

# PROPOSED PLAN

## AREA A LANDFILL

### INSTALLATION RESTORATION PROGRAM

*U.S. Department of the Navy  
Naval Submarine Bas  
New London*

*May 1995*

## U.S. Navy Announces a Plan to Clean Up Contaminated Soil at the Area A Landfill Naval Submarine Base New London

The U.S. Department of the Navy is proposing a cleanup plan, referred to as the Preferred Alternative or Proposed Plan, for contaminated soil at the Area A Landfill at the Naval Submarine Base New London. The Navy is publishing this Proposed Plan to encourage the public to review this and other cleanup alternatives considered by the Navy and to offer the public an opportunity to comment on them, either orally or in writing, before a final cleanup decision is made.

This Proposed Plan for the Area A Landfill recommends that a **low permeability cap** be placed over the entire landfill area to contain and isolate soils contaminated with **PCBs**. It should be noted that this Proposed Plan, which addresses contaminated soil only, was not developed to address contamination of ground or surface water, which will be studied and addressed at a later date.

The Navy's recommendation for contaminated soil at the Area A Landfill is preliminary, not final. The preferred alternative is one of nine cleanup alternatives examined for this site. Of these, three were deemed feasible. Besides the preferred alternative, they include: 2) removing soil containing high levels of PCBs for disposal at an off site licensed chemical waste landfill followed by covering the entire landfill area with a low permeability cap; and 3) removing soil containing high levels of PCBs for treatment in an off-site incinerator, followed by placement of a low permeability cap over the entire landfill area. As required by law, these alternatives are also compared to a fourth alternative, that of no-action. The **Focused Feasibility Study (FFS)** Report contains a detailed description of all the alternatives, and is available at the Information Repositories listed on page 3 of this Proposed Plan. This Proposed Plan:

1. Explains the opportunities for the public to comment on the remedial alternatives;
2. Includes a brief history of the site and the main findings of the remedial investigations;
3. Outlines the criteria used by the Navy to recommend this cleanup alternative for the site;
4. Provides a brief analysis of the preferred alternative and the other alternatives evaluated in the **Focused Feasibility Study (FFS)**;
5. Presents the Navy's rationale for its preliminary selection of the preferred alternative.

Words that appear in bold print are defined in the glossary at the end of this document.

## **The Public's Role in the Decision-Making Process**

To help the public participate in the decision making process for this site, this document also explains where and how interested citizens can receive information about the cleanup alternatives and comment on them. Opportunities for public involvement include:

### ***Public Comment Period***

The Navy will conduct a public comment period for 30 days from May 31 to June 30, 1995. During this comment period, the public is invited to review this Proposed Plan and make written or oral comments to the Navy. These comments will be considered before a final remedy is selected.

### ***Public Informational Meeting***

The Navy will hold a public meeting on June 7, 1995 at 7:00 p.m. at the Shepherd of the Sea Chapel on Gungywamp Road in Groton, to explain the preferred alternative and other feasible alternatives for the site. The public is encouraged to attend this meeting. Comments and questions are welcome.

### ***Public Hearing***

The Navy will hold a public hearing on June 28, 1995 at 7:00 p.m. at the Shepherd of the Sea Chapel on Gungywamp Road in Groton. At this public hearing, the Navy will accept oral comments on the cleanup alternatives presented in this Plan. Comments made at the hearing will be transcribed, and a copy of the transcript will be added to the site Administrative Record available at the information repositories listed on page 3.

### ***Written Comments***

Individuals wishing to comment in writing on the Navy's preferred alternative or any of the other cleanup alternatives under consideration, may deliver their written comments to the Navy at the Public Hearing on June 28, 1995 or may mail them (postmarked no later than June 30, 1995) to:

Mr. Mark Evans  
Remedial Project Manager  
Northern Division Naval Facilities Engineering Command  
10 Industrial Highway - Mail Stop #82 - Code 1823  
Lester, PA 19113  
(610) 595-0567 ext. 162

### ***Review of Public Comments***

The Navy will review and consider public comments on the cleanup alternatives as part of its final decision-making process for selecting the final cleanup alternative for the site. If public comments or new information are presented to them during the public comment period, the Proposed Plan may be changed to reflect the new data. The Navy will issue its final decision in a **Record of Decision (ROD)** that details the selected option for the site. The ROD will include a **Responsiveness Summary** of all oral and written comments received during the public comment period, together with the Navy's response to them.

