



Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills

Federal Facilities Restoration and Reuse Office
Mail Code 5101

Quick Reference Fact Sheet

Presumptive remedies are preferred technologies for common categories of sites based on historical patterns of remedy selection and the U.S. Environmental Protection Agency's (EPA's) scientific and engineering evaluation of performance data on technology implementation. By streamlining site investigation and accelerating the remedy selection process, presumptive remedies are expected to ensure the consistent selection of remedial actions and reduce the cost and time required to clean up similar sites. Presumptive remedies are expected to be used at all appropriate sites. Site-specific circumstances dictate whether a presumptive remedy is appropriate at a given site.

EPA established source containment as the presumptive remedy for municipal landfill sites regulated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in September of 1993 (see the directive *Presumptive Remedy for CERCLA Municipal Landfill Sites*). The municipal landfill presumptive remedy should also be applied to all appropriate military landfills. This directive highlights a step-by-step approach to determining when a specific military landfill is an appropriate site for application of the containment presumptive remedy. It identifies the characteristics of municipal landfills that are relevant to the applicability of the presumptive remedy, addresses characteristics specific to military landfills, outlines an approach to determining whether the presumptive remedy applies to a given military landfill, and discusses administrative record documentation requirements.

PURPOSE

This directive provides guidance on applying the containment presumptive remedy to military landfills. Specifically, this guidance:

- Describes the relevant characteristics of municipal landfills for applicability of the presumptive remedy;
- Presents the characteristics specific to military installations that affect application of the presumptive remedy;
- Provides a decision framework to determine applicability of the presumptive remedy to military landfills; and
- Provides relevant contacts/specialists in military wastes, case histories, administrative record documentation requirements, and references.

BACKGROUND

Municipal landfills are those facilities in which a combination of household, commercial and, to a lesser

extent, industrial wastes have been co-disposed. The presumptive remedy for municipal landfills – source containment – is described in detail in the directive *Presumptive Remedy for CERCLA Municipal Landfill Sites*. Highlight 1 outlines the components of the containment presumptive remedy. Highlight 2 lists the characteristics of municipal landfills that are compatible with the presumptive remedy of containment.

Highlight 1

Components of the Containment Presumptive Remedy

- Landfill cap
- Source area groundwater control to contain plume
- Leachate collection and treatment
- Landfill gas collection and treatment
- Institutional controls to supplement engineering controls

Highlight 2
**Appropriate Municipal Landfill
Characteristics for Applicability
of the Presumptive Remedy**

- Risks are low-level, except for "hot spots"
- Treatment of wastes is usually impractical due to the volume and heterogeneity of waste
- Waste types include household, commercial, nonhazardous sludge, and industrial solid wastes
- Lesser quantities of hazardous wastes are present as compared to municipal wastes
- Land application units, surface impoundments, injection wells, and waste piles are not included

The presumptive remedy process involves streamlining of the remedial investigation/feasibility study (RI/FS) or, for non-time-critical removals, an Engineering Evaluation/Cost Analysis (EE/CA) by:

- Relying on existing data to the extent possible rather than characterizing landfill contents (limited or no landfill source investigation unless there is information indicating a need to investigate hot spots);
- Conducting a streamlined risk assessment; and
- Developing a focused feasibility study that analyzes only alternatives consisting of appropriate components of the presumptive remedy and, as required by the National Contingency Plan, the no action alternative.

Several directives, including *Presumptive Remedy for CERCLA Municipal Landfill Sites*, *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, and *Streamlining the RI/FS for CERCLA Municipal Landfill Sites*, provide a complete discussion of these streamlining principles.

USE OF THIS GUIDANCE

EPA anticipates that the containment presumptive remedy will be applicable to a significant number of landfills found at military facilities. Although waste types may differ between municipal and military landfills, these differences do not preclude use of source containment as the primary remedy at appropriate military landfills.

Additionally, EPA continues to seek greater consistency among cleanup programs, especially in the process of

selecting response actions for sites regulated under CERCLA and corrective measures for facilities regulated under the Resource Conservation and Recovery Act (RCRA). In general, even though the Agency's presumptive remedy guidances were developed for CERCLA sites, they should also be used at RCRA Corrective Action sites to focus RCRA Facility Investigations, simplify evaluation of remedial alternatives in the Corrective Measures Study, and influence remedy selection in the Statement of Basis. For more information, refer to the *RCRA Corrective Action Plan*, the proposed *Subpart S regulations*, and the *RCRA Corrective Action Advance Notice of Proposed Rule-making*.

CHARACTERISTICS OF MILITARY LANDFILLS

The size of the landfill and the presence, proportion, distribution, and nature of wastes are fundamental to the application of the containment presumptive remedy to military landfills.

An examination of 31 Records of Decisions (RODs) that document the remedial decisions for 51 landfills at military installations revealed that no action was chosen for 10 landfills and remedial actions were chosen at 41 landfills (see Appendix). Of these 41 landfills, containment was selected at 23 (56 percent). For the remaining 18 landfills where other remedies were selected, institutional controls only were selected at three landfills, excavation and on-site consolidation were selected at four landfills, and excavation and off-site disposal were selected for 11 landfills.

The military landfills examined in the 51 RODs mentioned above ranged in size from 100 square feet to 150 acres and contained a wide variety of waste types. Of the 41 landfills for which remedial actions were chosen, 14 (34 percent) were one acre or less in size; containment was not selected for any of these landfills. Containment was chosen at 23 (85 percent) of the 27 landfills that were greater than one acre in size. This information suggests that the size of the landfill area is an important factor in determining the use of source containment at military landfills.

The wastes most frequently deposited at these military landfills were municipal-type wastes: household, commercial (e.g., hospital wastes, grease, construction debris), and industrial (e.g., process wastes, solvents, paints) wastes. Containment was the remedy selected at the majority of these sites. Military-specific wastes (e.g., munitions) were found at only 5 of the 51 landfills (10 percent).

