 acres
Mission: Serve as a flight training center
HRS Score: 42.40; placed on NPL in December 1989
IAG Status: Federal Facility Agreement signed in October 1990
Contaminants: Ammonia, asbestos, benzene, cyanide, heavy metals, paints, PCBs, pesticides, phenols, plating wastes, and chlorinated and nonchlorinated solvents
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $48.0 million
Estimated Cost to Completion (Completion Year): $70.1 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2013



Pensacola, Florida

Restoration Background

This installation, which now serves as a flight training center, was formerly a naval air rework facility and aviation depot. Operations that have caused contamination at the station include machine shops, a foundry, coating and paint shops, paint stripping and plating shops, various maintenance and support facilities, landfills, and storage facilities. Environmental investigations conducted at the installation since FY83 have identified 38 CERCLA sites, 1 solid waste management unit (SWMU), and 15 underground storage tank (UST) sites.

Site types include landfills, disposal sites, polychlorinated biphenyl (PCB) transformer and spill areas, industrial wastewater treatment plant areas, and evaporation ponds. The primary areas of concern are two landfills. Corrective measures have been taken at two UST sites. Cleanup activities, including installation of a groundwater pump-and-treat system, have been conducted at the SWMU. In FY94, the installation removed a waste tank. It also removed industrial sludge containing heavy metals from sludge-drying beds and stained soil from various sites. At another site, a fence was installed to restrict access to an area containing drums.

The installation formed a technical review committee in FY90 and converted it to a Restoration Advisory Board (RAB) in FY94. The RAB has nine members, five of whom represent the community, and meets monthly. The National Oceanic and Atmospheric Administration was included on the partnering team to assist in Ecological Risk Assessment issues. The installation held an open exposition and discussion concerning each agency's role and limitations. The RAB participated in television appearances and newspaper interviews to encourage community involvement.

In FY95, the installation began Interim Remedial Actions (IRAs) at four sites and completed the Remedial Investigation and Feasibility Study (RI/FS) and the Proposed Plan (PP) for an additional site. A Record of Decision (ROD) was signed for no further action (NFA) at Site 39. RI reports were submitted for 10 sites; RI fieldwork was completed for two of these sites. Five petroleum-contaminated sites were closed.

In FY96, a new CERCLA site was added to the program. The installation completed IRAs at four sites. The RI/FS was completed for four sites but was delayed, along with PPs for another four sites, until resolution of issues concerning use of institutional controls (ICs). The installation submitted an RI report for seven sites, completed an RI for Site 1, completed RI fieldwork for three sites, and initiated RIs for nine other sites. Remedial Design (RD) activities began at Sites 32, 33, and 35. In FY97, RI/FSs for Sites 4, 16, 28, and 36; an RI for nine sites; and RD for Sites 32, 33, and 35 were completed. An RD and a Remedial Action (RA) began at five sites. Monitoring for UST 17 continued through FY97. A hazardous waste permit was reissued for SWMU 1 allowed USGS to begin natural attenuation evaluation of the shallow aquifer's capacity to degrade halogenated compounds with provisions for a demonstration of source removal technology. The natural attenuation evaluation showed that favorable conditions exist for degrading contaminants at SWMU 1.

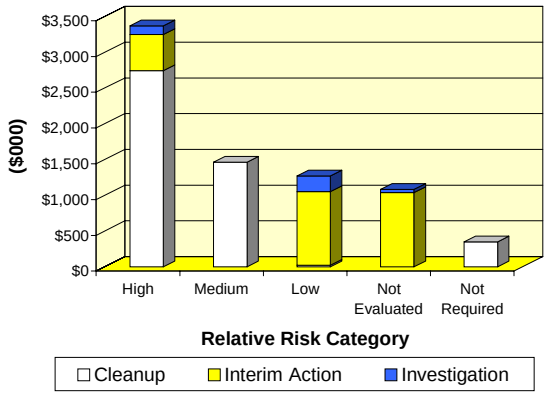
FY98 Restoration Progress

RIs at Sites 15, 19, 21, and 23 were completed, as were the RI/FSs for Sites 7 and 18. The Site 7 RI/FS requires an addendum to document a completed IRA. The Site 2 FS and PP were also completed. An FS for Sites 9, 29, and 34 was not completed because all parties agreed that Operable Unit (OU) 6 would be recommended for NFA. The PP and the ROD were completed but will need to be reissued because the no action alternative is unacceptable. The Site 2 ROD and RD were delayed because of discussion regarding the long-term monitoring alternative. The FS, RA, and PP were completed, and the ROD signed, for Site 1. The RA for Site 32 was initiated. The ROD for Site 38 was delayed because of additional delineation requirements for soil contamination. The RODs for Sites 17 and 42 were signed by the Commanding Officer of the installation, but editorial revisions to the final RODs were requested. The IRAs for Sites 1, 9, 10, 17, 18, and 25 were completed. The Remedial Action Plan was transferred to the UST program. The USGS continued the natural attenuation evaluation, and Fenton's reagent hydrogen peroxide injection technology was implemented for source removal of contamination at SWMU 1.

Plan of Action

- In FY99, complete RODs for Sites 2, 9, 15, and 29 and finalize RODs for Sites 17 and 42
- Complete RD for Site 1 and 2 and field investigation for Site 43 in FY99
- In FY99, complete source area removals (SARs) for USTs 15, 20, 21, 22, 23, and 26 and begin SARs for USTs 14 and 24
- Implement RA at UST 15, 20, and 21 in FY99 and at UST 14, 18, and 24 in FY00
- In FY00, begin RA for Site 1 and RD for Sites 15 and 38 and complete RODs for Sites 8, 11, 12, 24, 25, 26, 27, 30, 38, 40, and 41

FY99 Funding by Phase and Relative Risk



Size: 1,501 acres
Mission: Provide logistical support for ships and service craft; overhaul, repair, and outfit ships and craft; conduct research and development; test and evaluate shipboard systems
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, heavy metals, PCBs, solvents, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $19.8 million
Estimated Cost to Completion (Completion Year): $0.9 million (FY2009)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999

Philadelphia, Pennsylvania

Restoration Background

The Philadelphia Naval Complex comprises the Philadelphia Naval Shipyard, the Philadelphia Naval Station, and the Philadelphia Naval Hospital. In December 1988, the BRAC Commission recommended closure of the Philadelphia Naval Hospital. In July 1991, it recommended closure of the Philadelphia Naval Station and the Philadelphia Naval Shipyard. The BRAC 1995 amendment deleted preservation of the naval shipyard to provide for emerging requirements. A significant portion of the shipyard property now is scheduled for disposal.

Site types at the complex include landfills, oil spills, and disposal areas that have released petroleum/oil/lubricants and heavy metals into groundwater and soil. A Preliminary Assessment and Site Investigation (PA/SI) completed in FY88 identified 15 sites.

In FY90, the installation completed Remedial Investigation and Feasibility Study (RI/FS) activities at four sites and began RI/FS activities for eight sites and Remedial Design and Remedial Action (RD/RA) activities for four sites. The first phase of remediation was completed in FY92, and a Record of Decision (ROD) was signed for four sites. In FY93, two Interim Remedial Actions (IRAs) were completed at six sites.

In FY90, four underground storage tank (UST) sites were identified. Removal Actions were conducted at three of the four sites. In FY92, a RCRA Facility Assessment identified 167 solid waste management units (SWMUs) and 15 areas of concern (AOCs). The Navy began a focused RCRA Facility Investigation (RFI) to address 15 SWMUs and AOCs. Environmental Baseline Surveys (EBSs) were completed for the hospital in FY94 and for the shipyard and naval station in FY95. An EBS Phase II investigation required study of 57 areas at the complex. Twenty-one areas require further evaluation. During FY95, the installation signed an amended ROD, completed remediation of four sites, completed an RI and an IRA for Site 4, and initiated Removal Actions at two UST sites at the hospital. During FY96, the installation completed RA at four sites, closed out two sites, completed a design and remedy for an RA at one UST site, initiated Removal Actions at four sites, and drafted and submitted an Environmental Impact Statement.

In FY97, the installation began the riverbank stabilization at Site 5 and the sand blasting grit removal at Site 2, completed RDs at one UST site, completed remedial activities at two other UST sites, initiated two RAs, and completed two RAs. The installation also closed two sites and completed the corrective measures implementation and the RFI for an SWMU.

The complex formed a technical review committee in FY89. The installation also established a Restoration Advisory Board. In FY95, an information repository was established and the community relations plan was written. The complex formed a BRAC cleanup team and prepared a BRAC Cleanup Plan (BCP) in FY94. The BCP was revised in FY97.

FY98 Restoration Progress

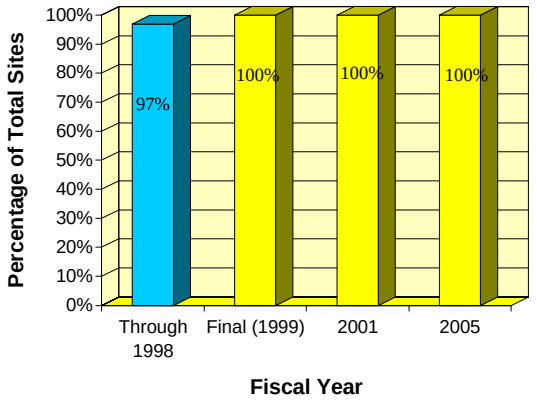
A finding of suitability to transfer (FOST) was signed for an approximately 800-acre parcel. A finding of suitability to lease (FOSL) was signed for a 90-acre parcel for use by a major international shipbuilder. Completion of RAs was delayed to expedite signing of this FOSL.

RODs were signed for Sites 1, 2, and 15, and a decision document was signed to implement institutional controls on naval station property for nonresidential use.

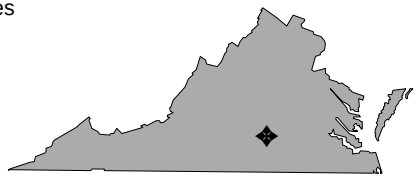
Plan of Action

- Complete all RAs in FY99
- Sign a FOST for each of two remaining BRAC parcels in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 45,160 acres
Mission: Provide training support for Active and Reserve Component Units of all Services
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, metals, propellants, and explosives
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $3.8 million
Estimated Cost to Completion (Completion Year): $8.1 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Blackstone, Virginia

Restoration Background

In July 1995, the BRAC Commission recommended closure of Fort Pickett except for essential training areas and facilities used for Reserve Components. The installation closed on September 30, 1997. Training and maneuver areas and part of the cantonment were transferred to the National Guard.

Once it was slated for closure, the installation began to build a framework for restoration activities. Site types include underground storage tanks (USTs), petroleum spills, old salvage yards, and firefighter training areas. Petroleum hydrocarbons are the primary contaminants affecting groundwater, surface water, sediment, and soil. Interim Actions at the installation include upgrading of USTs, asbestos surveys, and removal of polychlorinated byphenyl (PCB)–containing transformers.

During FY95, the installation held meetings with regulators to foster partnerships. The resulting partnerships facilitated identification of sites that require restoration. The community formed a local reuse authority.

In FY96, the Army formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). The local reuse authority contracted with a consultant to develop a local reuse plan. The installation performed an Environmental Baseline Survey (EBS). The BCT and the RAB reviewed the draft EBS report. Programs to upgrade UST sites and monitor groundwater quality continued.

The Army initiated projects to replace PCB-containing transformers and perform an asbestos survey of the buildings in the excess area. The Army also performed an Environmental Assessment (EA) and a Remedial Investigation (RI) of the 5-mile gasoline pipeline. The installation began a survey of all radioactive materials stored on the installation to support closeout of the license and conducted an archive search for unexploded ordnance (UXO) on the property.

In FY97, the installation completed the asbestos survey and the removal, replacement, and disposal of PCB-containing transformers. It also completed the UXO survey and continued support of the Army's UST upgrade program. Fort Pickett initiated a multisite Preliminary Assessment and Site Inspection (PA/SI) for the BRAC excess property and completed analysis of historical aerial photos to identify sites in need of investigation. The installation implemented standard operating procedures for expediting document review and site characterization. The RAB worked with the local reuse authority and the BCT to obtain funding for asbestos abatement.

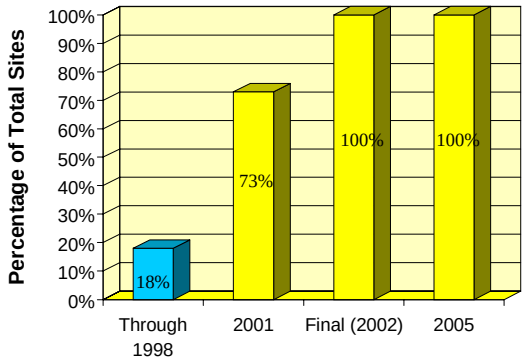
FY98 Restoration Progress

The installation completed a draft version of the Zone 1 PA/SI and a RI for the gasoline pipeline. The sampling and analysis plan for the PA/SI for Zone 2 (which includes the former building demolition and burial site) is under review. The installation also initiated an RI and Feasibility Study (FS) at the former fire training area, an RI/FS at the former service station, a Time-Critical Interim Removal Action at the former salvage yard site, and a project to drain residual fuel from the underground gasoline pipeline. Abatement of friable asbestos was completed in all buildings within the excess area. The Army initiated various findings of suitability to lease (FOSLs), and completed FOSLs for Blackstone Army Airfield and Support Facilities and for eight buildings and surrounding property. The installation deemed that no non-CERCLA waste removals were necessary in FY98. The installation received CERFA concurrence from the EPA and the Virginia Department of Environmental Quality in August 1998. The Fort Pickett RAB continues to be active in the restoration process, participating in site tours and receiving Technical Assistance for Public Participation training.

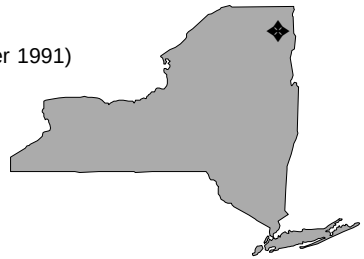
Plan of Action

- Finalize Zone 1 and Zone 2 PA/SIs during FY99
- Complete draining of the underground gasoline pipeline in FY99
- Complete the Time-Critical Interim Removal Action at the former salvage yard in FY99
- In FY99, conduct various Removal Actions for CERCLA-regulated waste at sites designated by the PA/SI, where contamination is isolated and limited
- Remove 10 unidentified cylinders from the installation in FY99
- Complete the RI/FSs at the firefighter training area and the former service station by FY00
- Complete BRAC cleanup work in FY02

Sites Achieving RIP or RC Per Fiscal Year



Size: 3,447 acres
Mission: Refuel and deploy aircraft
HRS Score: 30.34; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in July 1991 (effective September 1991)
Contaminants: Organic solvents, pesticides, fuels, PCBs, and lead
Media Affected: Groundwater and soil
Funding to Date: $36.4 million
Estimated Cost to Completion (Completion Year): $34.2 million (FY2031)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Plattsburgh, New York

Restoration Background

Environmental studies since FY87 identified 40 sites at this base for investigation and closure. Site types include underground storage tanks (USTs), aboveground storage tanks, landfills, industrial facilities, spill sites, and training areas. Regulatory concurrence has been received for closeout of 11 sites. The installation was placed on the National Priorities List (NPL) after the former Fire Training area was determined to be a source of chlorinated solvents and benzene, toluene, ethyl benzene, and xylene contamination in groundwater.

The installation began a Remedial Investigation and Feasibility Study (RI/FS) in FY89. In FY91, the installation completed a Removal Action for soil contaminated with the pesticide DDT and for an abandoned UST. In FY92, a soil Removal Action was completed and a free-product removal system was constructed at the former Fire Training Area. In addition, the installation prepared Remedial Designs for closure of two landfills.

In FY93, the installation removed a UST that had contained DDT, closed a pretreatment facility, and removed soil contaminated with lead. The installation completed Records of Decision (RODs) for three sites and constructed two landfill caps.

In FY94, the installation formed a Restoration Advisory Board (RAB).

In FY95, the installation removed soil contaminated with fuel from two sites and prepared final RODs for the Pesticide Storage Tank and a landfill. The installation received regulatory concurrence for no further action at seven sites and completed surveys for endangered species and Phase I archaeology. An installationwide Environmental Impact Statement and a comprehensive land reuse plan were completed, and a community relations plan was drafted.

In FY96, the groundwater treatment facility for free-product recovery at the former Fire Training Area was upgraded, and a source Removal Action using soil vapor extraction (SVE) and bioventing was initiated. Two additional Removal Actions using SVE began, and contaminated soil at three other sites was removed. The installation awarded a contract for construction of two additional landfill caps.

In FY97, an off-gas treatment/incinerator was tested at the former Fire Training Area in conjunction with SVE. The latest versions of the BRAC Cleanup Plan and the Environmental Baseline Survey (EBS) were completed. The installation held three public meetings at which RODs and Action Memorandums were proposed, and presented computer modeling of base groundwater and its regional impact.

FY98 Restoration Progress

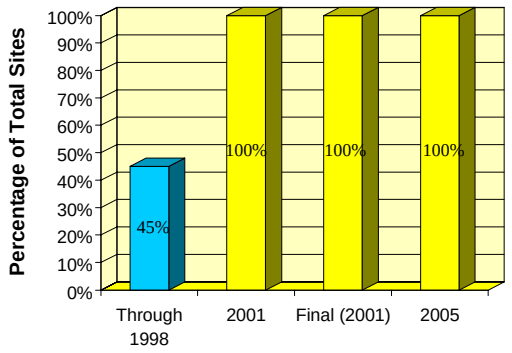
Two landfill caps and three contaminated-soil Removal Actions were completed. Installation of an SVE off-gas treatment/incinerator at the former Fire Training area was completed, and operation of treatment systems at three sites continued. RODs for implementing institutional controls were signed for two sites. Results of a groundwater impact study (RI/FS) were presented to the RAB. The first five-year review of Plattsburgh Air Force Base Remedial Activities and a Phase II archaeological survey were completed. The installation completed findings of suitability to lease/transfer for 72 percent of base property.

Some activities scheduled for FY98 were not accomplished because of contractor delays, negotiations with regulatory agencies, and the need for additional data or site characterizations.

Plan of Action

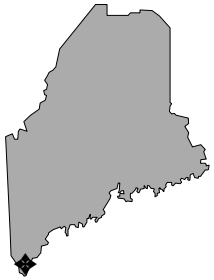
- Perform removal of contaminated soil at one site
- Complete groundwater impact study (RI/FS)
- Finalize RODs for five sites
- Initiate decommissioning of groundwater monitoring wells
- Complete evaluation of miscellaneous environmental factors and update basewide EBS
- Complete closure investigation and remediation of petroleum handling and storage facilities
- Complete Cold War Resources Survey and enter into a Memorandum of Agreement with the New York State Preservation Office for preservation and transfer of historic property

Sites Achieving RIP or RC Per Fiscal Year



Portsmouth Naval Shipyard NPL

Size: 278 acres
Mission: Maintain, repair, and overhaul nuclear submarines
HRS Score: 67.70; placed on NPL in May 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Heavy metals, PCBs, pesticides, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $20.8 million
Estimated Cost to Completion (Completion Year): $84.7 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2007



Kittery, Maine

Restoration Background

Portsmouth Naval Shipyard was placed on the National Priorities List (NPL) in May 1994 after it was discovered that surface runoff and erosion from the installation were contaminating the Piscataqua River. Contaminated groundwater was found in the vicinity of five sites.

A Preliminary Assessment in FY83 and a Site Inspection in FY86 identified four potentially contaminated sites. A RCRA Facility Assessment in FY86 identified 28 solid waste management units (SWMUs). Site types at the installation include a landfill, a salvage and storage area, and waste oil tanks. In FY92, the installation completed a RCRA Facility Investigation (RFI).

In FY94, the installation completed an interim measure at the Defense Reutilization and Marketing Office scrap yard, installed a cap on part of the scrap yard, and completed a groundwater and soil gas survey at another SWMU. The installation completed RFI fieldwork to address data gaps, developed onshore media protection standards (MPSs), and completed draft offshore Ecological and Human Health MPSs. Seven underground storage tanks (USTs) were removed during the RFI. Two of these UST sites remain under investigation.

In FY95, the installation prepared final reports on fieldwork conducted in FY94, developed a work plan for data gap investigations and monitoring of the Piscataqua River, initiated an Ecological Risk Assessment (ERA) of the Piscataqua River and Great Bay Estuary, and began developing preliminary remedial goals or MPSs. For the offshore investigation, the Navy Marine Environmental Support Office developed marine sampling and analytical methodologies. A draft Feasibility Study (FS) report for 11 SWMU sites was submitted to regulatory agencies.

The technical review committee, which was formed in FY87, was converted to a Restoration Advisory Board (RAB) in FY95. The community relations plan, which was developed in FY93, was updated in FY96 and FY97.

In FY96, EPA facilitated the smooth transition from the RCRA corrective action program to a CERCLA cleanup program, and the installation began negotiations with EPA and the Maine Department of Environmental Protection (MDEP) on a Federal Facility Agreement. A work plan for investigating groundwater and seeps was completed. Another work plan was prepared for performance of additional site characterizations at four SWMUs, including modeling of offshore migration of contaminants.

During FY97, the installation completed a work plan for SWMUs 10 and 29 and Phase I groundwater modeling for SWMUs 8, 9, 10, 11, and 27. A work plan and three rounds of basewide groundwater sampling also were completed. The installation began a Removal Action at SWMU 9 and completed and signed a no further action document for SWMUs 12, 13, 16, and 23.

FY98 Restoration Progress

The installation completed a work plan for Sites 30, 31, and 32 and finished Phase II groundwater modeling for SWMUs 8, 9, 10, 11, and 27. Fieldwork for SWMU 10 and Sites 29, 30, 31, and 32 and a fourth round of basewide groundwater sampling were also completed. In addition, the installation completed a Removal Action at SWMU 9 and initiated cleanup of the tank farm.

A work plan and fieldwork for three SWMUs and two sites were completed. The FS for an additional SWMU was not completed because additional site information was required. Completion of the Phase II fate-and-transport modeling was delayed because site-specific data needed to complete the modeling were unavailable. The basewide groundwater sampling program was completed.

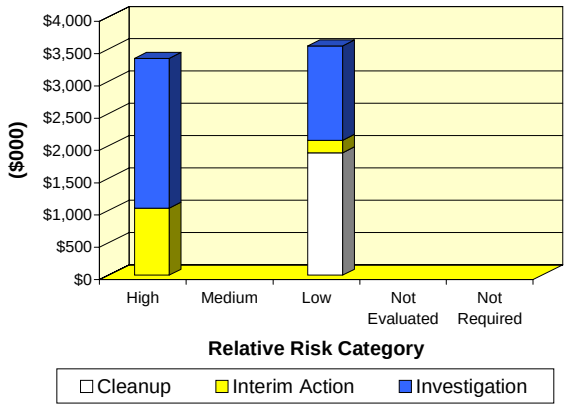
The Navy worked with EPA and MDEP to incorporate the weight-of-evidence approach into the offshore ERA. This approach was instrumental in reaching a consensus on the findings for the offshore ERA. Completion of the offshore ERA was delayed so that EPA, MDEP, the RAB, and the Technical Assistance Grant advisor could work together to write a reader-friendly Executive Summary for the document.

The Navy is using the multisensor towed array detection system (MTADS) to evaluate a possible location of buried drums at Site 8. After this survey, the Navy will initiate test pits to remove drums containing waste.

Plan of Action

- Complete the offshore ERA and the Phase II fate-and-transport modeling in FY99
- Complete report for basewide groundwater sampling program in FY99
- Complete an interim Record of Decision and an interim offshore monitoring plan for Operable Unit 4 in FY99
- Complete the MTADS survey and report in FY99
- Complete Site Screening Report for three sites in FY00
- Complete supplemental Remedial Investigation report for three sites in FY00
- Complete fieldwork and report in FY00 at OU3

FY99 Funding by Phase and Relative Risk



Size: 27,827 acres
Mission: Housed 7th Infantry Division (Light); supports the Defense Language Institute Foreign Language Center, currently at the Presidio of Monterey, California
HRS Score: 42.24; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in July 1990
Contaminants: VOCs, petroleum hydrocarbons, heavy metals, and pesticides
Media Affected: Groundwater and soil
Funding to Date: $168.2 million
Estimated Cost to Completion (Completion Year): $86.5 million (FY2033)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Marina, California

Restoration Background

From 1917 to 1994, Fort Ord served primarily as a training and staging installation for infantry units. In July 1991, the BRAC Commission recommended closing Fort Ord and moving the 7th Infantry Division (Light) to Fort Lewis, Washington. The Army closed Fort Ord in September 1994.

In FY87, a hydrogeological investigation identified the sanitary landfills at Fort Ord as potential sources of contamination for the city of Marina's backup drinking water supply well. In FY89, Remedial Investigation and Feasibility Study (RI/FS) activities began for the landfills. In FY90, a Preliminary Assessment and Site Inspection identified 61 sites, including landfills, 241 underground storage tanks, motor pools, family housing areas, a fire training area, an 8,000-acre impact area, and an explosive ordnance disposal area. Petroleum hydrocarbons and volatile organic compounds (VOCs) have migrated into groundwater.

In FY94, the installation commander converted the installation's technical review committee to a Restoration Advisory Board and formed a BRAC cleanup team (BCT). A FY95 RI/FS categorized 41 sites as requiring either no further action (NFA), Interim Action, or Remedial Action (RA). The installation constructed a groundwater treatment system at the post landfill and completed a Record of Decision (ROD) for the Fritzsche Army Air Field (FAAF) Operable Unit (OU) 1.

In FY96, the Army completed Proposed Plans (PPs) and a ROD for the RI sites and remediation of lead-contaminated soil for the Beach Ranges. The Army began to cap the OU2 landfill and construct a groundwater pump-and-treat system. The existing landfill, with a groundwater treatment system, was proposed as a corrective action management unit to allow consolidation of waste. This procedure saved at least $10 million in waste disposal costs and met the Superfund preference for on-site waste management.

In FY97, the Army prepared the Phase I and draft Phase II Engineering Evaluation and Cost Analyses (EE/CAs) addressing Removal Actions for ordnance and explosives. A Cooperative Agreement allowed initiation of a subsurface characterization of Fort Ord that included use of seismic reflection and downhole resistivity tests. The BCT completed the Phase I EE/CA document, a ROD for remedial sites, an interim ROD for Site 3 (beach ranges), and an explanation of significant differences for OU2.

FY98 Restoration Progress

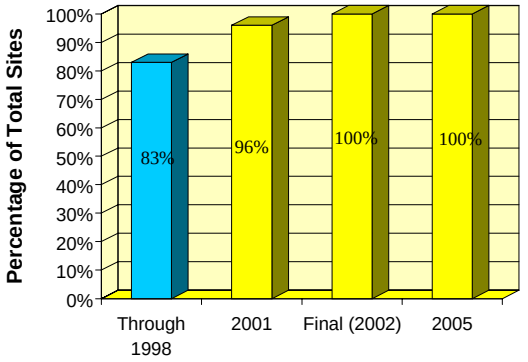
Operation of the OU1 and OU2 systems continued. The Army peer review team made recommendations for these units as well as for the Site 12 treatment system. The design of the Site 12 groundwater pump-and-treat system was completed. The installation completed waste removal actions at six sites and consolidated over 300,000 cubic yards of waste into OU2. Final closure and cap construction for 143 acres of the 150-acre landfill were completed. The remaining 7-acre portion of the landfill was temporarily closed to allow access for waste consolidation (Site 39 soil). The installation recycled over 750,000 pounds of lead removed from Site 3. It also prepared a report on potential disposal areas at FAAF and completed Removal Actions at Sites 34 and 39a for clean closure. Over 56 acres of property was transferred to six entities. Fourteen findings of suitability to lease (FOSTs) were finalized.

Ordnance and explosives (OE) assessment and cleanup continued, but some activities are on hold, pending performance of an RI/FS, which the Army, in response to a lawsuit, voluntarily agreed to conduct for OE at Fort Ord. The Army completed the Phase I and Phase II EE/CAs addressing Removal Actions for OE sites. The EPA and California EPA concurred in the Phase I EE/CA and Action Memorandum 1 for the 12 No Action OE sites; however, the related property transfers are delayed, pending implementation of the RI/FS process for OE at Fort Ord. The Ecological Risk Assessment(ERA) was completed except for its incorporation into a final ROD.

Plan of Action

- Continue operating OU1 and OU2 groundwater treatment systems
- Complete construction of groundwater pump-and-treatment system for Site 12 in FY99
- Prepare an agreement for cleanup of OE in FY99
- Draft an OE work plan for recurring review report for EE/CA Phase I sites in FY99
- Continue assessment or cleanup of sites affected by OE in FY99
- Conduct an RI/FS for OE in FY99
- Complete ERA, PP, and final ROD for Site 3 (beach ranges) in FY99
- Complete waste removal at Site 39 in FY99
- Complete RCRA closures for three sites in FY99
- Began preparation of basewide PP and decision document in FY99
- Finalize RA completion and post-remediation risk assessment reports in FY99
- Prepare approximately seven FOSTs in support of property transfers in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 1,480 acres
Mission: Served as Headquarters for the 6th Army, the Letterman Army Institute of Research, and the Letterman Army Medical Center
HRS Score: NA
IAG Status: None
Contaminants: Petroleum hydrocarbons, heavy metals, solvents, pesticides, and lead-based paint
Media Affected: Groundwater and soil
Funding to Date: $79.3 million
Estimated Cost to Completion (Completion Year): $20.9 million (FY2009)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005

San Francisco, California

Restoration Background

In December 1988, the BRAC Commission recommended closure of the Presidio of San Francisco, including the Letterman Army Medical Center (Letterman AMC). The BRAC Commission made this recommendation primarily because the installation had no ability to expand, and the Presidio and Letterman AMC functions could be relocated. The Army transferred the installation property to the National Park Service in October 1994 with the Army retaining responsibility for the cleanup.

Sites identified during studies at the installation include underground storage tanks (USTs), a fuel distribution system, landfills, hazardous waste storage areas, and polychlorinated biphenyl (PCB)–containing electrical transformers. The most prominent sources of contamination are leaking USTs and a heating-fuel distribution system, which have caused petroleum contamination in groundwater and soil. Other contaminants include heavy metals, solvents, and pesticides.

Investigations began in the late 1980s. The installation is divided into nine operable units (OUs). The Army manages six OUs: the Public Health Services Hospital, the Main Installation, the Crissy Field Area, the Firing Range Areas, the CERCLA Tank Sites, and the Department of Engineering and Housing (DEH) Area. The Golden Gate Bridge District and CALTrans and the US Coast Guard manage three other OUs.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY90. All RI fieldwork was completed during FY95, and the final RI report was published in FY97. The installation completed an Environmental Baseline Survey (CERFA) report in FY94.

In FY94, the installation formed a BRAC cleanup team (BCT) and converted the technical review committee to a Restoration Advisory Board (RAB). The RAB meets monthly to address issues related to restoration activities and comments from its members on restoration documents and plans. The BCT meets monthly and focuses on risk management decisions. The National Park Service also began implementing a general management plan for reuse of the property.

Cleanup actions at the installation have included UST removal and soil excavation for Petroleum Sites; a Record of Decision for the Public Health Services Hospital Area (formerly Letterman AMC), a Remedial Action Plan (RAP) for Crissy Field, and a RAP for the former DEH Area. Closure-related compliance actions include cleanup at two PCB-contaminated sites, an installationwide radon survey, radiological survey and material disposal, and asbestos and lead-based paint surveys and abatement for buildings and surrounding soil.

FY98 Restoration Progress

The installation completed Interim Removal Actions for PCB-contaminated soil at Building 1153. The installation removed 20,000 feet of fuel distribution system pipeline and an additional 20 USTs. In addition, the installation removed approximately 50,000 tons of contaminated soil from the Crissy Field Area. Another 30,000 tons was removed from the DEH Area. The installation used innovative methods, such as on-site laboratories, geoprobes, and magnetometers, to accelerate work.

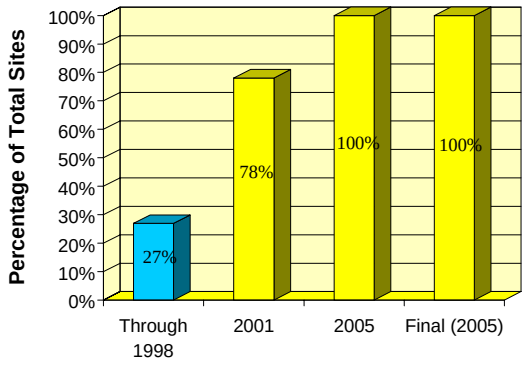
The installation used technical working groups to resolve technical issues at Crissy Field and the DEH Area. The Army developed the program schedule, monitored the BRAC budget, and synchronized cleanup with reuse activities. The installation conducted three site tours for RAB members in FY98.

The Army is negotiating with the Presidio Trust on the Trust's assumption of responsibilities for cleanup of the Presidio. The Trust, the National Park Service, and the Army signed a Memorandum of Agreement on how to pursue negotiations on the issue. Meanwhile, the Army continues restoration work so that there is no delay in the Presidio's cleanup.

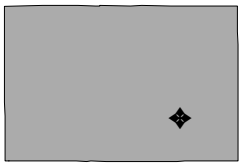
Plan of Action

- Complete UST removal and remediation at the Crissy Field Area in FY99
- Complete main installation FS and RAP in FY99
- Complete corrective action plans at Buildings 207/231, 637, 1349, and 1065 in FY99
- Complete RIs, FSs, and RAPs for CERCLA tank sites and the Outdoor Firing Range in FY99
- Complete PCB cleanup at Building 680 in FY99
- Complete remediation of Nike magazines in FY99
- Complete investigation of Commissary Area in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 23,121 acres
Mission: Store chemical munitions
HRS Score: 78.00
IAG Status: None
Contaminants: Heavy metals, petroleum/oil/lubricants, VOCs, SVOCs, pesticides, explosives, PCBs, and UXO
Media Affected: Groundwater and soil
Funding to Date: $70.2 million
Estimated Cost to Completion (Completion Year): $79.2 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2015



Pueblo, Colorado

Restoration Background

In December 1988, the BRAC Commission recommended realignment of the Pueblo Depot Activity, primarily because of chemical demilitarization activities. The commission recommended relocating the supply mission and the ammunition mission to other installations. In October 1996, the Army placed Pueblo Depot Activity under the Chemical and Biological Defense Command and changed the name to Pueblo Chemical Depot.

Investigations identified sites such as a landfill, open burning and detonation grounds, an ordnance and explosives waste area, lagoons, former building sites, oil-water separators, a TNT washout facility and discharge system, and hazardous waste storage units. Heavy metals and volatile organic compounds (VOCs) are the primary contaminants affecting groundwater and soil at the installation.

Between FY89 and FY94, the Army conducted RCRA Facility Investigations (RFIs) and corrective measures studies (CMSs) for 45 solid waste management units (SWMUs). In FY94, the installation formed a Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT). The installation also completed a final CERFA report.

Also in FY94, the community formed a Local Redevelopment Authority, which prepared and approved a land reuse plan. In cooperation with the local Pueblo Depot Activity Development Authority (PDADA), the installation prepared a master lease that allows subleasing of parts of the property.

In FY95, the installation constructed a groundwater extraction and treatment system to remediate, and prevent the off-site migration of, contaminated groundwater. An alternative drinking water supply was provided to a residence adjacent to the installation that could be affected by contamination. The installation submitted draft RFI work plans for 14 SWMUs, completed a Phase II RFI for 13 SWMUs, and submitted an RFI report for 8 SWMUs. Nine SWMUs were determined to require no further action.

In FY96, the installation conducted cleanup and removal of TNT washout buildings and identified the source of TNT by-products in an off-post spring. The installation developed Team Pueblo to coordinate public involvement in restoration and cleanup activities.

In FY97, the Environmental Baseline Survey (EBS) and the finding of suitability to lease (FOSL) were completed for 74 buildings. These buildings were turned over to PDADA for reuse. The installation and the state resolved all Consent Order issues, including reducing a $10 million fine to $500,000. Soil removal at TNT washout lagoons began, and the soil is being stored for future bioremediation. The installation developed the depot master plan and schedule for reuse and presented it to the RAB. Demolition of TNT buildings, clearance of unexploded ordnance (UXO), removal of the deactivation incinerator and 6 underground storage tanks (USTs), decontamination of 2 buildings, and demolition of 28 structures also occurred.

The BCT was involved in scheduling, setting SWMU priorities, and making reuse environmental determinations.

FY98 Restoration Progress

The installation completed soil removal at the TNT washout lagoons and is storing soil in a permitted unused existing building. The installation is preparing another unused existing building for soil bioremediation. A pilot study was completed at the landfill to locate hot spots, and a large amount of VOCs was removed. A temporary groundwater filter unit was installed at Circuli Springs to remove TNT contamination from a clean drinking water source.

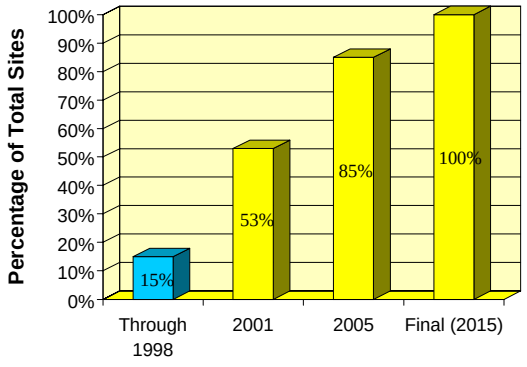
An EBS and a FOSL were completed for 764 buildings and for two other key buildings. These buildings have been turned over to PDADA for reuse, giving PDADA approximately 850 buildings for sublease. UXO work continues to focus on reuse and investigation. Per the reuse plan, wildlife and recreation areas are being considered for the Colorado Chico Basin Wildlife Area.