### *Additional Information*

This Proposed Plan provides only a summary description of the investigation of the Area A Landfill at the Naval Submarine Base New London. For additional information, the public is encouraged to review the Focused Feasibility Study (FFS), which contains a more detailed explanation of the nature and extent of the contamination at the site, as well as an in-depth explanation of the advantages and disadvantages of the various cleanup alternatives considered. The FFS, the Phase I Remedial Investigation Report, fact sheets, and other documents pertaining to the site are available for review at the following locations:

#### ***Groton Public Library***

52 Route 117  
Groton, CT 06340  
(203) 441-6750

#### **Hours:**

Mon-Thurs. 9 a.m. - 9 p.m.  
Fri. 9 a.m. - 5:30 p.m.  
Sat. 9 a.m. - 5 p.m.  
Sun. noon - 6 p.m.

#### ***Bill Library***

718 Colonel Ledyard Highway  
Ledyard, CT 06339  
(203) 464-9912

#### **Hours:**

Mon-Thurs 9 a.m. - 9 p.m.  
Fri & Sat. 9 a.m. - 5 p.m.  
Sun. 1 p.m. - 5 p.m.

#### ***Naval Submarine Base Library***

Groton, CT  
(203) 449-3723

#### **Hours:**

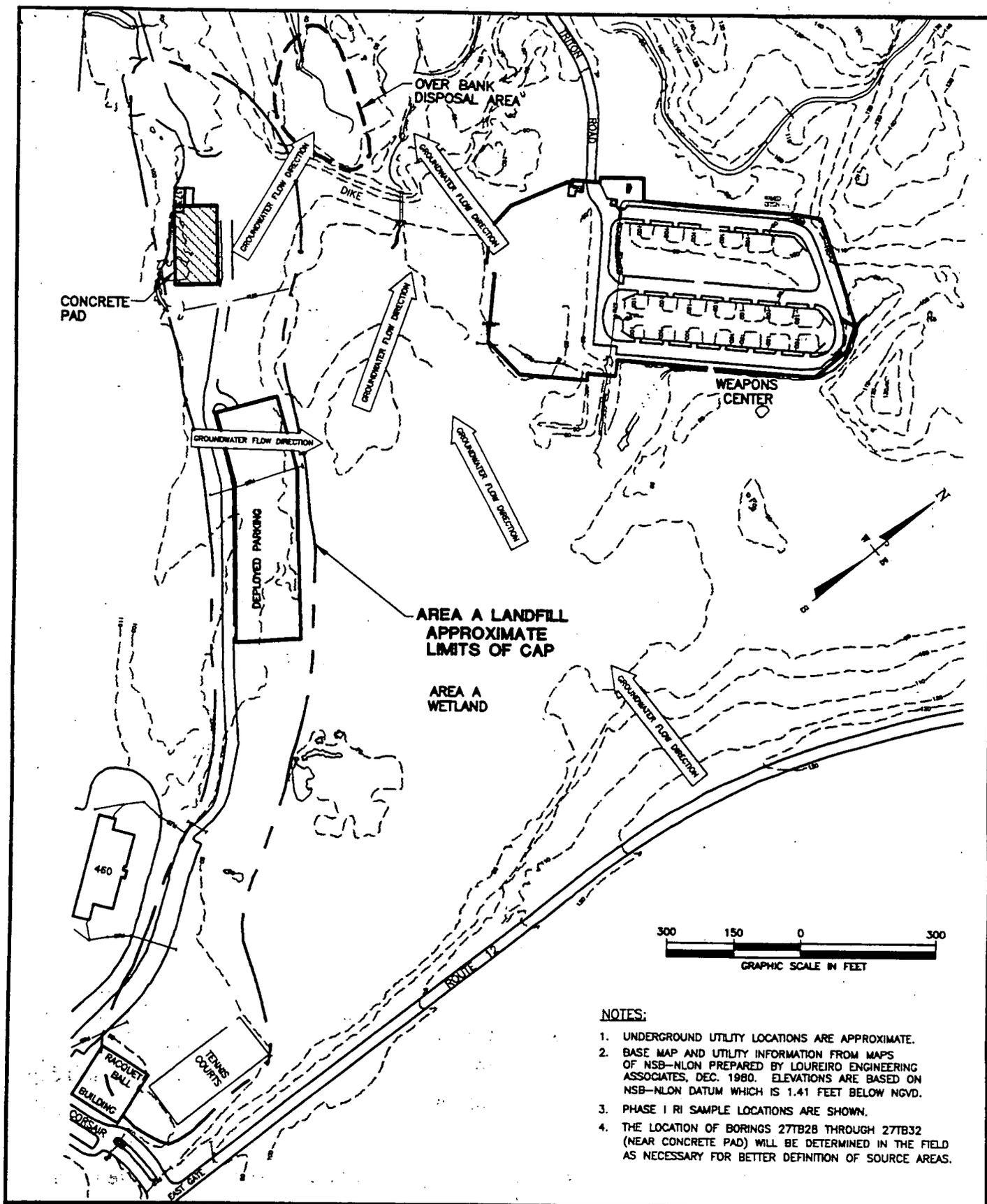
Mon-Fri. 10 a.m. - 8 p.m.  
Sat. 10 a.m. - 6 p.m.  
Sun. Closed