Highlight 3 lists typical municipal and military wastes, including:

- (1) Wastes that are common to both municipal landfills and military landfills;
- (2) Wastes that are usually specific to military bases but that do not necessarily pose higher risks than other industrial wastes commonly found in municipal landfills (i.e., low-hazard military-specific wastes), depending on the volume and heterogeneity of the wastes; and
- (3) High-hazard military wastes that, because of their unique characteristics, would require special consideration (i.e., high-hazard military-specific wastes).

The proportion and distribution of hazardous wastes in a landfill are important considerations. Generally, municipal landfills produce low-level threats with occasional hot spots. Similarly, most military landfills present only low-level threats with pockets of some high-hazard waste. However, some military facilities (e.g., weapons fabrication or testing, shipbuilding, major aircraft or equipment repair depots) have a high level of industrial activity compared to overall site activities. In these cases, there may be a higher proportion and wider distribution of industrial (i.e., potentially hazardous) wastes present than at other less industrialized facilities.

PRACTICAL CONSIDERATIONS

Sensitive Environments

Site-specific conditions may limit the use of the containment presumptive remedy at military landfills. For example, the presence of high water tables, wetlands and other sensitive environments, and the possible destruction or alteration of existing habitats as a result of a particular remedial action could all be important factors in the selection of the remedy.

Land Use

Reasonably anticipated future land use is also an important consideration at all sites. However, at military bases undergoing base closure procedures, where expeditiously converting property to civilian use is one of the primary goals, land use may receive heightened attention. Thus, at bases that are closing, it is particularly important for reuse planning to proceed concurrently with environmental investigation and restoration activities. The local reuse group is responsible for developing the preferred reuse alternatives. The Base Realignment and Closure Team should work closely with the reuse group to integrate reuse planning into the cleanup process, where practicable (see the *Land Use in CERCLA Remedy Selection* directive).

Highlight 3 **Examples of Municipal-Type** **and Military-Specific Wastes**

Municipal-Type Wastes

Municipal landfills contain predominantly non-hazardous materials. However, industrial solid waste and even some household refuse (e.g., pesticides, paints, and solvents) can possess hazardous components. Further, hazardous wastes are found in most municipal landfills as a result of past disposal practices.

Predominant Constituents

Household refuse, garbage, and debris
Commercial refuse, garbage, and debris
Construction debris
Yard wastes

Found in Low Proportion

Asbestos
Batteries
Hospital wastes
Industrial solid waste(s)
Paints and paint thinner
Pesticides
Transformer oils
Other solvents

Military-Specific Wastes

The majority of military landfills contain primarily nonhazardous wastes. The materials listed in this column are rarely predominant constituents of military landfills.

Low-Hazard Military-Specific Wastes

These types of wastes are specific to military bases but generally are no more hazardous than some wastes found in municipal landfills.