The RAB received risk assessment training and is electing new officers. The installation presented the Technical Assistance for Public Participation program to the RAB. The installation worked closely with the state and EPA to develop priorities and project schedules. The BCT is revising the BRAC Cleanup Plan (BCP) and the final reuse cleanup standards.

Plan of Action

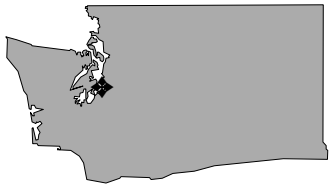
- Continue bioremediation of 21,000 cubic yards of TNT-contaminated soil in FY99
- Continue hot spot removals at the landfill in FY99
- Continue EBS and FOSL and building cleanups on remaining buildings for reuse in FY99
- Revisit possibility of early property transfer for unused property not required by chemical weapon destruction in FY99
- Complete cleanup of 700 ammunition buildings and demolition of 180 series buildings in FY99
- Simplify and condense the installationwide groundwater monitoring and sampling program in FY99
- Complete Version 3 of the BCP in FY99
- Delete five SWMUs from the RCRA Part B Permit in FY99
- Conduct independent Technical Review in FY99

Sites Achieving RIP or RC Per Fiscal Year



Puget Sound Naval Shipyard — Including Jackson Park Housing Complex — NPL

Size: 152 acres
Mission: Provide logistical support for assigned ships and service craft; perform authorized work in connection with construction, overhaul, and other tasks
HRS Score: 50.00 (Puget Sound Naval Shipyard); placed on NPL in May 1994
50.00 (Jackson Park Housing Complex); placed on NPL in May 1994
IAG Status: None
Contaminants: Heavy metals, VOCs, petroleum/oil/lubricants, grit, paint, solvents, construction debris, acids, and silver nitrate
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $60.5 million
Estimated Cost to Completion (Completion Year): $51.1 million (FY2006)
Final Remedy in Place or Response Complete Date for All Sites: FY2001



Bremerton and Kitsap Counties, Washington

Restoration Background

Most of the Bremerton Naval Complex (BNC), which includes the Puget Sound Naval Shipyard (PSNS), is built on contaminated fill material. Metals and petroleum/oil/lubricants are the primary contaminants. The main sources of contamination are past operations, such as cleaning and demilitarization of ordnance, and ship construction, maintenance, and demolition.

In FY83, an Initial Assessment Study (IAS) identified six potentially contaminated sites at BNC. In FY90, a supplemental Preliminary Assessment identified five other potentially contaminated sites. Nine of these 11 sites were recommended for further investigation. A draft IAS, completed in FY83 for the Jackson Park Housing Complex (JPHC), identified eight sites. Two sites were recommended for further investigation, and six for no further action. A Site Inspection report prepared in FY88 recommended further investigation of the two sites first identified in the IAS and divided one site into two parts.

In FY92, an underground storage tank (UST) validation report identified 26 abandoned tanks that required further investigation. Nine of those tanks were removed. In FY94, the remaining 17 tanks were removed or closed. Subsequent negotiations with the state regulatory agency revealed a need for further action for five tanks. In FY94, the installation excavated contaminated soil from a site at BNC and disposed of the soil at an approved off-site facility. Three Removal Actions were conducted at JPHC.

In FY95, sampling and analysis of soil and groundwater were conducted at three sites in the JPHC, and a Remedial Investigation (RI) was completed. Soil sampling and analysis were conducted at three other sites in the housing complex. Also in FY95, an extensive demonstration of steam-sparging was conducted at BNC to address oil contamination in the subsurface environment. The installation entered into a Memorandum of Understanding with the U.S. Geological Survey to obtain technical support.

In FY96, a Human Health Risk Assessment was completed for the terrestrial sites at JPHC, and development of Remedial Action (RA) work plans and decision documents was initiated for an operable unit (OU) at BNC. A corrective action began for five USTs. RI and Feasibility Study (FS) activities were performed at six sites at PSNS and three sites at JPHC. In FY97, the installation completed the demonstration of steam-sparging and awarded a contract for designing and constructing a full-scale system. The installation used geoprobe to assist with the benzene seep investigation at JPHC. A Site Characterization and Analysis Penetrometer System (SCAPS) delineated the extent of petroleum contamination at BNC OU C.

JPHC and BNC formed their technical review committees (TRCs) in FY91 and FY92, respectively. Both TRCs were converted to Restoration Advisory Boards in FY94.

FY98 Restoration Progress

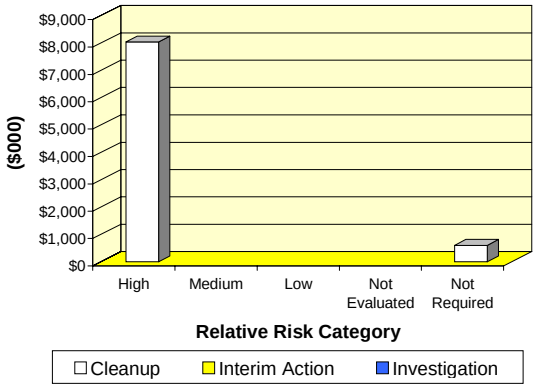
At JPHC, a final round of marine data for OU2 was collected in partnership with the state. The benzene investigation was completed, and final actions will be addressed as part of OU1. The FS addressing human health risks and the RI/FS addressing ecological marine risks were finalized. An unexploded ordnance (UXO) sweep and investigation began at Sites 101 and 103, resulting in the discovery of expended munitions and one item with a small amount of smokeless powder. Regulators and stakeholders reviewed a draft Proposed Plan (PP).

At BNC, Remedial Designs (RDs) for OUs NSC and A were completed. The RA for OU NSC was not completed on schedule because of the extent of the work required and the necessary coordination with ongoing mission activities. The RA for OU A was delayed by extensive negotiations with a local tribe about the action's potential impacts on the marine environment. The RI for OU B was not completed as scheduled because state and federal regulatory agency reviews took longer than expected. The steam-sparging expansion was completed and is operational. An Engineering Evaluation and Cost Analysis (EE/CA) and an Action Memorandum were prepared for capping potential contaminant sources within OU B. A Removal Action for capping Site 1 was completed.

Plan of Action

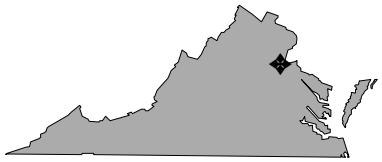
- At JPHC complete UXO investigation and sign Record of Decision (ROD) for four sites in FY99
- At JPHC, in FY99, conduct a Time-Critical Removal Action to temporarily prevent erosion of contaminated soil into the bay
- At BNC, complete RI/FS for OU B, and RA at OU A and OU NSC in FY99
- At BNC, complete the PP and the ROD and begin RD and the marine portion of RA for OU B in FY00
- At JPHC, complete RD and begin RA for four sites in FY00 and complete RA in FY05

FY99 Funding by Phase and Relative Risk



Quantico Marine Corps Combat Development Command — NPL

Size: 60,000 acres
Mission: Provide military training and support research, development, testing, and evaluation of military hardware
HRS Score: 50.00; placed on the NPL in June 1994
IAG Status: RCRA FFCA signed December 31, 1991; Federal Facility Agreement under negotiation
Contaminants: PCBs, pesticides, VOCs, phenols, heavy metals, petroleum hydrocarbons, and arsenic
Media Affected: Surface water, sediment, and soil
Funding to Date: $34.1 million
Estimated Cost to Completion (Completion Year): $102.4 million (FY2021)
Final Remedy in Place or Response Complete Date for All Sites: FY2014



Quantico, Virginia

Restoration Background

Quantico Marine Corps Combat Development Command operated a municipal landfill throughout the 1970s. After the 26-acre landfill closed, the area was used by the Defense Reutilization and Marketing Office as a scrap yard. During that time, polychlorinated biphenyl (PCB)–containing transformers were drained onto the ground so that copper and transformer casings could be recovered. Contamination at the old landfill area was the primary reason for the installation's placement on the National Priorities List (NPL). Site types at the installation include surface disposal areas, landfills, underground storage tanks (USTs), and disposal pits that contain contaminated soil, surface water, and sediment.

Since FY81, 243 solid waste management units (SWMUs) have been identified at Quantico. The number of SWMUs is expected to increase with the soon to be signed Federal Facility Agreement (FFA). The database contains an official count of 27 Installation Restoration (IR) sites, 71 SWMUs, and 2 USTs. Between FY81 and FY94, the installation completed Preliminary Assessments for 17 sites and 24 SWMUs, Site Inspections for 7 sites, RCRA Facility Assessments for 4 SWMUs, and RCRA Facility Investigations (RFIs) for 5 SWMUs. A corrective measures study (CMS) was completed for one SWMU. In addition, initial site characterizations were completed for two UST sites, and an investigation was completed for one UST site.

The installation completed several Interim Remedial Actions (IRAs): in situ soil treatment and long-term monitoring (LTM) for one SWMU; removal of PCB-contaminated soil and scrap metal from two sites; removal and incineration of pesticide- and arsenic-contaminated soil from one site; installation of runoff controls at one site; removal of waste from an embayment and placement of a stone revetment along the shoreline; and removal of petroleum-contaminated drums, tanks, and bulk containers from a UST site.

During FY95, the installation began developing a corrective action plan for one UST site, completed a Corrective Measures Design (CMD), began corrective measures implementation (CMI), and started capping a landfill for one SWMU. A CMD, CMI, and final Remedial Action (RA) for removal of contaminated soil also were completed, and operations and maintenance and LTM were initiated for two SWMUs. During FY96, the installation prepared Remedial Investigation and Feasibility Study (RI/FS) work plans for seven sites and began an IRA for capping a landfill at one site. In FY97, the installation signed a Record of Decision (ROD) for one site, initiated two early actions, and began LTM for one SWMU and RI/FSs for several sites. The installation entered into a partnership, called the Quantico Environmental Restoration Team, with regulatory agencies and contractors.

A technical review committee (TRC) was formed in FY89. In FY92, the installation established three information repositories, each containing a copy of the administrative record. In FY95, a community relations plan was completed. Although occasionally TRC meetings are held, there has been insufficient interest to convert the TRC to a Restoration Advisory Board.

FY98 Restoration Progress

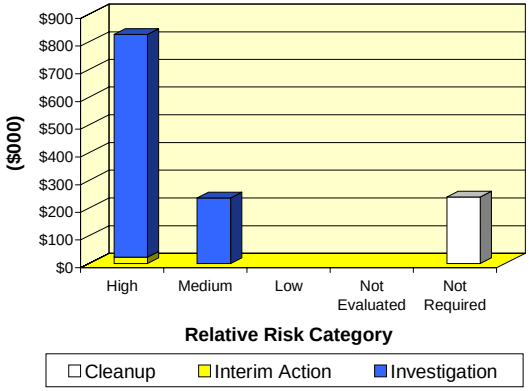
The IRA for capping the landfill was completed. The installation used a barrier layer to minimize exposure to the landfill, an innovative approach that was safe for human health and also resulted in a cost savings of over $5 million. An RI continued at this site, and four other RIs continued, with three of the sites nearing RODs. IRAs also were completed at two other UST sites. The CMS, corrective action, and screening investigations for four SWMUs, all scheduled for FY98, were found to be unnecessary. RI/FSs are under way at Sites 4 and 20, and RI/FSs for Sites 1, 5, and 17 were drafted and are awaiting EPA comment. The Remedial Design (RD) and RA for one site were delayed because additional sampling was required to fill data gaps. The investigations of 20 sites and SWMUs are under way. Five site screening areas are under investigation as well.

Under a consensus agreement developed by the team, 84 of the 100 sites and 111 areas of concern (AOCs) will be investigated as either desktop audit, desktop audit with sampling, or site screening process sites. This process allows the installation to systematically review a majority of the sites under the IR program. The Quantico Environmental Restoration Team continues to participate in a formal partnering process with federal and state regulatory agencies.

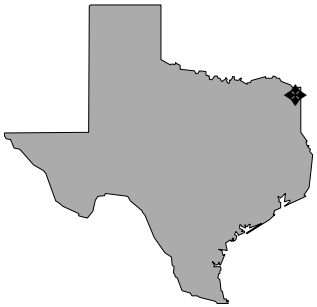
Plan of Action

- Complete site screenings at 15 AOCs in FY99
- Complete RIs at Sites 4 and 20 in FY99
- Finalize RI/FSs and prepare RODs for Sites 1, 5, and 17 in FY99
- Sign FFA in FY99
- Initiate sampling at 20 sites and SWMUs and 5 site screening areas in FY99
- Initiate RD and RA for one site in FY00

FY99 Funding by Phase and Relative Risk



Size: 19,081 acres
Mission: Provide maintenance for light combat vehicles, support rubber production, store ammunition, and conduct training
HRS Score: NA
IAG Status: None
Contaminants: TCE
Media Affected: Groundwater, surface water, and sediment
Funding to Date: $13.6 million
Estimated Cost to Completion (Completion Year): $21.4 million (FY2004)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2004



Texarkana, Texas

Restoration Background

In July 1995, the BRAC Commission recommended realignment of Red River Army Depot. All maintenance missions except those related to the Bradley Fighting Vehicle Series were recommended for relocation to other depots. The installation will retain its ammunition storage, intern training, civilian training, and rubber production missions.

Areas of environmental concern at the depot include the oil-water separator lagoons, spill sites associated with previous industrial activities and pre-RCRA disposal activities, and spill sites associated with pesticide storage and mixing activities. Trichloroethene (TCE) is the main contaminant affecting groundwater at the installation.

Interim Actions at the installation include removing the former Hays Treatment Plant Dunbar filter beds, demolishing buildings and removing contaminated soil, and demolishing Army-peculiar equipment.

In FY95, the installation formed a BRAC cleanup team (BCT), which includes representatives of the installation and federal and state regulatory agencies. The community formed a Local Redevelopment Authority. The installation continued its partnership with the Texas Natural Resource Conservation Commission (TNRCC) through the Defense and State Memorandum of Agreement (DSMOA) program. The Army removed more than 2,000 cubic yards of contaminated sediment from the north and south stormwater drainage ditches in the Wastewater Treatment Area.

In FY96, the installation commander formed a Restoration Advisory Board (RAB). The installation prepared the final draft Environmental Baseline Survey (EBS) report. The BCT prepared Version 1 of the BRAC Cleanup Plan (BCP). Environmental program strategies and planning efforts outlined in the BCP began.

In FY97, the Red River Local Redevelopment Authority (RRLRA) requested that the Army modify the excess footprint at the installation to make the footprint contiguous. The new footprint total is 765 acres. Because of this change, a draft Supplemental EBS was completed. The Army revised the preliminary draft Environmental Assessment (EA) to include additional information about the acreage. The RRLRA is interested in being the utility provider through privatization. Closure was complete for the final and intermediate lagoons at the industrial waste treatment plant (IWTP). The installation is awaiting state approval.

The BCT approved the final EBS and CERFA letter, participated in the Army peer review test program, approved a depot-wide risk assessment scope of activities, and conducted fieldwork that corrected the U.S. Geological Survey map for the installation area. The land reuse plan was completed, and 684 acres is awaiting regulatory concurrence as CERFA-clean.

FY98 Restoration Progress

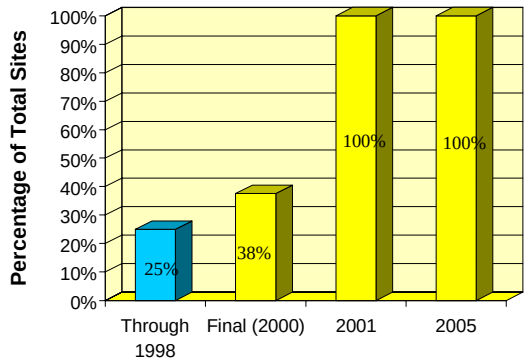
The installation sampled Environmental Condition of Property (ECP) Category 7 sites and made recommendations to recategorize the sites. The installation also planned RCRA Facility Investigations (RFIs) for the ECP 7 sites and a Treatability Study (TS) for the area of groundwater contamination in the Western Industrial Area. The installation completed the EA and a finding of no significant impact. Three tasks of a four-phase risk assessment and corrective measures study for nine sites are complete. The installation developed heavy-metals background levels for soil and groundwater, which EPA has approved. Scopes of work for five Removal Actions are under review. The installation completed radiological and cultural resource surveys and began negotiations on a cultural resources Memorandum of Agreement (MOA) with the State Historic Preservation Office (SHPO) for transfer of historic property.

The installation completed a master finding of suitability to lease (FOSL) for the excess footprint and completed the draft finding of suitability to transfer (FOST) for all ECP Category 1 and 2 sites. However, the BCP Version 2 was not completed because the BRAC acreage footprint changed. The installation and TNRCC finished developing the DSMOA plan. Closure of two lagoons in the Wastewater Treatment Area is on hold, pending funding by the Army.

Plan of Action

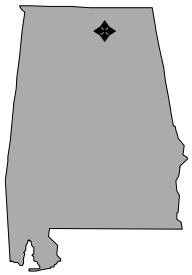
- Complete BCP Version II in FY99
- Perform five Removal Actions in FY99
- Transfer approximately 653 acres to RRLRA in FY99
- Complete cultural resources MOA with Texas SHPO for transfer of historic property to RRLRA during FY99
- Submit draft risk assessment for Western Industrial Area and Pesticide Pit Area in FY99
- Submit final FOST for all ECP 1 through 4 sites in FY99
- Potentially submit FOST for privatizing utilities, if land is transferred, in FY99

Sites Achieving RIP or RC Per Fiscal Year



Redstone Arsenal — NPL

Size: 38,300 acres
Mission: Army Aviation and Missile Command
HRS Score: 33.40; placed on NPL in June 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Heavy metals, solvents, SVOCs, CWM, and pesticides
Media Affected: Groundwater, sediment, and soil
Funding to Date: $59.4 million
Estimated Cost to Completion (Completion Year): $281.8 million (FY2008)
Final Remedy in Place and Response Complete Date for All Sites: FY2003



Huntsville, Alabama

Restoration Background

Past operations at the Redstone Arsenal (RSA) include production, receipt and shipment, storage, demilitarization, and disposal of chemical and high-explosive munitions. Commercial chemical pesticides also have been produced at the installation. RSA currently conducts military research and development, manages procurement, and supports the Army's aviation and missile weapons systems.

Environmental studies beginning in FY77 have identified 298 sites at RSA. Of these sites, 216 are Army sites and 82 are sites located at Marshall Space Flight Center, which is the responsibility of NASA. Site types include past disposal sites, landfills, open burning and open detonation (OB/OD) areas, chemical munition disposal sites, and solvent spill sites. Primary contaminants of concern include heavy metals, solvents, semivolatile organic compounds (SVOCs), chemical weapons/munitions (CWM), and pesticides.

In FY94, Interim Remedial Actions (IRAs) began at three dismantled lewisite manufacturing plants, as well as at the closed portions of the OB/OD grounds. Also in FY94, RSA formed a technical review committee and established information repositories at five locations accessible to the public. As part of Interagency Agreement (IAG) negotiations in FY95, the Army identified 11 sites as requiring no further action. All parties agreed to a list of 86 sites that would be covered by the agreement. The installation completed three IRA designs, including three groundwater extraction and treatment systems and a RCRA cap.

In FY96, Site Inspection fieldwork began at 38 sites, Remedial Investigation (RI) activities continued at 39 sites, and Feasibility Study (FS) activities began at 10 sites. The Army constructed a groundwater extraction system and an air stripper and began treating contaminated groundwater in the upper aquifer of the closed sanitary landfill. The Army also submitted a revised draft IAG to the regulatory agencies. RSA officials surveyed the public to determine community interest in forming a Restoration Advisory Board. Little interest was expressed.

In FY97, the installation completed the RCRA cap for the closed lewisite manufacturing plant. All fieldwork for a Removal Action involving an industrial septic tank system was completed. The Army completed No Further Action decision documents for three sites and Proposed Plans for four sites. Three of the plans involved long-term monitoring as the preferred alternative.

The installation improved site management techniques by reorganizing sites into operable units (OUs), developing an installationwide RI work plan and installationwide background and baseline concentrations, and implementing site-specific work plan review meetings to expedite regulatory review processes.

FY98 Restoration Progress

The Army completed construction and the start-up of the groundwater extraction and treatment plant at the OB/OD grounds. Additional extraction wells were installed to maximize the plant's capacity. In addition, the installation prepared and provided to the regulatory agencies for review a decision document and six interim Records of Decision (RODs). Negotiations on the Federal Facility Agreement (FFA) continued.

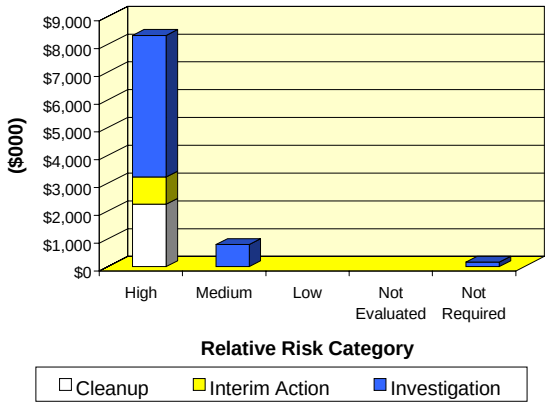
Construction of the soil vapor extraction (SVE) system for solvent-contaminated soil began at the OB/OD grounds. A horizontal well was used to dewater the soil for the SVE system. Four vertical wells would have been needed to dewater the same area.

RSA partnering initiatives with EPA Region 4 and the Alabama Department of Environmental Management have improved document review time and resulted in more effective, faster decision making. RSA risk managers meet for partnering sessions once a month.

Plan of Action

- Complete all fieldwork in FY99
- Continue negotiations toward an FFA in FY99
- Complete start-up of SVE system–contaminated soil at the OB/OD grounds in FY99
- Complete groundwater extraction and treatment system at the former RSA Rocket Engine Facility North Plant in FY99
- Continue efforts to reach RODs on several OUs in FY99
- Finalize RI/FS in FY99 and FY00

FY99 Funding by Phase and Relative Risk



Size: 2,987 acres
Mission: Conducted pilot training
HRS Score: NA
IAG Status: Federal Facility Agreement signed in 1987
Contaminants: VOCs, petroleum/oil/lubricants, metals, pesticides, and herbicides
Media Affected: Groundwater and soil
Funding to Date: $67.6 million
Estimated Cost to Completion (Completion Year): $67.4 million (FY2050)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999

Lubbock, Texas

Restoration Background

In July 1995, the BRAC Commission recommended closure of Reese Air Force Base, which is used for pilot training and related activities. The installation closed in September 1997.

Preliminary Assessments and Site Inspections conducted from FY84 through FY88 identified 13 sites, including landfills, surface impoundments, underground storage tanks (USTs), sludge spreading areas, industrial drain lines, and fire training areas. To date, 30 USTs have been removed from the installation during Interim Remedial Actions (IRAs). Of the 14 remaining USTs, 10 are regulated.

In FY93, the installation began an IRA in which an alternative source of drinking water was provided to off-base residences and businesses whose well water was contaminated. Studies determined that Reese Air Force Base was the source of trichloroethene (TCE) contamination in the sole-source aquifer for the region. An Environmental Working Group was formed in FY93 to expedite the restoration process. The group includes representatives of the installation, EPA, state regulatory agencies, the U.S. Army Corps of Engineers, and the primary environmental contractor at the installation.

In FY95, the installation reached an agreement with the State of Texas to implement an IRA for controlling a plume of TCE-contaminated groundwater. Under the IRA, the base installed a groundwater extraction and treatment system with an air stripper to treat groundwater contaminated with TCE and other volatile organic compounds (VOCs). A pilot-scale study indicated that soil vapor extraction (SVE) was a practicable means of treating soil contaminated with petroleum/oil/lubricants. A Restoration Advisory Board was formed.

In FY96, the installation undertook a RCRA Facility Investigation (RFI) to determine the source and extent of contamination. The installation also began a corrective measures study to address contaminated media identified during the RFI and completed construction of the SVE system. An Environmental Baseline Survey (EBS) and an Environmental Impact Survey were initiated. A BRAC cleanup team (BCT) was established.

In FY97, the installation completed the RFI initiated in FY96 and began RFIs at 20 solid waste management units (SWMUs). In addition, wells were installed at the boundary of the installation, the EBS and the Environmental Impact Survey were completed, and the RCRA permit for closure of Picnic Lake was modified.

FY98 Restoration Progress

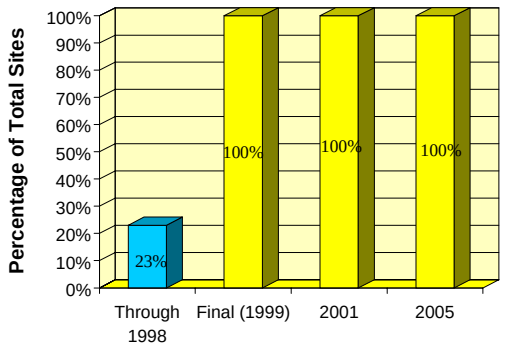
The installation continued investigations at 20 SWMUs. RCRA Permit Closure Reports were submitted to the regulators for Picnic Lake and Golf Course Lake. The industrial drain line was cleaned, and 14 USTs were removed. The design of the composite cap at the Southwest Landfill began. The Tower Area pump-and-treat expansion is under way, including the real estate easement process for off-base wells and pipeline.

The base is negotiating with EPA on the requirements of the current EPA RCRA 7003 Order requiring off-base sampling of domestic wells. The BCT continued its successful real-time decision-making process. The BCT has expedited cleanup to make Reese the fastest cleanup in the Air Force Base Conversion Agency (within 2 years of closure) and has produced a cost avoidance of over $1 million.

Plan of Action

- Construct off-base water lines in contaminated areas to reduce long-term liabilities and costs
- Complete construction of off-base pump-and-treat systems at the Tower Area and the Southwest Landfill
- Complete all investigations and submit reports to the regulatory agencies
- Remove all remaining USTs, aboveground storage tanks, and oil-water separators
- Remove lead-contaminated soil at the small-arms firing range
- Construct a composite cap at the Southwest Landfill
- Complete all real estate easements
- Continue to use the BCT to expedite cleanup actions
- Close the RCRA permit at Picnic Lake and Golf Course Lake

Sites Achieving RIP or RC Per Fiscal Year



Size: 428 acres
Mission: Housed the 442d Fighter Wing; supported A-10 aircraft
HRS Score: NA
IAG Status: None
Contaminants: Petroleum/oil/lubricants, PAHs, PCBs, VOCs, and heavy metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $4.5 million
Estimated Cost to Completion (Completion Year): $1.7 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Kansas City, Missouri

Restoration Background

In July 1991, the BRAC Commission recommended closure of Richards-Gebaur Air Reserve Station, the transfer of the 442nd Tactical Fighter Wing to Whiteman Air Force Base, and the transfer of the 36th Aeromedical Evacuation Squadron and the 77th and 78th Aerial Port Squadrons to Peterson Air Force Base. The installation was closed on September 30, 1994.

Environmental studies have been in progress at the installation since FY82. Prominent site types include a fire training area, vehicle maintenance areas, hazardous waste drum storage areas, fuel storage areas, and underground storage tanks (USTs). The installation conducted several Interim Remedial Actions (IRAs), including soil bioventing, removal of contaminated soil, and removal of polychlorinated biphenyl (PCB)-contaminated equipment. In FY95, the installation completed an IRA involving the removal of two USTs. The installation also installed a passive soil bioventing system at a former UST site.

An Environmental Baseline Survey (EBS) completed in FY94 designated 114 acres as CERFA-clean. The installation uses interim leases to lease parcels to the Kansas City Aviation Department (KCAD). Runway and aviation support facilities were transferred to KCAD before the installation was closed. Facilities permitted to the Marine Corps were also available for immediate reuse. Supplemental EBSs are used as attachments to finding of suitability to lease (FOSL) and finding of suitability to transfer (FOST) documents as further property is leased and transferred.

In FY97, a groundwater survey was conducted for the central drainage area and five sites. In addition, the EBS was revised, and implementation of the land reuse plan continued.

A Restoration Advisory Board (RAB) and a BRAC cleanup team (BCT) have been formed. The station holds quarterly RAB meetings to keep the public informed of ongoing environmental activities at the base.

FY98 Restoration Progress

The Air Force rejected the state's cleanup levels for contamination at the petroleum/oil/lubricant (POL) yard because they were not risk-based and because the state did not cite established guidance from which the levels were derived but stated that they were conceived by "consensus" of state personnel. Eventually the state requested that the Defense and State Memorandum of Agreement (DSMOA) dispute resolution process be invoked to settle the issue. After the Air Force and the state agreed to try to resolve the issue at the BCT level, the state withdrew the request.

An Air Force Technical Assistance Visit resulted in a recommendation for a complete review of the installation's past environmental work, a revised schedule and strategy for closing all sites according to the CERCLA process, and a more thorough Air Force technical review of Installation Restoration Program (IRP) documents before their release to the regulators. The BCT agreed to institute the state's Cleanup Levels for Missouri (CALM) guidance. The BCT now can agree on cleanup goals (by using CALM) at IRP sites before the sites are extensively characterized. These actions delayed the Evaluation and Consolidation Study (ECS) and long-term monitoring of groundwater at the installation. The BRAC Cleanup Plan was updated.

Fourteen USTs were registered and closed. The first IRP decision documents in the installation's history were signed by the BCT, resulting in the closure of three areas of concern. The remaining property was leased to KCAD under an interim lease.

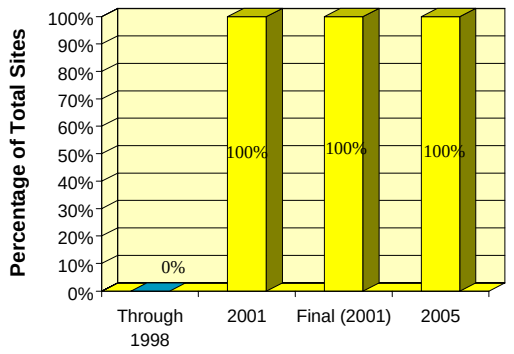
Memorandums of Agreement with the Army (for the Belton Training Complex) and the Marine Corps (for presently occupied Marine facilities) were signed.

The installation IRP is being managed from Rickenbacker ANGB in Columbus, Ohio because the Air Force closed the environmental office at Richards-Gebaur.

Plan of Action

- Remediate and close former UST sites at Parcels K and L and complete a FOST to transfer two parcels to the City of Belton in FY99
- Remediate and close eight additional former UST sites in FY99
- Complete basewide ECS in FY99
- Begin a basewide Remedial Investigation and Feasibility Study in FY99
- Close up to 15 additional sites in FY99-FY00
- Investigate the fuel hydrant line and the industrial waste line in FY00
- Complete most necessary Remedial Actions (RAs) by FY00
- Complete remaining RAs and transfer remaining Air Force property by FY02

Sites Achieving RIP or RC Per Fiscal Year



Size: 2,016 acres
Mission: Provide base of support for one fighter wing, one refueling wing, and one airlift group
HRS Score: 50.00; proposed for NPL in January 1994
IAG Status: None
Contaminants: Pesticides, paint, spent fuel, waste oil, solvents, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $22.1 million
Estimated Cost to Completion (Completion Year): $3.7 million (FY2016)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Columbus, Ohio

Restoration Background

July 1991, the BRAC commission recommended closure of Rickenbacker Air National Guard Base. In July 1993, realignment was recommended rather than base closure. The installation was realigned on September 30, 1994. Rickenbacker was recommended for listing on the National Priorities List (NPL) because of the potential effects of contamination on underlying groundwater, which supplies drinking water to 150,000 residents in nearby communities.

A Restoration Advisory Board formed and a basewide Environmental Baseline Survey was completed in FY94. In FY95, the final Environmental Impact Statement was published and a Record of Decision (ROD) was signed.

From FY96 through FY97, a supplemental Remedial Investigation (RI) and report were completed. Remedial Actions (RAs) included removal of 59 underground storage tanks (USTs), 28 aboveground storage tanks (ASTs), and asbestos; closure of abandoned fuel lines; and demolition of the heat and water plant lagoons. A Treatability Study and a risk assessment began at the former hazardous waste storage area (HWSA) to investigate potential risk-based closure of the facility. No Further Remedial Action Planned (NFRAP) documents were signed for 16 Installation Restoration Program (IRP) sites and 3 areas of concern (AOCs). Seven other IRP sites were closed with regulatory concurrence. A 30-acre parcel was transferred to the Army reserves, and the sale of 1.3 acres to the local power company was completed.

FY98 Restoration Progress

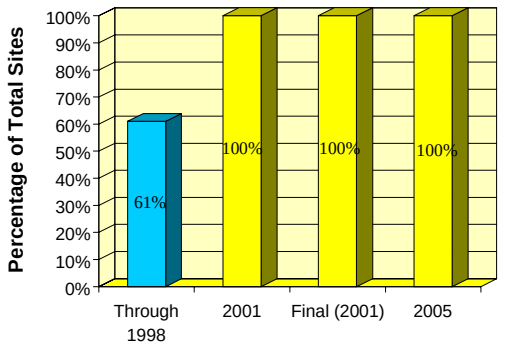
The installation published a final Phase II RI report, a draft final Feasibility Study (FS) for five IRP sites, and a draft scientific management position paper on the ecological risk for the basewide storm drainage system (Site 25). Twelve NFRAP documents were signed, covering nine IRP sites and three AOCs. A long-term lease was signed with the Local Redevelopment Authority (LRA) for 1,660 acres of real property. An amended closure plan for the former HWSA (IRP Site 1) was submitted to Ohio EPA.

RAs included removal of three USTs at Facility 544 and contaminated soil at two former gas stations, Sites 6 and 45. Final investigations for site assessments of petroleum-contaminated soil were conducted along an abandoned fuel line, at two pump houses, and at Facility 544. Remedial Design (RD) for five IRP sites began.

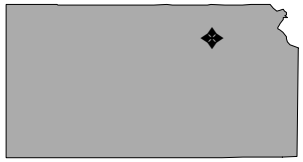
Plan of Action

- Publish final FS and complete Proposed Plan, RA decision document, and RD for five IRP sites in FY99. Initiate RAs at all five sites
- Resolve ecorisk issue at Site 25 and reevaluate the closure plan for HWSA (Site 1) for other possible remediation
- Complete the Remedial Action Plans and accomplish RAs for petroleum contamination at the abandoned fuel line and two pump houses
- Achieve response complete at 6 additional IRP sites
- Complete the finding of suitability to transfer (FOST) and the transfer of parcels D1.A to the LRA (approximately 1,310 acres)
- Complete the finding of suitability to transfer (FOST) and the transfer of parcel D1.A to the LRA, for a total transfer of approximately 1,370 acres

Sites Achieving RIP or RC Per Fiscal Year



Size: 100,671 acres
Mission: Provide training, readiness, and deployability for three component combat brigades; mobilize and deploy active and reserve component units
HRS Score: 33.79; placed on NPL in August 1990
IAG Status: IAG effective June 1991
Contaminants: VOCs, pesticides, and lead
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $46.5 million
Estimated Cost to Completion (Completion Year): $31.8 million (FY2014)
Final Remedy in Place or Response Complete Date for All Sites: FY2013



Junction City, Kansas

Restoration Background

Environmental studies from FY74 through FY86 identified a former pesticide storage facility, a dry cleaning facility and a closed landfill. Additional sites identified in a FY92 installation-wide site assessment include a former firing range, two former landfill areas, an open burn/open detonation range, and a former fire training area.

The installation has identified five operable units (OUs): the Southwest Funston Landfill (OU1), the Pesticide Storage Facility (OU2), the Dry Cleaning Facility (OU3), the former Fire Training Area (OU4), and the 354 Area Solvent Detection Site (OU5).

Remedial Investigation and Feasibility Studies (RI/FSs) began at OU1 and OU2 in FY91, and at OU3 in FY92. In FY94 to FY95, the installation stabilized the riverbank at OU1, conducted Removal Actions at OU2 and a former range site, and performed soil vapor extraction (SVE) pilot tests at OU3 and OU4. The installation also formed a partnership with USGS to develop and perform long-term monitoring (LTM) of groundwater at OU1.

In FY96, the installation conducted soil investigations at OU4 and initiated an Engineering Evaluation and Cost Analysis (EE/CA) to evaluate measures for controlling exposure of nearby users of the groundwater. In FY97, the Army obtained signatures on the final ROD for OU1 and the ROD for OU2, which calls for institutional controls. The Army completed the RI/FS work plan, and the EE/CA was initiated to evaluate potential early actions addressing groundwater contamination at OU4. The installation performed initial field investigations at OU5. Remediation of fuel oil-contaminated utility trenches in the 6200 Family Housing Area was completed.

EPA and state regulators participated in developing the Installation Action Plan (IAP). A Restoration Advisory Board (RAB) orientation meeting was held, and a RAB community co-chair was selected.

FY98 Restoration Progress

The draft Proposed Plan for OU3 was submitted to regulators. Delay in finalization is primarily due to extended regulatory review periods for the draft FS and extended periods for installation revision and submittal of the draft final FS. The proposed remedy is LTM and institutional controls.