## Site History

The Navy's Submarine Base in New London (Subase) consists of approximately 550 acres of land in southeast Connecticut in the towns of Ledyard and Groton, on the east bank of the Thames River, approximately six miles north of Long Island Sound. For almost 100 years, the Subase has served as a major support center for the U.S. Atlantic fleet. Of necessity, the Subase has used, handled, stored, and disposed of hazardous materials, some of which have contaminated soil and/or ground or surface water in areas of the Subase.

The Area A landfill is located in the northeastern and north-central section of the Subase (see overall Subase map on the next page and the landfill site map on page 5). The site, covering up to approximately 13 acres, is a relatively flat area bordered by a steep, wooded hillside to the south, a steep wooded ravine to the west, and the Area A wetland to the north (see also page 10). Aerial photographs show that the landfill appears to have extended eastward along the wetland as far as the present position of the tennis courts. Runoff from the landfill drains as overland flow north into the Area A wetland; the runoff discharges to the Area A downstream and into the Thames River.





AREA A LANDFILL  
APPROXIMATE  
LIMITS OF CAP

AREA A  
WETLAND

**NOTES:**

1. UNDERGROUND UTILITY LOCATIONS ARE APPROXIMATE.
2. BASE MAP AND UTILITY INFORMATION FROM MAPS OF NSB-NLON PREPARED BY LOUREIRO ENGINEERING ASSOCIATES, DEC. 1980. ELEVATIONS ARE BASED ON NSB-NLON DATUM WHICH IS 1.41 FEET BELOW NGVD.
3. PHASE I RI SAMPLE LOCATIONS ARE SHOWN.
4. THE LOCATION OF BORINGS 27TB28 THROUGH 27TB32 (NEAR CONCRETE PAD) WILL BE DETERMINED IN THE FIELD AS NECESSARY FOR BETTER DEFINITION OF SOURCE AREAS.

**INSTALLATION RESTORATION STUDY**  
**NAVAL SUBMARINE BASE-NEW LONDON**  
**GROTON, CONN.**

LEGEND	
---10---	EXIST CONTOUR
123	BUILDING No.
—	WATERCOURSE
—	STORM SEWER
□	CATCH BASIN

**FIGURE 2**  
**AREA A LANDFILL**  
  
ATLANTIC ENVIRONMENTAL SERVICES, INC.

The landfill opened sometime before 1957 and received primarily ash from the Subase incinerator. After the Subase incinerator closed in 1963, all wastes, including all nonsalvageable materials generated by submarines and base operations, were disposed of in the landfill. This included industrial, commercial and household wastes. The landfill closed in 1973.

After closure, an asphalt pad was constructed in the southwest portion of the landfill for aboveground storage of industrial wastes. Steel drums, transformers, and electric switches were stored on the pad. All of these materials have been properly disposed of off-site. The remainder of the landfill is not paved.

In recent years, sand bags and contractor supplies and equipment have been stored over the former landfill. Crane weights and other equipment are stored on the asphalt pad in the southwest portion of the landfill. A gravel-covered parking lot also exists at the former landfill.