Low-level radioactive wastes
Decontamination kits
Munitions hardware

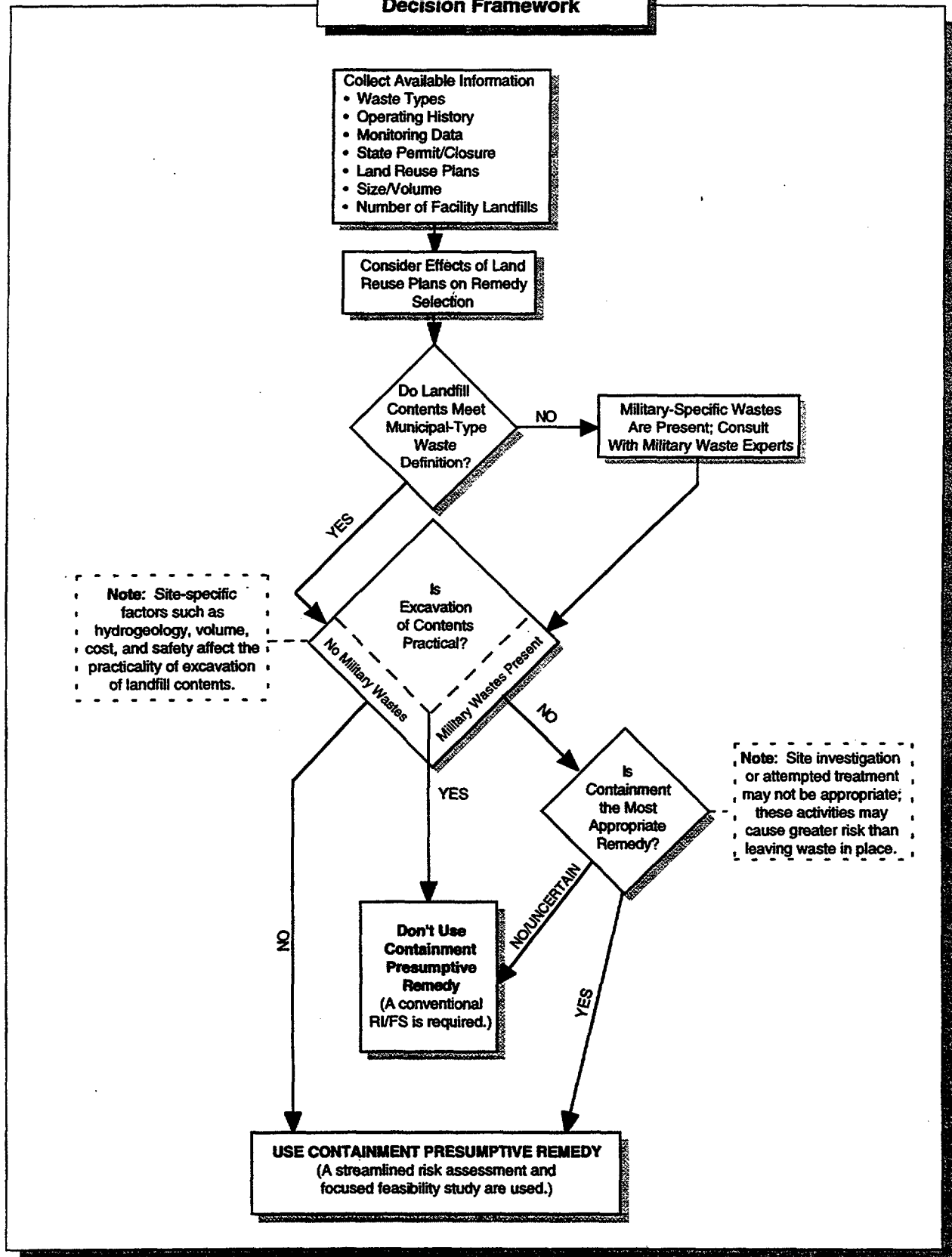
High-Hazard Military-Specific Wastes

These wastes are extremely hazardous and may possess unique safety, risk, and toxicity characteristics. Special consideration and expertise are required to address these wastes.

Military Munitions

Chemical warfare agents
(e.g., mustard gas, tear agents)
Chemical warfare agent training kits
Artillery, small arms, bombs
Other military chemicals
(e.g., demolition charges,
pyrotechnics, propellants)
Smoke grenades

Highlight 4 Decision Framework



DECISION FRAMEWORK TO EVALUATE APPLICABILITY OF THE PRESUMPTIVE REMEDY TO MILITARY LANDFILLS

This Section and Highlight 4 describe the steps involved in determining whether the containment presumptive remedy applies to a specific military landfill.

1. What Information Should Be Collected? Determine the sources, types, and volumes of landfill wastes using historical records, state files, closure plans, available sampling data, etc. This information should be sufficient to determine whether source containment is the appropriate remedy for the landfill. If adequate data do not exist, it may be necessary to collect additional sampling or monitoring data. The installation point of contact (environmental coordinator, base civil engineer, or public works office) should be contacted to obtain records of disposal practices. Current and former employees are also good sources of information.

2. How May Land Reuse Plans Affect Remedy Selection? For smaller landfills (generally less than two acres), land reuse plans may influence the decision on the practicality of excavation and consolidation or treatment of landfill contents. Excavation is a remedial alternative that is fundamentally incompatible with the presumptive remedy of source containment.

3. Do Landfill Contents Meet Municipal Landfill-Type Waste Definition? To determine whether a specific military landfill is appropriate for application of the containment presumptive remedy, compare the characteristics of the wastes to the information in Highlights 2 and 3.

4. Are Military-Specific Wastes Present? Military wastes, especially high-hazard military wastes, may possess unique safety, risk, and toxicity characteristics. Highlight 3 presents examples of these types of materials. If historical records or sampling data indicate that these wastes may have been disposed at the site, special consideration should be given to their handling and remediation. Caution is warranted because site investigation or attempted treatment of these contaminants may pose safety issues for site workers and the community. Some high-hazard military-specific wastes could be considered to present low-level risk, depending on the location, volume, and concentration of these materials relative to environmental receptors. Consult specialists in military wastes (see Highlight 5) when determining whether military-specific wastes at a site fall into either the low-hazard or the high-hazard military-specific waste category found in Highlight 3.

Highlight 5 Specialists in Military Wastes

The installation point of contact will notify the major military command's specialists in military wastes (Explosive Ordnance Disposal Team) for assistance with regard to safety and disposal issues related to any type of military items.

Army chemical warfare agents specialists:

- Project Manager, Non-Stockpile Chemical Materiel, Aberdeen Proving Ground, Maryland 21010-5401, (410) 671-1083.

Navy ordnance related items specialists:

- The Navy Ordnance Environmental Support Office, Naval Surface Warfare Center, Indian Head, Maryland 20460-5035, (301) 743-4534/4906/4450.

Navy low-level radioactive wastes specialists:

- The Naval Sea Systems Command Detachment, Radiological Affairs Support Office, Yorktown, Virginia 23691-0260, (804) 887-4692.

Air Force ordnance specialists:

- The Air Force Civil Engineering Support Agency, Contingency Support Division, Tyndall AFB, Florida 32403-5319, (904) 283-6410.

Responsibilities for response are clearly spelled out in the regulation *Interservice Responsibilities For Explosive Ordnance Disposal*.

5. Is Excavation of Contents Practical? The volume of landfill contents, types of wastes, hydrogeology, and safety must be considered when assessing the practicality of excavation and consolidation or treatment of wastes. Consideration of excavation must balance the long-term benefits of lower operation and maintenance costs and unrestricted land use with the initial high capital construction costs and potential risks associated with excavation. Although no set excavation volume limit exists, landfills with a content of more than 100,000 cubic yards (approximately two acres, 30 feet deep) would normally not be considered for excavation. If military wastes are present, especially high-hazard military wastes such as ordnance, safety considerations may be very important in determining the practicality of excavation.

If excavation of the landfill contents is being considered as an alternative, the presumptive remedy should not be used. Therefore, a standard RI/FS would be required to adequately analyze and select the appropriate remedial actions.