The exposure control (installation of replacement wells) EE/CA for OU4 was completed and was followed by a public comment period and signing of the Action Memorandum. The action has not been implemented because the property owners have not granted access. An EE/CA for the groundwater early action for OU4 was drafted but placed on hold because recent monitoring data show a marked decrease in contaminant levels, apparently due to the success of an FY94–FY95 source removal and natural attenuation. The Army awarded a contract for the OU5 RI/FS work plan.

The installation completed decision memorandums for numerous No Action and No Further Action sites. It also completed an EE/CA, drafted an Action Memorandum, and initiated the design for riverbank stabilization at the Forsyth Landfill Area. The installation drafted an EE/CA for hot-spot ash and soil removal at the Old Southeast Funston Landfill Incinerator and cover repairs at the Old Southeast Funston Landfill.

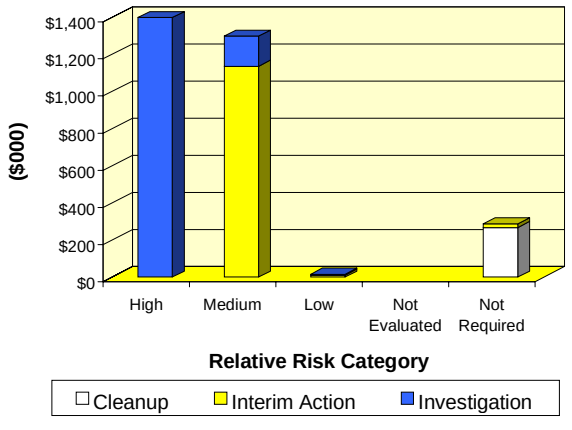
Demonstrated natural attenuation is expected to shorten the LTM period for OU1 and to be a primary component of the remedy for OU4.

Installation and major command staff have briefed the RAB on Installation Restoration Program (IRP) procedures, project prioritization, and funding issues. Installation staff and project contractors have presented detailed project information. The RAB provided feedback that was important to the development of preliminary cleanup goals for OU4. It also reviewed the EE/CA for OU4 and multiple decision memorandums and received a site tour. The RAB co-chair participated in the IAP development workshop in July 1998. To promote public outreach, the September 1998 RAB meeting was held in a local public library.

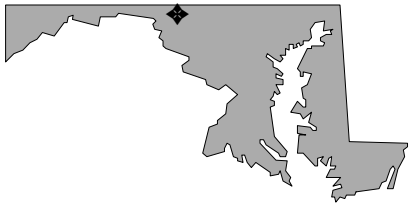
Plan of Action

- Complete the Proposed Plan for OU3 in FY99
- Implement exposure control action and complete early groundwater action EE/CA at OU4 in FY99
- Issue a draft ROD for OU3 in FY99
- Submit the groundwater modeling report for the Camp Funston Groundwater Evaluation project
- Draft the RI/FS work plan and perform Phase I field investigations for OU5 in FY99
- Complete the Action Memorandum and begin construction of riverbank stabilization at the Forsyth Landfill Area in FY99
- Complete EE/CA and begin construction of hot-spot ash and soil removal at Old Southeast Funston Landfill Incinerator and cover repairs at Old Southeast Funston Landfill

FY99 Funding by Phase and Relative Risk



Size: 1,374 acres
Mission: Supported Site R underground facility
HRS Score: NA
IAG Status: None
Contaminants: UXO, heavy metals, and asbestos
Media Affected: Groundwater and soil
Funding to Date: $0.4 million
Estimated Cost to Completion (Completion Year): $0
Final Remedy in Place or Response Complete Date for BRAC Sites: NA



Fort Ritchie, Maryland

Restoration Background

In July 1995, the BRAC Commission recommended that Fort Ritchie be closed. The installation closed on September 30, 1998.

Environmental contamination at Fort Ritchie resulted from underground storage tanks (USTs), a mortar firing range, and a skeet range. The closed mortar range may contain unexploded ordnance (UXO). Housing units and administrative buildings contain asbestos and lead-based paint.

Interim Actions to date include removal or replacement of all USTs, relining of sewer lines with plastic, removal of falling lead paint and high-hazard friable asbestos, and closure of an incinerator. The Army also cleaned up a gasoline spill in FY92.

The installation developed a positive working relationship with state and local officials. Measures to improve the decision-making process and communication at the installation include forming a planning group, conducting meetings at the town hall, conducting quarterly in-progress reviews, establishing hot lines to answer employee questions, and relaying installation updates to the local news media.

In FY96, the Army formed a BRAC cleanup team to investigate and ensure cleanup of all areas of concern and allow transfer of all BRAC parcels. The commander also formed a Restoration Advisory Board. Also in FY96, the Environmental Baseline Survey and the BRAC Cleanup Plan (BCP), Version 1, were completed. The installation's supporting U.S. Army Corps of Engineers (USACE) District negotiated a Total Environmental Restoration Contract for all restoration work. Work began on the Environmental Impact Statement (EIS) and the draft report on the archive search for UXO. In addition, the installation developed a partnership with the Local Redevelopment Authority.

In FY97, the installation completed the UXO archive search with the help of USACE St. Louis District. The installation initiated hazardous, toxic, and radioactive waste (HTRW) and UXO sampling. It also completed draft BCP Version 2 and a draft EIS.

FY98 Restoration Progress

The installation completed a revised draft Site Inspection report and the BCP Version 2. It also completed UXO sampling, the UXO interim characterization report, and additional HTRW sampling. In addition, the installation signed a programmatic agreement for historic district preservation and completed the EIS and the ROD.

Plan of Action

- Conduct HTRW sampling as required by the Maryland Department of the Environment and EPA in FY99
- Complete Focused Feasibility Studies for various HTRW sites in FY99
- Publish draft ordnance and explosives Engineering Evaluation and Cost Analysis for public input in FY99
- Expedite cleanup and property availability, lease, and transfer in FY99

Sites Achieving RIP or RC Per Fiscal Year

*Fort Ritchie has no environmental restoration activities. All environmental compliance activities are scheduled for completion by FY2002.

Riverbank Army Ammunition Plant NPL

Size: 172 acres
Mission: Manufacture grenades, projectiles, and steel cartridge casings
HRS Score: 63.94; placed on NPL in February 1990
IAG Status: IAG signed in April 1990
Contaminants: Chromium, cyanide, and zinc
Media Affected: Groundwater and soil
Funding to Date: $41.1 million
Estimated Cost to Completion (Completion Year): $45.7 million (FY2015)
Final Remedy in Place and Response Complete Date for All Sites: FY1998

Riverbank, California

Restoration Background

In 1942, the Army constructed what is now the Riverbank Army Ammunition Plant as an aluminum reduction plant to supply military requirements. Since 1951, the installation has manufactured steel cartridge cases for the Army and the Navy. Other manufactured products include grenades and projectiles, which are shipped to other ammunition plants for loading operations.

In FY85, chromium was detected in drinking water wells at residences west of the installation. As an Interim Action, the installation began a quarterly groundwater monitoring program. The Army provided alternative water supplies from deeper groundwater wells to five residences with contaminated wells. A Preliminary Assessment and Site Inspection identified the following sites: an industrial wastewater treatment plant, an abandoned landfill, and four evaporation and percolation ponds located north of the plant near the Stanislaus River. Chromium, cyanide, and zinc are the primary contaminants affecting groundwater and soil.

A FY90 Interim Action included construction of a groundwater extraction and treatment system. In FY92, the Army constructed a water distribution system for 70 nearby residences. In FY93, the regulatory agencies approved the final Remedial Investigation and Feasibility Study (RI/FS) report, and the Army presented the Proposed Plan to the public for review. The plan recommended (1) expansion of the groundwater extraction and treatment system to provide complete capture of the contaminated groundwater plume and (2) placement of a final cap over the abandoned landfill.

In FY94, the installation completed a Removal Action at the four evaporation and percolation ponds and received approval from EPA and the state regulatory agency for the first installationwide Record of Decision (ROD).

The installation formed a technical review committee (TRC), which meets monthly to discuss outstanding issues. To accelerate cleanup, the TRC developed a process for concurrent preparation and review of documents. The process allowed the Army, EPA, and the state regulatory agency to review the draft FS report while the Army began preparing the ROD. In FY95, the installation completed construction of the landfill cap and awarded the Remedial Action (RA) contract for expansion of the groundwater extraction and treatment system.

In FY96, the off-site groundwater extraction system was installed and placed on-line to minimize migration of the plume and to demonstrate capture of the plume. The installation initiated a maintenance program for the landfill cap. The Army petitioned EPA Region 9 to remove the installation from the National Priorities List (NPL) in September 1996, the first request for NPL deletion for an entire Army installation.

In FY97, the installation completed expansion of the groundwater extraction and treatment system and began long-term monitoring. The petition to delist the installation from the NPL was submitted as scheduled. EPA approved the preliminary Closeout Report and the Remedial Action Completion Report. Riverbank became the first DoD installation to reach construction completion under the EPA Superfund 900 by 2000 initiative.

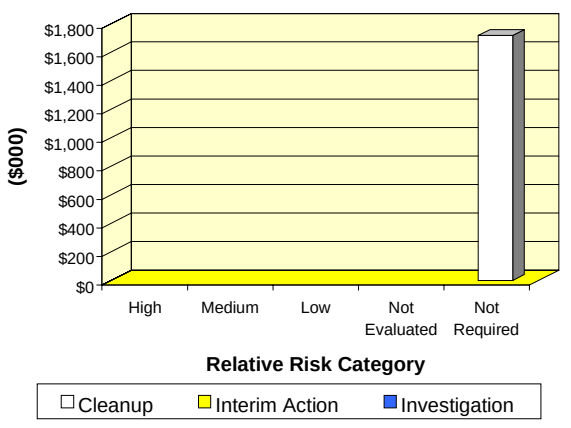
FY98 Restoration Progress

The installation eliminated chemical usage at the interim groundwater treatment system by using an ion exchange system for removing chromium and cyanide contaminants from the groundwater. This change is expected to reduce long-term operating costs by 40 percent in FY99.

Plan of Action

- Complete closeout of the RA by FY03
- Achieve NPL deletion by FY03

FY99 Funding by Phase and Relative Risk



Robins Air Force Base NPL

Size: 8,855 acres
Mission: Provide logistics support for aircraft
HRS Score: 51.66; placed on NPL in July 1987
IAG Status: IAG signed in July 1989
Contaminants: VOCs, paint strippers and thinners, paints, solvents, phosphoric and chromic acids, oils, cyanide, and carbon remover
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $88.2 million
Estimated Cost to Completion (Completion Year): $363.4 million (FY2033)
Final Remedy in Place or Response Complete Date for All Sites: FY2006

Houston County, Georgia

Restoration Background

In FY82, Preliminary Assessments and Site Inspections were completed for 33 sites at this installation. The most significant site consists of Landfill No. 4 and an adjacent sludge lagoon. The site is divided into three operable units (OUs): source control (OU1), wetlands (OU2), and groundwater (OU3). Primary contaminants at the site include trichloroethene and tetrachloroethane in soil and groundwater.

Remedial Investigation and Feasibility Study (RI/FS) activities were initiated in FY86 and FY88. In FY93, the installation constructed run-on controls, and completed the pilot-scale system for lagoon solidification, at OU1. Also in FY93, the installation completed the Remedial Design (RD) of the cover for Landfill No. 4. In FY94, the installation began a RCRA Facility Investigation (RFI) at five sites. Interim Actions included encapsulation of Landfill No. 3 and removal of hazardous and radioactive waste from two other sites. An interim Record of Decision (ROD) was signed for OU2. In FY95, an interim ROD was signed for OU3 and Interim Actions were completed at the Hazardous Waste Site. Final decision documents for 24 of the 33 sites recommended no further action (NFA).

In FY96, cleanup of the sludge lagoon was completed on schedule. The installation also demonstrated a bioremediation treatment process for groundwater contaminated with volatile organic compounds (VOCs). Construction of the leachate collection system at Landfill No. 4, the groundwater extraction system, and the associated wastewater treatment plant began. Quarterly monitoring began at OU2. Microbial activity was evaluated for remediation of contamination in both OU2 and the Base Industrial Area. Draft corrective action plans (CAPs) were completed for two RCRA sites, final RFIs were completed for four sites, and one more RCRA site was recommended for NFA. In FY97, the installation completed a redesign of the Landfill No. 4 cover. The process of obtaining a National Pollutant Discharge Elimination System (NPDES) permit for a new pump-and-treat system began. The CAP for SS10 was approved by the Georgia Environmental Protection Division (GA EPD). In addition, a review priority list was established; this list is tracked regularly.

A technical review committee formed in FY89 was converted to a Restoration Advisory Board (RAB) in FY94. The RAB has met quarterly since FY96.

FY98 Restoration Progress

A full-scale bioventing system was installed, a 300-gallon-per-minute capacity groundwater treatment plant was put into operation, the LF-4 geosynthetic clay liner installation was completed, and contaminated sediment was removed from Duck Lake.

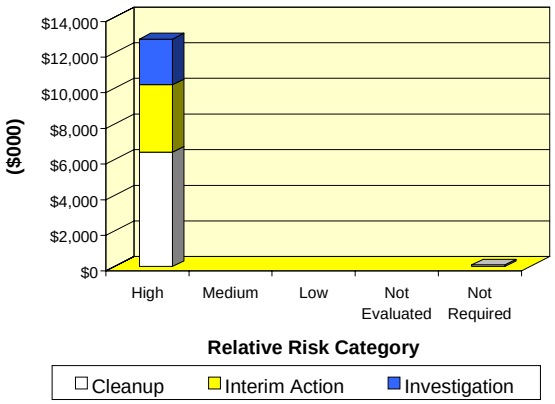
CAPs were approved by the GA EPD for two sites, and the RD was initiated for implementing those CAPs. RFIs are being performed on five sites. The construction contingency plan for containing sediment at OU2 was completed, and the sediment removal study is under way.

Completion of the final FS and ROD was delayed because of delays in obtaining concurrence on the draft Initial Screening of Alternatives document. Monitoring and sampling of the wetlands were halted until the sediment containment project is in operation. The RAB played a major role in Relative Risk Site Evaluations, establishing cleanup priorities, and evaluation of program issues and goals.

Plan of Action

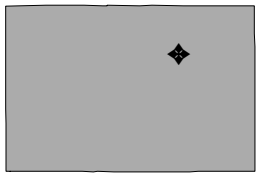
- Complete the RD for LF03 and OT17 and begin construction on the final Remedial Action (RA) in FY99
- Complete fieldwork on RFIs for OT20, DC34, SS35, SS36, and OT37 in FY99
- Begin fieldwork on OT38 RFI in FY99
- Obtain approval for site closure for three fire training areas in FY99
- Complete OU2 sediment containment project in FY99
- Continue operation of interim measures at LF03, LF04, and OT20 in FY99
- Continue final RAs at SS10 and OT29 in FY99
- Continue basewide groundwater sampling in FY99

FY99 Funding by Phase and Relative Risk



Rocky Mountain Arsenal NPL

Size: 17,228 acres
Mission: Manufactured and stored chemical munitions
HRS Score: 58.15; placed on NPL in July 1987
IAG Status: IAG and Federal Facility Agreement signed in 1989
Contaminants: Pesticides, chemical agents, VOCs, chlorinated organics, PCBs, UXO, heavy metals, and solvents
Media Affected: Groundwater and soil
Funding to Date: $875.9 million
Estimated Cost to Completion (Completion Year): $934.5 million (FY2033)
Final Remedy in Place and Response Complete Date for All Sites: FY2011



Adams County, Colorado

Restoration Background

Rocky Mountain Arsenal operated as a chemical munitions production facility from 1942 until 1982. It has been the focus of an aggressive soil and groundwater contamination cleanup program since the 1980s. Contaminated sites included liquid waste in unlined and lined lagoons and basins, open burning and detonation areas, and landfills that received both liquid and solid wastes.

In FY84, the Army completed a Preliminary Assessment and Site Inspection that identified 179 potentially contaminated sites. Subsequently, the installation was divided into two operable units (OUs): the On-Post OU and the Off-Post OU. The Army completed Remedial Investigation and Feasibility Study activities for both OUs by FY96. Identification of additional sites raised the total number to 209.

The Army has completed 14 emergency responses at 17 sites. Under this program, four groundwater extraction and treatment systems have been installed on site and one off site. All five systems continue to operate. In FY90, 10.5 million gallons of chemical wastewater and 580,000 cubic yards of contaminated soil were removed from the Basin F Area and placed in temporary storage facilities. Hundreds of drums of waste and tons of asbestos and related materials were disposed of off post. The installation closed 450 abandoned wells and the sewer systems in the South Plants, and closed and removed the former hydrazine blending facility. The installation used an innovative submerged quench incineration (SQI) system to remediate liquid waste removed from Basin F. The SQI treated more than 16 million gallons of scrubber brine and recovered more than 250,000 pounds of copper. The Army later dismantled the system and removed it from the installation.

In FY94, the Army converted its Technical Review Committee to a Restoration Advisory Board (RAB). In FY96, the Army and regulators signed Records of Decision (RODs) for both OUs. The Army formed a partnership between the U.S. Fish and Wildlife Service, and Shell Oil Company for oversight of the program management contract.

In FY97, the oversight partnership, called the Remediation Venture Office (RVO), developed a Remedial Design Implementation Schedule (RDIS) for the On-Post OU. The Army completed Remedial Designs (RDs) and awarded construction contracts for chemical and sanitary sewer plugging and for the Army-Shell trenches remediation. The design for the consolidation area within Basin A was also completed.

FY98 Restoration Progress

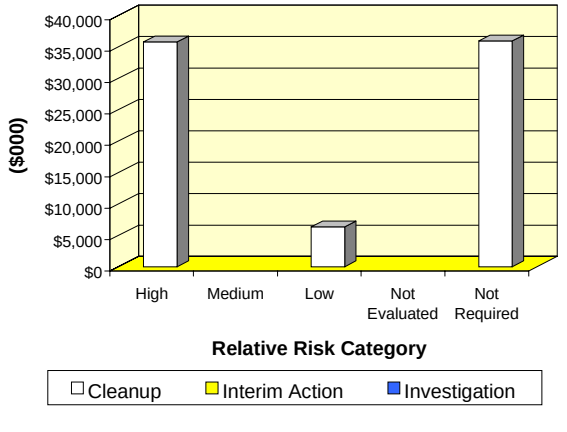
The RVO awarded the Program Management Contract (PMC) that will manage, design, and execute the major on-post Remedial Actions (RAs). The design for an on-site hazardous waste landfill (HWL) was completed, and construction began at the Basin A Consolidation Area and the HWL. RAs were completed for chemical and sanitary sewer plugging, off-post soil tillage, the off-post water supply system, and modification of the North Boundary Containment System for treatment of N-nitro-sodimthyamine. The PMC contractor completed RD for four of the Phase I (outlying areas) RAs. Construction on the Army-Shell Complex Trenches RA was delayed for performance of additional geophysical survey work. Removal of chemical processing equipment and asbestos-containing material continued. The implementation of installationwide programs and operation of groundwater treatment systems continued.

The RAB continued to hold monthly meetings, where project progress reports were provided, and to conduct other RAB business.

Plan of Action

- Complete the remaining Phase I (outlying areas) RA designs (six projects) in FY99
- Complete startup construction for the Basin A Consolidation Area and HWL and initiate facilities operation in FY99
- Award contracts for Phase I RAs and begin remediation in FY99
- Start RDs for Phase II (South Plants Area) RAs in FY99
- Continue implementing installationwide programs and operating groundwater treatment systems in FY99
- Continue off-post and on-post water acquisition tasks in FY99

FY99 Funding by Phase and Relative Risk



Sabana Seca Naval Security Group Activity NPL

Size: 2,254 acres
Mission: Provide communication support
HRS Score: 34.28; placed on NPL in October 1989
IAG Status: Federal Facility Agreement signed in March 1992
Contaminants: Heavy metals, PCBs, pesticides, herbicides, and phenols
Media Affected: Groundwater and soil
Funding to Date: $3.5 million
Estimated Cost to Completion (Completion Year): $0.4 million (FY2005)
Final Remedy in Place or Response Complete Date for All Sites: FY1997

Sabana Seca, Puerto Rico

Restoration Background

The Sabana Seca Naval Security Group Activity operates as a high-frequency direction-finding facility, providing communication and related support to Navy and DoD missions in the area. Areas of concern include a former pest control shop, where pesticides and herbicides were disposed of, and a leachate ponding area, which receives leachate from an adjacent municipal landfill. Because the pesticide-contaminated site (Site 6) is adjacent to the installation's picnic, playground, and housing areas, Sabana Seca Naval Security Group Activity was placed on the National Priorities List (NPL).

In FY84, the installation completed Preliminary Assessments (PAs) for seven sites and an Interim Remedial Action (IRA) at Site 5. As recommended, a Site Inspection (SI) was initiated at Sites 6 and 7. In FY88, in an IRA, a 6-inch cover of clean soil was placed over Site 6 and fencing was constructed to prevent exposure to spilled pesticides. In FY89, an SI was completed for Site 7 and the Remedial Investigation (RI) for Site 6 was initiated.

In FY93, the RI for Site 6 was completed and the Feasibility Study (FS) was initiated. The FS for Site 7 was initiated to identify an IRA that could protect installation personnel from exposure to leachate from the municipal landfill. In FY95, the Agency for Toxic Substances and Disease Registry performed a Public Health Assessment of the installation. For Sites 1 and 3, the initial SI was completed and an Expanded SI (ESI) with Baseline Risk Assessment was initiated. In FY96, the FS, the Proposed Remedial Action Plan (PRAP), and the Record of Decision (ROD) for Site 6 were completed. The ROD indicated installing an asphalt cap at Site 6.

In FY97, the ESI, the PRAP, and the ROD for Sites 1 and 3 were completed. The ROD at Sites 1 and 3 indicated no further action (NFA). The SI, PRAP, and ROD for Sites 2 and 4 were also completed. The ROD for Sites 2 and 4 indicated NFA. The capping of Site 6 was completed, and the area was converted to a parking lot for the picnic area. The final FS report for Site 7 determined that the source of contamination was an off-base, non-Navy-controlled landfill, and therefore no remediation was necessary. EPA concurred in the NFA designation, and no ROD was needed. Nevertheless, the Navy entered into a partnering agreement with the landfill owners and operators, allowing the Navy to work with the municipality to address the landfill leachate problem. The RODs for Sites 1 through 4 were used in lieu of a Facility Closeout Report and demonstrated that the Navy had completed all construction activities for all sites at the facility and that the facility was ready to be deleted from the NPL.

The installation formed a technical review committee in FY90 and converted it to a Restoration Advisory Board (RAB) in FY96. A community relations plan was prepared in FY91, and an information repository and administrative record were established in FY94. Bilingual versions of pertinent summary documents and public notices were made available for the public awareness sessions that were held for public input. The RAB was given the opportunity to review and comment on all draft documents.

FY98 Restoration Progress

The installation was not deleted from the NPL in FY98. The Notice of Intention to Delete (NOID) was completed and the Notice of Deletion (NOD) was signed in FY98, but EPA had to obtain agreement from the state and the public before the NOD could be published. EPA obtained written concurrence from the Puerto Rico Environmental Quality Board to proceed with the deletion process, published the NOD, and provided a 30-day public comment period before signing the NOD. The administrative record and information repository were not placed on CD-ROM because the installation wanted to include the NOID, NOD, and public notices, which had not been completed in FY98.

Sabana Seca Naval Security Group Activity will be the second Navy NPL site and the ninth federal NPL site to be deleted from the NPL.

Plan of Action

- Delete installation from the NPL in FY99
- Place administrative record and information repository on CD-ROM in FY99

FY99 Funding by Phase and Relative Risk

All sites are in the long-term monitoring phase.

Size: 485 acres
Mission: Repair and maintain communications and electronic equipment
HRS Score: 44.46; placed on NPL in July 1987
IAG Status: IAG signed in 1988
Contaminants: Waste oil and grease; solvents; metal plating wastes; and wastewater containing caustics, cyanide, and metals
Media Affected: Groundwater and soil
Funding to Date: $56.9 million
Estimated Cost to Completion (Completion Year): $9.0 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Sacramento, California

Restoration Background

Environmental studies conducted at the Sacramento Army Depot since FY79 identified 55 sites, 47 of which required no further action. The remaining sites were divided into four operable units (OUs). The installation conducted Remedial Investigation and Feasibility Study (RI/FS) activities for the four OUs between FY89 and FY92, and an installationwide RI/FS began in FY92. The Army and regulatory agencies signed Records of Decision (RODs) for all four OUs. The Army completed the Remedial Actions (RAs) at all sites, except groundwater cleanup, which requires long-term operation.

In FY93, the installation completed the RA at the Tank No. 2 OU. This RA consisted of use of a soil vapor extraction (SVE) system to clean up soil contaminated with organic solvents. In FY94, air sparging was used to treat soil and groundwater at Parking Lot 3 and the Freon 113 Areas. Operation of an SVE system achieved Phase I cleanup goals at the South Post Burn Pits, the source of off-site groundwater contamination. Also in FY94, the installation completed a pilot-scale test of soil washing at the Oxidation Lagoons, a BRAC Cleanup Plan, and a CERFA report.

In FY94, the installation commander formed a Restoration Advisory Board to facilitate communication among regulatory agencies, members of the community, and installation personnel.

In FY95, an installationwide ROD and the Environmental Impact Statement (EIS) for disposal and reuse were completed and signed. Other environmental restoration efforts included surveys of all asbestos and lead-based paint, radiation surveys of buildings, and submission of the application for closeout of the Nuclear Regulatory Commission (NRC) license.

In FY96, the installation completed upgrades of the groundwater treatment plant for long-term monitoring and operations. Upgrades to the system included new piping systems and additional extraction wells. The Army began work to determine the most effective and efficient operation parameters for the upgraded groundwater treatment plant. The installation completed a RA at the Oxidation Lagoons and the South Post Burn Pits. The soil from those two areas was treated and placed in stabilization pits. Approval of the closeout of the NRC license was received.

In addition, EPA concurred in the determination that the treatment system at Parking Lot 3 is in place and functioning as designed, thereby facilitating transfer of the property. Sacramento Army Depot removed the source of groundwater contamination and installed a groundwater treatment system.

In FY97, the Army initiated a partial National Priorities List (NPL) delisting for areas not associated with groundwater contamination. This was made possible by the completion of the soil stabilization project. The Army also determined that a cap for the Old Burn Pits was unnecessary. The Burn Pits and Oxidation Lagoons soil stabilization cleanups were completed.

FY98 Restoration Progress

Horizontal extraction wells installed in FY96 were discovered to be performing poorly. The installation determined the cause of failure and explored new technologies to address remediation. The new effort was halted because of equipment failure.

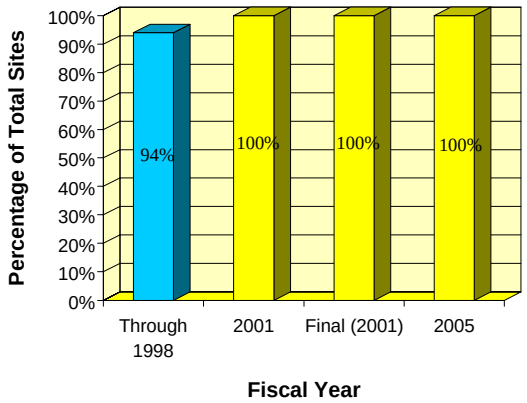
Finding of suitability to transfer (FOST) and BRAC Disposal Support Package (BDSP) packages have been developed and are near completion for two of the last three parcels to be transferred. The installation continues modeling efforts to capture the plume of contamination. The installation's efforts to achieve a partial delisting for soil for the entire installation and construction complete for groundwater depend on proving it has successfully captured the plume.

The installation continued to meet with regulatory agencies. As the installation has approached final cleanup, closure, transfer, and delisting, the regulatory agencies have become more conservative in their approach to documentation, reviews and approvals, and negotiations.

Plan of Action

- Complete FOST and BDSP packages for the transfer of two parcels in FY99
- Complete plume capture model in FY99

Sites Achieving RIP or RC Per Fiscal Year



San Bernardino Engineering Depot NPL

Size: 1,663 acres
Mission: World War II Engineer storage depot, Quartermaster repair facility, and prisoner of war camp
HRS Score: Unknown
IAG Status: None
Contaminants: TCE, PCE, and Freon 11 and 12
Media Affected: Groundwater
Funding to Date: $2.9 million
Estimated Cost to Completion (Completion Year): $3.3 million (FY2000)
Final Remedy in Place or Response Complete Date for All Sites: NA

San Bernardino, California

Restoration Background

The San Bernardino Engineering Depot closed in 1947. Since then, the area has been developed for industrial and residential uses. The Newmark Groundwater Contamination Site was added to the National Priorities List (NPL) in 1989, after discovery of two groundwater plumes during a water supply monitoring program. The Newmark and Muscoy plumes are located on the east and west sides of the site, respectively.

The discovery of tetrachloroethene (PCE), trichloroethene (TCE), and chlorinated solvents in the groundwater resulted in the closure of 20 water supply wells. The state brought 12 of the wells back into operation by installing air stripping towers on eight wells and carbon filtration systems on the other four.

In FY88, EPA conducted a preliminary investigation at the installation. In May 1992, EPA conducted a soil gas investigation to evaluate the need for a Removal Action at a suspected disposal site in a residential neighborhood. No volatile organic compounds (VOCs) were found in areas above the contaminated groundwater. In FY93, EPA conducted a subsurface survey to investigate a suspected military equipment disposal site; however, no site was found.

An investigation was initiated in FY90 to identify the source of the Newmark plume contaminants and to identify ways of controlling continued downgradient migration while removing contaminants. The investigation determined that the contamination originated at least 2 miles upgradient of the site in another portion of the valley. A pump-and-treat remedy using conventional activated carbon adsorption technology was chosen.

In FY92, an investigation of the Muscoy area was initiated. EPA separated the area into two projects in FY94: one to address the spread of contamination and the other to clean up the source of contamination.

DoD and EPA have been working closely with the U.S. Army Corps of Engineers (USACE) and the San Bernardino County Solid Waste Department to investigate the nature and extent of the contamination. Efforts to date have included research of military archives, numerous interviews, seismic and magnetometer surveys of the subsurface, and construction of four monitoring wells.

EPA conducted Remedial Investigation and Feasibility Study activities in FY91, FY92, and FY95 and completed two Records of Decision in FY93 and FY94. The site has been divided into three operable units. In FY97, granular activated carbon and pump-and-treat remedies were employed by EPA at the former DoD property.

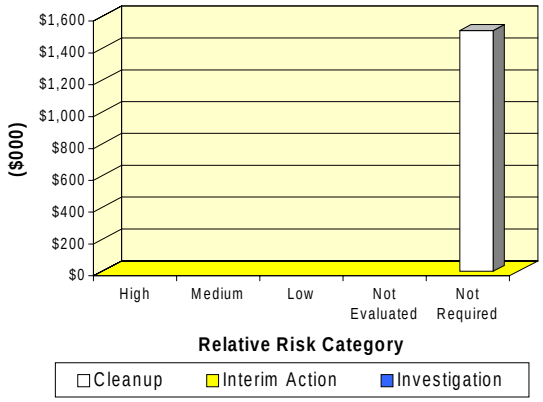
FY98 Restoration Progress

USACE developed an overall investigation strategy and technical approaches for investigating both the upgradient source and former facility operations. USACE's investigation work plans underwent a stringent EPA concurrence process. Consultation with the U.S. Fish and Wildlife Service was completed for potential impacts on several endangered species; the San Bernardino Kangaroo Rat was listed as an endangered species.

Plan of Action

- In FY99, install groundwater wells and conduct soil vapor borings near sewage treatment plant and below the landfill; evaluate results for indications of presence of contaminant plume and for probability of surface release
- In FY99, install groundwater wells and conduct soil vapor borings in next parcel uphill from the sewage treatment plant to determine the direction from which contamination may be flowing onto the former camp property; evaluate soil vapor for indications of surface release on former Army property
- In FY99, conduct soil gas probes on the former camp property to detect surface releases
- In FY99, consult with EPA, on groundwater well and soil vapor borings data and their implications for future projects at property

FY99 Funding by Phase and Relative Risk



Size: 541 acres
Mission: Provided recruit training for enlisted personnel and specialized training for officers and enlisted personnel
HRS Score: NA
IAG Status: None
Contaminants: Paint, pesticides, solvents, and petroleum/oil/lubricants
Media Affected: Soil and groundwater
Funding to Date: $17.1 million
Estimated Cost to Completion (Completion Year): $20.5 million (FY2010)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2010

San Diego, California

Restoration Background

In July 1993, the BRAC Commission recommended closure of the installation and relocation of personnel, equipment, and mission support to other Naval training centers. Certain installation facilities and activities will be retained to support other Naval operations in the San Diego area; 503 acres will be available for transfer. The installation closed in April 1997.

In FY86, an Initial Assessment Study identified 12 sites that might present environmental problems: five sites are being studied under CERCLA; seven under the underground storage tank (UST) program. Site types include a landfill and petroleum-contaminated areas. In FY91, a Site Inspection (SI) was completed at one UST site and an SI and Phase I Remedial Investigation (RI) at another. In FY92, free-product removal at a UST site was completed. In FY94, the installation completed an Interim Removal Action at a landfill.

In FY95, a Preliminary Assessment (PA) was completed for three sites, one of which requires no further action (NFA). Remedial Designs (RDs) were completed for two sites; the RD for a third site is under way. An Expanded SI (ESI) was completed for one UST site. Petroleum-contaminated soil was removed from three UST sites. Human Health and Ecological Baseline Risk Assessments were completed for one site.

An Environmental Baseline Survey (EBS), completed in FY94, identified 85 points of interest (POIs), later increased to 93. Many POIs were designated for NFA; the installation is studying 18. The installation completed a revised EBS in FY95. It identified 115 acres for reuse by the Navy.

In FY96, the installation completed an ESI and initiated an Engineering Evaluation and Cost Analysis (EE/CA) for one site. SIs were completed for two sites, one of which required NFA. An EBS identified two additional sites under the CERCLA program and a PA/SI was completed. The installation completed the investigation at four UST sites, a corrective action plan (CAP) for two UST sites, and excavation of contaminated soil from another UST site. Cleanup began at the two sites covered by the CAP. During FY97, the installation initiated an RI for one site and groundwater monitoring at a UST site. RD and corrective actions were completed for these UST sites. Cleanup for Sites 7 and 10 was completed. The master finding of suitability of lease was also completed.

The installation developed a community relations plan in FY92 and updated it in FY95. A Restoration Advisory Board (RAB), a BRAC cleanup team (BCT), and an information repository containing the administrative record were established in FY94, and the installation completed a BRAC Cleanup Plan (BCP).

FY98 Restoration Progress

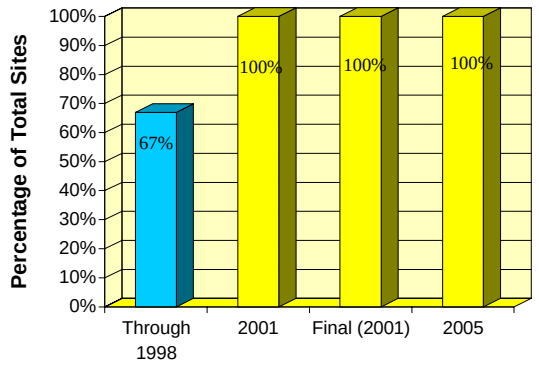
The installation completed site assessments for the remaining 18 POIs. An ESI was initiated at Site 15; an extended site assessment was completed at Site 14 and an EE/CA was initiated. An RI work plan was finalized for Site 12. The long-term operations at Site 11 were completed. Site 10 confirmation sampling was initiated. The long-term monitoring at Site 8 and the Interim Remedial Action (IRA) at Site 3 continued. The IRA at Site 1 was completed, but the RD was delayed while Early Transfer Authority (CERCLA Section 334) negotiations with San Diego Unified Port District progressed. The Section 334 process has required a close working partnership between BCT regulators and the Port of San Diego and will provide significant cost savings for the Navy. A finding of suitability to transfer (FOST) was initiated for all applicable parcels, and a basewide groundwater study was initiated.

The RAB reviewed documents, attended a site tour, and held two meetings. The EPA Region 9 representative took an active role in RAB meetings. The BCT provided input on all Installation Restoration documents, and the BCP was updated.

Plan of Action

- Sign the Record of Decision for the Environmental Impact Statement in FY99
- Transfer Site 3 to the San Diego Marine Corps Recruit Division and close Site 8 in FY99
- Complete EE/CA and Action Memorandum (AM) and award Remedial Action (RA) for Site 1 in FY99
- Complete confirmatory sampling and closure report for Site 10 in FY99
- Initiate IRA for additional soil cleanup at Site 11 in FY99
- Complete draft RI and award Feasibility Study for Site 12 in FY99
- Complete EE/CA, AM, and RA for Site 14 in FY99
- Complete ESI and NFA document for Site 15 in FY99
- Update BCP in FY99
- Complete basewide groundwater study in FY99
- Complete FOST for all parcels except the Boat Channel in FY99

Sites Achieving RIP or RC Per Fiscal Year



San Fernando Valley (Area 1) — Formerly Air Force Plant No. 14 — NPL

Size: 520 acres
Mission: Design, manufacture, produce, research and develop, and repair military aircraft
HRS Score: 42.24; placed on NPL in June 1986
IAG Status: None
Contaminants: Chlorinated solvents, chromium, and petroleum hydrocarbons
Media Affected: Groundwater and soil
Funding to Date: $3.9 million
Estimated Cost to Completion (Completion Year): $0.2 million (FY2000)
Final Remedy in Place or Response Complete Date for All Sites: NA

Burbank, California

Restoration Background

The former Air Force Plant No. 14 is located in Area 1, Burbank Operable Unit (OU), of the San Fernando Valley Area 1 through 4 site. Since 1941, there has been a geographic, functional, and orga nizational relationship among Air Force Plant No. 14; two Plancors, 236 and 1193; and Lockheed Martin Corporation's plants and air terminal. The facilities were used for the design, manufacture, and repair of military and civilian aircraft. Air Force Plant No. 14, a government-owned, contractor-operated facility, was established in 1947 when the government exchanged some of its Plancor facilities for Lockheed's Plant B-1. In 1974, all property owned by the Air Force was conveyed to Lockheed Martin Corporation. Since DoD's disposal of this property, Lockheed has used the facilities for the design and production of missiles, satellites, and military and commercial aircraft.