## Site Activities to Date

*The IRP and CERCLA.* In 1975, the Department of Defense developed a program to investigate and clean up problem areas involving hazardous waste at federal facilities such as the Submarine Base in New London. That program, known as the **Installation Restoration Program (IRP)**, is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA**), commonly referred to as the **Superfund** law. In 1986, Congress passed Amendments to CERCLA which contain provisions for federal facilities.

The Subase was placed on the **National Priorities List (NPL)** of federal Superfund sites on August 30, 1990 by the U.S. Environmental Protection Agency (EPA). A **Phase I Remedial Investigation (RI)** was completed in August 1992 for nine sites at the Subase, including the Area A Landfill. The Phase I report evaluated potential risks to human health and the environment from contaminants at each site. All nine sites, including the Area A Landfill, were determined to pose potential risks.

*Remedial Investigations to Date.* To address the potential risks at these sites, a **Feasibility Study (FS)** to identify and evaluate cleanup alternatives was begun for each of the sites. As work on the feasibility study progressed, EPA expressed concern that the data on which the FS was based did not show completely the extent and degree of contamination. As a result, work on the FS was stopped and a Phase II RI workplan was developed to fill data gaps, to better estimate the extent of soil contamination in the vicinity of the concrete pad, to address EPA's concerns, and to implement recommendations made in the Phase I RI.

*Accelerated Action for Three Sites.* The time required for full implementation of the Phase II RI Work Plan, preparation of a Phase II RI report, FS, and selection of final remedial alternatives for the sites may take several years. Therefore, the Navy decided to accelerate remedial activities for selected **media** (in this case, soil) at three of the sites for which risks had been positively identified, in order to eliminate or minimize risks from those areas. These selected media are classified as **operable units** for purposes of making decisions in the Superfund program. The Area A Landfill was one of the three sites selected for accelerated

action. The accelerated plan of action submitted to EPA enabled the Navy to collect design data, complete focused feasibility studies, and design accelerated remedial action programs to eliminate or lessen risk. It also provided for the simultaneous preparation of focused feasibility study reports, and final plans/specifications.

*Focused Feasibility Study.* This Proposed Plan is based on a "Focused" Feasibility Study (FFS) report. The study is described as an FFS rather than a conventional feasibility study (FS) because it *focused* on the following three points.

- (1) selecting a remedial alternative for one aspect of the Area A Landfill: contaminated soils;
- (2) evaluating several remedial alternatives that use commercially available, proven technologies; and
- (3) implementing a remedy that has been commonly and effectively used at similar sites as an interim measure to control the source of contamination.

**FOCUSING ON CONTAINMENT OF LANDFILL WASTES.** The purpose of this FFS was to evaluate and select remedial actions to contain the landfill contents/contaminated soils. Therefore, the FFS report offers descriptions and evaluations of remedial alternatives to contain landfill wastes.

**FOCUSING ON AVAILABLE, PROVEN TECHNOLOGIES.** All of the remedial alternatives evaluated for the site are currently available from commercial sources and have been proven to be effective in similar remediation projects.

**FOCUSING ON REMEDIES THAT HAVE WORKED AT SIMILAR SITES.** The FFS report also describes the reasons for selecting what is termed a **presumptive remedy** to control the source of contamination (i.e. landfill contents/contaminated soils). Presumptive remedies are technologies preferred for use at common categories of sites such as landfills. These technologies are preferred based on historical information and data from site cleanups around the country. In reviewing remedy selection at many sites, as well as currently available performance data on remedial technologies, the EPA has identified remedial actions that have been commonly selected for particular types of sites and have performed well at those sites. Therefore, the EPA has determined what remedy or set of remedies are *presumptively* the most appropriate to address specific types or categories of sites. The EPA encourages presumptive remedies to be considered at all appropriate sites. Presumptive remedies for landfills consist of containment remedies, such as landfill caps, and groundwater remediation, such as treatment systems.