6. Can the Presumptive Remedy Be Used? The site manager will make the initial decision of whether a particular military landfill site is suitable for the presumptive remedy or whether a more comprehensive RI/FS is required. This determination must be made before the RI/FS is initiated. This decision will depend on whether the site is a potential candidate for excavation, and if not, whether the nature of contamination is such that a streamlined risk evaluation can be conducted.* A site generally is eligible for a streamlined risk evaluation if groundwater contaminant concentrations clearly exceed chemical-specific standards or the Agency's level of risk or if other conditions exist that provide a justification for action (e.g., direct contact with landfill contents due to unstable slopes). If these conditions do not exist, a quantitative risk assessment that addresses all exposure pathways will be necessary to determine whether action is needed. Before work on the RI/FS workplan is initiated, the community and state should be notified that a presumptive remedy is being considered for the site. It is important for all stakeholders to understand completely how the presumptive remedy process varies from the usual clean-up process, and the benefits of using the presumptive remedy process.

TREATING "HOT SPOTS"

The presumptive remedy also allows for the treatment of hot spots containing military-specific (or other) waste. While the analysis, *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*, that justified the selection of source containment as the presumptive remedy for municipal landfill sites did not specifically take into account high-hazard military wastes, the high-hazard materials present in some military landfills may be compared to the hazardous wastes at municipal landfills and could potentially be treated as hot spots. For further information and case studies on treatment of hot spots, see the *Presumptive Remedy for CERCLA Municipal Landfill Sites* directive.

CASE HISTORIES

The case histories below illustrate how use of the municipal landfill presumptive remedy at military landfills follows the decision framework in Highlight 4.

* See *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, which states that if MCLs or non-zero MCLGs are exceeded [a response] action generally is warranted.

The decision to use the presumptive remedy can be made for one landfill or as a part of a site-wide strategy (as in the Loring Air Force Base example below), depending on factors such as the nature of the wastes, size of the landfill, land reuse potential, and public acceptance.

The following case histories present examples of where the containment presumptive remedy was or was not applied, based on site-specific conditions.

Disposal of Municipal-Type Wastes

The Naval Reactor Facility (NRF) site in Idaho Falls, Idaho, was established in 1949 as a testing site for the nuclear propulsion program. The three landfill units at the site received solid wastes similar to municipal landfills. These wastes included petroleum and paint products, construction debris, and cafeteria wastes. Historical records do not indicate that any radioactive wastes were disposed of in these landfill units. The selected remedy for the landfills at the site included the installation of a 24-inch native soil cover designed to incorporate erosion control measures to reduce the effects from rain and wind. The remedy also provided for maintenance of the landfill covers, including subsidence correction and erosion control. Monitoring of the landfills will include sampling of soil gas to assess the effectiveness of the cover and sampling of the groundwater to ensure that the remedy remains protective. Institutional controls will also be implemented to prevent direct exposure to the landfill. The NRF site is an example of where the streamlining principles of the presumptive remedy process, including a streamlined risk assessment and a focused feasibility study, were successfully employed.

Co-Disposal of High-Hazard Wastes

At the Massachusetts Military Reservation, in Cape Cod, Massachusetts, anecdotal information indicated that munitions had been disposed of at an unidentified location in a landfill that primarily contained municipal-type waste. Ground penetrating radar was utilized to determine if there were any discrete disposal areas containing potential hot spots at this site and found none. Because the munitions waste was not in a known discrete and accessible area, it could not be treated as a hot spot. Consequently, without excavating or treating the munitions waste as a hot spot, the authorities decided to cap the landfill. In this case, the streamlining principles of the presumptive remedy process were applied. For example, site investigation was limited and treatment options were not considered.

Land Reuse Considerations

At Loring Air Force Base, a closing base in Limestone, Maine, base landfills 2 and 3 (9 and 17 acres, respectively) consisted primarily of municipal and flightline wastes. The selected remedy for these landfills included a multi-layer cap, passive venting system, and institutional controls. The RODs for the landfills, signed in September 1994, required placing a RCRA Subtitle C cap on the landfills. To construct the RCRA cap, the designers estimated that 400,000 to 600,000 cyds of material would have to be placed on the landfills prior to construction of the cap to ensure proper drainage and slopes.

At Loring, the streamlining principles of the containment remedy, a focused feasibility study, and a streamlined risk assessment were applied for landfills 2 and 3. Additionally, the RODs signed for these landfills specified that excavated material from other parts of the base would be used at the landfills to meet subgrade design specifications. To date, more than 500,000 cyds of contaminated soils have been excavated and used as subgrade for the landfills (after demonstrating compliance with RCRA Land Disposal Restrictions). In addition to cost savings realized by providing subgrade, other benefits have been realized, such as limiting the number of parcels requiring deed restrictions and minimizing locations requiring operation and maintenance. At this base, the landfill consolidation efforts resulted in an estimated total cost savings of \$12–20 million while incorporating future land use considerations into the decision process.

The Brunswick Naval Air Station in Brunswick, Maine, contained several landfill sites. One of the first RODs signed, for Sites 1 and 3, called for construction of a 12-acre RCRA Subtitle C cap and a slurry wall, as well as for groundwater extraction and treatment. Subsequently, during the remedy selection process for Site 8, the public objected to containment as the proposed remedy for this relatively small (0.6 acre) site on the grounds that should the base eventually close, containment would create several useless parcels of land. After public comment, the Navy reconsidered, proposing instead to excavate Site 8 and consolidate the removed materials (which consisted of construction debris and soil contaminated with nonhazardous levels of polycyclic aromatic hydrocarbons) as part of the necessary subgrade fill for the landfill cap to be constructed at Sites 1 and 3. In this case, land reuse considerations preempted the selection of a containment remedy.

PRESUMPTIVE REMEDY ADMINISTRATIVE RECORD DOCUMENTATION REQUIREMENTS

As stated earlier, it must be determined whether the military landfill in question contains military-specific wastes, as described in Highlight 3. This should be followed by a determination of whether anything about these wastes would make the engineering controls specified in the presumptive remedy for municipal landfills less suitable at that site. These determinations must be documented in the administrative record, which supports the final decision. This information, in turn, will assist the public in understanding the evaluation of the site as a candidate for use of the presumptive remedy and the advantage it provides. For further reference, the administrative record requirements for all Superfund sites including military landfills are explained in the *Final Guidance on Administrative Records for Selecting CERCLA Response Actions*.