In late 1980, groundwater contamination was discovered in water supply wells in Burbank, California. The wells contained the chlorinated solvents trichloroethene (TCE) and tetrachloroethene (PCE). The results of a groundwater monitoring program conducted from 1981 through 1987 indicated that approximately 50 percent of the water supply wells in the eastern portion of the San Fernando Valley groundwater basin were contaminated.

In 1984, Lockheed began conducting extensive site investigations to find the sources of the groundwater contamination and to determine the extent of the contaminated groundwater's migration off site. A number of sources of contamination were found, including a waste disposal area, underground storage tanks, a chip recovery area, sumps, clarifiers, degreasers, and pipes. PCE was found in the groundwater. In June 1986, the Burbank OU was placed on the National Priorities List (NPL).

In FY88, Lockheed received a Cleanup and Abatement Order for soil and groundwater remediation at Plant B-1, Building 175, where a clarifier was found to have a softball-sized hole. Soil and groundwater were remediated by an integrated soil vapor extraction (SVE) and groundwater treatment system.

In FY89, EPA signed the Record of Decision for remediation of groundwater at the Burbank OU. This groundwater pump-and-treat system is located southwest of Plant B-1.

In FY96, Lockheed Martin began operating the groundwater pump-and-treat system at Plant B-1. Lockheed also constructed an SVE system, which is now operating at the site. In FY97, Lockheed Martin filed a CERCLA cost recovery lawsuit against the United States seeking more than $500 million.

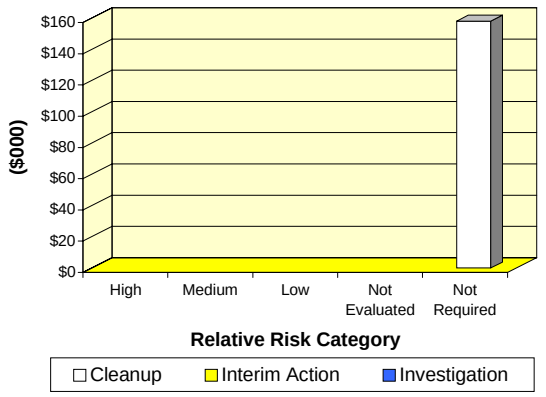
FY98 Restoration Progress

Lockheed Martin continued site restoration. Negotiations continued between the United States and Lockheed Martin regarding CERCLA liability.

Plan of Action

- Continue negotiations between the United States and Lockheed Martin in FY99

FY99 Funding by Phase and Relative Risk



Sangamo Electric Dump/Crab Orchard National Wildlife Refuge

Formerly Illinois Ordnance Plant **NPL**

Size: 43,000 acres
Mission: Manufacture and load ordnance for shipping
HRS Score: 43.70; placed on NPL in July 1987
IAG Status: IAG signed in September 1991
Contaminants: Organic solvents, inorganic compounds, PAHs, PCBs, munitions, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $0.8 million
Estimated Cost to Completion (Completion Year): $32.3 million (FY2024)
Final Remedy in Place or Response Complete Date for All Sites: FY2012

Carterville, Illinois

Restoration Background

The former Illinois Ordnance Plant, which operated from 1942 to 1945, is located on the eastern portion of the U.S. Fish and Wildlife Service's Crab Orchard National Wildlife Refuge. The ordnance plant served as a manufacturing and loading site for high-explosive shells, bombs, and other weapons components.

Thirty-three areas were identified for site investigation. These areas were grouped into four operable units (OUs): the PCB OU, the Metals OU, the Miscellaneous OU, and the Explosives and Munitions Manufacturing Area OU. EPA was established as the lead agency for the PCB OU through a Consent Decree issued to Sangamo Electric, Inc. The U.S. Fish and Wildlife Service is responsible for the Metals OU and the Miscellaneous Area OU. The Department of the Army, represented by the U.S. Army Corps of Engineers (USACE), is responsible for the Explosives and Munitions Manufacturing Area OU.

In FY88, a Preliminary Assessment (PA) was conducted at the areas associated with the ordnance plant. A Site Inspection (SI), focusing on 14 sites, also was completed. Results of the PA and the SI did not indicate widespread contamination. Two surface munitions bunkers were demolished in FY92. Other unsafe buildings were demolished in FY93.

In FY93, a Remedial Investigation and Feasibility Study (RI/FS) was completed for the PCB OU and the Metals OU. A Record of Decision (ROD) designating the environmental restoration alternative for the Metals OU was signed, and most Remedial Design and Remedial Action (RD/RA) activities for that OU were completed in FY95. The ROD for the PCB OU was completed.

An RI was completed to study the presence and magnitude of contamination at the Explosives and Munitions Manufacturing Area OU. Fieldwork at the OU included installation of monitoring wells, collection of soil borings and sediment samples, and excavation of magnetic anomalies. The FS for this OU was completed in FY95. Also in FY95, the RI process began at the Miscellaneous Area OU, and an Engineering Evaluation and Cost Analysis (EE/CA) for ordnance and explosives waste (OEW) was undertaken.

In FY96, USACE completed the ROD for the Explosives and Munitions Manufacturing Area OU and began fieldwork for the OEW EE/CA. A draft report was issued; preliminary study indicated a need for institutional controls. The parties involved determined that the U.S. Fish and Wildlife Service must provide preliminary investigations for uncharacterized sites.

In FY97, the ROD for the Explosives and Munitions Manufacturing Area OU was signed, and cleanup of the PCB OU was completed. USACE expedited approval of well abandonment plans by adapting previously approved work plans. Monthly meetings were held with representatives of EPA, Illinois EPA, and the U.S. Fish and Wildlife Service. USACE held a press conference after the incineration of the polychlorinated biphenyls (PCBs), to involve the Restoration Advisory Board (RAB) and the local community.

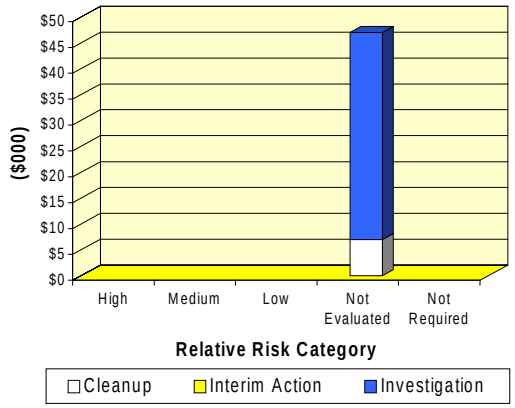
FY98 Restoration Progress

Risk evaluations were completed for all sites. Facilitated partnering was discontinued in July, at which time Illinois EPA withdrew from the partnership. The RA began for hazardous, toxic, and radioactive waste (HTRW) and OEW at the Explosives and Munitions Manufacturing Area OU.

Plan of Action

- Complete RA for HTRW and OEW at the Explosives and Munitions Manufacturing Area OU in FY99

FY99 Funding by Phase and Relative Risk



Size: 13,062 acres
Mission: Receive, store, and demilitarize ammunition; manufacture ammunition-specific equipment
HRS Score: 42.20; placed on NPL in March 1989
IAG Status: IAG signed in 1989
Contaminants: Explosives, metals, solvents, petroleum/oil/lubricants, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $51.7 million
Estimated Cost to Completion (Completion Year): $230.7 million (FY2032)
Final Remedy in Place and Response Complete Date for BRAC Sites: FY2005

Savanna, Illinois

Restoration Background

In July 1995, the BRAC Commission recommended closure of the Savanna Depot Activity and relocation of the U.S. Army Defense Ammunition Center and School to McAlester Army Ammunition Plant in Oklahoma.

The installation began operation in 1917 as the Savanna Proving Grounds. During the 1920s, the mission changed to include storage, receipt, issuance, demilitarization, and renovation of ammunition.

Contaminants from installation operations were released into the environment at landfills; the open burning and open detonation ground; the fire training area; and ammunition load, assemble, and pack facilities. Remedial Investigation and Feasibility Study (RI/FS) activities, beginning in FY89, delineated the extent of explosives-contaminated groundwater, soil, and sediment at all sites, including the TNT washout lagoons.

In FY90, a Remedial Action (RA) began at the TNT washout lagoons to remove contaminated sediment. In FY92, the Army and regulators signed a Record of Decision approving incineration of TNT-contaminated soil and sediment from the site. In FY93, the installation completed a trial burn and began full-scale sediment removal, incineration, and ash-processing.

In FY93, the Army began using high-temperature thermal treatment for cleanup of volatile organic compound (VOC)–contaminated soil at the fire training area. In FY94, the installation completed incineration of TNT-contaminated sediment. To promote the use of innovative technologies, the Army hosted a demonstration of an ultraviolet oxidation (UV/OX) groundwater treatment for removing TNT. During the demonstration, four UV/OX commercial vendors operated their treatment systems. The Army analyzed the demonstrations in an effort to foster technology transfer and communication among installations with similar groundwater contamination concerns. During FY95, the installation completed a trial burn for the high-temperature thermal treatment system at the fire training area.

In FY96, the Army formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). The installation also began an Environmental Baseline Survey (EBS) and drafted the RI/FS report for sites with anticipated cleanups. The installation also completed RCRA closure and cleanup activities at the ammunition deactivation furnace. The BCT completed the draft EBS report and submitted it for regulatory agency review. The installation initiated the BRAC Cleanup Plan (BCP) based on the draft EBS.

In FY97, the installation completed cleanup of the fire training area and completed the BCP, which is awaiting EPA approval. The Army signed a Total Environmental Restoration Contract with Savanna as the anchor installation. The BCT held monthly meetings with the RAB and presented cleanup initiatives to the RAB for input. The BCT also performed field surveys of the contaminated sites. In addition, 11,808 acres have been proposed as CERFA-uncontaminated.

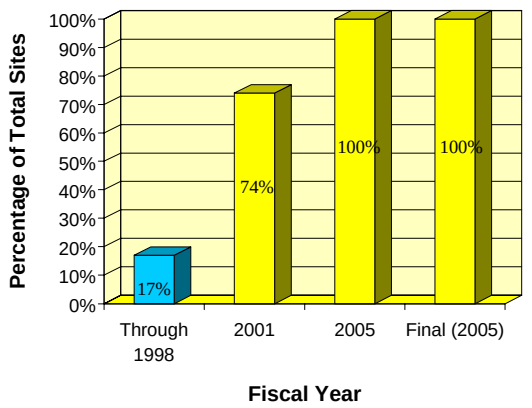
FY98 Restoration Progress

The installation developed the design for the cleanup of the reserve motor pool, continued the investigation of the lower post, and completed the remediation of the PCB vault. Additionally, remediation has been started in the open burning grounds (OBG). All further initiatives for the OBG remediation project were put on hold pending implementation of the Army's peer review guidance on cost avoidance.

Plan of Action

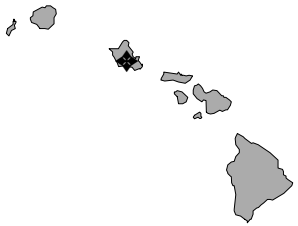
- Initiate the Removal Action at the pesticide burial area in FY99
- In FY99, complete the soil pile Removal Action and the Ecological Risk Assessment at OBG
- Update CERFA report and BCP in FY00

Sites Achieving RIP or RC Per Fiscal Year



Schofield Barracks NPL

Size: 17,725 acres
Mission: Conduct troop training and operations
HR. Score: 28.90; placed on NPL in August 1990
IAG Status: IAG signed in September 1991
Contaminants: Organic solvents, petroleum/oil/lubricants, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $33.5 million
Estimated Cost to Completion (Completion Year): $27.8 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2000



Oahu, Hawaii

Restoration Background

Environmental studies conducted at Schofield Barracks since FY83 have identified 125 sites. Subsequent investigations concluded that 123 sites required no further action. In FY85, the installation detected trichloroethene (TCE) in drinking water wells on site. Schofield Barracks installed an air stripper treatment system in FY86 to remove the TCE from the drinking water.

In FY91, the installation separated sites into four operable units (OUs). OU1 consists of suspected sources of TCE contamination; OU2, of contaminated groundwater; OU4, of the former Schofield Barracks landfill; and OU3, of all other hazardous waste sites identified on the installation.

A Preliminary Assessment and Site Inspection (PA/SI) initiated in FY92 scoped Remedial Investigation and Feasibility Study (RI/FS) efforts for OUs 1, 2, and 4. For OU2, the installation proposed limiting data collection to support a Remedial Action (RA) wellhead treatment strategy. OU4 was addressed in accordance with EPA guidance on generic remedies for the investigation of CERCLA municipal landfills.

In FY93, RIs for OU1 concluded that those sites did not require further action. PA/SI efforts for OU3 screened 106 sites and recommended no further action for 72. The installation structured the restoration program for OU3 to minimize investigations and to move forward quickly to clean up soil. Removal Actions were completed at seven underground storage tank sites.

In FY94, under the Phase I RIs for OU2, groundwater data were collected from wells near the installation. Studies for OU2 did not show TCE contamination in wells other than installation supply wells. Sampling and analysis plans were developed and approved for OU3 to collect the limited data needed to screen the sites and determine the need for further action. RIs for OU4 concluded that the landfill is a continuing source of TCE and other contamination in groundwater. However, the direction of groundwater flow eliminates the landfill as the source of the TCE that is affecting the installation supply wells.

Schofield Barracks concluded investigative efforts for all sites in FY95. In FY96, the installation held public sessions to solicit interest from the community in forming a Restoration Advisory Board; no interest has been expressed. The Army and EPA completed all Records of Decision (RODs) for all operable units in FY96 and approved RODs for OUs 1 and 3 in FY96.

In FY97, the Army petitioned EPA to delete the installation from the National Priorities List (NPL). EPA responded favorably to the NPL deletion proposal and committed to proceeding to deletion after completion of repairs to the former landfill cap for OU4. EPA, the Hawaii Department of Health, and the Army partnered to expedite approval of the remaining two RODs by February 1997. As required by the OU2 ROD, long-term groundwater monitoring of downgradient municipal wells and the implementation of wellhead treatment, where needed to remove TCE migrating from Schofield Barracks, were initiated in FY97.

FY98 Restoration Progress

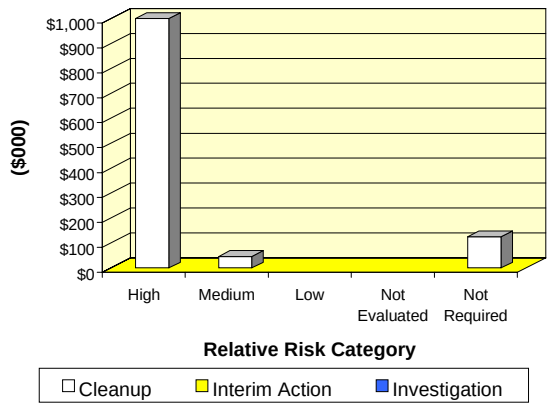
The installation completed construction associated with the repair and maintenance action at OU4. EPA approved the RA report for OU4, and Schofield Barracks reached the Construction Complete milestone. Long-term monitoring of groundwater and landfill gas continues. In accordance with the OU2 ROD, the Army has reimbursed Del Monte Fresh Produce (Hawaii), Inc., for capital costs associated with an air-stripping tower treatment facility at Del Monte's Kunia Village. The Army also funds the operations and maintenance for the facility's removal of TCE from the drinking water supply.

The installation continued to work with EPA and the Hawaii Department of Health throughout FY98 to remove the installation from the NPL. It communicates continuously with EPA and the state to ensure that the regulators are provided with all necessary information to support construction completion and NPL deletion. The installation also works with the regulators to concurrently review documentation in the draft stages in order to reduce review time.

Plan of Action

- Request deletion of Schofield Barracks from the NPL in FY99
- Continue monitoring groundwater to track any movement of TCE contamination in FY99
- Continue monitoring methane gas and providing cap maintenance at the landfill in FY99

FY99 Funding by Phase and Relative Risk



Size: 10,594 acres
Mission: Receive, store, distribute, maintain, and demilitarize conventional ammunition, explosives, and special weapons
HRS Score: 37.30; placed on NPL in August 1990
IAG Status: FFA signed in January 1993
Contaminants: Chlorinated solvents, radioactive isotopes, heavy metals, and petroleum hydrocarbons
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $48.9 million
Estimated Cost to Completion (Completion Year): $88.3 million (FY2005)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002

Romulus, New York

Restoration Background

In July 1995, the BRAC Commission recommended closing Seneca Army Depot, except for an enclave that will store hazardous materials and ores. The installation is scheduled to close in FY00.

During its operation, the installation stored munitions and supplies and distributed them to the Army. Operations such as demilitarization and disposal of munitions and explosives contributed to contamination at the installation. Environmental studies since FY78 have identified the following site types: an open burning (OB) ground, an ash landfill, other landfills, low-level radioactive waste burial grounds, underground storage tanks (USTs), spill areas, fire training areas, and munitions disposal areas.

Under the Federal Facility Agreement in FY94, the Army completed a solid waste management classification study. The study identified 72 solid waste management units (SWMUs); 36 units required no further action or completion reports, 8 required Removal Actions, and 28 required Remedial Investigations and Feasibility Studies (RI/FSs). The 28 sites requiring RI/FSs were divided into 13 groups. The installation began RI/FSs for six groups in FY91, FY95, and FY96.

Interim Actions at the installation include removal of several USTs and associated contaminated soil. The installation completed a Removal Action at the ash landfill in FY95. Approximately 25,000 cubic yards of soil was removed and treated by an innovative low-temperature thermal desorption technique that allowed return of the cleaned soil to the site.

In FY96, the installation completed RI/FSs for the first two groups of sites and drafted a Proposed Plan. RI/FS work plans began for the remaining groups. Fieldwork began for three of the groups.

The installation commander converted the installation's technical review committee to a Restoration Advisory Board (RAB) and established a BRAC cleanup team (BCT). The installation started an Environmental Baseline Survey (EBS) and submitted a draft CERFA report to the regulatory agencies for concurrence. On the basis of the EBS, the BCT completed its bottom-up review and developed a strategy for future cleanup actions. The community formed a local reuse authority and initiated a land reuse plan.

In FY97, the installation completed the EBS and began follow-up action at newly identified sites. The Army's peer review team performed a program review to streamline processes, provide technical advice, and recommend opportunities for cost savings and avoidance. The BCT initiated a peer review action plan for implementing the peer review recommendations, reprioritized schedules for reuse, and initiated a risk assessment protocol for sites for which there are limited data.

FY98 Restoration Progress

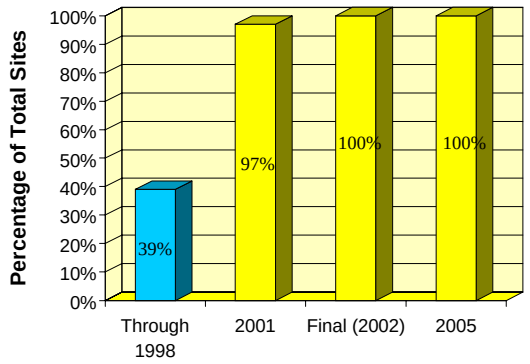
The installation completed an Environmental Impact Statement (EIS) for BRAC closure and began two RIs. It also changed an RI to an Engineering Evaluation and Cost Analysis for a Removal Action and began two additional Removal Actions. Ground-penetrating radar and electromagnetic sensors were employed to conduct surveys at two Seneca sites with mixed results. The Army initiated a Treatibility Study for the reactive wall treatment of the trichloroethene plume, with construction scheduled for FY99. Remedial Designs for the ash landfill and the OB grounds also started. Peer review recommendations were implemented, delaying the completion of the Records of Decision (RODs) for five projects. A more liberal view of the units was discussed, which resulted in further negotiations with the agencies. This effort may produce significant savings for the Army in implementing the selected remedies. A follow-on peer review meeting on the operable units resulted in continued streamlining of the CERCLA program.

Nine new members joined the RAB, and seven members resigned. The new members received a tour of the installation. Training and information sessions are conducted monthly for all members. The Army, the Local Redevelopment Authority, and the state participated in partnering sessions that produced an EIS that satisfied state NEPA requirements for new projects for reuse.

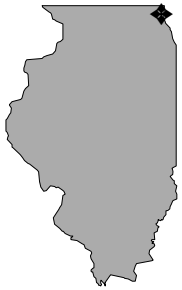
Plan of Action

- Complete RODs for the ash landfill, the OB grounds, the fire training area, and deactivation furnaces in FY99
- Complete No Further Action decision documents for 45 SWMU sites and complete three findings of suitability to transfer in FY99
- Continue RI at two sites and begin two additional RIs in FY99
- Initiate a long-term monitoring effort for ROD sites in FY99
- Demonstrate success of innovative technology in FY99
- Implement peer review recommendations in FY99
- Obtain regulator concurrence in recommendation from EBS site investigations in FY99
- Close installation in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 712 acres
Mission: Provided administrative and logistical support; nonexcess property currently used as Army Reserve installation and Navy Housing Area
HRS Score: NA
IAG Status: None
Contaminants: VOCs, fuel hydrocarbons, PAHs, metals, and UXO
Media Affected: Groundwater and soil
Funding to Date: $33.2 million
Estimated Cost to Completion (Completion Year): $12.2 million (FY2033)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2003



Fort Sheridan, Illinois

Restoration Background

In December 1988, the BRAC Commission recommended the closure of Fort Sheridan. Over its 100-year history, the fort's missions have included cavalry and infantry training, NIKE systems maintenance, and administrative and logistical support. Currently, 104 acres is used as an Army Reserve installation.

Sites include landfills, pesticide storage areas, hazardous material storage areas, underground storage tanks (USTs), polychlorinated biphenyl (PCB)–containing transformers, and unexploded ordnance (UXO) areas. Petroleum hydrocarbons, volatile organic compounds (VOCs), and polyaromatic hydrocarbons (PAHs) affect groundwater and soil. Early actions included removal of USTs and contaminated soil.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY90. These investigations identified the following areas for potential cleanup: groundwater and soil contamination at two gas stations, seven landfills, and soil contamination at coal storage areas.

In FY94, an installation survey identified UXO at the former artillery range at the north end of the fort. The installation completed an Environmental Baseline Survey (EBS) that identified 304 acres as clean under CERFA requirements. Regulatory agencies concurred that 22 acres is CERFA-clean. The commander formed a BRAC cleanup team, which completed the Version 1 BRAC Cleanup Plan (BCP).

FY95 actions included removal of contaminated soil from Building 208 and a Time-Critical Removal Action (TCRA) involving removal of contaminated sediment from Buildings 43 and 368. The installation also began an Interim Action to close Landfills 6 and 7, conducted background sampling, and classified groundwater conditions at the installation. The commander also formed a Restoration Advisory Board (RAB), and the Army approved a land reuse plan prepared by the Local Redevelopment Authority.

In FY96, the Army completed the TCRA at Buildings 43 and 368. The installation completed Phase II and Phase III RI fieldwork at the excess property, performed a UXO Removal Action, and completed Version 2 of the BCP. The Army removed several USTs on excess property and conducted asbestos abatement for excess-area buildings. The Army also completed a radiological closeout survey.

In FY97, the Army completed the decision document for the Landfill 6 and 7 Interim Remedial Action (IRA) and began IRA construction. A Non-Time-Critical Removal Action for cleaning up coal storage areas and a blacksmith's shop on excess property also began. In addition, the installation prepared a RI, a Proposed Plan, and a no-action decision document for Landfills 3 and 4.

The Army conducted lead-based paint hazard abatement for excess property. RI reports were prepared for the remaining parts of the excess property. A site-specific EBS for property transfers and leases was completed, as was Phase II RI fieldwork on nonsurplus property.

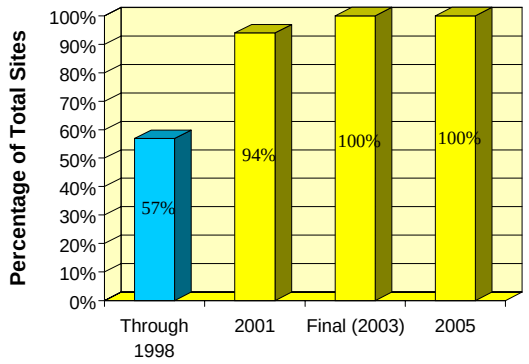
FY98 Restoration Progress

The installation prepared two RI reports for the remainder of the excess property and a RI report for nonsurplus property. It also completed a no-action decision document for portions of the excess property, completed an EBS and findings of suitability to transfer (FOSTs) for property transfers, and transferred 300 acres of excess property. Regulatory agencies concurred with approximately 300 acres of CERFA-uncontaminated property. The installation conducted a Non-Time-Critical Removal Action at the coal storage areas and the former blacksmith's shop. The Army made significant progress on constructing the IRA for Landfills 6 and 7. The installation also completed UXO clearance on the former rifle range.

Plan of Action

- Prepare decision document for remainder of excess property in FY99
- Prepare EBS and FOST for property transfers in FY99
- Complete RI/FS for nonsurplus property in FY99
- Continue IRA at Landfills 6 and 7 in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 36,322 acres
Mission: Receive, store, and maintain conventional ammunition, as necessary to support demilitarization of conventional ammunition and receive, store, maintain, and issue operational project stocks and general supplies
HRS Score: NA
IAG Status: Two-party Federal Facility Agreement signed in May 1991
Contaminants: Petroleum products, solvents, and explosives
Media Affected: Groundwater and soil
Funding to Date: $33.6 million
Estimated Cost to Completion (Completion Year): $30.0 million (FY2035)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2006

Herlong, California

Restoration Background

In 1995, the BRAC Commission recommended realignment of Sierra Army Depot by reducing its conventional ammunition mission to a level sufficient to support conventional ammunition demilitarization, and by retaining it as an enclave for the Operational Project Stocks mission and the static storage of ores. Approximately 4,537 acres was identified as excess. Environmental contamination at the depot originated from burn trenches, explosives leaching beds, landfills, burial sites, spill sites, sewage lines, underground storage tanks, sumps, and fire training areas. Primary contaminants in soil and groundwater include trichloroethene (TCE), petroleum products, and explosives. Environmental investigations identified 23 sites; 12 sites required no further action.

The installation partnered with state regulatory agencies to set up a geographic information system (GIS) at the installation. It also developed a cooperative program with the University of Nevada-Reno. Results of graduate student studies have refined knowledge of the aquifer in Honey Lake Valley. This information is being used and shared with the community to locate a higher quality, more dependable source of potable water.

Restoration activities in FY95 included a bioventing project at the active fire training area and signature on a Record of Decision (ROD) for nine sites. RODs for seven sites specified use of natural attenuation and degradation (NAD) for both explosives and TCE in groundwater. Selection of this remedy marked the first time that U.S. regulators had allowed the use of natural attenuation (NA) as an innovative technology for remediating explosive products and TCE in groundwater. The Army completed a design implementing composting for treatment of soil contaminated with explosives.

In FY96, the installation commander formed a BRAC cleanup team (BCT), which published Version 1 of a BRAC Cleanup Plan (BCP). The Army developed the design concept for preventing off-post migration of a TCE-contaminated groundwater plume. The installation updated its community relations plan and used the plan to establish a Restoration Advisory Board in FY97. The Army developed an early warning groundwater transducer program to monitor petroleum- and TCE-containing plumes near the potable water supply network. By the end of FY96, RODs had addressed 17 of Sierra's 23 sites. Work also began on the BRAC NEPA document.

In FY97, the Army completed an Environmental Baseline Survey and identified 3,537 acres as CERFA-clean. In addition, a report of availability and an Environmental Condition of Property (ECP) were completed for the BRAC cantonment parcel. The Army used a NEPA Categorical Exclusion to transfer some BRAC property. Sierra Army Depot was the first BRAC 95 installation to transfer property. Version 2 of the BCP was completed.

FY98 Restoration Progress

The depot used contaminated soil removed from the BRAC property Rifle Range to resurface the range impact berm at an active range on the retained parcel. By collecting data in the field during the BRAC berm removal and the retained-range berm improvement, the installation reduced cleanup time and costs. The BRAC range was remediated and closed.

The installation also completed a Removal Action for the BRAC construction debris area to remove hazards and remediate the site. An Engineering Evaluation and Cost Analysis project design was completed for the BRAC unexploded ordnance (UXO) areas. If UXO is identified on the site, further work may be required.

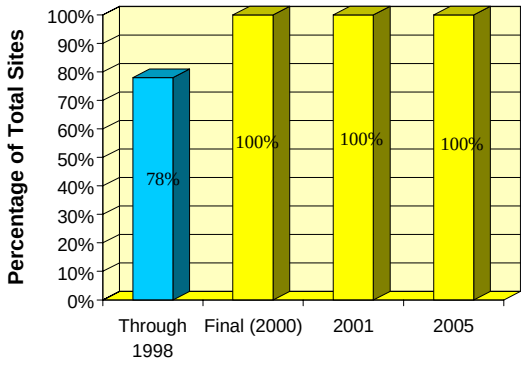
Preliminary screening at a contaminated soil area indicated that no further action would be required at the site. The installation also completed reviews of three ECOPs. The properties covered by the ECOPs are available for transfer. The installation has two approved RODs with NA of groundwater identified as the preferred remedy. The Army anticipates that it will propose two or more NA RODs in the future. RODs were signed for the Defense Reutilization and Marketing Office (DRMO) site. The selected remedy includes active bioventing of soil with a hot-spot removal, and NA for groundwater. The installation completed soil removals to close two other sites.

The installation worked successfully to meet its project schedule. Efforts to emphasize risk-based decisions have been slowed by an increased exchange of position papers between the Army and state regulators. The BCT reviewed all ECOPs. The installation has conducted site tours and published newsletters about the sites. The Army Environmental Center briefed the RAB about the Technical Assistance Public Participation (TAPP).

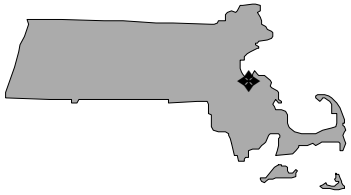
Plan of Action

- Complete three BRAC property transfers in FY99
- Remove all depleted uranium (DU) munitions in FY99
- Complete final two RI reports in FY99
- Close out two active restoration operations in FY99
- Complete DU closeout report in FY00
- Complete 5-year report on NA at TNT area in FY00
- Install and begin operating the DRMO remediation system and complete one BRAC property transfer in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 78 acres
Mission: Research and develop food, clothing, equipment, and materials to support military operations
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: None
Contaminants: Pesticides, herbicides, pentachlorophenol, solvents, and VOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $16.3 million
Estimated Cost to Completion (Completion Year): $28.6 million (FY2030)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Natick, Massachusetts

Restoration Background

Since 1954, this installation has supported industrial, laboratory, and storage activities for research and development in food science and aeromechanical, clothing, material, and equipment engineering. Operations used various volatile organic compounds (VOCs), including tetrachloroethene (PCE), trichloroethene (TCE), carbon disulfide, benzene, and chloroform. Site types include contaminated buildings, spill sites, storage areas, disposal pits, dry wells, and underground storage tanks.

In FY89, soil gas surveys detected VOCs under Building T-25 and the former proposed gymnasium areas. Groundwater, soil, and surface water samples collected during later studies also contained VOCs.

The installation completed an Expanded Site Inspection in FY92 that confirmed TCE contamination in groundwater. A Remedial Investigation and Feasibility Study (RI/FS) began in FY93. The installation has performed several Interim Actions, including removal of waste and contaminated soil and pavement from the drum storage area. The installation also removed a 1,000-gallon waste oil storage tank and associated contaminated soil, and removed polychlorinated biphenyl (PCB)–contaminated soil from an exploded transformer.

After its placement on the National Priorities List (NPL), the installation increased efforts to partner with state and federal regulators and communicate with the community. The installation established a Restoration Advisory Board (RAB) in FY95.

In FY96, the installation conducted a Phase II RI of the Building T-25 area to address the concerns of regulatory agencies and the RAB. The Army completed the first iteration of the groundwater model, detailing movement of water and contaminants within the complex alluvial aquifer. The Phase I RI for the Building T-25 area was completed, incorporating the views of the regulatory agencies. The installation began receiving drinking water from public wells and discontinued sampling of the installation's drinking water wells.

Also in FY96, all active sites received an initial Relative Risk Site Evaluation ranking, which incorporated the views of the regulatory agencies. The RAB received and reviewed work plans and reports and participated in relative risk rankings of NPL sites.

In FY97, the installation performed quarterly monitoring of groundwater contaminant levels in the monitoring well network. Bimonthly meetings with regulators increased coordination between regulators and installation. To resolve issues with regulators, the installation established a consensus approach to new work. Field screening with geoprobe and ground-penetrating radar was used to expedite site characterization.

FY98 Restoration Progress

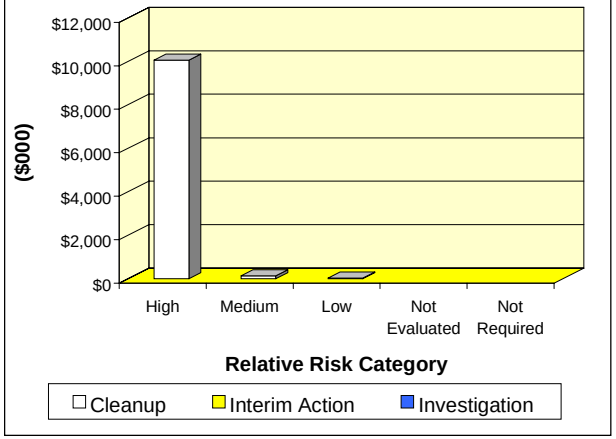
The installation completed fieldwork for the RI at the former proposed gymnasium site and removed pesticide-contaminated soil. The installation also continued quarterly monitoring of groundwater contaminant levels on and off site and began the approved T-25 Treatability Study (TS) to contain contamination within the post boundaries. Initial results indicate that the strategy is working. The installation began investigating the boiler plant site.

The installation remedial project manager meets weekly with regulators to speed document review. Quarterly partnering meetings with regulators also encourage cooperation among parties.

Plan of Action

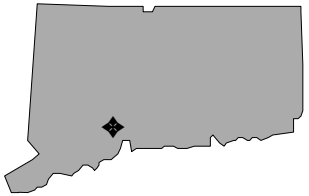
- Continue operation of the T-25 TS in FY99
- Complete RI/FS at the gymnasium site in FY99
- Complete the T-25 groundwater Record of Decision in FY99
- Begin a Removal Action at the boiler plant in FY99

FY99 Funding by Phase and Relative Risk



Stratford Army Engine Plant — BRAC 1995

Size: 128 acres
Mission: Manufacture engines for heavy armor vehicles and rotary wing aircraft
HRS Score: NA
IAG Status: None
Contaminants: PCBs, asbestos, fuel-related VOCs, solvents, metals, and PAHs
Media Affected: Groundwater, soil, surface water, and sediment
Funding to Date: $6.3 million
Estimated Cost to Completion (Completion Year): $19.9 million (FY2001)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001



Stratford, Connecticut

Restoration Background

In July 1995, the BRAC Commission recommended closure of the Stratford Army Engine Plant. The installation closed in September 1998.

Since FY91, environmental studies at the installation have identified the following sites: transformers that contain polychlorinated biphenyls (PCBs), underground storage tanks (USTs), sludge lagoons, a fire training and explosives equipment testing area, hazardous materials and hazardous waste storage areas, and buildings constructed with asbestos-containing materials. Preliminary studies indicated that contaminants might include PCBs, fuel-related volatile organic compounds (VOCs), solvents, metals, polyaromatic hydrocarbons (PAHs), and asbestos.

Interim Actions at the installation have included removal of 27 USTs, capping of two sludge lagoons, and capping of one large parking lot area to immobilize contaminated soil. The installation closed two USTs in place. In FY95, the installation began a Remedial Investigation (RI) to identify and characterize contamination and affected media throughout the installation.

In FY96, the Army appointed a BRAC environmental coordinator (BEC) and formed a BRAC cleanup team (BCT). The community formed a Local Redevelopment Authority to address socioeconomic issues related to closure of the installation and to develop a land reuse plan. Phase II of the RI was completed. The installation held two public meetings to keep the community informed about all BRAC activities and property disposal. The installation also began an asbestos survey of all buildings and started the NEPA process, including an archive search. A draft final Environmental Baseline Survey (EBS) and a draft BRAC Cleanup Plan (BCP) were completed.

In FY97, the installation received concurrence from the appropriate regulatory agencies on the EBS and CERFA reports. RI Phase III began. The installation amended work plans for the RI and Feasibility Study (FS) to tighten schedules and activities. As a result, the schedule and deliverables were monitored more closely. The BCT reviewed the EBS and CERFA reports. The latest version of the BCP was completed. The appropriate regulatory agencies concurred with the proposed designation of 3 acres as CERFA-uncontaminated. The installation improved its management practices by implementing systems for monitoring schedules and budgets.