*Interim remedies.* The Area A Landfill remedial action will be implemented in accordance with all administrative procedures required by law for final remedial actions. The remedial actions selected, based on the FFS, are intended to be a final source control remedy for the landfill contents. However, the remedial actions are not final for the Area A Landfill site as a whole because risks to the environment from contaminated groundwater need to be evaluated after the source control remedies are completed. Based on this assessment, a determination will be made whether on-site groundwater remediation measures are necessary to protect water quality.

## Soil Contamination at the Area A Landfill

The field investigation at the Area A Landfill consisted of soil collection and analysis to determine the extent and degree of contamination at the site.

Several soil samples were taken, primarily within the landfill limits, at various depths from the ground surface to a depth of approximately 16 feet, well below the water table. Each sample was analyzed for **Volatile Organic Compounds (VOCs)**, **Semi-Volatile Organic Compounds (SVOCs)**, pesticides, **PCBs**, and inorganics. Chemical concentrations found in the soil were then compared to **Applicable or Relevant and Appropriate Requirements (ARARs)** and "to be considered" (TBC) values. ARARs and TBC values are based on cleanup standards or other environmental protection requirements or criteria, either set forth in the law or in relevant federal or state guidance materials. Tests revealed the presence of the following contaminants:

**VOCs:** The following VOCs were detected at one or more sampling locations: methylene chloride; acetone; 2-butanone; toluene; ethylbenzene; total xylene; carbon disulfide; trichloroethene; 1,1,2 trichloroethane; 4-methyl-2-pentanone; and 1,1,2,2, tetrachloroethane.

**SVOCs**, predominantly **Polycyclic Aromatic Hydrocarbons (PAHs)**, were detected in soils collected across the site.

**PCBs** were detected in two surface soil samples during the Phase I investigation. In the Phase II investigation **PCBs** were detected in each of the sampling locations.

**Pesticides** were detected at several locations sampled during the Phase I investigation and at all locations sampled during the Phase II investigation, primarily at low concentrations.

**Dioxin** was found in only one sample, at a low concentration. Dioxin is not considered to be a chemical of concern at this site.

**Inorganics:** lead was found in significant concentrations in only two samples. Slightly elevated levels of other inorganics, including chromium, copper, mercury, and nickel were found. These constituents do not appear to be of concern at this site.

## Proposed Remedial Action Objectives

*Remedial action objectives* are designed to protect human health and the environment, and should reduce or eliminate potential health risks posed by the site. Cleanup objectives, at a minimum, must comply with the statutory requirements for CERCLA remedies as promulgated in the **National Contingency Plan (NCP)**. They must also meet all **Applicable or Relevant and Appropriate Requirements (ARARs)**. In order to define remedial action objectives for this site, the following are established:

- the contaminants of concern;
- the **media** in which the contaminants occur;
- the potential exposure routes or pathways by which the contaminants may reach potential receptors (persons, animals, or the environment);
- the remediation goals (the elimination or reduction of contamination to acceptable levels).

PCBs are the primary contaminant of concern, with respect to risks to human health, in the soil at the Area A Landfill. Although elevated concentrations of other contaminants (VOCs, PAHs, and inorganics, including lead) were of general concern, in the soil they do not pose a risk to human health or the environment.

Risks, if any, associated with groundwater contamination will be addressed during analysis of groundwater monitoring, at a later date. This Proposed Plan, as stated elsewhere, focuses on source control only. In any event, the installation of a cap will minimize infiltration of water to the site, (and potential migration of contaminants), and will minimize erosion.

Individuals considered to be at risk are workers involved in loading and unloading wooden pallets, those involved in excavation for storm sewers, and children playing on the Area A Landfill and surrounding woodlands. Risks to children playing near the landfill from wind blown dust were evaluated and found to be negligible. Therefore, based on the information gathered thus far, and the results of the human health risk assessment, a remedial action objective was developed that would reduce human exposure to PCBs in both surface and subsurface soils.

## **The Development of the Navy's Preferred Alternative**

The number of practicable general response actions for landfills is limited. EPA expects that containment technologies (capping) generally will be appropriate for wastes that pose a relatively low, long-term threat or where treatment is impracticable. The Navy's preliminary selection of the preferred cleanup alternative for the Area A Landfill, as described in this Proposed Plan, is the result of a comprehensive evaluation and screening process that included EPA guidance, engineering judgment, and the mandates of the NCP. The Focused Feasibility Study (FFS) for the Area A Landfill describes the alternatives considered for addressing source control, as well as the process and criteria the Navy used to narrow the list to four potential remedial alternatives. For details on all the alternatives considered by the Navy, consult the FFS report, available at the Information Repositories listed on page 3 of this Proposed Plan.