The administrative record must contain the following generic and site-specific information, which documents the selection or non-selection of the containment presumptive remedy.

Generic Information

A. Generic Documents. These documents should be placed in the docket for each federal facility site where the containment presumptive remedy is selected. Each EPA Regional Office has copies of the following presumptive remedy documents:

- *Presumptive Remedy: Policy and Procedures*
- *Presumptive Remedy for CERCLA Municipal Landfill Sites*
- *Application of the Municipal Landfill Presumptive Remedy to Military Landfills*
- *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*

B. Notice Regarding Backup File. The docket should include a notice specifying the location of and times when public access is available to the generic file of backup materials used in developing the *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*. This file contains background materials such as technical references and portions of the feasibility studies used in the generic study. Each EPA Regional Office has a copy of this file.

Site-specific Information

Focused FS or EE/CA. Military-specific wastes need to be addressed in site-specific analyses when determining the applicability of the containment presumptive remedy to military landfills. High-hazard military-specific waste materials (e.g., military munitions) require special consideration when applying the presumptive remedy.

As noted on pages 1 and 2 of this directive, the presumptive remedy approach allows you to streamline and focus the FS or EE/CA by eliminating the technology screening step from the feasibility study process. EPA has already conducted this step on a generic basis in the *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*. Thus, the FS analyzes only alternatives comprised of components of the containment remedy identified in Highlight 1. In addition, the focused FS or EE/CA should include a site-specific explanation of how the application of the presumptive remedy satisfies the National Contingency Plan's three site-specific remedy selection criteria (i.e., compliance with state applicable or relevant and appropriate requirements, state acceptance, and community acceptance).

CONCLUSION

This directive provides guidance for the use of the containment presumptive remedy at appropriate military landfills. The remedies selected at numerous military installations indicate that source containment is applicable to a significant number of military landfills. These landfills need not be identical to municipal landfills in all regards. Key factors determining whether the containment presumptive remedy should be applied to a specific military landfill include the size of the landfill; volume and the type of landfill contents; future land use of the area; and the presence, proportion, and distribution of military-specific wastes.

REFERENCES

California Base Closure Environmental Committee, *Integrating Land Use and Cleanup Planning at Closing Bases*, December 1994.

Federal Register, 1996. Volume 61, No. 85, May 1, 1996; *Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities, Advance Notice of Proposed Rulemaking*.

Federal Register, 1990. Volume 55, No. 145, July 27, 1990; 40 CFR Parts 264, 265, 270 and 271; *Corrective Action for Solid Waste Management Units at Hazardous Waste Facilities; Proposed (proposed Subpart S regulations)*.

U.S. Environmental Protection Agency, OSWER Directive 93557-04, *Land Use in the CERCLA Remedy Selection*, May 25, 1995.

U.S. Environmental Protection Agency, OSWER Directive 9356.0-03, EPA/540/R-94/081, *Feasibility Study Analysis for CERCLA Municipal Landfill Sites*, August 1994.

U.S. Environmental Protection Agency, OSWER Directive 9902.3-2A, EPA/520/R-94/004, *RCRA Corrective Action Plan*, May 1994.

U.S. Environmental Protection Agency, OSWER Directive 9355.0-49FS, *Presumptive Remedy for CERCLA Municipal Landfill Sites*, September 1993.

U.S. Environmental Protection Agency, OSWER Directive 9355.0-47FS, EPA/540/F-93/047, *Presumptive Remedy: Policy and Procedures*, September, 1993.

U.S. Environmental Protection Agency, OSWER Publication 9380.3-06FS, *Guide to Principal Threat and Low Level Threat Wastes*, November 1991.

U.S. Environmental Protection Agency, OSWER Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, April 22, 1991.

U.S. Environmental Protection Agency, OERR, EPA/540/P-91/001, *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites*, February 1991.

U.S. Environmental Protection Agency, OSWER Directive 9833.3A.1, *Final Guidance on Administrative Records for Selecting CERCLA Response Actions*, December 3, 1990.

U.S. Environmental Protection Agency, OSWER Directive 9355.3-11FS, *Streamlining the RI/FS for CERCLA Municipal Landfill Sites*, September 1990.

U.S. Department of Navy, *Interservice Responsibilities for Explosive Ordnance Disposal* OPNAVINST 8027.1G (also known as MCO 8027.1D, AR 75-14; or AFR 32-3002), February 14, 1992.