FY98 Restoration Progress

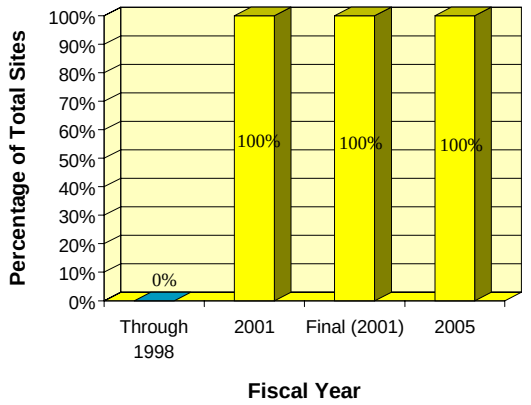
The installation implemented the community relations plan, which includes establishment of a staffed on-site public information repository. The installation also began a Time-Critical Removal Action to address high concentrations of hexavalent chrome in soil in the old chrome-plating area. This Removal Action should attain long-term remediation goals.

The installation began a major sitewide RI/FS for a 76-acre upland portion of the property. The RI/FS includes performance of all necessary risk assessments to expedite transfer of the property.

Plan of Action

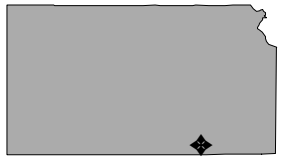
- Complete sitewide RI/FS investigation in FY99 and a Proposed Plan and ROD in FY00
- Complete Removal Action at chrome-plating area in FY99
- Address possible use of an Engineering Evaluation and Cost Analysis approach to remediating causeway portion of tidal flats in FY99
- Begin action to change fluids in 17 PCB-containing transformers to permit their reclassification as non-PCB transformers and enable installation to leave units in place at transfer in FY99

Sites Achieving RIP or RC Per Fiscal Year



Strother Army Airfield NPL

Size: 1,386 acres
Mission: World War II basic flying training station and tactical training station
HRS Score: Unknown; placed on NPL in May 1986
IAG Status: None
Contaminants: VOCs
Media Affected: Groundwater
Funding to Date: $0.06 million
Estimated Cost to Completion (Completion Year): $0.08 million (FY2001)
Final Remedy In Place or Response Complete Date for All Sites: NA



Cowley County, Kansas

Restoration Background

The Strother Army Airfield near Winfield, Kansas, was declared as excess to the government in 1945, and the property was transferred to the Strother Field Airport Commission in 1946. The commission subsequently converted the property into a municipal airport and an industrial park.

On June 10, 1986, the Strother Field Industrial Park was placed on the National Priorities List (NPL). Samples collected and analyzed by the state indicated the presence of volatile organic compounds (VOCs), including trichloroethene (TCE), in groundwater. Two inactive solid waste landfills, which were used for disposal of various industrial wastes, exist at the site.

Until 1983, the Strother Field Airport Commission had operated a water supply system consisting of eight wells on the site. The contaminated groundwater is no longer used for drinking but is still used for industrial processes. Drinking water was provided by trucks until the commission installed two wells upgradient of the contaminant plume. In 1985, General Electric, a potentially responsible party (PRP), installed groundwater extraction wells and air stripping towers to remove VOCs from the groundwater under an Administrative Order by the Kansas Department of Health and Environment.

The state oversaw an investigation by the PRP that identified the types of contaminants remaining in the groundwater and other areas and has recommended a remedy for final site cleanup. The remedy includes pumping and treating the groundwater and using soil vapor extraction to clean up the soil. Design of the remedy began in late 1994.

In March 1997, EPA notified the Kansas City District of the U.S. Army Corps of Engineers (USACE) about DoD's potential liability at the Strother Field Industrial Park Superfund Site. The Kansas City District received authorization in April 1997 to conduct a limited investigation to determine whether DoD should be included as a PRP at the site. DoD has conducted a preliminary evaluation of DoD's liability and is working with the Department of Justice (DOJ) and EPA to determine whether DoD should remain a PRP.

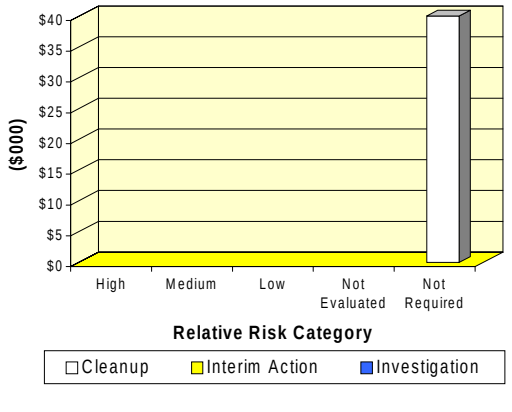
FY98 Restoration Progress

USACE completed a limited historical investigation of DoD activities at the site and a study of the availability and use of solvents at World War II Army Airfields. USACE and EPA conducted independent assessments of DoD liability and submitted their evaluations to the Department of Justice. The Department of Justice began an evaluation of USACE's and EPA's positions. USACE has assisted DOJ with technical and historical input.

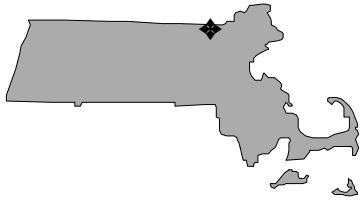
Plan of Action

- Receive DOJ evaluation and recommendation concerning DoD liability in FY99
- Provide technical support to DOJ as requested in FY99
- Reach settlement releasing DoD from further liability and achieve project closeout in FY99

FY99 Funding by Phase and Relative Risk



Size: 2,292 acres
Mission: Train troops and test ordnance, material, and equipment
HRS Score: 35.57; placed on NPL in February 1990
IAG Status: IAG signed in May 1991
Contaminants: VOCs, PCBs, pesticides, and heavy metals
Media Affected: Groundwater and soil
Funding to Date: $12.6 million
Estimated Cost to Completion (Completion Year): $2.3 million (FY1999)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Middlesex County, Massachusetts

Restoration Background

In July 1995, the BRAC Commission recommended closure of the Sudbury Training Annex, a subpost of Fort Devens in eastern Massachusetts. Environmental studies since FY80 identified several site types, including an old landfill, disposal and dump areas, a fire training pit, ordnance test areas, a leach field, underground storage tanks (USTs), a drum storage area, a burning ground area, and a chemical research and development area. In FY86, Remedial Investigation and Feasibility Study (RI/FS) activities confirmed groundwater contamination at two sites. The primary contaminants at the installation are volatile organic compounds (VOCs) and pesticides in groundwater and soil.

Interim Actions at the installation include removal of drums, petroleum-contaminated soil, and a UST. In the mid-1980s, the installation excavated fuel-contaminated soil from a burning ground area and polychlorinated biphenyl (PCB)–contaminated soil from a transformer storage area.

In FY94, the installation removed 2,300 tons of contaminated soil, 15 tons of debris, 107 abandoned drums, and 13 abandoned oil USTs. In FY95, the installation identified two additional sites, bringing the total number of identified sites to 74. Cleanup and study actions at individual sites included signing decision documents for no further action at 19 sites; completing the FS, Proposed Plan, and Record of Decision (ROD) for 5 sites and initiating Remedial Design (RD) activities; completing the final RI for 5 sites; completing Screening Site Inspections (SSIs) for 15 sites; initiating SSIs for 10 sites; and performing Engineering Evaluation and Cost Analyses for 4 sites. The installation also removed 1,200 tons of arsenic-contaminated soil.

The Army signed a ROD for five sites, completed RD for those sites, and began Remedial Action (RA). The installation began an Environmental Baseline Survey. SSIs of 15 sites were completed. The Army performed Removal Actions at nine sites, resulting in removal of 11,800 cubic yards of soil contaminated with total petroleum hydrocarbons, polyaromatic hydrocarbons (PAHs), and metals. RODs for no further action were signed for five additional sites.

In early FY97, the Army completed Removal Actions at nine sites for metals, pesticides, PAHs, and VOCs. All outstanding Site Inspections were completed by early FY97. The installation also completed an archive search for unexploded ordnance (UXO) and an installation-wide arsenic study, and installed a landfill cap. Site cleanups were completed, and a ROD for no further action was signed, for Sites A4, A7, and A9. The installation implemented an innovative Geonet gas venting system and consolidated the removed soil from nine sites as subgrade under the landfill cap, saving off-site disposal costs.

A technical review committee (TRC) was formed in FY90. The TRC helped foster partnerships with EPA and state regulatory agencies and gave local environmental groups a means of participating in the review process for the installation cleanup program. In FY96, the commander of the installation determined that there was insufficient public interest to convert the TRC to a Restoration Advisory Board.

FY98 Restoration Progress

The installation completed closure of 93 monitoring wells, five abandoned septic systems, and four water supply wells. A 3-year installationwide arsenic study was completed. This study concluded that no human health risks exist but that more data are required to determine ecological risks. The installation identified two remaining sites for limited Removal Action.

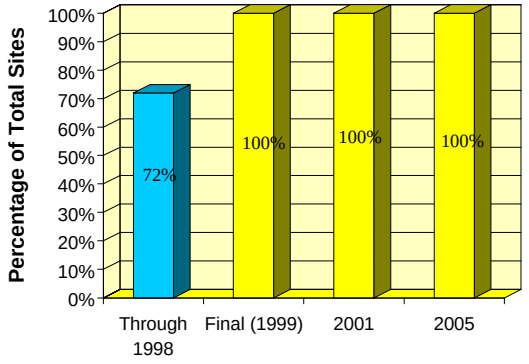
The property transfer split among the Air Force (AF), the Federal Emergency Management Agency (FEMA), and the U.S. Fish & Wildlife Service is expected early in 1999 and has been delayed by ongoing negotiations between the agencies. However, appropriate Environmental Condition of Property Statements and Memorandums of Agreement were sent to the U.S. Forces Command for approval.

The cultural and natural resources survey was also completed. A UXO survey was completed and found UXO residue in one building that will require remediation.

Plan of Action

- In FY99, collect data with EPA to determine ecological risks associated with the arsenic study
- Achieve deletion of the installation from the National Priorities List (NPL) in FY99
- Transfer property to the Department of Interior, AF, and FEMA in FY99
- Receive regulatory concurrence on finding of No Human Health or Environmental Risk in FY99
- Examine all CERCLA sites and determine CERFA designation by the BRAC cleanup team in FY99
- Complete all BRAC activities, except long-term monitoring by FY05

Sites Achieving RIP or RC Per Fiscal Year



Sunflower Army Ammunition Plant — Proposed NPL

Size: 9,065 acres
Mission: Manufactured smokeless powder and propellants; on standby status for production of nitroguanidine
HRS Score: 50.00; proposed for NPL in February 1995
IAG Status: None
Contaminants: Nitrates, sulfates, lead, chromium, and propellants
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $13.8 million
Estimated Cost to Completion (Completion Year): $54.5 million (FY2025)
Final Remedy in Place or Response Complete Date for All Sites: FY2014

De Soto, Kansas

Restoration Background

The Sunflower Army Ammunition Plant began operations in 1942. Its primary mission was to manufacture smokeless powder and propellants. Additional installation operations included the manufacture and regeneration of nitric and sulfuric acids and munitions proving. The installation no longer has a mission, and all real property is being designated as excess. Sources of contamination at the installation include production line areas, magazine storage areas, and 50 RCRA solid waste management units (SWMUs). EPA proposed placing the installation on the National Priorities List (NPL) after they evaluated five munitions manufacturing surface impoundments as potential sources of hazardous waste.

Prominent site types at the installation include landfills, open burn and open detonation (OB/OD) areas, propellant production areas, dump sites, a battery handling area, settling ponds, wastewater lagoons, and drainage ditches.

A groundwater contamination survey in FY87 and a Site Inspection in FY88 revealed contaminated groundwater at the installation. Results of analysis also indicated contamination of surface water and sediment with heavy metals. Interim Actions at the installation have included removal of underground storage tanks and associated contaminated soil and cleanup of an asbestos dump site.

The technical review committee, including representatives from EPA, the Kansas Department of Health and Environment (KDHE), the U.S. Army Corps of Engineers, and contractors, continues to meet monthly to discuss restoration activities and devise ways of accelerating Remedial Actions.

The Army completed an Ecological Risk Assessment for the entire installation and submitted the document to EPA and KDHE for review. The assessment concluded that no further action was necessary for most of the areas studied. A final survey of benthic macroinvertebrates was completed; the survey concluded that biological features of surface water appear to be in good condition. A 1996 visit and summary conducted by the Agency for Toxic Substances and Disease Registry identified no specific environmental or public health concerns related to the installation.

In FY97, the installation completed the site cleanup for SWMU 50 (South). RCRA Facility Investigations (RFIs) for eight SWMUs were also completed. The installation completed Relative Risk Site Evaluations for all sites.

FY98 Restoration Progress

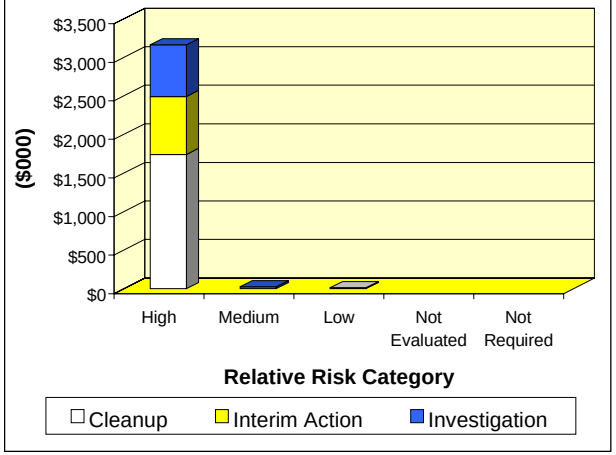
The Army completed the restoration of the remaining wastewater lagoon. The installation also completed soil and groundwater sampling and analysis and finished investigations of SWMUs. The Army continues to participate in a phytoremediation study of sites contaminated with lead; this study is being funded by the Army Environmental Center and conducted by the Tennessee Valley Authority. EPA and state regulators approved the Army's Ecological Risk Assessment for the installation and the community relations plan.

The installation did not complete the planned Interim Remedial Actions for SWMU 50 (North) due to a change in priorities and increased project scope. The commander converted the technical review committee to a Restoration Advisory Board, which meets every 2 months.

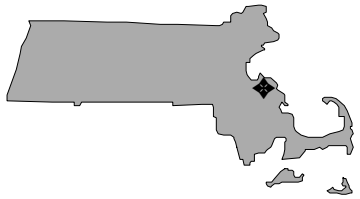
Plan of Action

- Complete RFIs for SWMUs 14, 21, 24, 25, 30, 33, 34, 35 and 36 in FY99
- Complete Interim Remedial Actions for SWMU 50 (North) in FY99
- Complete an inventory of off-site wells in FY99
- In FY99, begin long-term monitoring of groundwater beneath the lagoons
- Complete the grazing study in FY99
- Complete closure of the OB/OD site (SWMU 23) in FY99
- Complete the field evaluation of two new SWMUs in FY99
- Complete groundwater investigations for OU1 in FY99

FY99 Funding by Phase and Relative Risk



Size: 2,174 acres
Mission: Provided administrative coordination and logistic support for Reserve Units; provided logistic support for the Marine Air Reserve Training Detachment South Weymouth
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement negotiation planned (FY99)
Contaminants: Petroleum hydrocarbons, solvents, acids, paints, metals, photographic chemicals, and industrial wastes
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $16.2 million
Estimated Cost to Completion (Completion Year): $13.8 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Weymouth, Massachusetts

Restoration Background

In July 1995, the BRAC Commission recommended closure of the South Weymouth Naval Air Station (NAS). Operations were transferred to the Brunswick Naval Air Station, and aircraft, personnel, and equipment were relocated. The installation was closed on September 30, 1997.

Initially, eight CERCLA sites and one RCRA underground storage tank (UST) site were identified at the installation. One of the CERCLA sites, Site 6, is being investigated as a UST site. Prominent site types include a landfill, a tank storage area, a tank farm where jet fuel is stored in five USTs, a rubble disposal area, and a fire training area.

In FY91, the waste oil tank was removed from UST 1. In FY93, an initial investigation was completed for the UST site. The installation completed a Preliminary Assessment for five sites in FY88 and a Site Inspection for eight sites in FY92. Also in FY92, several compressed chlorine gas cylinders and pesticide containers were removed from an old sewage treatment plant (Site 7). In FY93, the installation conducted a second Removal Action at Site 7 to remove contaminated soil and liquids. In FY95, during a preliminary corrective action involving removal of soil, the installation identified additional contamination at UST 1. A third UST site (UST 2) was identified at Squantum Gardens Housing Area. Two Removal Actions, one to remove tanks and the other to remove contaminated soil, were completed for the site.

In FY94, the year NAS South Weymouth was placed on the National Priorities List (NPL), the Agency for Toxic Substances and Disease Registry (ATSDR) completed an abbreviated Public Health Assessment of the installation. No major health hazards were identified.

In FY96, the Remedial Investigation (RI) work plan was completed for seven Installation Restoration (IR) sites. Also during FY96, the installation formed a BRAC cleanup team (BCT) and began to develop its BRAC Cleanup Plan (BCP). A corrective action plan was completed for UST 1, and a corrective action began for UST 2. The Navy implemented the RI work plan for the seven sites and began work on Phase I of an Environmental Baseline Survey (EBS).

In FY97, the design for UST 1 and the corrective action for UST 2 were completed. In addition, Phase I of the EBS was finished and Phase II initiated. The RI Phase I report was submitted as a draft document. A geographic information system (GIS) was initiated at the NAS to present and process the data from the IR Program (IRP) and the UST Program, as well as the future EBS data.

The installation established a technical review committee in FY92 and converted it to a Restoration Advisory Board (RAB) in FY94. The installation established an administrative record and four information repositories in FY92 and completed its community relations plan (CRP) in FY92.

FY98 Restoration Progress

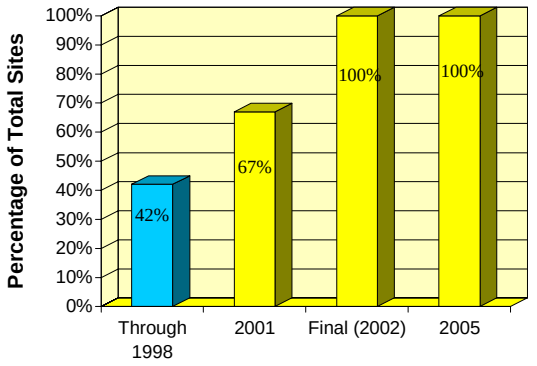
The draft RI Phase I report was finalized after review by the Navy, regulatory agencies, community groups, the RAB, and the EPA technical assistance grant (TAG) grantee. An RI Phase II work plan was implemented based on conclusions and recommendations by the many participants in the Navy IRP. ATSDR completed a draft Public Health Assessment report for the installation. The EBS Phase II work plan neared completion after much review of planned activities and EBS protocol. The GIS was completed, and further updating will occur as data are collected. All seven IRP sites were reviewed for possible use of presumptive remedies, and the surficial debris Removal Action work plan was initiated for these sites. The site management plan was initiated in preparation for Federal Facility Agreement (FFA) negotiations, scheduled for FY99.

The RAB met 11 times, and the BCT met frequently. The CRP was updated and submitted to all participants in the IRP. The latest version of the BCP was released in August. A draft Technical Assistance for Public Participation application was prepared by the RAB in cooperation with the Navy. Informal partnering expedited the decision-making process, and the Navy has continued conducting site tours of the activity for interested community residents, RAB members, and public groups.

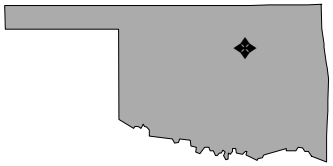
Plan of Action

- Complete RI Phase II work plan in FY99
- Complete site management plan in coordination with the negotiation of the FFA in FY99
- Review IRP sites as candidates for presumptive remedies and/or innovative and improved technologies in FY99
- Complete surficial debris Removal Action in FY99
- Initiate Feasibility Studies for IRP sites in FY00
- Complete No Further Action Records of Decision for three IRP sites in FY00
- Initiate Interim Remedial Actions for two IRP sites in FY00

Sites Achieving RIP or RC Per Fiscal Year



Size: 5,044 acres
Mission: Repair aircraft, weapons, and engines
HRS Score: 42.24; placed on NPL in July 1987
IAG Status: IAG signed in September 1988
Contaminants: Organic solvents, heavy metals, and low-level radioactive material
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $144.8 million
Estimated Cost to Completion (Completion Year): $163.7 million (FY2023)
Final Remedy in Place or Response Complete Date for All Sites: FY2008



Oklahoma City, Oklahoma

Restoration Background

Environmental studies at Tinker Air Force Base revealed a 220-acre contaminant plume in the upper aquifer at Soldier Creek and Building 3001. Additional sites include landfills, underground storage tanks (USTs), waste pits, fire training areas, spill sites, and low-level radioactive waste sites.

The installation has implemented numerous Interim Actions, including removal of contaminated soil and USTs and installation of landfill caps, free-product recovery systems, bioventing systems, a biostripping system, and a solidification and stabilization system. A Record of Decision (ROD) was signed for Building 3001 in FY90, and a groundwater extraction and treatment system is operating at the site. A ROD for Soldier Creek was signed in FY93. In FY94, the installation participated in EPA's Superfund Innovative Technology Evaluation program.

In FY95, the installation expanded the fuel recovery system at the North Tank Operable Unit (OU) and removed all USTs from four sites. The installation also began a Phase II RCRA Facility Investigation (RFI) for 18 sites and completed the majority of the Remedial Investigation (RI) for the Industrial Wastewater Treatment Plant (IWTP)/Soldier Creek Off-Base Groundwater (SCOBGW) OU. A bioslurping system and a bioventing system were installed to treat fuel-contaminated soil. In addition, Remedial Actions (RAs) involving treatment of fuel and solvent contamination were implemented at two sites, and a two-dimensional (2-D), high-resolution seismic reflection study was completed to identify preferential contaminant-migration pathways. The installation began using a geographic information system (GIS) to improve site characterization.

The installation completed a Phase II RFI report in FY96. Actions to increase product recovery and reduce the volume of extracted groundwater were implemented at fuel-contaminated sites. Seven interim corrective actions were initiated, and one was completed. A draft final RI and Feasibility Study (FS) of the IWTP/SCOBGW OU also was completed.

In FY97, the installation removed low-level radioactive waste and completed the cleanup of Radioactive Waste Disposal Site 1030W. In addition, the base completed the capping preparation for Landfill 2, capping of Landfill 4, construction of a bioventing system for the Fuel Purge Facility, and construction of a treatment system for the Area A Service Station. These early response actions reduced the risk of five high-risk sites to low risk. The installation used 2-D/3-D shallow seismic reflection, a Global Positioning System (GPS), and a GPS magnetic and electromagnetic induction survey.

The installation formed its Restoration Advisory Board in FY94.

FY98 Restoration Progress

The installation completed construction of RCRA caps for Landfills 2 and 5. Sixty million gallons of groundwater was treated and 100 gallons of trichloroethene was recovered. A groundwater treatment plant for the southwest quadrant of the base was constructed. This treatment system addresses the groundwater contamination under 25 percent of the Installation Restoration Program sites on base.

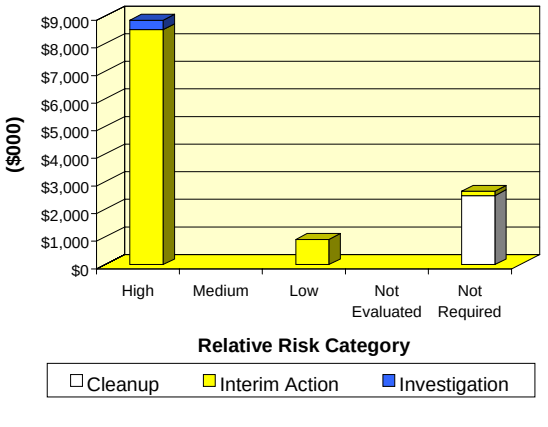
The installation reduced the relative risk of four high-risk sites to low risk. This reduction puts Tinker on track to eliminate all high-risk sites by FY2002, ahead of the Air Force and DoD target date of FY2007.

The Proposed Plan and the ROD for the SCOBGW OU were delayed, pending regulatory concurrence. Source removal began at Waste Pit 1 but requires further investigation for delineation of this site and completion of the remediation.

Plan of Action

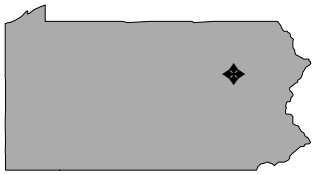
- Complete FS, risk assessment, Proposed Plan, and ROD for SCOBGW OU and begin RA in FY99
- Install a RCRA cap at Landfill 6 in FY99
- Construct a groundwater treatment system for the Gator Groundwater Management Unit in FY99
- Close the 3700 Fuel Yard and Purge Facility sites in FY99
- Finish 5-year review of National Priorities List (NPL) treatment systems in FY99
- Close all five remaining radioactive waste disposal sites in FY00
- Complete construction of treatment system at 290 Fuel Farm in FY00

FY99 Funding by Phase and Relative Risk



Tobyhanna Army Depot — NPL

Size: 1,293 acres
Mission: Provide logistics for communications and electronics equipment
HRS Score: 37.93; placed on NPL in August 1990
IAG Status: IAG signed in September 1990
Contaminants: Heavy metals, VOCs, PCBs, petroleum/oil/lubricants, and UXO
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $13.7 million
Estimated Cost to Completion (Completion Year): $8.6 million (FY2021)
Final Remedy in Place or Response Complete Date for All Sites: FY2004



Tobyhanna, Pennsylvania

Restoration Background

Environmental studies since FY80 have identified several sites at this installation, including landfills, a disposal pit, underground storage tanks (USTs), burn areas, drum staging areas, a surface disposal area, a waste treatment plant, a spill site area, an unexploded ordnance (UXO) area, and a firefighting training area. The most prominent sites are the burn areas and a drum staging area, which together form Operable Unit (OU) 1. Contamination at these sites includes volatile organic compounds (VOCs), solvents, and heavy metals in groundwater; solvents, heavy metals, polychlorinated biphenyls (PCBs), and petroleum/oil/lubricants (POL) in surface water and sediment; and solvents, heavy metals, PCBs, POL, and UXO in soil.

The installation initiated several Interim Actions between FY87 and FY91 and constructed a water line extension from the installation to affected residences. The installation also removed 40 USTs.

Remedial Investigation and Feasibility Study (RI/FS) activities began in FY90. In FY92, the installation completed RI fieldwork at OU1 and a Treatability Study of a soil volatilization technology. In FY94, the installation completed the Phase I RI at 11 sites and began an installationwide Ecological Risk Assessment (ERA).

In FY95, the installation submitted an RI work plan for construction and installation of groundwater monitoring wells at the Inactive Sanitary Landfill. In addition, the installation conducted an Interim Remedial Action at OU1 Area B to remove contaminated soil, eliminating the need to treat the soil on site. The commander formed a Restoration Advisory Board (RAB). Early RAB meetings focused on restoration activities, monitoring of results, and evaluation of Proposed Plans. The RAB members reviewed Proposed Remedial Action Plans and draft Records of Decision (RODs) and offered input on the cleanup process.

In FY96, the RAB helped coordinate the efforts of the installation and the local government in application of geographic information systems (GISs). The installation completed negotiations with EPA and the Pennsylvania Department of Environmental Protection (PADEP) on restoration of OU1 and drafted the Proposed Plan. In addition, a cleanup action was completed at Oakes Swamp, Area of Concern (AOC) 8.

In FY97, the installation completed a ROD for OU1 groundwater that specifies natural attenuation in conjunction with long-term monitoring. This is significant in that Pennsylvania formerly had a background-level applicable or relevant and appropriate requirement (ARAR). Risk-based standards will result in significant cost avoidance. The RI for the Inactive Sanitary Landfill was completed.

FY98 Restoration Progress

Through successful partnering with EPA and PADEP, the installation completed a closeout document for 35 No Further Action sites, instead of two RODs as originally planned, which saved time and money. An amendment to the Federal Facility Agreement was not required because the closeout document was determined appropriate to close the sites.

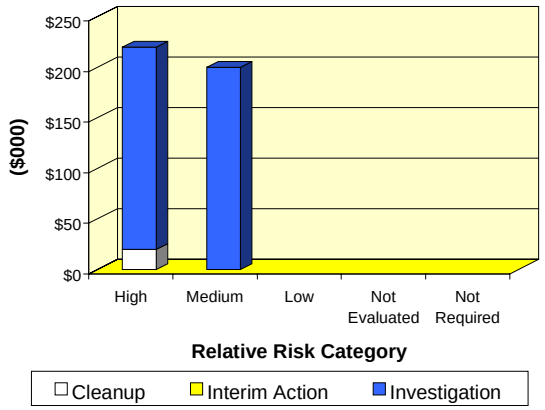
The installation completed fieldwork for the ERA; however, an extended document review and comment period has delayed completion of the ERA. The installation determined, based on the ERA fieldwork, that a Focused Feasibility Study (FFS) rather than a full FS will be sufficient. The Army will complete the ERA with the assistance of EPA, PADEP, and the U.S. Fish and Wildlife Service.

A Burn Pan was removed at AOC 58, the firefighting training area, which completes remediation at this site. The installation, EPA, and PADEP agreed that removing the pan and backfilling the area would lead to site closure. The Army constructed four additional off-site monitoring wells adjacent to the Inactive Sanitary Landfill to determine whether any contaminants have migrated. A Remedial Design document was drafted for OU1. The installation drafted a new community relations plan (CRP), which the RAB reviewed. The RAB also reviewed the closeout document and provided advice on the analytical requirements at OU1 and the Inactive Sanitary Landfill.

Plan of Action

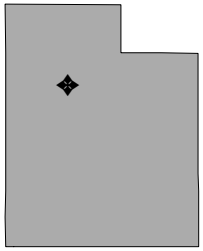
- Complete a closeout document for 11 No Further Action sites in FY99
- Complete the installationwide ERA in FY99
- Initiate a FFS for three sites in FY99
- Complete the Quality Assurance Project Plan for AOC 1 in FY99
- Continue groundwater monitoring at OU1 and AOC 1
- Complete all decision documents by FY02

FY99 Funding by Phase and Relative Risk



Tooele Army Depot

Size: 24,732 acres
Mission: Store and demilitarize munitions
HRS Score: 53.95; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in September 1991
Contaminants: Solvents, metals, explosives, petroleum hydrocarbons, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $80.7 million
Estimated Cost to Completion (Completion Year): $92.7 million (FY2037)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2003
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY2007



Tooele, Utah

Restoration Background

In July 1993, the BRAC Commission recommended realignment of the Tooele Army Depot Maintenance Mission. The commission recommended that the depot retain its conventional ammunition storage and chemical demilitarization missions. After the BRAC action, the chemical demilitarization mission was transferred to the Chemical and Biological Defense Command. The Army will transfer 1,700 acres and retain 23,032 acres for the conventional ammunition mission.

Environmental studies have been under way at the installation since FY79. Sites include open burning and open detonation areas, an ammunition demilitarization facility, landfills, firing ranges, industrial sites, underground storage tanks (USTs), surface impoundments and lagoons, and drain fields. Organic solvents are the primary contaminants affecting groundwater.

Tooele's environmental program is regulated under a CERCLA Federal Facility Agreement (FFA) and a RCRA corrective action permit (CAP) dated 1991. The installation has investigated 57 sites and completed response actions at 17 sites (6 under CERCLA and 11 under RCRA).

In FY93, the installation began using a groundwater extraction and treatment system to clean up water contaminated by a solvent plume. In FY94, the Army and EPA approved a Record of Decision addressing six sites (with determinations of no further action for four of the six). The installation established a Restoration Advisory Board. In FY95, the BRAC cleanup team (BCT) prepared Version II of the BRAC Cleanup Plan. BCT members also helped prepare 10 finding of suitability to lease (FOSL) documents. The community completed a draft land reuse plan.

In FY96, Tooele Army Depot completed the disposal and reuse Environmental Impact Statement for 1,700 acres available for transfer, after obtaining approval from regulators. In FY97, the installation delineated the on-post extent of another contaminated groundwater plume and initiated investigations to determine the source of contamination. Regulatory agencies concurred in the designation of 340 acres as CERFA-clean. The BCT initiated corrective measures studies (CMS) and Feasibility Studies (FSs) for the sites requiring further action. The lease for the remaining BRAC property was executed in FY97.

FY98 Restoration Progress

The installation completed a finding of suitability for early transfer (FOSET) for the remainder of the BRAC property. Work continued on the selection of remedies for 40 sites under the FFA and RCRA CAP. Regulators approved the closure of two UST sites and approved the design for cleanup of the final two UST sites. The installation completed the cleanup of an indoor firing range and a transformer storage facility that are being transferred under the BRAC action.

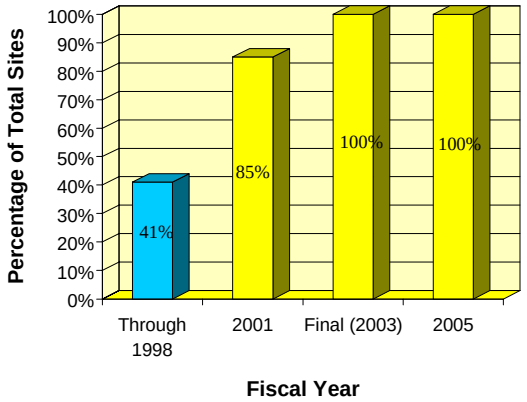
The installation completed a groundwater treatment system optimization study, evaluating alternatives to the existing cleanup, and began investigating all potential groundwater contaminant sources. The installation is evaluating these efforts to reduce the life cycle and cost of groundwater remediation.

The installation did not conduct two planned Removal Actions or complete soil washing at the Skeet Range. These activities were planned as presumptive remedies because the sites they addressed were in BRAC areas of high interest to the Redevelopment Agency. However, regulatory agencies have been reluctant to execute presumptive remedies and would rather allow the CMS/FS process to proceed to remedy selection.

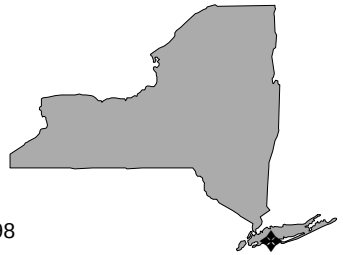
Plan of Action

- Complete all required CMSs and FSs in FY99 and FY00
- Complete construction and initiate operation of a two-UST bioventing system in FY99
- Execute early transfer of all remaining BRAC property by end of the second quarter of FY99
- Initiate risk assessment and petition for alternate cleanup level for groundwater contamination in FY99
- Complete Phase I investigation of potential groundwater contaminant sources in FY99 and initiate Phase II in FY00
- Initiate required Remedial Design for the FFA sites in FY00
- Complete source removal soil vapor extraction pilot studies, if required, in FY00

FY99 Funding by Phase and Relative Risk



Size: 135 acres
Mission: Provided administrative and logistical support and housing; nonexcess property currently used as an Army Reserve enclave.
HRS Score: NA
IAG Status: None
Contaminants: Fuel hydrocarbons and metals
Media Affected: Groundwater and soil
Funding to Date: $1.7 million
Estimated Cost to Completion (Completion Year): $0 (FY1998)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1998
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1998



Bayside, New York

Restoration Background

In 1995, the BRAC Commission recommended closing Fort Totten except for use as an enclave for the U.S. Army Reserve.

In 1989, the installation initiated a broad Installation Restoration Program. The Army conducted several preliminary studies, including groundwater sampling at the former landfill area and soil sampling throughout the installation, at locations with the potential for contamination. The installation completed several Interim Remedial Actions and removals. The actions including removing and replacing polychlorinated biphenyl (PCB)-containing transformers, removing and replacing tanks, removing petroleum-contaminated soil, and removing asbestos from family housing.

In FY95, the installation initiated an Environmental Baseline Survey (EBS), which identified seven areas on BRAC property that required further evaluation. In FY96, the installation submitted a draft EBS report to the regulatory agencies for review. An unexploded ordnance archive search was performed, along with a limited field survey.

In FY97, the Army completed the EBS and began an Environmental Investigation. The BRAC cleanup team (BCT) was able to expedite document review by implementing a 15-day review process. The Restoration Advisory Board (RAB) for Fort Totten reviewed technical documents and responded to public comments on environmental issues. The BCT was able to coordinate with RAB members in making decisions. The Army identified 100 acres of CERFA-uncontaminated acreage at the installation for transfer. The appropriate regulatory agencies approved this designation.

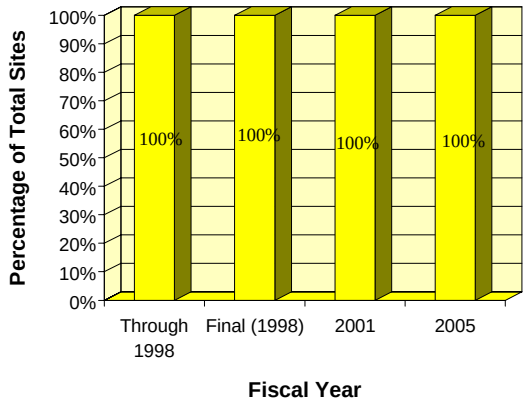
FY98 Restoration Progress

The installation investigated Little Bay sediment. The Formerly Used Defense Sites (FUDS) program will address any further issues concerning the bay. Cleanup of the Old Fort Area was completed. The installation tested four USTs for leaks and determined that removal is not necessary. It also determined that further monitoring of groundwater wells was unnecessary. The installation received regulatory concurrence on the remainder of the CERFA-uncontaminated acreage.