The following nine criteria are used to evaluate the alternatives identified in the FFS. The final remedial alternative selected for this site must represent the best balance among the evaluation criteria.

*The first two criteria must be met before any alternative may be carried forward for further evaluation.*

1. *Overall protection of human health and the environment* addresses how an alternative as a whole will protect human health and the environment over time. This includes an assessment of whether risks are properly eliminated, reduced, or controlled.
2. *Compliance with applicable or relevant and appropriate requirements (ARARs)* addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the site conditions and cleanup options.

*The next five criteria are used as primary balancing criteria when evaluating alternatives:*

3. *Short-term effectiveness* refers to the likelihood of any adverse effects on human health or the environment that may be posed during the construction and implementation of the alternative.

4. *Long-term effectiveness and permanence* refers to the ability of the alternative to maintain reliable protection of human health and the environment over time once the cleanup activity has been completed.
5. *Reduction of toxicity, mobility, or volume* measures the overall performance of an alternative. The 1986 amendments to the Superfund statute (SARA) emphasize that, whenever possible, the selected remedy should utilize a treatment process that permanently reduces the level of toxicity of contaminants at the site, the spread of contaminants away from the source (mobility), and the volume, or amount, of contamination at the site.
6. *Implementability* evaluates the technical and administrative feasibility of an alternative, including the availability of materials and services needed for the alternative.
7. *Cost* includes the capital (up-front) cost of implementing the alternative as well as the cost of operating and maintaining the alternative over the long term.

*The final two criteria are considered in the final selection among otherwise viable alternatives:*

8. *State acceptance* addresses whether, based on its review of the RI/FFS and Proposed Plan, the State concurs with, opposes, or has no comment on the alternative the Navy is proposing as the remedy for the site.
9. *Community acceptance* addresses whether the public concurs with the Proposed Plan. Community acceptance of this Plan will be evaluated based on comments received at the upcoming public meeting and during the public comment period.

## **The Navy's Preferred Alternative**

Based on a detailed analysis of these factors, the Navy has made a preliminary recommendation:

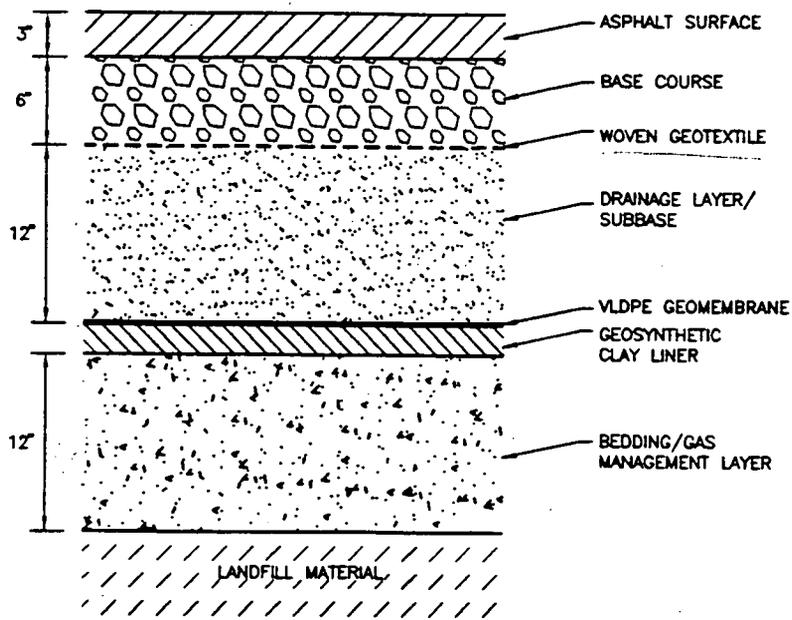
A low permeability cap would be placed over the landfill wastes. Depending upon the results of ongoing investigations, the area covered by the cap may vary from the current estimate of 13 acres. The cap would consist of a double liner, topped with drainage netting, and an operating surface (see diagram on next page).