NOTICE

The policies set out in this document are intended solely as guidance to the EPA personnel; they are not final EPA actions and do not constitute rulemaking. These policies are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this document, or to act at variance with the guidance, based on an analysis of specific site circumstances. EPA also reserves the right to change this guidance at any time without public notice.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Brunswick NAS, Sites 1 and 3 (OU1), ME, Region 1 6/16/92	Site 1, 8.5 acres; Site 3, 1.5 acres. Sites are in close proximity and not easily distinguishable; the combined volume of Sites 1 and 3 is 300,000 cy	Household refuse, waste oil, solvents, pesticides, paints, isopropyl alcohol	Metals, VOCs, PAHs, PCBs, pesticides	Remedy: Capping (permanent, low-permeability, RCRA Subtitle C cap), of 12 acres with a slurry wall and pump and treat ground water within cap and slurry wall.
Brunswick NAS, Sites 5 and 6 (OU3), ME, Region 1 8/31/93	Site 5, 0.25 acres, 12 cy	Asbestos-covered pipes	Asbestos	Remedy: Excavation, containerization, and transport to landfill Sites 1 and 3 for use as fill under cap.
Brunswick NAS, Sites 5 and 6 (OU3), ME, Region 1 8/31/93	Site 6, 1.0 acre, 8,800 - 18,700 cy	Construction debris, and aircraft parts, asbestos pipes	Asbestos	Remedy: Excavation, containerization, and transport to Sites 1 and 3 landfill for use as fill under cap.
Brunswick NAS, Site 8 (OU4), ME, Region 1 8/31/93	Site 8, 0.6 acres, 5,600 - 14,000 cy	Rubble, debris, trash, and possibly solvents	Metals, pesticides, PCBs ¹	Remedy: Excavation, containerization, and transport to landfill Sites 1 and 3 for use as fill under cap.
Loring AFB, Landfills 2 and 3 (OU2), ME, Region 1 9/30/94	Landfill 2, 9 acres	Domestic waste, construction debris, flightline wastes, sewage sludge and oil-filled switches	PCBs, VOCs, SVOCs, metals, DDT ¹	Remedy: Capping (low-permeability cover system which meets RCRA Subtitle C and Maine hazardous waste landfill cap requirements), passive gas venting system and controls, and institutional controls.
Loring AFB, Landfills 2 and 3 (OU2), ME, Region 1 9/30/94	Landfill 3, 17 acres	Waste oil/fuels, solvents, paints, thinners, and hydraulic fluids	VOCs, SVOCs, DDT, PCBs, metals ¹	Remedy: Capping (low-permeability cover system which meets RCRA Subtitle C and Maine hazardous waste landfill cap requirements), passive gas venting system and controls, and institutional controls.