Plan of Action

- Prepare finding of suitability to transfer and supporting EBS in FY99
- Complete assessment of cultural resource issues and sign programmatic agreement with the State Historic Preservation Office in FY99
- Complete final Environmental Assessment for disposal and reuse action in FY99

Sites Achieving RIP or RC Per Fiscal Year



Travis Air Force Base NPL

Size: 6,277 acres
Mission: Provide air refueling and strategic airlift services for troops, cargo, and equipment
HRS Score: 29.49; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in September 1990 and amended in May 1993, October 1995, July 1996, November 1997, and July 1998
Contaminants: VOCs, heavy metals, and PAHs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $64.2 million
Estimated Cost to Completion (Completion Year): $85.5 million (FY2188)
Final Remedy in Place or Response Complete Date for All Sites: FY2005

Solano County, California

Restoration Background

Travis Air Force Base has supported Air Force operations since 1943. Historical activities at the base have resulted in numerous releases of fuels, solvents, and petroleum/oils/lubricants, which migrated into groundwater. Since FY85, studies have identified a number of sites, including old landfills, a closed sewage treatment plant, four fire training areas, disposal pits, spill areas, the storm sewage drainage system, a pesticide disposal site, and a low-level radioactive waste burial site. In FY93, the Air Force divided the installation into four operable units (OUs).

The Air Force implemented several Interim Actions at the installation, including removal of 27 underground storage tanks. Granular activated carbon treatment systems were installed to treat groundwater contaminated with trichloroethene (TCE) at a storm sewer outfall in Union Creek and a source area for the installation's largest TCE groundwater plume. Treatability Studies were conducted in FY94 on the use of horizontal wells, two-phase extraction systems, bioventing, and bioslurping. The installation also completed an analysis of the feasibility of applying intrinsic remediation to petroleum-contaminated groundwater beneath the base gasoline station.

The installation completed field investigations and Remedial Investigation (RI) reports for all OUs. It also completed one TCE Removal Action at the storm sewer outfall and implemented another TCE Removal Action incorporating horizontal extraction wells and two-phase extraction technology. In FY95, the installation formed a Restoration Advisory Board (RAB) and established the RAB Relative Risk Focus Group to address restoration priorities, the Technical Review Focus Group to review draft documents, and the Community Relations Focus Group to disseminate information to the public.

In FY96, the installation developed a model to help set priorities among high-relative-risk sites for Remedial Action (RA). The installation developed a chemical reference handbook for the public that describes the contaminants at the installation and their potential effects on human health and the environment. It combined the North, East, and West Industrial OUs into a single OU (NEWIOU) for the Feasibility Study (FS), the Proposed Plan, and the Record of Decision (ROD). The FS for the NEWIOU and the Proposed Plan for the groundwater part of the NEWIOU were completed.

In FY97, the RI for the West/Annexes/Basewide OU (WABOU) and the expansion of the Interim Action for the installation's largest TCE-contaminated groundwater plume were completed.

FY98 Restoration Progress

Dates for two draft RODs were revised in the Federal Facility Agreement (FFA) and agreed to by all parties. An interim ROD for groundwater in NEWIOU was completed and signed by the Air Force, EPA, the California Department of Toxic Substances Control, and the San Francisco Bay Regional Water Quality Control Board. The NEWIOU Proposed Plan for surface water, sediment, and soil was completed and public comments received. The base completed the FS and Proposed Plans for groundwater and soil sites at WABOU.

RA began at two of three sites from which contaminated groundwater has migrated off site. The third site is awaiting a final access agreement with the landowner. Interim Remedial Actions (IRAs) began at two additional sites. Interim Remedial Design began on 14 other groundwater sites.

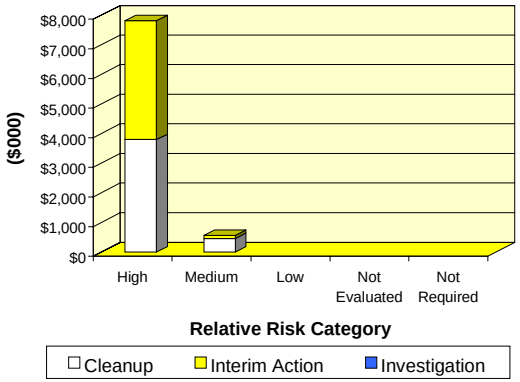
The installation has developed a model for evaluating the effectiveness of natural attenuation in groundwater contaminated with fuel and chlorinated solvents. A two-phase extraction well was installed a year ahead of schedule in a suspected area of free-phase TCE.

The RAB meets quarterly.

Plan of Action

- Begin IRA on the last groundwater plume that extends off base and complete IRAs at all three sites with off-base groundwater plumes in FY99
- Complete the WABOU groundwater interim ROD and the soil ROD in FY99
- Complete the NEWIOU soil, sediment, and surface water ROD in FY99
- Complete Removal Actions at two soil sites and IRAs at seven additional groundwater sites in FY99
- Begin construction of a landfill cap in FY00
- Begin RA at five soil sites in FY00
- Complete IRA at all groundwater sites in FY00

FY99 Funding by Phase and Relative Risk



Treasure Island Naval Station

BRAC 1993

Size: 1,080 acres
Mission: Provide services and materials to support units of operating forces and shore activities
HRS Score: NA
IAG Status: Federal Facility Site Remediation Agreement signed in September 1992
Contaminants: Petroleum hydrocarbons, VOCs, SVOCs, chlorinated solvents, metals, pesticides, and PCBs
Media Affected: Groundwater and soil
Funding to Date: $19.3 million
Estimated Cost to Completion (Completion Year): $59.9 million (FY2008)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2003

Treasure Island, California

Restoration Background

In July 1993, the BRAC Commission recommended closure of Treasure Island Naval Station and relocation of the Naval Reserve Center to Alameda, California, and the Naval Technical Training Center to Great Lakes, Illinois, and Little Creek, Virginia. Operational closure was completed in September 1997.

Twenty-nine sites, including a former fire training area, a landfill, a former dry-cleaning facility, an old bunker area, fuel farms, and a service station, have been identified. Contamination at the sites is largely the result of migration of petroleum products from fueling operation areas. A Preliminary Assessment and a Site Inspection were completed for 26 sites in FY88. In FY92, the installation completed a community relations plan and established two information repositories and an administrative record.

Remedial Investigation and Feasibility Study (RI/FS) activities were initiated for 22 sites in FY93. The installation formed a technical review committee and converted it to a Restoration Advisory Board in FY94. Also in FY94, three additional sites, including the former skeet range and the areas under the Bay Bridge and on/off ramps, were included in the Installation Restoration Program (IRP). A BRAC cleanup team was established, and the installation completed a BRAC Cleanup Plan. In FY95, the installation began removing floating product from one site and contaminated soil from another. Of the 75 potential underground storage tanks (USTs), 40 were removed, 14 were closed in place, 20 were found to be nonexistent, and 1 is scheduled for removal in FY99. An Environmental Baseline Survey (EBS) was also completed for all sites in FY95. Under the EBS, nine parcels were designated as CERFA-clean. Site-specific EBSs for leasing and transfer are ongoing.

During FY96, the Local Reuse Authority (City of San Francisco) completed a draft reuse plan. EBS summary documents were completed for the transfer of 35.5 acres to the U.S. Department of Labor for a Job Corps Center. Another 10 acres was transferred to the U.S. Coast Guard. The Federal Facility Site Remediation Agreement was amended to include three newly identified sites and to group Sites 13 and 27 into one offshore operable unit. In FY97, nine CERCLA IRP sites were transferred to the petroleum corrective action plan (CAP) program for fast-track cleanup.

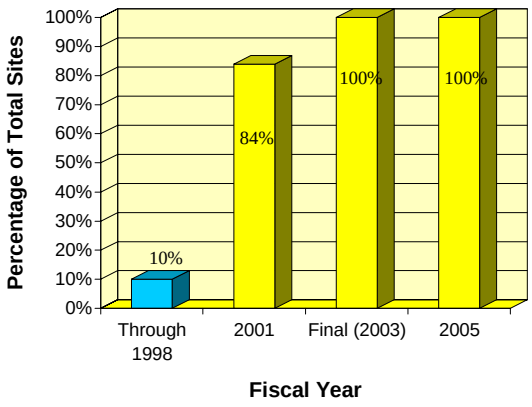
FY98 Restoration Progress

The installation completed removal or closure in place of all underground fuel lines, a draft RI report for offshore sediment, and fieldwork for additional characterization of Site 12. The summary report for additional characterization of Site 24 and the draft CAP for nine petroleum IRP sites were also completed. The ecological validation study work plan for Sites 11, 28, and 29 was completed. A basewide asbestos study and a bird survey for the ecological validation study are ongoing.

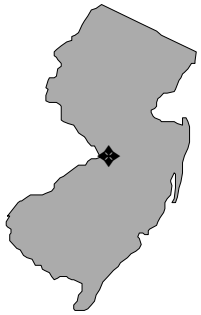
Plan of Action

- Remove remaining UST in FY99
- Complete an Interim Removal Action for Site 12 in FY99
- Complete an RI/FS and a draft Remedial Action Plan (RAP) and Record of Decision (ROD) for onshore and offshore sites in FY99
- Complete CAP, design, and initial remediation for petroleum sites in FY99
- Complete a No Further Action RAP and ROD for Sites 1 and 3 in FY99
- Complete CAPs and Remedial Designs for UST and fuel line sites in FY99
- Complete asbestos abatement in FY99
- Complete a structure and soil lead abatement for pre-1960 housing in FY99
- Complete findings of suitability to transfer for the first phase of property disposal in FY99

Sites Achieving RIP or RC Per Fiscal Year



Size: 66 acres
Mission: Test engine systems and components
HRS Score: NA
IAG Status: None
Contaminants: Trichloroethene, freon, fuels, mercury, and solvents
Media Affected: Groundwater and soil
Funding to Date: $19.4 million
Estimated Cost to Completion (Completion Year): $6.5 million (FY2016)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1999



Trenton, New Jersey

Restoration Background

In July 1993, the BRAC Commission recommended closure of this installation. Operations will be transferred to the Arnold Engineering Development Center and the Patuxent River Naval Air Station. The installation is scheduled to close in December1998.

Contamination at the installation resulted from various fuels used to operate engines during tests and from trichloroethene (TCE), ethylene glycol, and freon used to cool the air entering the engines. Residues of fuels and solvents have been detected in groundwater and soil. Site types include underground storage tanks (USTs), disposal areas, and spill sites. The TCE-contaminated groundwater is the issue of greatest concern.

Since FY86, environmental studies at the installation have identified nine CERCLA sites and two UST sites. Removal of a tank and associated contaminated soil was completed for UST 2 in FY92 and for UST 1 in FY93. The two UST sites were then recommended for no further action (NFA).

A technical review committee was formed in FY91 and converted to a Restoration Advisory Board in FY93. In FY94, a BRAC cleanup team (BCT) was formed. The BCT prepared a BRAC Cleanup Plan (BCP) in FY95. To accelerate community reuse of installation property, a local company used a building under an interim lease. The installation has been divided into four parcels of property, and an Environmental Baseline Survey (EBS) was completed for all parcels. One area, covering 10 acres, was identified as CERFA-clean.

During FY95, the installation began an Interim Remedial Action to treat TCE-contaminated groundwater at Site 1. To identify fractures and establish the properties of the rock, the U.S. Geological Survey conducted geophysical borehole investigations in conjunction with performance of aquifer tests by the Navy. Data from the investigations will enable the Navy to place future monitoring wells accurately to delineate the groundwater plume. In FY96, the design of a modified treatment plant was completed, contaminated sludge was removed from Site 3, and the installation completed a land reuse plan.

In FY97, the installation completed construction of the modified treatment plant for groundwater contamination, installation of monitoring wells at Site 1, the Remedial Investigation and Feasibility Study (RI/FS) for Site 2 and Sites 4 through 9, Phase II of the EBS, and design and implementation of an iron-filings treatment system for Site 1 groundwater contamination. A decision document for NFA was prepared for Site 3. In addition, the BCT prepared and reviewed the latest versions of the BCP and the EBS and conducted Site 3 decision document review, the Site 1 groundwater investigation, Site 8 barometric well closure, and preparation of an NFA document for Sites 2, 5, 6, 7, and 9.

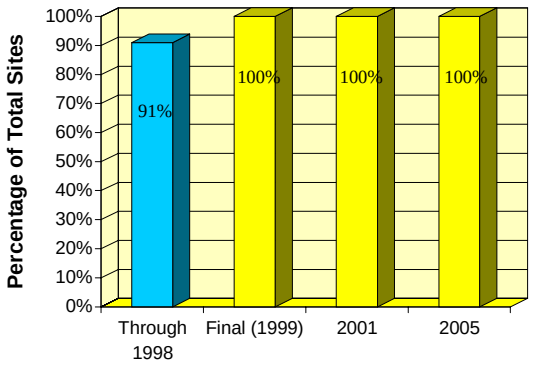
FY98 Restoration Progress

The installation completed a draft Environmental Impact Study and revised it to an Environmental Assessment. Decision documents were completed for Sites 1 through 9. The installation also completed a draft decision document for Site 1 groundwater, a draft EBS Phase III report, and a Focused FS. A finding of suitability to transfer (FOST) was issued for Parcel C, and a draft FOST was issued for Parcels A, B, and D. The installation completed soil removal at Site 1, a cap for Site 4, and Remedial Actions at 23 EBS areas of concern (AOCs). Six underground storage tanks were removed, and a treatment plant was expanded from 15 gallons per minute (gpm) capacity to 60 gpm. The installation removed sediment, which contained mercury, from outfalls and catch basins. The installation was able to identify the source of the mercury and remediate areas in the outfalls and catch basins. Leaking lines in the barometric well at Site 8 were investigated and a decision document was completed for this site.

Plan of Action

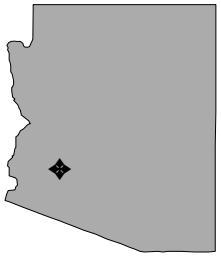
- Complete decision document for Site 1 groundwater in FY99
- Issue final FOST for Parcels A, B, and D in FY99
- Complete EBS Phase III report in FY99
- Complete closeout report for mercury contamination in FY99
- Complete remediation of remaining EBS AOCs in FY99
- Complete final design and construction of groundwater treatment plant in FY00

Sites Achieving RIP or RC Per Fiscal Year



Tucson International Airport NPL

Size: 84 acres
Mission: Provide Air National Guard training
HRS Score: 57.86; placed on NPL in September 1983
IAG Status: Federal Facility Agreement signed in October 1994
Contaminants: TCE, tetrachloroethene, chromium, petroleum hydrocarbons, and petroleum/oil/lubricants
Media Affected: Groundwater and soil
Funding to Date: $8.0 million
Estimated Cost to Completion (Completion Year): $13.6 million (FY2022)
Final Remedy in Place or Response Complete Date for All Sites: FY1997



Tucson, Arizona

Restoration Background

Environmental studies at Tucson International Airport have identified eight sites, including fire training areas, solvent dumping areas, storm drainage discharge areas, the old wash rack area, petroleum/oil/lubricant areas, and spill areas. Waste disposal and spill sites have had the greatest effect on the environment. The principal contaminant is trichloroethene (TCE) in groundwater. Tetrachloroethene and chromium also have affected groundwater, but to a lesser extent. In addition, total petroleum hydrocarbons have been detected in soil at the installation. In FY94, the installation finished Remedial Investigation activities for all identified sites.

The installation established successful partnerships with citizens and regulators. The Unified Community Advisory Board (UCAB) provides a forum in which citizens and organizations can discuss current environmental issues. The UCAB consists of community members; regulators; and responsible parties like Air Force Plant 44, Burr-Brown Corporation, the Airport Authority/City of Tucson, West Cap Industries (defunct), and the Air National Guard. Representatives of regulatory agencies, the State of Arizona, Pima County, and the City of Tucson, and leaders of community groups regularly attend meetings of the board.

In FY97, the installation complied with the Federal Facility Agreement and reevaluated all sites through the Relative Risk Site Evaluation process. A Record of Decision was completed for the cleanup of contaminated soil. The installation also finished construction of a permanent groundwater extraction, treatment, and recharge system to clean up contaminated groundwater. The groundwater extraction and treatment system for Sites FT01, SD03 and SS02, 04-08, and the soil vapor extraction and treatment system at Site SS05 started up and operated continuously in FY97.

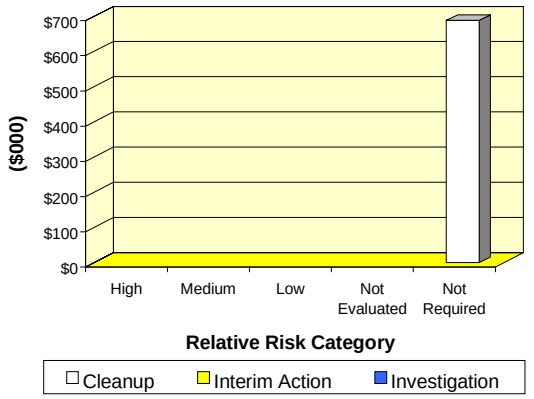
FY98 Restoration Progress

The groundwater extraction and treatment system has operated continuously since FY97. The soil vapor extraction and treatment system at Site SS05 accomplished its mission by reducing contaminant concentration in soil vapor to levels that have negligible impact on groundwater. Restoration Advisory Board activities with UCAB have been successful, as have continuing partnering efforts with regulatory agencies.

Plan of Action

- In FY99, continue partnership with EPA Region 9 and the Arizona Department of Environmental Quality
- Continue operating the groundwater extraction and treatment system
- Continue participation in UCAB

FY99 Funding by Phase and Relative Risk



Size: 1,600 acres
Mission: Provide services and materials to support operations of the Third Marine Aircraft Wing; provide operations training facility support; operate helicopter outlying fields and maintain area landing sites; operate air traffic control facility; provide weather support
HRS Score: NA
IAG Status: Under negotiation
Contaminants: VOCs, dichloroethane, dichloroethene, trichloroethene, trichloropropane, BTEX, naphthalene, petroleum hydrocarbons, and pentachlorophenol
Media Affected: Surface water, groundwater, and soil
Funding to Date: $42.0 million
Estimated Cost to Completion (Completion Year): $8.4 million (FY2016)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2007

Tustin, California

Restoration Background

In July 1991, the BRAC Commission recommended closure of Tustin Marine Corps Air Station with retention of the family housing and related personnel facilities to support El Toro Marine Corps Air Station.

Environmental studies since FY85 have identified 16 CERCLA sites, 250 areas of concern (AOCs), 129 underground storage tank (UST) sites, and 19 aboveground storage tank sites. There are 24 CERCLA sites in the study phase, and the Expanded Site Inspection (ESI) phase or the Remedial Investigation and Feasibility Study (RI/FS) phase has been completed at 14 of those sites.

Two phases, preliminary review and a visual site inspection and sampling visit, of a three-phase RCRA Facility Assessment (RFA) have been completed. Phase III of the RFA is under way at 12 sites. Interim Remedial Actions completed at the installation include removal of USTs and construction of a drainage system. In FY86, the installation excavated and disposed of contaminated soil. In FY88, a Gunite concrete slurry wall was installed at the same site. In FY92, 39 tanks were removed at the Fuel Farm; 30 more tanks were removed in FY93.

A BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB) were formed in FY94. In FY95, the installation undertook Engineering Evaluations and Cost Analyses for three sites where Removal Actions are planned. Contaminated soil was removed from the Fuel Farm. The installation began a parcel-specific Environmental Baseline Survey (EBS) to support transfer of clean property in FY96. It proposed 1,285 acres as clean, and regulatory agencies have concurred in this determination.

In FY96, RI/FS fieldwork was completed at Operable Unit (OU) 1, OU2, and OU3; a draft ESI was issued for 5 sites; a draft RFA was issued for 15 sites; and the final Phase III RFA was issued. Remediation was completed at the Fuel Farm, and a draft land reuse plan was finalized and submitted for approval. Draft findings of suitability to transfer (FOSTs) were prepared for eight parcels, and cleanup was completed to clear six parcels for transfer.

During FY97, Removal Actions for AOCs MWA-3, IRP-2, 9, and 13W were finished; the ESIs were completed for five sites; the final RI/FS was issued for OU3; and a landfill containment presumptive remedy was implemented. The BCT also reviewed sampling plans and a draft Record of Decision (ROD) for OU3. The BCT agreed on data quality objectives for Site 9B and completed the latest BRAC Cleanup Plan (BCP) and EBS.

FY98 Restoration Progress

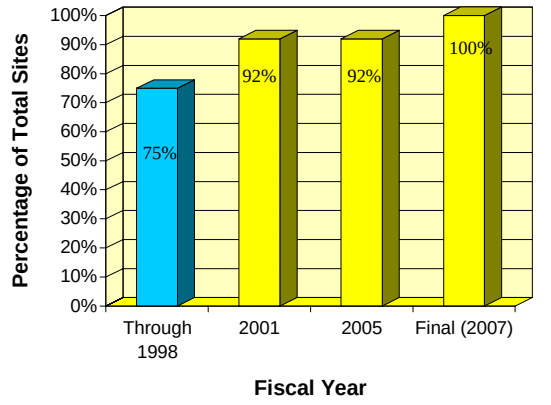
The BCT accepted the final RI for OUs 1 and 2, and reviewed the draft FS. Other RI/FSs were delayed when an RI discovered a 1,2,3-trichloropropane plume in a deeper aquifer unit. The latest version of the BCP was issued, as were draft parcel-specific FOSTs for nine parcels. Additional parcel-specific EBSs were delayed by the need to further determine the grouping of these parcels. The draft CERFA EBS was concurred on by regulatory agencies, but further CERFA eligibility is not anticipated. The installation evaluated potential alternatives to proposed improvements to the Peters Canyon Flood Control Channel, which is adjacent to OU3. A document was completed in support of the federal-to-federal transfer of 16 acres, and the Tustin Spur of the JP-5 jet fuel supply line was closed in place. A pilot study for vacuum enhanced vapor extraction was implemented to determine whether this technology could reduce the time needed to attain remedial goals in groundwater treatment.

The Tustin RAB met bimonthly and frequently reviewed documents. A partnering session was held between the BCT and management representatives.

Plan of Action

- Complete RCRA cleanup at 15 sites in FY99
- Complete corrective action plans for all USTs in FY99
- Sign three RODs and complete Remedial Actions for six sites in FY99
- Complete the final FS, draft the ROD, and start Remedial Design for OUs 1 and 2 in FY99
- Complete the latest BCP and the parcel-specific EBS in FY99
- Update CERFA EBS in FY99
- Complete the ROD for 23 no further action sites in FY99
- Transfer 10 parcels of property in FY00

Sites Achieving RIP or RC Per Fiscal Year



Twin Cities Army Ammunition Plant NPL

Size: 2,370 acres
Mission: Modified caretaker; provide support to DoD tenants; formerly manufactured small-arms ammunition and projectile casings
HRS Score: 59.60; placed on NPL in September 1983
IAG Status: Federal Facility Agreement signed in August 1987
Contaminants: VOCs, PCBs, and heavy metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $113.2 million
Estimated Cost to Completion (Completion Year): $230.3 million (FY2080)
Final Remedy in Place or Response Complete Date for All Sites: FY2008

Arden Hills, Minnesota

Restoration Background

Since FY81, environmental studies verified that past waste disposal practices at this installation had released hazardous contaminants into soil, groundwater, and sediment, which migrated into the Minneapolis-St. Paul groundwater supply. Twenty-eight sites are grouped into three operable units (OUs), which include former landfills, burning and burial grounds, ammunition testing and disposal sites, industrial operations buildings, and sewer system discharge areas.

Ammunition-related metals, volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs) are the primary soil contaminants at the installation. Soil vapor extraction (SVE) systems have been installed to remove VOCs from soil. In 1989, the thermal treatment of 1,400 cubic yards of PCB-contaminated soil was completed.

VOCs are the primary contaminants in groundwater. From FY86 to FY93, groundwater extraction and treatment systems were installed. The installation constructed a Boundary Groundwater Recovery System to contain and treat VOC-contaminated groundwater at the installation's southwest boundary. The Army provided a permanent groundwater treatment system for the city of New Brighton, and the installation provided a municipal water supply hookup at the Lowry Grove Trailer Park.

In FY94, the OU3 Plume Groundwater Recovery System and the OU1 and OU3 municipal drinking water interconnection became operational. In addition, a boundary plume containment system was initiated to prevent off-post migration of VOCs in shallow groundwater. The installation established a technical review committee in 1985 and a Restoration Advisory Board (RAB) in FY96 to allow community input on cleanup decisions. Also in FY96, the installation continued work on the Outdoor Firing Range Phase III investigation and Engineering Evaluation and Cost Analysis (EE/CA), the Grenade Range EE/CA, and closure of Site F. The Water Tower Area site was closed, and a well advisory was implemented for OUs 1, 2, and 3.

In FY97, the Army implemented the alternate water supply plan, abandoning five residential wells. Five other wells were considered for alternate water supply or abandonment. For OU1, the installation installed two performance-monitoring wells. Upon completion of the OU2 Feasibility Study, the installation drafted the OU2 Record of Decision (ROD). The Army began Remedial Design (RD) for eight shallow soil sites and two deep soil sites and completed removal of all contaminated soil from Site F.

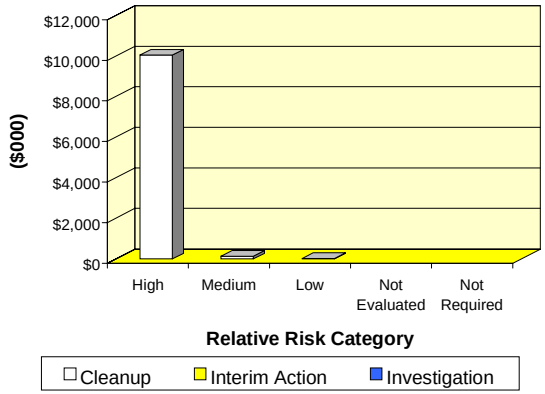
FY98 Restoration Progress

An installationwide ROD was signed, becoming the third and final ROD for the installation. This initiated the final cleanup at OU2, including construction and operation of a corrective action management unit. The Army completed RD for six sites and initiated RD for five sites; it began Remedial Action (RA) for two sites. The Army continued implementing the alternate water supply plan, abandoning one residential well. Seven other wells were considered for alternate water supply or abandonment. The RA (construction) for OU1 was completed; two additional containment wells and six additional performance monitoring wells were installed, which completed the remedy and satisfied the requirements of the OU1 ROD. The Army completed EE/CAs for the Outdoor Firing Range, the Grenade Range, and the VOC-contaminated soil at Site A. It initiated a Removal Action at the Outdoor Firing Range. A 2-year phytoremediation demonstration project, in conjunction with the U.S. Army Environmental Center (AEC), was initiated at two sites. Work continued on a tiered Ecological Risk Assessment (ERA) to evaluate the surface water and sediment for the entire installation. The Tier I ERA was completed and the Tier II investigation began.

Plan of Action

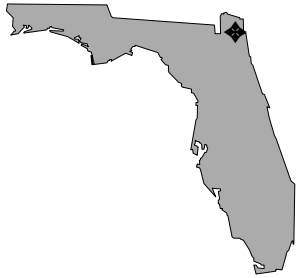
- Complete Tier II ERA in FY99
- Operate and maintain all RAs at OU1 and OU3 in FY99 and beyond
- Complete Site F closure report in FY99
- Complete RD for four sites and initiate RA for five sites at OU2 in FY99
- Complete RA for eight sites at OU2 in FY99
- Complete Remedial Investigation and EE/CAs for two primer tracer areas at OU2 from FY00 to FY02
- Complete all RAs by FY2003 under accelerated program

FY99 Funding by Phase and Relative Risk



Tyndall Air Force Base NPL

Size: 28,824 acres
Mission: Provide advanced F-15 fighter training
HRS Score: 50.00; placed on NPL in March 1997
IAG Status: IAG under negotiation
Contaminants: Petroleum/oil/lubricants, chlorinated solvents, pesticides, metals, PCBs, and general refuse
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $12.3 million
Estimated Cost to Completion (Completion Year): $26.7 million (FY2010)
Final Remedy in Place or Response Complete Date for All Sites: FY2002



Panama City, Florida

Restoration Background

Tyndall Field was activated in 1941 as the Flexible Gunnery School of the U.S. Army Air Corps. The installation became Tyndall Air Force Base in 1947 when the Air Force became a separate branch of the military.

Environmental studies, beginning in FY81, identified 36 sites at the installation. Principal site types include fire training areas, spill sites, landfills, and disposal trenches. One site is being cleaned up for petroleum contamination under the direction of the DLA. Five other off-site locations have been closed, and regulatory agencies have concurred that they pose no risks and require no actions. In FY95, a RCRA Facility Assessment identified 58 solid waste management units and 18 areas of concern.

The installation completed pilot tests for dual-phase vacuum extraction, soil vapor extraction (SVE), and air sparging (AS) at Site SS-15. The installation completed a well assessment report for 141 restoration program monitoring wells. Contamination Assessment Reports (CARs) were completed at Sites SS-15, FT-16, SS-19, and FT-23. The installation also completed Chemical Data Acquisition Plan Addendum 3 for Site OT-29. Remedial Investigation (RI) fieldwork was initiated at Sites LF-6, LF-7, SS-26, and OT-29. Remedial Action Plans have begun on Sites SS-15, FT-16, and FT-23.

The installation completed RCRA clean-closure activities at Site LF-36, as required by Florida Department of Environmental Protection (FDEP). In FY97, the installation signed decision documents and received No Further Action concurrence from FDEP and EPA for 11 sites and achieved site consolidation for 2 sites. Interim Remedial Actions (IRAs) and Removal Actions were studied or conducted at six sites. The AS/SVE pilot project for Site FT-16 was completed. It was determined during the OT-29 IRA site characterization stage that no clear contamination source could be identified and that risk levels were low enough to negate the need for an IRA. The installation partnership with FDEP, EPA, and restoration contractors has evolved into a project team serving as the technical review committee.

In FY94 and FY97, there were efforts to establish a Restoration Advisory Board (RAB). Public response indicated a high level of trust and no need for a RAB. A community relations plan (CRP) was completed to inform the public. The issue of RAB formation will be revisited in FY99.

FY98 Restoration Progress

Progress on the RI phases for FT-17 and SS-26 was slowed by contracting constraints, partnering team turnover, and project complexity. These RI projects and those for LF-6 and LF-7 are under contract for an interactive RI and Feasibility Study project. CARs have been completed and submitted for regulatory concurrence for SS-15, SS-19, and FT-23.

A draft IRA report was submitted for Site OT-21. A decision on the need for a post-IRA groundwater assessment of the site will be made following regulatory review. The IRA for OT-29 is being redirected for RI. No contamination source was found during site characterization, and contamination levels failed to support the need for an IRA. RI fieldwork began. A bioslurper IRA project at FT-23 failed to meet performance standards and was halted until design modifications can be effected. The IRAs at Sites SS-20 and SS-26 are being expanded to provide further delineation and characterization of the contamination plumes. Several decision documents are awaiting review.

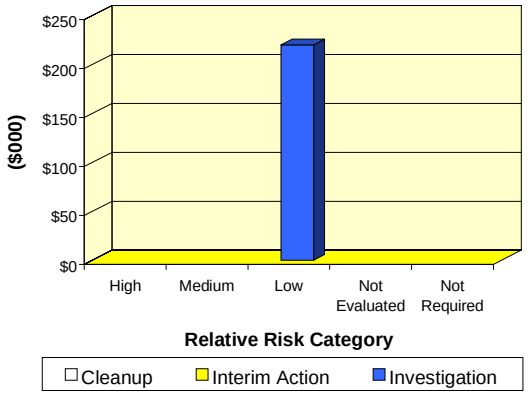
Free-product removal is being conducted with in-well product bailers at most sites, and with in-well skimmers at SS-26. Natural Attenuation (NA) treatment trains have been evaluated at FT-16 and SS-19. Results show that no further Remedial Actions beyond NA with monitoring may be needed at FT-16.

Relative risk will be reevaluated for all sites during October. FT-16, OT-21, SS-14, and OT-24 relative risk classifications are expected to be reduced. Project planning and contract awards were accomplished for all projects except the basewide background study.

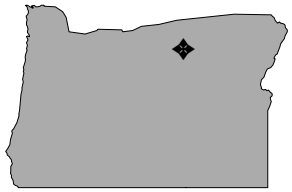
Plan of Action

- Complete RI characterization fieldwork for LF-06, LF-07, SS-26, and OT-29 in FY99
- Begin Baseline Risk Assessment (BRA) work for LF-06 and LF-07 and continue BRA work for OT-29 in FY99
- Complete basewide background study allowing screening and possible closure of Site Inspection sites in FY99
- Receive decision document concurrence on NA at FT-16 and SS-19 in FY99
- Complete all current RI projects by FY00

FY99 Funding by Phase and Relative Risk



Size: 19,729 acres
Mission: Store ammunition
HRS Score: 31.31; placed on NPL in July 1987
IAG Status: Federal Facility Agreement signed in October 1989
Contaminants: Explosives, UXO, heavy metals, pesticides, and nitrates
Media Affected: Groundwater and soil
Funding to Date: $48.4 million
Estimated Cost to Completion (Completion Year): $21.5 million (FY2023)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY1998



Hermiston, Oregon

Restoration Background

In 1941, the Army established Umatilla Chemical Depot Activity as an ordnance facility for storing conventional munitions. Between 1945 and 1955, the installation's functions expanded to include demolition, renovation, and maintenance of ammunition. In 1962, the Army began to store chemical munitions at the depot. In December 1988, the BRAC Commission recommended realignment of the installation.

Studies from FY87 to FY90 identified 80 sites, including explosives-washout lagoons, an open burning and open detonation area, pesticide disposal pits, a deactivation furnace, and landfills. In FY92, the sites were grouped into nine operable units (OUs).

In FY92, the Army signed a Record of Decision (ROD) selecting bioremediation by windrow composting as the treatment for the Washout Lagoon Soil OU. A ROD was also signed for the Deactivation Furnace OU, selecting solidification and stabilization of lead-contaminated soil. In FY93, the Army and regulators signed two RODs for no further action at two landfills.

In FY94, the installation completed Phase I of the bioremediation program for explosives-contaminated soil in the washout lagoon and stabilized lead-contaminated soil from the deactivation furnace. To meet BRAC program milestones, the installation transferred its conventional weapons mission to another installation. The commander formed a BRAC cleanup team (BCT), which completed a BRAC Cleanup Plan (BCP). The commander also converted the installation's technical review committee to a Restoration Advisory Board (RAB).

In FY95, the installation designated 14,000 acres as CERFA-clean, and regulatory agencies concurred on about 11,000 acres. The installation completed RODs for the Groundwater OU, the Bomb Washout Plant OU, the Miscellaneous Sites OU, and the Ammunition Demolition Activity Area (ADA) OU. A decision document was completed for supplementary sites. The Army completed the Remedial Design (RD) for groundwater treatment and for soil stabilization at the Miscellaneous Sites OU, the ADA OU, and the Bomb Washout Plant OU. The RD for the Groundwater OU addressed a 350-acre plume contaminated with explosives.

In FY96, the Army completed the lead-based paint assessment, and bioremediation of 10,000 cubic yards of explosives-contaminated soil. In FY97, the Army began operating a groundwater treatment facility constructed in FY96 and completed remediation of contaminated soil in the ADA OU, the Miscellaneous Sites OU, and the Bomb Washout Plant OU.

The BCT approved the final Environmental Monitoring Plan for the Active Landfill OU, held scoping meetings on the closure cap at the Landfill OU, conducted unexploded ordnance (UXO) subsurface characterization at the ADA OU, and completed the latest BCP. The BCT also began preparing clean-closure documents for ADA and Washout Lagoon soil, the Miscellaneous Sites OU, the Deactivation Furnace OU, and the Bomb Washout Plant OU.

FY98 Restoration Progress

The installation completed landfill closure and capping in October 1997. The BCT completed Remedial Action (RA) Reports (clean-closure documents) for the Washout Lagoon Soil, Deactivation Furnace, Miscellaneous Sites, and Active Landfill OUs.

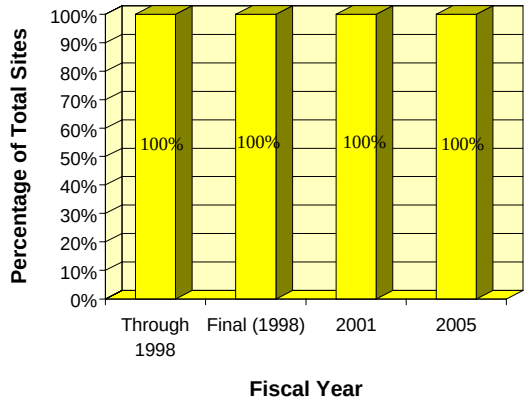
The installation completed geophysical mapping and an Engineering Sampling Analysis Report for UXO in the ADA OU. It also completed a draft Environmental Baseline Survey (EBS) and a finding of suitability to lease (FOSL) for interim leasing of 100/200-series warehouses and the Rail Classification Yard and released the EBS and FOSL for public comment. All remaining heating oil underground storage tanks were removed and converted to aboveground propane tanks. The installation has removed and disposed of all investigation-derived wastes generated during Remedial Investigation and Feasibility Study activities and well development.

The first three activities in the current plan of action were originally scheduled for completion during FY98. They were delayed by lengthy regulatory comment periods and technical data gaps.

Plan of Action

- Complete RA Reports on Bomb Washout Plant and ADA OUs in FY99
- Complete National Priorities List (NPL) partial delisting documents during FY99
- Complete negotiations for UXO cleanup of ADA OU in FY99
- Complete next version of BCP in FY99
- Complete EBS and FOSL for interim lease of 100/200-series warehouses and Rail Classification Yard to Umatilla Local Reuse Authority in FY99
- In FY99, conduct additional soil sampling at selected sites in ADA OU discovered during geophysical mapping and subsurface UXO characterization
- Complete the RA Report for the Lagoons Groundwater OU and prepare the remaining documentation required for property transfer in FY06-FY07

Sites Achieving RIP or RC Per Fiscal Year



Vint Hill Farms Station — BRAC 1993

Size: 701 acres
Mission: Provide logistics support for assigned signals intelligence and electronics warfare weapon systems and equipment; provide communication jamming and intelligence fusion material capability
HRS Score: NA
IAG Status: None
Contaminants: Metals, cyanide, VOCs, petroleum hydrocarbons, PCBs, photographic wastes, and asbestos
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $9.3 million
Estimated Cost to Completion (Completion Year): $3.8 million (FY2002)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000
Final Remedy in Place or Response Complete Date for Non-BRAC Sites: FY1999

Vint Hill Farms, Virginia

Restoration Background

In 1993, the BRAC Commission recommended closure of Vint Hill Farms Station; relocation of the maintenance and repair functions of the Intelligence Material Management Center to Tobyhanna Army Depot, Pennsylvania; and transfer of the remaining components to Fort Monmouth, New Jersey. The installation officially closed on October 1, 1997. The installation is in a caretaker status, providing minimal operations and maintenance (O&M) and oversight of remedial activities until the Army transfers the property.

During the 1940s and 1950s, Vint Hill Farms Station served as a training center for Signal Corps personnel and as a refitting station for signal units. In FY90, a Preliminary Assessment (PA) identified 26 sites, including underground storage tanks (USTs), landfills, lagoons, storage areas, pit areas, fire training areas, disposal areas, spill sites, areas with asbestos-containing materials, lead-based paint areas, and transformers containing polychlorinated biphenyls (PCBs). The installation conducted Removal Actions for USTs, contaminated soil, and PCB-containing transformers. In FY90, soil and groundwater sampling revealed petroleum and solvent contamination.

In FY94, an enhanced PA identified 16 additional sites. Twelve of these sites were recommended for no further action (NFA). The installation formed a BRAC cleanup team (BCT) and completed the final CERFA report and an Environmental Baseline Survey, which identified 417 acres as CERFA-clean. The BCT expedited document review through scoping meetings for incorporating regulatory requirements into Site Inspection (SI) and Remedial Investigation and Feasibility Study (RI/FS) activities.

In FY95, the installation formed a Restoration Advisory Board to facilitate communication among regulatory agencies, contractors, and members of the local community. A land reuse plan was completed and submitted to the regulatory agencies for approval. The installation also initiated an RI/FS for the Phase I reuse priority area, as identified by the Local Redevelopment Authority, and began an Environmental Impact Statement (EIS).

In FY96, the Army completed a final SI report identifying 24 sites for further investigation. RI/FS Phase I fieldwork was completed. The installation assigned execution of the Phase II RI/FS to the U.S. Army Corps of Engineers for inclusion in the Total Environmental Restoration Contract. In FY97, the Army submitted the draft Phase I RI report to the regulatory agencies for review and approval. The report recommended only four Areas for Environmental Evaluation (AREEs) for remediation; all other areas were recommended for NFA. The Army recommended Interim Remedial Actions (IRAs) for the four AREEs needing remediation and received regulatory approval. The Army also prepared Proposed Plans for these actions and published them for public comment. The Army completed Phase II RI fieldwork.

FY98 Restoration Progress

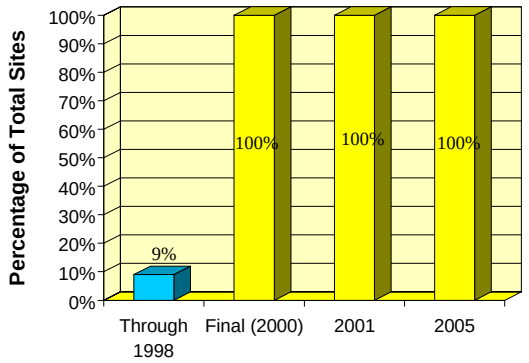
The Army submitted the final Phase I RI report and the draft Phase II RI report to the regulatory agencies for review and approval. The Phase II report recommended three AREEs for remediation. The Army recommended and completed IRAs for the three AREEs. The Army began an FS for AREE 1, the former landfill, which studied the feasibility of several different Remedial Actions (RAs) for this site.

The Army issued the final EIS and Record of Decision. The first three items in the current plan of action were originally scheduled for completion in FY98 but were delayed because of extended regulatory review periods.

Plan of Action

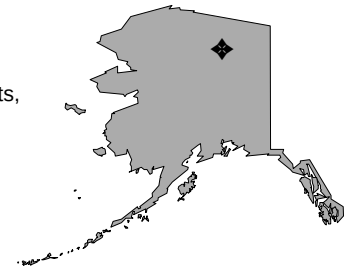
- Complete decision documents for Phase I RI sites and begin Remedial Design (RD) and RA in FY99
- Complete Phase II RI report and forward to regulators for comment and concurrence in FY99
- Complete Phase II FS and begin RD/RA in FY99
- Complete Phase II RD/RA in FY00
- Begin long-term monitoring at AREE 1 after completion of RD/RA activities in FY00
- Complete all BRAC activities by the end of FY01

Sites Achieving RIP or RC Per Fiscal Year



Fort Wainwright NPL

Size: 917,993 acres
Mission: House the Headquarters of the 6th Light Infantry Division
HRS Score: 50.00; placed on NPL in August 1990
IAG Status: Federal Facility Agreement signed in November 1991
Contaminants: Petroleum/oil/lubricants, heavy metals, solvents, pesticides, paints, UXO, ordnance compounds, and chemical agents
Media Affected: Groundwater and soil
Funding to Date: $92.1 million
Estimated Cost to Completion (Completion Year): $32.9 million (FY2017)
Final Remedy in Place or Response Complete Date for All Sites: FY2003



Fairbanks, Alaska

Restoration Background

Since World War II, Fort Wainwright has housed light infantry brigades, most recently the 1st Brigade, 6th Infantry Division (Light).

Environmental studies at the installation identified the following site types: a chemical agent dump, drum burial sites, underground storage tanks, a railroad car off-loading facility, an open burning and open detonation area, a former ordnance disposal site, solvent groundwater plumes, petroleum/oil/lubricant (POL) plumes, and pesticide-contaminated soil. The installation divided the sites into five operable units (OUs). In FY90, the installation established a technical review committee.

The Army conducted two Interim Actions in FY93 and FY94 to remove drums and contaminated soil. In FY93, the installation completed Site Inspections at 30 sites, 15 of which required no further action. In FY94 and FY95, the installation continued Remedial Investigation/Feasibility Study (RI/FS) activities, which included characterization of POL and solvent groundwater plumes and fieldwork for several areas and a former landfill. The chemical agent dump site was addressed separately under an interim Record of Decision (ROD).

In FY96, the Army and regulators signed RODs for groundwater contamination in OU3 and soil and groundwater contamination in OU4. The OU4 remedy specifies natural attenuation of groundwater contamination, capping of the landfill, and in situ treatment of coal storage lot soil and air sparging of associated groundwater. Remedial Design (RD) began for all sites addressed under those RODs, and some OU3 Remedial Action (RA) construction was completed. The Army completed the fire training pits (OU4) Removal Action in FY96 and closed the site.

Sampling at hot spots at the railroad off-loading facility (OU3) showed decreasing levels of contamination. At breaks in the pipeline from Fairbanks to Eielson Air Force Base (also OU3), treatment included injection of oxygen-releasing compounds to enhance in situ biodegradation of benzene, toluene, ethyl benzene, and xylene compounds in the groundwater.

In FY97, the installation completed the FS, Proposed Plan, and ROD for OU1. The Army and regulators signed the ROD for OU2, and the installation initiated RD. The OU4 RD was completed. The installation completed the draft FS and initiated Treatability Studies (TSs), including installation of a horizontal well, for OU5. A postwide risk assessment was incorporated into the FS for OU5.

The Army completed a pipeline study for OU3 and OU5, initiated a TS at OU5, and installed horizontal air-sparging/soil vapor extraction technology. The commander formed a Restoration Advisory Board (RAB). The Army, EPA, and the Alaska Department of Environmental Conservation met to review and write documents.

FY98 Restoration Progress

RA construction and operations continued at OU1 and OU2. OU4 reached construction complete status in September. At OU3, systems were expanded to address additional contamination. At OU5, the installation began TSs, including soil heating to enhance biodegradation; tracer studies to further delineate contamination movement; and installation of an air-sparging curtain to protect the Chena River from contamination. Removal of an old retaining structure at OU5 resulted in removal and treatment of 650 cubic yards of contaminated soil and 1,700 gallons of product.

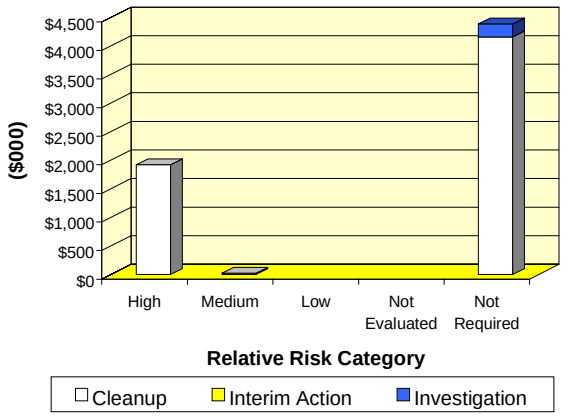
The Army met with members of churches near OU3 and continues to provide bottled water to the churches. The ROD for OU5 is in the final draft stages. Excellent teaming relationships with the regulators and coordination efforts to rewrite the OU5 ROD have expedited the review of this comprehensive, final ROD. The Chena River Aquatic Assessment Program, which will help determine whether operations on Fort Wainwright have affected ecological receptors in the river, continued.

RAB participation continues to grow. Quarterly fact sheets were distributed to interested community members, and interested RAB members received tours of the restoration sites. The installation also held a public meeting on the Proposed Plan for OU5.

Plan of Action

- Complete OU5 ROD and RD in FY99
- Continue quarterly RAB meetings and distribution of fact sheets in FY99
- Continue Chena River Aquatic Assessment Program on a reduced schedule in FY99
- Continue remediating petroleum-contaminated sites under state agreement in FY99
- Work toward construction complete status at OU1 and OU2 in FY99
- Continue to provide bottled water to neighboring churches in FY99

FY99 Funding by Phase and Relative Risk



Warminster Naval Air Warfare Center Aircraft Division — NPL/BRAC 1991

Size: 839 acres
Mission: Perform research, development, testing, and evaluation for Naval aircraft systems and antisubmarine warfare systems; perform associated software development
HRS Score: 57.93; placed on NPL in October 1989
IAG Status: Federal Facility Agreement signed in September 1990
Contaminants: VOCs, heavy metals, firing range wastes, fuels, industrial wastewater sludges, nonindustrial solid wastes, paints, PCBs, sewage treatment sludge, and solvents
Media Affected: Groundwater and soil
Funding to Date: $16.9 million
Estimated Cost to Completion (Completion Year): $16.3 million (FY2029)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2001

Warminster Township, Pennsylvania

Restoration Background

In July 1991 and July 1995, the BRAC Commission recommended that Warminster Naval Air Warfare Center Aircraft Division be realigned and closed. The installation closed in March 1997, with final transfer of property targeted for December 1998.

In FY79, metals and volatile organic compounds (VOCs), primarily trichloroethene (TCE) and tetrachloroethane, were detected in local groundwater wells. Studies have identified nine sites, eight of which were recommended for further investigation. Site types include waste burn pits, sludge disposal pits, landfills, waste pits, and a fire training area.

One underground storage tank and associated contaminated soil were removed between FY86 and FY90. In FY93, the installation signed a Record of Decision (ROD) for Operable Unit (OU) 1. Remedial Design (RD) activities for the site were completed in FY94. The installation's contract for an extraction and treatment system for the groundwater at OU1 now includes OU3 and OU4.

In FY93 and FY94, the installation completed groundwater Remedial Investigation and Feasibility Study (RI/FS) activities for eight sites. In FY95, it completed a Remedial Action (RA) for residential wells contaminated with TCE. The Navy distributed bottled water, installed temporary treatment systems at each affected well, and worked with EPA and the local water authority to provide public water service to affected residential areas. In FY96, groundwater RI/FS activities at Site 9 and the RD for Sites 4 and 8 were completed. During FY97, a source Removal Action was completed at Site 4 and another initiated at Site 6. The installation also completed a RA at OU3, began operation of an extraction and treatment system, and started long-term monitoring. Groundwater investigations for Area D concluded when an interim ROD was signed. The Navy and EPA held regularly scheduled Tier II meetings.

A technical review committee, formed in FY88, was converted to a Restoration Advisory Board in FY94. The installation completed its community relations plan and established an administrative record in the same year. A BRAC cleanup team also was established in FY94. The installation completed the BRAC Cleanup Plan (BCP) and a Phase I Environmental Baseline Survey (EBS) in FY95. The property was divided into eight parcels, with 353 acres identified as CERFA-clean. Also in FY95, the installation began a Phase II EBS.

FY98 Restoration Progress

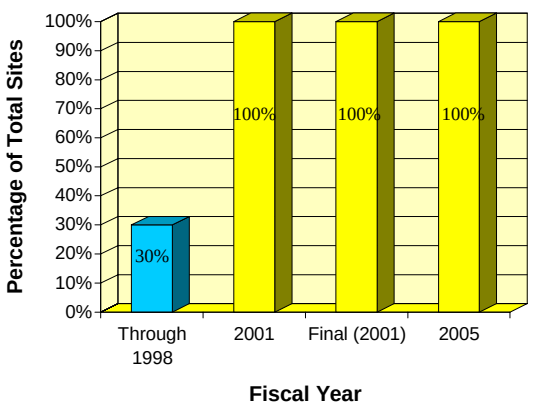
The installation issued a final RI report for Area D sources and a finding of suitability to transfer (FOST) for 29 acres to be transferred by public benefit conveyance (PBC). Fieldwork was completed and draft reports were issued for EBS Phase II work, including risk assessments. The installation initiated a Removal Action at Area A (Site 1) and conducted pump tests at Areas A and D. The groundwater monitoring program continued for perimeter, off-base, and Area C wells. Three findings of suitability to lease were issued for various buildings to be leased by the Federal Lands Reuse Authority. Supplemental investigations for Site 5 and suspected trenches were initiated. The latest version of the BCP was completed, and Tier II meetings continued on a regular basis.

The final ROD for Sites 5 through 7 (Area B) was not signed because of continuing field investigations at Site 5 and an ongoing RI/FS at Sites 6 and 7. The draft Phase III RI/FS for media other than groundwater was completed. An interim RD/RA for groundwater at Areas A and D was initiated; the final RD/RA cannot begin until the interim remedy is completed. The no further action ROD for source removal at Sites 4 and 6 has been postponed while the installation determines the necessary interim steps for site cleanup. The RD/RA for Area B was delayed by additional field investigations. The interim remedy for Areas A and B groundwater, OU1, was also delayed.

Plan of Action

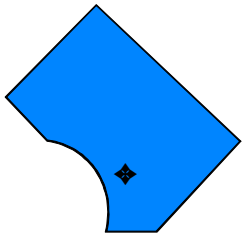
- Complete Removal Actions at Sites 1, 2, and 3 in FY99
- Initiate Removal Action at Site 8 in FY99
- Initiate additional Removal Actions at Site 6 in FY99
- Drill extraction wells at Areas A and D and connect piping to existing treatment facility in FY99
- Prepare Environmental Baseline Survey for Transfer and draft FOSTs for PBC and economic development conveyance parcels in FY99

Sites Achieving RIP or RC Per Fiscal Year



Washington Navy Yard NPL

Size: 63.3 acres
Mission: As the Navy's Quarterdeck in the Washington area, provide resources, including administrative space, housing, training facilities, logistical support, and supplies, for Washington Navy Yard tenants and other assigned units
HRS Score: 48.57; placed on NPL in July 1998
IAG Status: Federal Facility Agreement under negotiation
Contaminants: PCBs, pesticides, solvents, and metals
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $8.5 million
Estimated Cost to Completion (Completion Year): $13.1 million (FY2009)
Final Remedy in Place or Response Complete Date for All Sites: FY2008



Washington, D.C.

Restoration Background

Investigations at the Washington Navy Yard have identified 14 sites, including 3 leaking underground storage tank (UST) sites. Contaminants released from past storage and disposal operations at the installation may have migrated to shallow and deep aquifers and the Anacostia River.

A RCRA Consent Order was signed in July 1997 and dictates specific investigative actions and Interim Actions to be taken by the Navy. In FY97, the installation's UST program completed corrective action plans for two sites.

FY98 Restoration Progress

In April 1998, the Navy and Earthjustice, the legal defense portion of the Sierra Club, signed a Consent Decree that adds additional investigative and reporting requirements for the Navy. In July, the Washington Navy Yard was placed on the National Priorities List (NPL).

Currently, a Federal Facility Agreement (FFA) under CERCLA is being negotiated with EPA Region 3 and the District of Columbia. As part of the negotiations, the District of Columbia has suggested adding 30 areas of concern that were identified as requiring additional investigation or remediation. EPA Region 3 has identified eight locations that need to be investigated. Subsequent negotiations with the District of Columbia and EPA have reduced the number of additional sites requiring investigation to fewer than 15.

A corrective action management plan (CAMP) was developed and approved for FY99. The CAMP outlines all projects and schedules to ensure that all sites comply with the RCRA Consent Order. The first update of the CAMP was submitted to EPA Region 3 and the District of Columbia Environmental Health Administration. In addition, work plans were developed and reviewed for the RCRA Facility Investigation (RFI) of basewide groundwater and Site 16, a former dive shop area where mercury was detected during an unrelated UST investigation. The basewide RFI constitutes the major portion of the first phase of investigation.

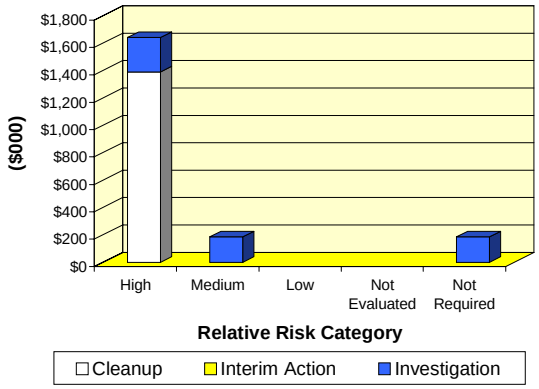
To minimize potential exposure of the Anacostia River, the installation has completed Removal Actions for Sites 6 and 14, which both contained polychlorinated biphenyl (PCB)–contaminated soil. Final closure reports for the two sites have been completed. In addition, the site assessment phase was completed for one UST site, which was determined to require no further action. An Interim Action work plan for the cleaning and assessment of the storm sewer system was completed, and the work was performed.

The installation also formed a Restoration Advisory Board (RAB), completed a community relations plan, and established four information repositories and an administrative record. RAB members were trained in RCRA and CERCLA processes, relative risk rankings, field sampling methods, and uses of the geographic information system (GIS). Regulators and RAB members participated in site visits and work functions. Monthly RAB meetings have included program status updates, discussion of the availability of documents for public review, EPA and local community perspectives, and other general environmental issues.

Plan of Action

- Finalize work plans for basewide and Site 16 RFIs in FY99
- Begin field investigation of basewide groundwater and Anacostia River sediment in FY99
- Begin field investigation of Site 16 mercury contamination and draft an Engineering Evaluation and Cost Analysis (EE/CA) in FY99
- Finalize EE/CA and Action Memorandum for Site 10 in FY99
- Begin rehabilitation of storm sewer system in FY99
- Finalize the work plans for removal site evaluations at Sites 7, 11, and 13 in FY99
- Begin EE/CAs for Sites 7, 11, and 13, as necessary, in FY99
- Negotiate FFA with EPA and the District of Columbia in FY99
- Draft a site management plan for CERCLA-based investigations in FY99
- Implement corrective actions at two UST sites in FY99

FY99 Funding by Phase and Relative Risk



West Virginia Ordnance Works — NPL

Size: 2,704 acres
Mission: Manufactured TNT
HRS Score: 35.72; placed on NPL in September 1983
IAG Status: First IAG signed in September 1987; second IAG signed in July 1989
Contaminants: TNT, DNT, and organic compounds
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $48.7 million
Estimated Cost to Completion (Completion Year): $41.0 million (FY2031)
Final Remedy in Place or Response Complete Date for All Sites: FY2004

Point Pleasant, West Virginia

Restoration Background

From 1941 to 1946, West Virginia Ordnance Works manufactured TNT from toluene, nitric acid, and sulfuric acid. By-products of the manufacturing process included TNT, DNT, and organic compounds, which were released into groundwater, soil, surface water, and sediment. Principal site types include TNT manufacturing areas, wastewater sewer lines, and wastewater ponds known as the "Red and Yellow Water Ponds."

Preliminary Assessments and Site Inspections (SIs) in FY81 and FY82 identified two operable units (OUs). The property is now divided into 12 OUs. From FY88 to FY93, contaminated soil was capped in the TNT manufacturing area. Caps for the ponds and the reservoir (OUs 2 and 3) were completed, and the installation began Remedial Investigation and Feasibility Study (RI/FS) activities at OUs 8, 9, and 11. The U.S. Army Corps of Engineers (USACE) began operations and maintenance and long-term monitoring (LTM) for OUs 1, 2, and 3.

In FY94, the site management plan for the former installation was completed. Remedial Design (RD) activities were completed for OU4 and the groundwater extraction and treatment system. RI activities continued for the other OUs, and Expanded SIs began. USACE removed 546 tons of hazardous material from the TNT manufacturing area and backfilled open pits and manholes.

In FY95, USACE completed Removal Actions for asbestos in the acids area and two powerhouses and performed follow-on building demolition. USACE also began quarterly LTM of the adjacent Point Pleasant and Camp Conley municipal water supply wells. Construction began on a groundwater extraction and treatment system at OU4 and OU5. At OU6, sampling was completed, and the RD began for construction of wetlands. Potentially responsible party (PRP) efforts began for OU7. A risk assessment began at OU11.

During FY96, USACE submitted a risk assessment and an RI report to EPA Region 3 and began an FS at OUs 8, 9, and 11. It also initiated final Baseline Risk Assessments for OUs 10 and 12.

In FY97, USACE completed construction of the groundwater extraction and treatment system and submitted a Remedial Action report for OU4. The final Alternative Analysis report for OU5 and the final Baseline Risk Assessment for OUs 10, 11, and 12 also were submitted to EPA. USACE presented a draft FS for OU10, a draft risk evaluation for ESI 3, and a Proposed Plan for OU11. The conceptual design for OU5 also was initiated.

USACE worked with the technical review committee (TRC) to reestablish project priorities. Additionally, a draft no-action Record of Decision (ROD) was reached for OU11 through partnering with regulatory agencies.

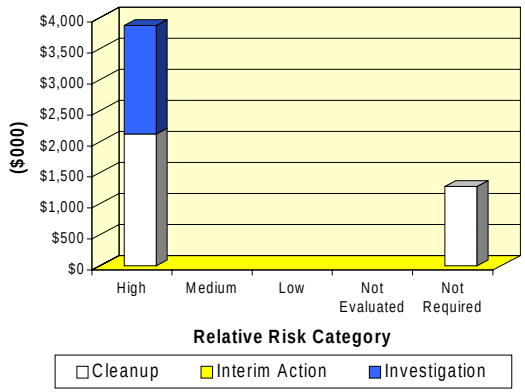
FY98 Restoration Progress

Based on partnering with regulatory agencies, DoD, and USACE, an agreement was reached with the property owner to purchase the OU11 property under CERCLA authority. USACE completed a sitewide groundwater model and converted the TRC to a formal Restoration Advisory Board (RAB). USACE increased RAB support and public awareness through community surveys and media involvement. A draft FS for OU4 Alternative Analysis was completed to identify alternatives for bringing the system into compliance with state discharge standards. Completion of the OU5 ROD was delayed, pending the outcome of fish sampling analyses and associated issues. USACE developed draft decision documents for Extended SIs 1, 2, 3, 8, and 9. Draft Proposed Plans for OU10 and OU12 were completed.

Plan of Action

- Complete OU5 ROD (no action pending resolution of fish sampling issues) in FY99
- Complete OU1 burning ground investigation in FY99
- Develop final decision documents for Extended SIs 1, 2, 3, 8, and 9 in FY99
- Complete final Proposed Plan and ROD for OU10 and OU12 in FY99
- Complete final FS for OU4 Alternative Analysis in FY99

FY99 Funding by Phase and Relative Risk



Size: 7,000 acres
Mission: Serve as training and operations center for the A-6 and A-6E bomber squadrons; serve as center for U.S. Navy and Marine Corps reserve training in the Pacific Northwest
HRS Score: 39.64 (Seaplane Base); placed on NPL in February 1990
48.48 (Ault Field); placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in September 1990
Contaminants: Chlorinated solvents, PCBs, and PAHs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $73.4 million
Estimated Cost to Completion (Completion Year): $60.3 million (FY2025)
Final Remedy in Place or Response Complete Date for All Sites: FY2008

Oak Harbor, Washington

Restoration Background

Whidbey Island Naval Air Station occupies four separate areas on Whidbey Island: Ault Field, the Seaplane Base, the Outlying Field, and the Lake Hancock Target Range. The Seaplane Base and Ault Field were placed on the National Priorities List (NPL) in February 1990. Past disposal practices resulted in contamination at several sites, including six former landfills. Other operations that contributed to contamination are aircraft maintenance, vehicle maintenance, public works shop activities, and firefighting training activities.

Environmental investigations, which began in FY84, have identified 52 sites at the installation. These 52 sites have been grouped into five operable units (OUs). Eighteen of the sites were recommended for no further action. No sites were identified at the Outlying Field. The installation also has 36 underground storage tank (UST) sites.

In FY90, the Navy signed a Federal Facility Agreement (FFA) for Ault Field and the Seaplane Base. The FFA specified that 26 sites were to undergo more intensive sampling programs under a Hazardous Waste Evaluation Study (HWES) for potential inclusion in a Remedial Investigation and Feasibility Study (RI/FS). After the HWES was completed in FY94, two sites were recommended for an RI/FS because of soil and groundwater contamination. Removal Actions were recommended for seven sites. The installation completed a community relations plan (CRP) in FY91.

From FY91 to FY95, early actions, including UST Removal Actions, removal of contaminated soil, and Interim Remedial Actions, were conducted at the installation. In FY94, the installation converted its technical review committee to a Restoration Advisory Board (RAB) in FY94. The Navy prepared a Readers Guide for the RAB and the community. The guide provides a technical summary of RI/FS activities at a specific OU. The installation also conducted corrective actions at 16 UST sites in FY94.

During FY95, the installation completed RI/FS activities at one OU. A Record of Decision (ROD) was signed and a Remedial Design (RD) completed for another OU. Remedial Actions (RAs) were completed at two OUs, and various USTs were removed from the installation. Groundwater contamination from a former Navy landfill was found to be migrating off base and to threaten the water supplies of private landowners. A pump-and-treat system began full-scale operation to control the migration of contamination. In addition, the private wells have been closed, and the residences have been connected to public water supplies. An RA that removed sediment by dredging 7,000 linear feet of runway ditches was completed. The sediment is contaminated with petroleum hydrocarbons, inorganic compounds, and polyaromatic hydrocarbons. The installation updated the CRP, and solicited comments from the community at an open house.

In FY95, the Seaplane Base was deleted from the NPL and from the State of Washington's Hazardous Sites List. Soil excavation activities have sufficiently reduced the threat to human health and the environment.

During FY96, the installation updated the CRP and completed the RA to remove contaminated sediment from the runway ditches. Work continued on the landfill cap while the pump-and-treat system at the landfill was upgraded. Other activities included the signing of a ROD, the beginning of RD at OU5, continuation of long-term monitoring (LTM) at OU2, and the closing-in-place of a UST.

In FY97, the installation completed the RD and the RA for three sites at OU5. The landfill cap also was completed. RODs for three sites were signed, and RDs for two sites were completed. The process of deleting OU3 (Ault Field) from the NPL began in FY97 with the completion of the Construction Complete milestone. In addition, LTM and operations and maintenance (O&M) continued at OU1, and LTM continued at OU2.

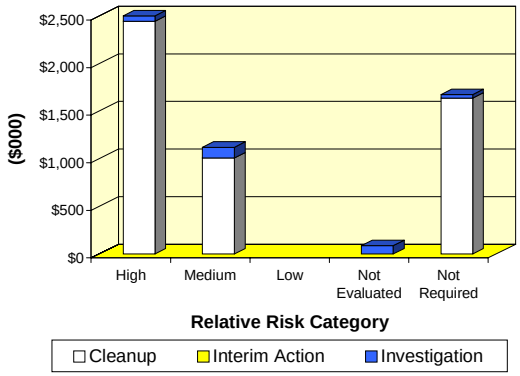
FY98 Restoration Progress

The installation continued O&M and monitoring activities at OUs 1, 2, and 5. The five-year review was completed for Ault Field Sites (OU3).

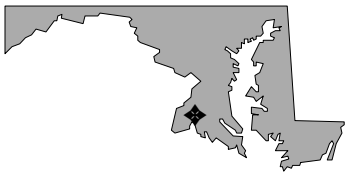
Plan of Action

- Continue LTM and O&M activities at OU1 and OU5 in FY99

FY99 Funding by Phase and Relative Risk



Size: 710 acres
Mission: Research, develop, test, and evaluate ordnance technology
HRS Score: NA
IAG Status: None
Contaminants: Explosive compounds, waste oil, PCBs, heavy metals, VOCs, and SVOCs
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $14.4 million
Estimated Cost to Completion (Completion Year): $20.5 million (FY2011)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2002



Silver Spring, Maryland

Restoration Background

In July 1995, the BRAC Commission recommended closure of White Oak Naval Surface Warfare Center. Functions performed at White Oak were absorbed by Panama City Coastal Systems Station and Carderock's Indian Head and Dahlgren Divisions. The facility closed permanently in July 1997. The General Services Administration (GSA) and the Local Redevelopment Authority developed a land reuse plan.

Historical activities at the installation include landfill disposal of oils, polychlorinated biphenyls (PCBs), solvents, paint residue, and miscellaneous chemicals (including mercury); disposal of chemical research wastewater in dry wells; burning of explosive ordnance; and composting of sludge. Records also indicate that a radium spill occurred. Contaminants of concern are volatile organic compounds (VOCs); PCBs; cadmium; chromium; lead; mercury; nickel; and ordnance compounds, such as RDX and TNT. These contaminants primarily affect groundwater and surface water.

Studies identified 14 sites, 7 of which required no further action (NFA) after the Preliminary Assessment (PA) in FY84. The remaining sites proceeded to the Site Inspection (SI) phase, which was completed in FY87. Contamination was detected at all seven sites included in the SI, and further investigation was recommended. PCBs in surface soil at the Apple Orchard Landfill site represent a risk to people who have access to the site; therefore, a fence was installed around the site.

The installation completed the Remedial Investigation and Feasibility Study (RI/FS) phase for all seven remaining sites in FY93. The Human Health Risk Assessment identified a present risk at the Apple Orchard Landfill site and a potential risk at the remaining six sites. Source removal was recommended for five sites and encapsulation for two sites. The installation began Remedial Design (RD) for six sites in FY94.

A RCRA Facility Assessment, in FY89 identified 97 solid waste management units (SWMUs) and 19 areas of concern (AOCs), including 14 sites identified during the PA. Thirty-eight SWMUs required further investigation.

A technical review committee was formed in FY89 and converted to a Restoration Advisory Board (RAB) in FY96. The installation established an administrative record, an information repository, and a community relations plan in FY94. During FY96, the installation formed a BRAC cleanup team (BCT); completed RDs for Sites 8, 9, and 11; completed an Environmental Baseline Survey; and began developing a BRAC Cleanup Plan.

In FY97, the installation completed a finding of suitability to transfer (FOST) for a transfer of property to GSA and the Army; finished Interim Remedial Actions (IRAs) for Sites 8, 9, and 11; completed several underground storage tank removals; and initiated RI/FS for Sites 7 and 9. Relative Risk Site Evaluations have been completed at 29 sites. The BCT approved a Removal Action for Site 46, work plans at AOC 1, a basewide background study, and the SI for Site 46.

FY98 Restoration Progress

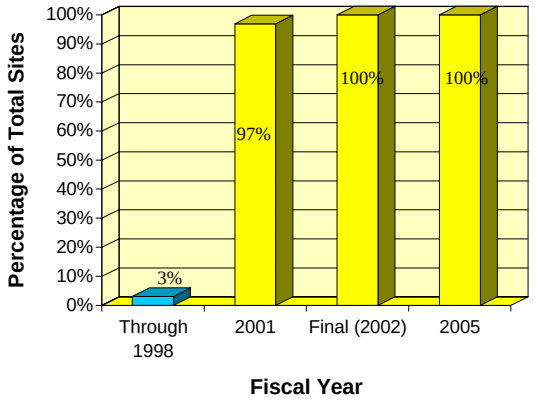
Forty-eight acres was transferred to the U.S. Army and 662 acres to the GSA. A land reuse plan was under development by GSA. A RCRA 7003 Order was issued. Of the 18 sites (AOC 1) scheduled for RI/FSs in FY98, 7 had RI/FSs initiated, 9 were recommended for NFA, and 2 were recommended for Removal Actions. No Remedial Actions (RAs) or RDs were conducted because the BCT rearranged site priorities. IRAs were initiated at Sites 1, 4, 28, and 46. A new Removal Action was initiated at Site 46, and Removal Actions were recommended for Sites 1 and 28 after site screenings. To expedite and improve cleanup at Site 46, the site was broken into two phases: surface water contamination and groundwater contamination. The installation completed an SI at Site 46, a basewide background study, and site screenings of Sites 1, 5, 6, 12, 13, 28, 29, 31, 32, and 33 (AOC 1) and AOC 100. The installation initiated a basewide explosives survey, Removal Actions at Sites 10 and 14, site screenings at AOC 2, and basewide storm and sanitary sewer investigations.

The RAB remained active, reviewing documents and providing comments. Site tours were given to community members on request. Partnering efforts were initiated with EPA and the State of Maryland. These partnering efforts have improved team performance.

Plan of Action

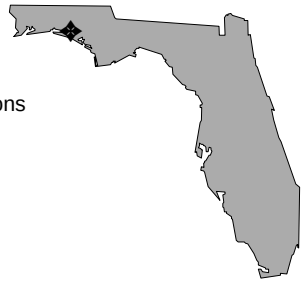
- Initiate RI at Site 46 in FY99
- Initiate Proposed Plan and Record of Decision at Sites 8, 10, and 14 in FY99
- Initiate clean closure at Site 3 in FY99
- Initiate RI for AOC 2 in FY99
- Complete Removal Actions at Sites 1, 4, 10, 14, and 28 in FY99
- Initiate RAs at two sites and RDs at four sites in FY00

Sites Achieving RIP or RC Per Fiscal Year



Whiting Field Naval Air Station NPL

Size: 3,842 acres
Mission: Train student naval aviators
HRS Score: 50.00; placed on NPL in May 1994
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Pesticides, PCBs, VOCs, heavy metals, and chlorinated hydrocarbons
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $21.0 million
Estimated Cost to Completion (Completion Year): $33.9 million (FY2025)
Final Remedy in Place or Response Complete Date for All Sites: FY2012



Milton, Florida

Restoration Background

In FY85, a Preliminary Assessment (PA) identified 23 sites at Naval Air Station (NAS) Whiting Field. In FY89, a supplemental PA identified five sites at the Outlying Landing Field (OLF) Barin. Site types include disposal areas and pits, storage areas, spill areas, landfills, a disposal and burning area, a maintenance area, underground storage tanks (USTs) and fuel pits, fire training areas, and drainage ditches. There are currently 39 CERCLA sites.

In FY87, Site 5 was determined to require no further action (NFA). In FY89, Remedial Investigation and Feasibility Study (RI/FS) activities began for most sites at the installation. In FY92, soil contaminated with mercury, lead, and methylene chloride was detected at the OLF Barin. RI/FS activities began for the five original sites and five new sites at OLF Barin and six sites at NAS Whiting Field. In FY94, the installation completed a Baseline Risk Assessment for the OLF Barin and a Baseline Risk Assessment work plan for the NAS. In FY95 and FY96, the installation completed RI/FS activities and closed four sites at OLF, with NFA.

During an assessment of six UST sites, chlorinated hydrocarbon contamination was detected, and 19 tanks identified. In FY92, Removal Actions were completed for all USTs and associated soil. In FY94, two UST sites were closed. In FY95, a corrective action plan (CAP) was completed for one UST site, and corrective measures were initiated for three sites. A decision for NFA at three UST sites has been approved, and three UST sites remain.