¹ Contaminants of Potential Concern

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Newport Naval Education and Training Center, McAllister Point Landfill, RI, Region 1 9/27/93	McAllister Point Landfill, 11.5 acres	Domestic refuse, spent acids, paints, solvents, waste oils, and PCB-contaminated transformer oil	VOCs, PAHs, PCBs, pesticides, phenols, metals	Remedy: Capping (RCRA Subtitle C, multi-layer cap), landfill gas management, surface controls, and institutional controls.
Otis Air National Guard, Camp Edwards, Massachusetts Military Reservation, MA, Region 1 1/14/93	Landfill Number 1 (LF-1), 100 acres	General refuse, fuel tank sludge, herbicides, blank ammunition, paints, paint thinners, batteries, DDT, hospital wastes, sewage sludge, coal ash, possibly live ordnance	VOCs, SVOCs, inorganics	Remedy: Capping (composite-low-permeability cover system), institutional controls, soil cover inspection, and ground water monitoring.
Pease AFB (OU1), NH, Region 1 9/27/93	LF-5, 23 acres	Domestic and industrial wastes, waste oils and solvents, and industrial wastewater treatment plant sludge	VOCs, PAHs, arsenic and other metals	Remedy: Excavation, dewatering and consolidation and regrading of waste under a composite-barrier type cap, institutional controls, and extraction and treatment of ground water with discharge to base wastewater treatment facility.
Fort Dix Landfill Site, NJ, Region 2 9/24/91	Main area, 126 acres	Domestic waste, paints and paint thinners, demolition debris, ash, and solvents	VOCs, metals	Remedy: Capping 50-acre portion (New Jersey Administrative Code 7:26 closure plan for hazardous waste), installing gas venting system and an air monitoring system, ground water, surface water, and air monitoring, and institutional controls.
Naval Air Engineering Center (OU3), NJ, Region 2 9/16/91	Site 26, 1500 sq. ft., volume not reported	Oil, roofing materials, building debris	No contamination was detected	Remedy: Source: No action.
Naval Air Engineering Center (OU3), NJ, Region 2 9/16/91	Site 27, 6.4 acres	Scrap steel cable	No contamination was detected	Remedy: Source: No action.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Naval Air Engineering Center (OU17), NJ, Region 2 9/26/94	Site 29, 20 acres	Construction debris, metal, asbestos, solvents, other miscellaneous wastes	VOCs, SVOCs, metals	Remedy: Source: No action.
Plattsburgh AFB, LF-022, NY, Region 2 9/30/92	LF-022, approx. 13.7 acres, approx. 524,000 cy	Household refuse	Metals, pesticides	Remedy: Capping (NY State requirements for solid waste landfills, 12 inch soil cap), and institutional controls.
Plattsburgh AFB, LF-023, NY, Region 2 9/30/92	LF-023, approx. 9 acres, approx. 406,000 cy	Household refuse, debris, car parts	Metals, VOCs, SVOCs, PCB, pesticides	Remedy: Capping (NY State requirements for solid waste landfills, low permeability cap), and institutional controls.
U.S. Army Aberdeen Proving Grounds (OU 1), MD, Region 3 6/30/92	Michaelsville Landfill, 20 acres, greater than 100,000 cy	Household refuse, limited quantities of industrial waste, burned sludges, pesticide containers, paint, asbestos shingles, solvents, waste motor oils, grease, PCB transformer oils, possible pesticides	Metals, pesticides, VOCs, PCBs, PAHs	Remedy: Capping (multi-layer cap in accordance with MDE requirements for sanitary landfills, using a geosynthetic membrane, 0-2 feet compacted earth material), surface water controls, and gas venting system.
Marine Corps Base, Camp Lejeune (OU1), NC, Region 4 9/15/94	Site 24, 100 acres, volume not reported	Fly ash, cinders, solvents, used paint stripping compounds, sewage sludge, spiractor sludge, construction debris	Pesticides, metals, SVOCs, PCBs	Remedy: Source: No action.
Robins AFB (OU1), GA, Region 4 6/25/91	Main area (Landfill No. 4), 45 acres, greater than 100,000 cy	Household refuse, industrial waste	VOCs, metals	Remedy: Capping (to maintain a minimum 2-foot cover over the waste materials), renovation of current soil cover including clearing, filling, regrading, adding soil and clay cover material and seeding to maintain a minimum 2-foot cover over the waste material.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Twin Cities AFB Reserve, MN, Region 5 3/31/92	Main area, approx. 2 acres, volume not reported	Household refuse, small amounts of industrial; some burned waste	VOCs, metals	Remedy: Source: Institutional controls, natural attenuation, ground water and surface water monitoring.
Wright-Patterson AFB, (Source Control Operable Unit) OH, Region 5 7/15/93	LF-8, 11 acres, 187,300 cy	General refuse and hazardous materials	PAHs, pesticides, PCBs, VOCs, metals, inorganics	Remedy: Capping (low-permeability clay cap that complies with Ohio EPA regulations for sanitary landfills which meet or exceed RCRA Subtitle D requirements), institutional controls, ground water treatment and monitoring.
Wright-Patterson AFB, (Source Control Operable Unit) OH, Region 5 7/15/93	LF-10, 8 acres, 171,600 cy	General refuse and hazardous materials	PAHs, pesticides, PCBs, VOCs, metals, inorganics	Remedy: Capping (low-permeability clay cap that complies with Ohio EPA regulations for sanitary landfills which meet or exceed RCRA Subtitle D requirements), institutional controls, ground water treatment and monitoring.
Hill AFB (OU4), UT, Region 8 6/14/94	Landfill 1, 3.5 acres, 140,000 cy	Burned solid waste, small amounts of waste oils and solvents (from vehicle maintenance facility).	VOCs (TCE)	Remedy: Capping (clay or multi-media cap), pumping, treating, and discharging ground water to POTW, treating contaminated surface water, soil vapor extraction, implementing institutional controls and access restrictions.
Defense Depot, Ogden (OU1), UT, Region 8 6/26/92	Plain City Canal Backfill Area, 4,000 cy	Electrical wire, glass, ash, charcoal, asphalt, wood, concrete, plastic and metal fragments	Metals, PCBs, dioxins, furans, VOCs	Remedy: Excavation, sorting, and off-site disposal in a RCRA permitted facility.
Defense Depot, Ogden (OU3), UT, Region 8 9/28/92	Burial Site 3-A: Chemical Warfare Agent Identification Kit Burial Area, 100 cy	Vials of chemical surety agents, broken glass	Metals, chemical warfare agents	Remedy: Excavation, sorting, and off-site disposal in a RCRA permitted facility.
Defense Depot, Ogden (OU3), UT, Region 8 9/28/92	Burial Site 3-A: Riot Control and Smoke Grenade Burial Area, 90 cy	Unfused grenades and grenade fragments, as well as riot control grenades	No contaminants identified	Remedy: Excavation, sorting, and off-site disposal in a RCRA permitted facility.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Defense Depot, Ogden (OU3), UT, Region 8 9/28/92	Burial Site 3-A: Compressed Gas Cylinder Reburial Area	Two compressed gas cylinders and four smaller steel tanks removed from the Chemical Warfare Agent Identification Kit and Riot Control and Smoke Grenade burial areas	Unknown, possible chemical warfare agents	Remedy: Excavation of compressed gas cylinders and disposal by a commercial operator.
Defense Depot, Ogden (OU3), UT, Region 8 9/28/92	Burial Site 3-A: Miscellaneous Items Burial Area, 230 cy	Chemical Warfare Agent Identification Kits containing no CWAs, World War II gas mask canisters, paint, broken glass, wooden boxes, and pieces of iron	No contaminants identified	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted hazardous waste landfill.
Defense Depot, Ogden (OU3), UT, Region 8 9/28/92	Water Purification Tablet Burial Area, 110 cy	Bottles containing halazone water purification tablets	No contaminants identified	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted industrial waste landfill.
Defense Depot, Ogden (OU4), UT, Region 8 9/28/92	4-A, 7500, sq. ft., 3000 cy	Wood, crating materials, paper, greases, debris, medical waste, oils, some burned waste	Pesticides, VOCs, PCBs	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted hazardous waste landfill.
Defense Depot, Ogden (OU4), UT, Region 8 9/28/92	4-B, (inside 4-E), less than 7,500, sq. ft.	Fluorescent tubes	No contaminants identified	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted landfill.
Defense Depot, Ogden (OU4), UT, Region 8 9/28/92	4-C, 6,000 sq. ft	Food products, sanitary landfill waste	Pesticides, VOCs, PCBs	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted landfill.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Defense Depot, Ogden (OU4), UT, Region 8 9/28/92	4-D, 2,000 sq. ft.	Methyl bromide cylinders, halazone tablets (jars)	Possibly methyl bromide	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted industrial landfill.
Defense Depot, Ogden (OU4), UT, Region 8 9/28/92	4-E, 7,500 sq. ft., volume not reported	Oils, spent solvents, industrial waste	PCBs, VOCs, pesticides	Remedy: Excavation and transportation for off-site disposal in a RCRA permitted hazardous landfill.
Rocky Mountain Arsenal, Shell Section 36 Trenches (OU23), CO, Region 8 5/3/90	Shell Trench Area, 8 acres	Rags, plastic and metal cans, glass jars, piping, pipe fittings, insulation, refuse, insulation, liquid and solid wastes generated from the manufacture of pesticides	VOCs, SVOCs, pesticides ²	Remedy: Capping (physical barrier with a soil and vegetative cover).
Fort Ord Landfills (OU2), CA, Region 9 8/23/94	Landfills, 150 acres	Household and commercial refuse, dried sewage sludge, construction debris, small amounts of chemical waste including paint, oil, pesticides, and epoxy adhesive, electrical equipment	VOCs	Remedy: Capping (California Code of Regulations for non-hazardous waste), institutional controls, extraction, treatment, and recharge of ground water.
Riverbank Army Ammunition Plant Site, CA, Region 9 3/24/94	Landfill, 4.5 acres	Paper, oils, greases, solvents, hospital wastes, construction debris, and industrial sludges	Metals	Remedy: Capping (a multi-layer cap as specified in Dispute Resolution Agreement), pump and treat ground water, discharge treated water to on-site ponds.