In FY97, cleanup of five sites was completed and the sites closed at OLF Barin: two sites required NFA; two required Interim Removal Actions, then NFA; one site required a Remedial Action (RA). At the NAS, groundwater was isolated as a separate site, enabling the installation to finish field investigations at 13 sites. Clear Creek and off-base migration received preliminary investigation. A large UST site was investigated, and a significant amount of petroleum-impacted soil was found. The site was given a monitoring-only designation because of changes in state regulations and the low risk of migration of contamination. The NAS completed a CAP and began a Remedial Design for one UST site and placed a contractor on the on-board review to ensure that all permits are in place.

The NAS formed a technical review committee (TRC) in FY89. A community relations plan (CRP) was completed in FY91 and updated in FY95. NAS formed a TRC for OLF Barin in FY92; a CRP was completed for the OLF Barin in FY93. In FY95, both TRCs were converted to Restoration Advisory Boards (RABs), and NAS initiated a partnership agreement with regulators and stakeholders.

FY98 Restoration Progress

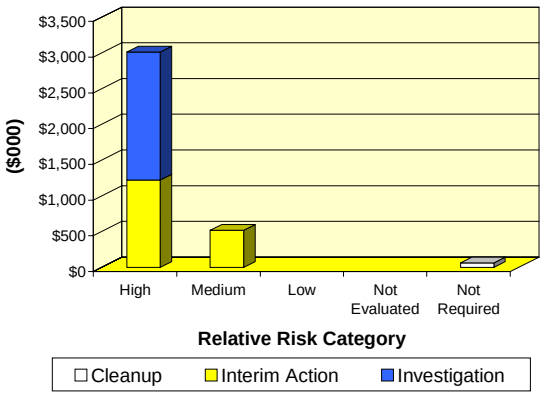
At NAS RI reports were written for nine sites, FS reports were written for two sites, and a Proposed Plan (PP) and draft Record of Decision (ROD) were written for one site. Field investigations were finished at six sites. Long-term monitoring (LTM) began at one UST site. The installation completed an RI/FS for Site 122, previously Site 22, at OLF Barin. An Interim Remedial Action (IRA) for Site 17 was delayed, pending completion of an Installation Restoration (IR) report for the site. NFA letters for Sites 36 and 37 were not completed because Site 36 had to be retested to determine whether the contaminates found were laboratory contaminates. The Machine Gun Butt Area was not made into a separate site because it is within the arcs of the existing firing range. The contract for a Remedial Action Plan (RAP) was not awarded because groundwater for the site must be separated and moved to the IR Program for Site 40. Completion of the IR Program at OLF Barin was awaiting finalization of land use controls.

The RAB reviewed nine RI reports, two FS reports, and one PP. The RAB also received training on the technical assistance for public participation program, the technical assistance grant program, and risk assessment guidance for human health. The partnering team has been proactive and expedited the decision-making process, providing cost and time savings.

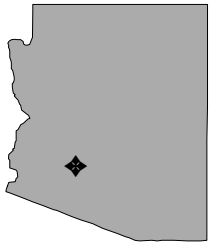
Plan of Action

- Complete IRA for four sites in FY99
- Complete NFA letter for Site 37 in FY99
- Complete RI/FS reports for 18 sites in FY99
- Complete PPs and RODs for 12 sites in FY99
- Begin field investigation for groundwater in FY99 and complete investigation in FY00
- Sign Federal Facility Agreement in FY99
- Initiate LTM for one UST site in FY99 and for another UST site in FY00
- Complete RODs for six sites in FY00
- Complete RAP for a UST site in FY00

FY99 Funding by Phase and Relative Risk



Size: 4,042 acres
Mission: Supported pilot training and ground equipment maintenance
HRS Score: 37.93; placed on NPL in November 1989
IAG Status: Federal Facility Agreement signed in 1990
Contaminants: VOCs, petroleum/oil/lubricants, heavy metals, and pesticides
Media Affected: Groundwater and soil
Funding to Date: $42.1 million
Estimated Cost to Completion (Completion Year): $2.7 million (FY2027)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000



Mesa, Arizona

Restoration Background

In July 1991, the BRAC Commission recommended closure of this installation. The installation closed on September 30, 1993.

Before base closure, environmental studies identified 15 sites at the installation. These sites were consolidated into three operable units (OUs). In FY93, an Environmental Assessment of 30 additional areas resulted in creation of two more OUs including 17 new Installation Restoration Program (IRP) sites. OU1 contains 10 sites; OU2 is the liquid fuels storage area; OU3 consists of Fire Protection Training Area No. 2 and a collapsed stormwater line; OU4 contains 9 sites; and OU5 contains 9 sites. A sixth OU was created by Consensus Statement at the April 1997 Technical Working Group Meeting at Williams (Site SS-17 was moved from OU4 to maintain the OU4 schedule). OU6 is the Old Pesticide/Paint Shop.

Removal Actions and Interim Remedial Actions included removal of buried containers, contaminated soil, and 12 underground storage tanks (USTs). In FY93, a Record of Decision (ROD) was signed for OU2, and the installation began Remedial Design (RD) and Remedial Action activities. Soil at OU2 is being treated by soil vapor extraction (SVE). An Environmental Baseline Survey was completed.

In FY94, a ROD was signed for OU1, and all known USTs and oil-water separators were removed. A free-product extraction system was installed at IRP Site ST-12 (OU2). In FY95, the installation removed a UST from the Airfield Site and removed stained-soil areas, drums, and asbestos-containing material from the Concrete Hardfill Site. Risk assessments were prepared for two sites, and decision documents recommending No Further Action were prepared for five sites at OU5. The installation also completed a Feasibility Study (FS), a Proposed Plan, and a draft ROD for OU3. Under the ROD for OU1, installation of a landfill cap was completed. In FY94, the installation formed a BRAC cleanup team and a Restoration Advisory Board. The community relations plan, initially approved in FY91, was revised.

In FY96, a ROD was signed for OU3. Treatability Studies (TSs) of free-product removal, natural attenuation, bioventing, and SVE were initiated at OU2. The installation also completed Remedial Investigations (RIs) at OU4 and OU5. Oil-contaminated soil at the Civil Engineering Prime Beef Yard Site was removed, and two areas of the site were deemed clean by the regulatory agencies.

In FY97, an OU2 TS evaluated natural attenuation and SVE as substitutes for pump-and-treat technology and free-product recovery. An OU3 TS addressing vadose zone (zone extending to the groundwater) contamination and an Engineering Evaluation and Cost Analysis also were completed, and RD activities began. Partnering efforts helped resolve lead cleanup issues at Site SS-19. The ROD for OU5 was signed. The latest version of the BRAC Cleanup Plan was completed.

FY98 Restoration Progress

A focused FS for the liquid fuels storage area (ST-12) was initiated to evaluate remediation alternatives based on the results of the SVE pilot project and the TS. An FS and a Proposed Plan were completed for OU4, which resulted in lead removal, disposal, and capping at the South Desert Village Housing Area.

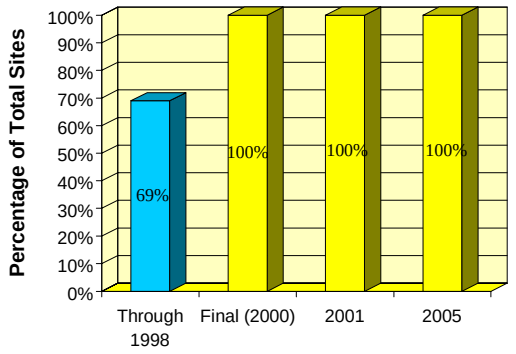
Because tetrachloroethene (PCE) and trichloroethene (TCE) were detected at the landfill (LF-04) at levels above threshold limits, an RI/FS was programmed for funding in FY99. Annual inspection of the cap at LF-04 was completed.

Investigations were completed at SS-17 (Old Pesticide/Paint Shop); these showed no contamination in groundwater and no unacceptable risks to human health. A risk assessment at FT-02 (Fire Protection Training Area No. 2) showed no unacceptable risks to human health, and no further action at the site was required. The Air Force and EPA agreed that no further testing for pesticides was required at the Williams Golf Course.

Plan of Action

- Obtain all necessary agency signatures on the OU4 ROD
- Begin new contract for long-term operations and maintenance at ST-12 and LF-04
- Conduct RI/FS for PCE and TCE contamination at LF-04

Sites Achieving RIP or RC Per Fiscal Year



Willow Grove Naval Air Station Joint Reserve Base NPL

Size: 1,090 acres
Mission: Serve as Reserve Naval Air Station for aviation training activities
HRS Score: 50.00; placed on NPL in September 1995
IAG Status: Federal Facility Agreement under negotiation
Contaminants: Heavy metals, PCBs, petroleum/oil/lubricants, and solvents
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $4.7 million
Estimated Cost to Completion (Completion Year): $32.8 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2009

Willow Grove, Pennsylvania

Restoration Background

Environmental studies at this installation identified 11 CERCLA sites and 2 RCRA sites. Site types include landfills, underground storage tanks (USTs), and a fire training area. In an effort to close out sites that pose no risk, decision documents recommending no further action (NFA) at five sites have been submitted for review.

In FY86, Preliminary Assessments (PAs) were completed for nine sites. Five of these sites were recommended for further investigation because of potential contamination of surface water and groundwater. In FY90, all nine sites were included in a Site Inspection (SI), along with a new site (Navy Fuel Farm). An Expanded Site Inspection was recommended for Site 7 because of trace levels of methylene chloride. Remedial Investigations and Feasibility Studies (RI/FSs) were recommended for Sites 1, 2, 3, and 5. Decision documents recommending NFA for Sites 4, 6, 7, 8, and 9 were submitted to EPA Region 3.

In FY92, two 210,000-gallon USTs were removed from the Navy Fuel Farm (Site 10). A pilot-scale recovery system for removal of free product was installed in FY93 and operated through FY95.

In FY93, an RI for Sites 1, 2, 3, and 5 recommended a Phase II RI/FS. In FY95, a Phase II RI work plan was issued for these four sites and for Site 11. Site 11 was later removed from the work plan. Also in FY95, 6,000 cubic yards of soil was removed from Site 10. A state-approved plan allowed the removed soil to be spread on another area at the installation. In FY96, the work proposed for four sites was approved. The pilot study on free-product recovery at Site 10 was completed.

During FY97, a draft site management plan (SMP) and the Phase II RI work plan were completed. A design-and-build approach for Site 10 allowed the Remedial Action to be awarded with the Remedial Design and completed under one delivery order. Vacuum-enhanced recovery of light nonaqueous-phase liquids with full-time water table depression, and immunoassay kits for polychlorinated biphenyl (PCB) screening, accelerated characterization and fieldwork. Scoping meetings were held with regulators to expedite finalization of the Phase II RI work plan.

The installation formed a technical review committee in FY90. In FY91, it established an administrative record and an information repository. In FY95, the installation established a Restoration Advisory Board (RAB). In FY97, a community relations plan was developed.

FY98 Restoration Progress

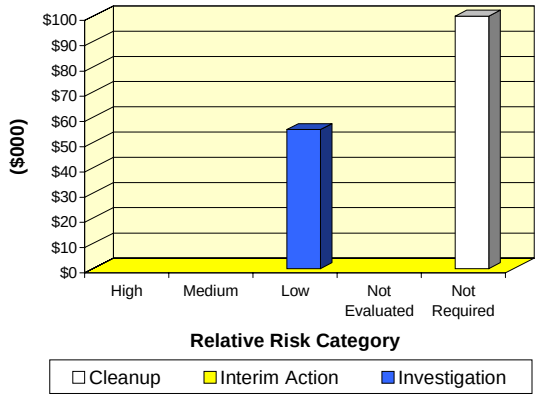
The SMP was not finalized as planned because no review comments were submitted by EPA Region 3. EPA also did not initiate Federal Facility Agreement (FFA) negotiations as expected. A draft Phase II RI report was submitted to regulatory and RAB members for review. The FS and the Record of Decision (ROD) for Site 1 were not accomplished because finalization of the Phase II RI report was delayed. RI/FS activities for Site 11 were not initiated. These activities are on hold, pending receipt of regulatory comments on four other sites. Fieldwork for Site 11 will be added to the Phase II RI work plan to minimize mobilization costs. The Interim Remedial Action (IRA) for PCB-contaminated soil at Site 1 was awarded to a contractor.

Three RAB meetings were held. One meeting was dedicated to training RAB members on toxicological and risk assessment terminology to aid in their review of the draft Phase II RI report.

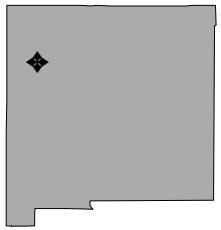
Plan of Action

- Discuss initiation of FFA negotiations with EPA Region 3 in FY99
- Finalize Phase II RI report in FY99
- Initiate individual FS development for specific media at sites, as dictated by RAB prioritization, in FY99
- Finalize SMP using information from finalized Phase II RI report in FY99
- Initiate RI/FS activities for Site 11 along with requested fieldwork for Installation Restoration Program sites in FY99
- Complete IRA for PCB-contaminated soil at Site 1 in FY99
- Hold quarterly RAB meetings in FY99

FY99 Funding by Phase and Relative Risk



Size: 22,120 acres
Mission Stored, shipped, and received ammunition components and disposed of obsolete or deteriorated explosives and ammunition
HRS Score: NA
IAG Status: None
Contaminants: Explosive compounds, UXO, PCBs, pesticides, heavy metals, asbestos, and lead-based paint
Media Affected: Groundwater and soil
Funding to Date: $23.1 million
Estimated Cost to Completion (Completion Year): $29.8 million (FY2030)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2005



Gallup, New Mexico

Restoration Background

From 1949 to 1993, Fort Wingate stored, tested, and demilitarized munitions. Past practices deposited ordnance-related waste on and off the installation. Restoration efforts have focused on land affected by unexploded ordnance (UXO); the Open Burning and Open Detonation (OB/OD) Area; soil at a pistol range; pesticide-contaminated soil at Building 5; explosives-contaminated soil at the former Bomb Washout Plant Lagoons; polychlorinated biphenyl (PCB) contamination in Buildings 501 and 11; demolition of the former Bomb Washout Plant (Building 503); and three unpermitted solid waste landfills.

In FY94, the installation commander formed a BRAC cleanup team (BCT) and a Restoration Advisory Board (RAB). In FY95, the installation revised the BRAC Cleanup Plan (BCP). The Army conducted a Removal Action to clear UXO from Indian tribal lands adjacent to the OB/OD Area. Remedial Designs (RDs) were completed for the pistol range and for Building 5 soil.

In FY96, the Army reached an agreement in principle with regulatory agencies on developing a binding installationwide cleanup agreement. The installation conducted additional fieldwork for a Remedial Investigation and Feasibility Study (RI/FS) and completed field investigations at the three unpermitted solid waste landfills. Groundwater contamination was detected at the former TNT Washout Plant.

In FY97, the installation began negotiations with regulators on a cleanup agreement, which will help resolve overlapping jurisdictions applicable to closure of the OB/OD Area under RCRA.

FY98 Restoration Progress

The installation completed RD for the Group C and Central Landfills and awarded contracts for the Remedial Action (RA). The Army remediated PCB-contaminated soil at Buildings 536 and 537 and excavated and disposed of pesticide-contaminated soil from Building 5 at an approved off-site facility. The excavated soil was replaced with clean fill and turfing.

The field program confirmed the extent of groundwater contamination with explosives and defined the northern extent of nitrite and nitrate groundwater contamination at the former TNT Washout Plant. Subsurface soil was characterized in preparation for evaluating RD options. The Army installed monitoring wells at the Bomb Washout Plant site and the OB/OD unit. The installation actively solicited regulatory involvement in well siting and the field program and used regulator input.

The installation demolished Building 501 and disposed of PCB-contaminated building materials at a licensed off-site facility. At Building 503, explosives-contaminated process equipment was flash-flamed to remove residues. The process equipment was recycled, and the building materials were disposed of off-site.

Discussions with regulators have clarified additional requirements that should be included in a post-closure care plan for the OB/OD unit. All sites outside the OB/OD unit have been investigated, except for Building 11, where a potential release of PCBs to the environment was identified, and Functional Test Range 1 (FTR1), where potential disposal sites were discovered. Investigation of FTR1 is under way.

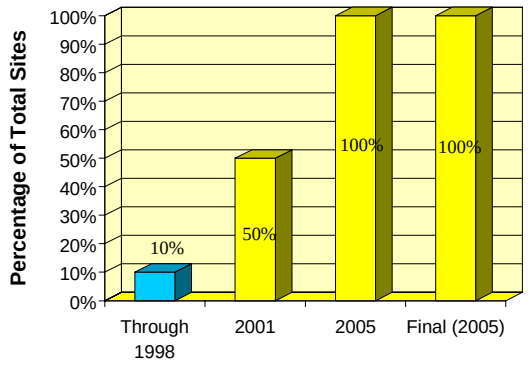
The installation intensively coordinated with regulators to define the regulatory mechanisms for cleanup and closure.

The RAB met quarterly and reviewed all RAs. The installation initiated efforts to increase public attendance at the RAB meetings and to make the RAB membership more representative of the community. RAB members served as observers at BCT meetings. The BCT convened quarterly to discuss technical and regulatory issues and define the work for installation closure and transfer. The BCT coordinated all RAs, RDs, investigations, and other activities.

Plan of Action

- Conduct asbestos abatement at 11 buildings in FY99-FY00
- In FY99, plan and conduct Human Health and Ecological Baseline Risk Assessments
- In FY99, design plan to remediate PCBs in Building 11 and investigate potential releases of PCBs into the environment
- In FY99, complete investigating the disposal pits at FTR1
- In FY99, conduct installationwide surface water assessments
- In FY99, petition for No Further Action at specific areas
- In FY99, complete UXO clearance and install institutional controls to facilitate transfer of southern properties
- In FY99, develop and submit a draft application for a post-closure care permit
- In FY00, complete RAs at Group C and Central Landfills
- In FY00, remediate the Western Landfill
- In FY00, close and remediate the OB/OD Area, implement installationwide cleanup of soil contamination, continue evaluating groundwater contamination

Sites Achieving RIP or RC Per Fiscal Year



Wright-Patterson Air Force Base NPL

Size: 8,511 acres
Mission: Serve as host to many organizations, including Headquarters to Air Force Material Command
HRS Score: 57.85; placed on NPL in October 1989
IAG Status: IAG signed in March 1991
Contaminants: Waste oil and fuels, acids, plating wastes, and solvents
Media Affected: Groundwater and soil
Funding to Date: $176.4 million
Estimated Cost to Completion (Completion Year): $38.3 million (FY2028)
Final Remedy in Place or Response Complete Date for All Sites: FY1999

Dayton, Ohio

Restoration Background

Past activities at Wright-Patterson Air Force Base created spill sites and unlined waste disposal areas, including landfills, fire training areas, underground storage tanks, earth fill disposal areas, and coal storage areas. Investigations identified 67 sites. Soil and groundwater have been contaminated with volatile organic compounds; semivolatile organic compounds; and benzene, toluene, ethyl benzene, and xylene compounds. Fire training exercises conducted in unlined pits contaminated soil and groundwater with fuel and its combustion by-products. In FY97, two new sites, Contaminated Groundwater Area A/C and Contaminated Groundwater Area B were added to address mingled groundwater plumes and expedite source area site closure.

In FY89, the installation began Remedial Investigation and Feasibility Study (RI/FS) activities for 39 sites. Early in FY92, the installation completed a Removal Action along the installation boundary to intercept and treat contaminated groundwater flowing toward wellfields in the city of Dayton.

In FY94, the Record of Decision (ROD) for Landfills 8 and 10 was approved and the Remedial Design (RD) was completed for capping the landfills. An Engineering Evaluation and Cost Analysis and a Removal Action Plan for all landfills were approved by the regulatory agencies.

In FY95, the installation conducted a pilot-scale study of bioslurping using vacuum-enhanced extraction. It also continued to operate the air-sparging groundwater treatment system, began constructing a Remedial Action at Landfills 8 and 10, and performed an Interim Action at Landfill 5 to construct a landfill cap. A Restoration Advisory Board was formed.

In FY96, a ROD was completed for 21 sites that required no further action. RD was initiated for Landfills 1, 2, 3, 4, 6, and 7, following the basewide Removal Action presumptive remedy process.

In FY97, RIs were completed at the remaining 10 sites within Operable Units 8, 9, and 11. A bioslurper was installed and began operating at Fuel Spill Site 5. Geoprobe technology and an on-site laboratory were used, and a natural attenuation ROD for Fuel Spill Sites 2, 3, and 10 was completed. The installation continued its involvement as a principal partner in the "Groundwater 2000" initiative to preserve and protect the region's sole-source drinking water aquifer. Landfill cover was completed at Landfill 11.

FY98 Restoration Progress

The installation decided to prepare a groundwater ROD rather than the planned Action Memorandum. Actions on this ROD were delayed because of the complexity of the groundwater risk assessment and transport model. A final ROD was completed for 40 Installation Restoration Program sites. Only the two remaining groundwater sites do not have a final ROD.

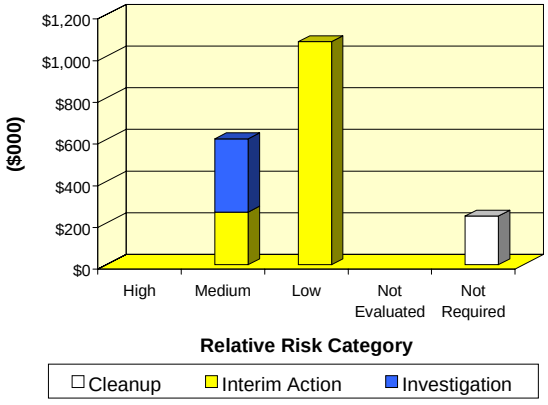
Landfill caps were installed for Landfills 1, 2, 6, 7, and 9, and a french drain was installed at Spill Site 11. The installation completed excavation of the Landfill 12 contents. A Removal Action was designed, and construction work began, at Heating Plant 5.

The installation received the Groundwater Guardian Award for its cleanup efforts and aquifer protection initiatives. A Defense and State Memorandum of Agreement (DSMOA) Cooperative Agreement work plan was developed with Ohio EPA.

Plan of Action

- Complete the groundwater ROD
- Complete the Removal Action at Heating Plant 5
- Conduct a Treatability Study to evaluate removal efficiency for the vinyl chloride plume in Area B in FY99
- Conduct Phase I of monitoring-well abandonment in FY99
- Submit delisting petition for the soils portion of the base in FY99
- Modify groundwater treatment system to reduce operation and maintenance costs in FY00
- Conduct Phase II of monitoring-well abandonment in FY00

FY99 Funding by Phase and Relative Risk



Size: 4,626 acres
Mission: Conducted tactical fighter and bomber training
HRS Score: 50.00; proposed for NPL in January 1994
IAG Status: None
Contaminants: Jet fuel and waste oil, spent solvents, VOCs
Media Affected: Groundwater and soil
Funding to Date: $34.4 million
Estimated Cost to Completion (Completion Year): $14.2 million (FY2015)
Final Remedy in Place or Response Complete Date for BRAC Sites: FY2000

Oscoda, Michigan

Restoration Background

In July 1991, the BRAC Commission recommended closure of Wurtsmith Air Force Base, transfer of KC-135 aircraft to the Air Reserve Component, retirement of the assigned B-52G aircraft, and inactivation of the 379th Bombardment Wing. The installation closed on June 30, 1993.

Sites at the installation include a waste solvent underground storage tank (UST), bulk storage areas for petroleum/oil/lubricants (POL), aboveground storage tanks (ASTs), fire training areas, and an aircraft crash site. Volatile organic compounds (VOCs) present at the installation include trichloroethene; dichloroethene; vinyl chloride; and benzene, toluene, ethyl benzene, and xylenes, all of which primarily affect groundwater.

Interim Actions at the installation provided drinking water to potentially affected communities in the area. Air strippers were installed to treat groundwater contaminated with VOCs. Remedial Actions (RAs) included implementation of three groundwater extraction and treatment systems with air stripping capabilities.

The installation's BRAC cleanup team (BCT), which was formed in FY94, developed a master environmental restoration schedule and set priorities for site investigations and actions. A BRAC Cleanup Plan was prepared. Regulatory agencies concurred in the designation of 2,257 acres as CERFA-clean. Intrinsic remediation projects are under way at four fuel-contaminated sites.

In FY95, Supplemental Environmental Baseline Surveys were completed to facilitate transfer of property. Draft Feasibility Studies were completed for seven sites, and the installation obtained the concurrence of the regulatory agencies on nine sites designated for no further action. In addition, the installation conducted Relative Risk Site Evaluations (RRSEs) at all sites, involving both the Restoration Advisory Board (RAB) and the BCT in the effort. An RA for removal of eight USTs and most of the piping for the hydrant refueling system also was completed. Additional Interim Actions included removal of the hydrant refueling system and closure of five oil-water separators. The installation also installed groundwater monitoring wells and used groundwater modeling to predict cleanup times for RA systems.

During FY96, the installation removed 38 USTs and 10 ASTs. Three large bulk fuel tanks were dismantled. Remedial Design (RD) projects for seven sites were awarded. Two of the three sewage treatment plant lagoons were closed and the sludge removed. The installation submitted No Further Remedial Action Planned (NFRAP) decision documents for seven sites and updated RRSEs as new site data were obtained. Bioventing was implemented at the former POL storage yard to degrade semivolatiles in the soil.

In FY97, design began on an enhanced in situ bioremediation process for groundwater at LF30/31. The technology will include injection of chemicals to speed up the natural bioremediation process. Through the RAB, the installation was able to obtain stakeholder concurrence on the Remedial Action Plan (RAP) for LF30/31. Field investigations at landfills 62 and 63 indicated that no further action is required. The water and sewer systems ceased operating, but physical closure was cancelled at the request of the Township of Oscoda so that the plant could be used as a municipal sewage treatment plant.

FY98 Restoration Progress

Investigations were completed for 7 sites and 31 areas of concern (AOCs), and continue at 4 AOCs. Intrinsic remediation monitoring systems were completed for ST-41, SS-42, and SS-51. Air-sparging and soil vapor extraction wells were installed at SS-06 and SS-08.

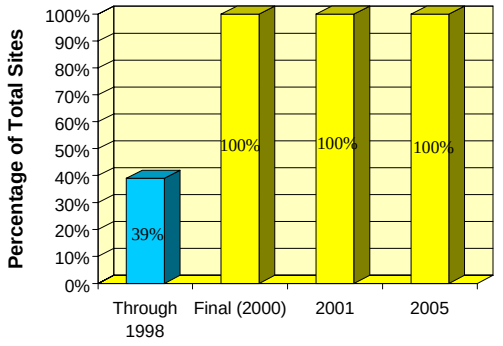
Improvements have been made to the free-product recovery system of the benzene plant, resulting in hundreds of gallons of free product removed from the water table. RD continued for LF30/31 and FT-02. RDs for four of the nine sites required data gaps to be filled before cleanup systems were completed.

Regulatory concurrence was obtained on a draft report for two landfills. NFRAP documents are being prepared for final concurrence.

Plan of Action

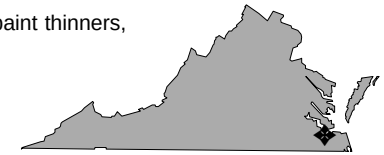
- Complete RDs for OT-24, LF-30/31, FT-02, and OT-16 in FY99
- Obtain BCT concurrence on all decision documents in FY99
- Develop a consolidated RAP in FY99

Sites Achieving RIP or RC Per Fiscal Year



Yorktown Naval Weapons Station NPL

Size: 10,624 acres
Mission: Provide ordnance technical support and related services; provide maintenance, modifications, production, loading, off-loading, and storage for the Atlantic Fleet
HRS Score: 50.00; placed on NPL in October 1992
IAG Status: Federal Facility Agreement signed in September 1994
Contaminants: Acids, asbestos, explosives, cadmium, lead, mercury, nickel, paint thinners, solvents, PCBs, varnishes, and waste oil
Media Affected: Groundwater, surface water, sediment, and soil
Funding to Date: $24.7 million
Estimated Cost to Completion (Completion Year): $24.3 million (FY2015)
Final Remedy in Place or Response Complete Date for All Sites: FY2009



Yorktown, Virginia

Restoration Background

Since FY84, environmental studies at Yorktown Naval Weapons Station have identified 50 sites. No further action (NFA) has been recommended for 13 sites. The installation was placed on the National Priorities List (NPL) primarily because of contamination at six sites identified in FY92. These sites are hydrologically connected to the Chesapeake Bay. Contaminants include explosives and nitramine compounds and primarily affect groundwater, surface water, and sediment.

During FY93, the installation completed an initial site characterization for all four underground storage tank (UST) sites. A corrective action plan (CAP) also was completed. In FY95, corrective actions were completed for USTs 1 and 2.

Between FY84 and FY93, the installation completed an Initial Assessment Study for 19 sites, a confirmation study for 15 sites, and a Site Inspection (SI) for 1 site. During FY94, a Remedial Investigation and Feasibility Study (RI/FS) was completed for one site and Removal Actions were completed for three sites. The installation completed an SI for one solid waste management unit (SWMU). A comprehensive site management plan was completed in FY94 and is updated annually. The installation began partnering with the U.S. Army Corps of Engineers Waterways Experiment Station and initiated a Treatability Study (TS) of two technologies for treatment of explosives-contaminated soil under this program.

During FY95, the installation completed an SI for three SWMUs, completed an RI, and signed a Record of Decision (ROD) for NFA for one site and one SWMU. An innovative process demonstrated that composite carbon zinc battery waste was not hazardous. This approach saved more than $1 million in disposal costs.

During FY96, the installation completed an SI for eight SWMUs. An RI/FS was completed and Remedial Design (RD) initiated for another site. RI/FSs were initiated at eight sites and five SWMUs. In addition, three fire training pits and associated contaminated soil, a UST and piping, and underwater ordnance items were removed from two SWMUs. In FY97, RI/FSs were initiated and completed for four sites. The installation completed field- and bench-scale TSs for one site and began Remedial Action (RA) for one site. SIs were completed at four SWMUs/Site Screening Areas (SSAs). Early actions took place at two SSAs. The installation implemented a large-scale pilot study to treat approximately 700 cubic yards of explosives-contaminated soil with the J.R. Simplot SABRE technology, an anaerobic bioslurry/biocell technology using potato waste as a co-metabolite to enhance degradation.

The installation formed a technical review committee in FY91 and converted it to a Restoration Advisory Board (RAB) in FY95. A community relations plan was completed the same year.

FY98 Restoration Progress

Site investigations have been initiated at all identified sites. The Simplot SABRE technology was successfully used for a full-scale treatment of 1,200 cubic yards of explosives-contaminated soil. An RA was completed at one site, and long-term monitoring (LTM) was initiated at the site. Some RI/FSs and SIs scheduled for FY98 completion were moved to FY99 to focus on final ROD signatures. RAs were initiated for three sites. An additional innovative technology is being used to remediate soil contaminated with explosives and listed hazardous waste. This biotreatment technology is a solid phase land-treatment technique using organic methods. The cost-savings from this technology compared with the alternative (off-site incineration) are estimated to be between $1.5 million and $2 million.

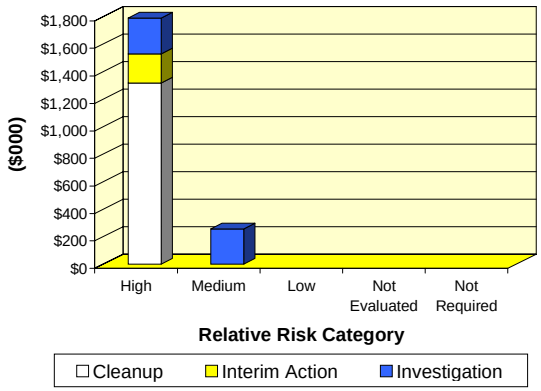
A joint public-private partnership was initiated and will save the Navy approximately $200,000 due to cost-sharing.

RAB meetings continued to foster a high level of trust within the community and a high level of installation commitment to the community. The installation continues successful use of partnering efforts with the regulatory agencies to expedite decision making and cleanup.

Plan of Action

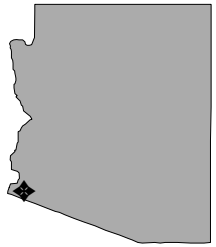
- Initiate RI/FSs at four sites in FY99
- Complete RI/FSs at 8 sites and SIs at 11 SSAs in FY99
- Sign four RODs for six sites in FY99
- Initiate RA at one site and complete RAs at three sites in FY99
- Initiate a Removal Action at one SSA in FY99
- Initiate LTM at three sites in FY99

FY99 Funding by Phase and Relative Risk



Yuma Marine Corps Air Station NPL

Size: 3,000 acres
Mission: Support tactical aircrew combat training for Pacific and Atlantic Fleet Marine Corps Forces
HRS Score: 32.24; placed on NPL in February 1990
IAG Status: Federal Facility Agreement signed in January 1992
Contaminants: JP-5, petroleum hydrocarbons, SVOCs, trihalomethanes, and VOCs
Media Affected: Groundwater and soil
Funding to Date: $35.9 million
Estimated Cost to Completion (Completion Year): $30.6 million (FY2016)
Final Remedy in Place or Response Complete Date for All Sites: FY2012



Yuma, Arizona

Restoration Background

Investigations conducted between FY85 and FY92 identified 20 CERCLA sites and 5 underground storage tank (UST) sites at Yuma Marine Corps Air Station (MCAS). Site types include landfills, sewage lagoons, liquid waste disposal areas, and ordnance and low-level radioactive material disposal sites.

Under the Federal Facility Agreement, the sites were divided into three operable units (OUs). OU1 addresses installationwide groundwater contamination, OU2 addresses surface and subsurface soil contamination at 18 sites, and OU3 was established for sites that may be identified in the future.

In FY80, the installation removed sealed pipes containing low-level radioactive dials, gauges, and tubes at one site. It completed Site Inspections at 2 sites in FY88 and at 10 sites in FY91. In FY93, the installation removed 92 waste drums from a drum storage site. Initial site characterizations (ISCs) were completed at two UST sites in FY93 and one UST site in FY94. During the FY94 ISC, a pilot Treatability Study was initiated to remove petroleum from the groundwater. The installation constructed three air-sparging and soil vapor extraction (AS/SVE) systems, including one at the fuel farm and one at the motor transportation pool area.

The installation established a technical review committee (TRC) and two information repositories in FY90. In FY95, the installation converted the TRC to a Restoration Advisory Board (RAB). The community relations plan was completed in FY93 and updated in FY94.

During FY95, the installation completed a corrective action plan (CAP) at one UST site and initiated a corrective action at another. The draft Remedial Investigation (RI) report for OU1 was submitted to regulatory agencies. The report identified several areas of contamination that required further investigation. The OU2 RI report was submitted to regulatory agencies, recommending no further action at 12 sites, institutional controls at 3 sites, and removal of asbestos-containing materials at 3 sites.

Field investigations at OU3 were completed in FY96. The installation completed RIs for OU1 and OU2, submitted a draft Feasibility Study (FS) report for OU2 to the regulatory agencies, submitted the draft Proposed Plan and Record of Decision (ROD) for OU2, and performed two pilot studies addressing in situ cleanup of groundwater at Site 19. Fifty UST site assessments were performed at UST Units 2, 3, and 4. Approximately 40 USTs are candidates for clean closure, pending approval by the State of Arizona.

The Yuma MCAS project team, established in FY94, was able to save 2 to 3 years and approximately $10 million on the RI phase of the cleanup. The innovative approach consisted of developing expedited, site-specific work plans; using on-site mobile laboratories and cone penetrometer testing and transmitting the resulting data to regulatory agencies; and obtaining concurrence on further sampling without delay.

In FY97, the installation completed draft CAPs for four USTs and closed six others. A Removal Action and closeout report were completed for UST B1040. FSs were completed for OU1 and OU2, as was a draft Proposed Plan for OU1. Additionally, the installation implemented geosorbers, a geoprobe, in-well air stripping, and a prepilot ozone sparging study. To expedite document review, Implementation Memorandum Reports were prepared instead of full work plans. These reports were presented to the RAB.

FY98 Restoration Progress

Vertical recirculation technology was used in the Leading Edge Plume Area pilot study. Preliminary results showed the operation to be successful. Approximately 8 million gallons of groundwater has been treated. A preliminary design for the remediation of the hot spot of the Area 1 plume was developed and submitted to the project team. Two full-scale UST systems utilizing AS/SVE and free product removal were implemented. Team regulators accepted the OU1 FS. The CAP for the Motor Transportation Pool selected monitored natural attenuation as the remedial alternative, and the alternative was approved by the Arizona Department of Environmental Quality (ADEQ). Eight USTs were removed; the remediation of these sites is under way. The OU2 ROD was signed. The OU1 ROD and Remedial Action (RA) were delayed by the project team's decision to change remedies and plan for remedial contingencies. The CAPs are awaiting approval by ADEQ.

The RAB met twice to receive briefings by Navy contractors on AS/SVE and monitored natural attenuation.

Plan of Action

- Complete fieldwork and begin RA for OU2 in FY99
- Finalize ROD for OU1 in FY99
- Submit the CAPs for the Fuel Farm and the Gas Station to ADEQ for approval in FY99

FY99 Funding by Phase and Relative Risk