² Contaminants identified as emanating from the trenches but not contaminants of concern

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Williams AFB (OU1), AZ, Region 9 5/18/94	Landfill LF-04, 90 acres, 59,000 cy	Dried sewage sludge, domestic trash and garbage, wood, metal, brush, construction debris, some solvents and chemicals	Soil, pesticides, SVOCs, inorganics, including beryllium, lead, zinc	Remedy: Capping (a permeable cap with a 24 inch soil cover), stormwater runoff controls, institutional actions, and soil and ground water monitoring.
Williams AFB (OU1), AZ, Region 9 5/18/94	Pesticide Burial Area (DP-13), 0.4 acre	Pesticides	Pesticides, VOCs, metals	Remedy: Source: No action.
Williams AFB (OU1), AZ, Region 9 5/18/94	Radioactive Instrumentation Burial Area (RW-11), 100 sq. ft.	Cement; radioactive instruments	Radium (background levels)	Remedy: Source: No action.
Elmendorf AFB (OU1), AK, Region 10 9/29/94	LF05, 17 acres	General refuse, scrap metal, used chemicals and other scrap material	VOCs, PCBs, metals, PAHs	Remedy: Source: No action.
Elmendorf AFB (OU1), AK, Region 10 9/29/94	LF07, 35 acres	Base generated refuse, scrap metal, construction rubble, drums of asphalt, empty pesticide containers, small amounts of shop wastes, and asbestos wastes	VOCs, PCBs, metals, PAHs	Remedy: Source: No action.
Elmendorf AFB (OU1), AK, Region 10 9/29/94	LF13, 2 acres	Empty drums, metal piping, drums of asphalt, and small quantities of quicklime	VOCs, PCBs, metals, PAHs	Remedy: Source: No action.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Elmendorf AFB (OU1), AK, Region 10 9/29/94	LF59, 2 landfills (.5 acres each)	General refuse and construction debris, and tar seep	VOCs, PCBs, metals, PAHs	Remedy: Source: No action.
Fairchild AFB (OU1), WA, Region 10 2/13/93	Southwest area, 12.6 acres, 407,300 cy	Coal ash, solvents, dry cleaning filters, paints, thinners, possibly electrical transformers.	VOCs	Remedy: Capping (low-permeability cap designed to meet the closure requirements of Washington State's Minimum Functional Standards for Solid Waste handling and of federal RCRA Subtitle D), SVE/ treatment system, extracting contaminated ground water and treating by air stripping and granular activated carbon, disposal off-site, monitoring off-site water supply wells.
Fairchild AFB (OU1), WA, Region 10 2/13/93	Northeast area, 6 acres, 291,000 cy	Coal ash, solvents, dry cleaning filters, paints, thinners, possibly electrical transformers.	VOCs	Remedy: Capping (low-permeability cap designed to meet the closure requirements of Washington State's Minimum Functional Standards for Solid Waste handling and of federal RCRA Subtitle D), SVE/ treatment system, extracting contaminated ground water and treating by air stripping and granular activated carbon, disposal off-site, monitoring off-site water supply wells.
Fort Lewis Military Reservation, Landfill 4 and the Solvent Refined Coal Pilot Plant, WA, Region 10 9/24/93	LF4, 52 acres	Domestic and light industrial solid waste (no landfill records were maintained).	VOCs, metals	Remedy: Source: Institutional controls, treat ground water and soil using SVE and air sparging system.
Naval Air Station, Whidbey Island, Ault Field (OU1), WA, Region 10 12/20/93	Area 6 Landfill, 40 acres. Within Area 6 there are 2 distinct areas where wastes were disposed.	Household waste, construction debris, and yard waste	VOCs	Remedy: Capping (low-permeability cap to meet Washington State Minimum Functional Standards for non-hazardous closure), air stripping ground water, ground water monitoring, and institutional controls.
Naval Air Station, Whidbey Island, Ault Field (OU2), WA, Region 10 12/20/93	Area 2, 13 acres; Area 3, 1.5 acres. Both treated together due to close proximity.	Solid waste from the base, industrial wastes, and construction and demolition debris	Metals, PAHs	Remedy: Source: Institutional controls, ground water monitoring.

DATA SUMMARY TABLE FOR MILITARY LANDFILLS APPENDIX (CONT.)

ROD / Site Name, State, Region, ROD Sign Date	Disposal Area, Size, Volume of Waste	Type of Waste Deposited	Contaminants of Concern	Remedy
Naval Reactor Facility, ID, Region 10 9/27/94	Landfill Unit 8-05-1, (350 ft. by 450 ft. by 4-25 ft.)	Construction debris, small quantities of paints, solvents, cafeteria wastes, and petroleum products	Metals, VOCs	Remedy: Capping (24-inch native soil cover), institutional controls.
Naval Reactor Facility, ID, Region 10 9/27/94	Landfill Unit 8-05-51, (450 ft. by 100 -175 ft. by 10-15 ft.)	Construction debris, small quantities of paints, solvents, cafeteria wastes, and petroleum products	Metals, VOCs	Remedy: Capping (24-inch native soil cover), institutional controls.
Naval Reactor Facility, ID, Region 10 9/27/94	Landfill Unit 8-06-53, (900 ft. by 1200 ft. by 7- 10 ft.)	Construction debris, small quantities of paints, solvents, cafeteria wastes, and petroleum products	Metals, VOCs	Remedy: Capping (24-inch native soil cover), institutional controls.



United States
Environmental Protection
Agency
Washington, D.C. 20460

Official Business
Penalty for Private Use
\$300