The low permeability double liner will prevent water infiltration to the landfill. The geonet drainage layer, installed over the double liner, will remove water to prevent ponding above the liner, and the operating surface will protect the underlying cap layers from damage. This operating surface would be 12 inches thick and consist of non-compacted, granular soil covered by an asphalt surface. The cap would be graded to prevent run-on and promote runoff.

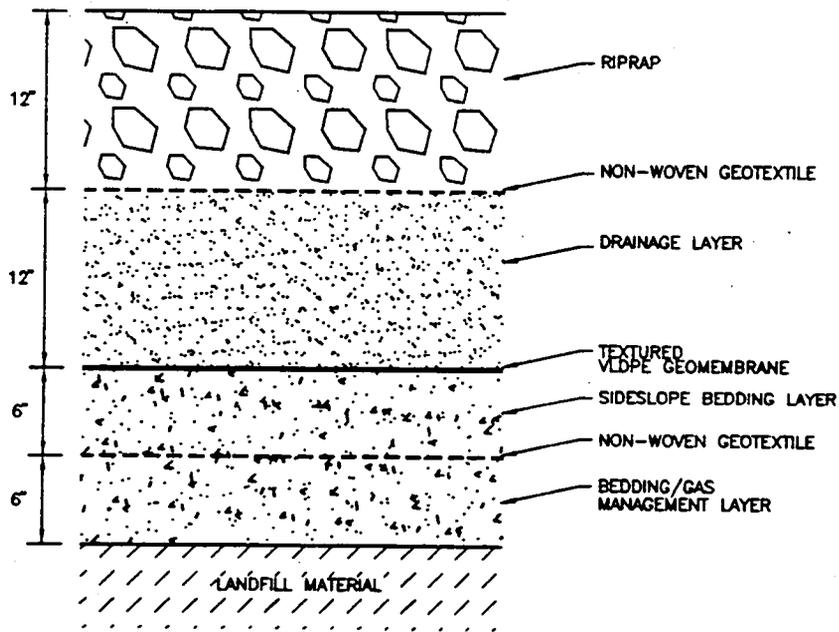
A groundwater interception system would be installed to collect shallow groundwater flowing to the landfill and reroute it around the landfill to reduce contact of the groundwater with landfill contents/soils. Existing storm drainage lines passing through the landfill will be plugged, and storm water will be re-routed around the landfill.

A leachate collection system will be installed to stabilize the cap and to further

### PLATEAU AREA FINAL COVER SYSTEM



### SIDESLOPE AREA FINAL COVER SYSTEM



INSTALLATION RESTORATION STUDY  
 NAVAL SUBMARINE BASE - NEW LONDON  
 GROTON, CT

FIGURE 3  
 CAP DIAGRAM

ATLANTIC ENVIRONMENTAL SERVICES, INC.

contain landfill wastes. The system isolates and collects the leachate for treatment and/or disposal.

Groundwater will be monitored to ensure that the cap and other measures are effective in preventing further groundwater contamination. Access to the site would be controlled by continued maintenance of the existing perimeter fence and security procedures.

Although the cap would be designed to allow continuation of current Area A Landfill operations, proper maintenance of the cap and fence would be required to ensure its long-term integrity. Operations and Maintenance procedures to prevent any unauthorized digging or other activities that could jeopardize the integrity of the cap would be developed as well.

*Risks associated with this alternative.* This alternative would effectively eliminate the principal threats posed by this site which are risks to human health due to direct contact and off-site migration of contaminants via erosion and infiltration. Operations and maintenance procedures to be followed at the Landfill, along with institutional controls, would protect the cap by preventing unauthorized excavation or other activities that could jeopardize the integrity of the cap. Future construction activities could involve disturbing contaminated soils.

Owing to the closure of several Navy bases, the Subase could gain several additional duties. Accordingly, there may be a need for new construction projects. In particular, the Navy may need to build a new nuclear power school, including a new barracks and a dental clinic, if the Base Realignment and Closure (BRAC) law requires the school to be built in Groton, CT. The school needs to be completed by April 1997 in order to facilitate closure of the school in Orlando, FL. If the school goes to the Subase, the Navy plans to build in the south central part of the Subase, near Rock Lake.

Thousands of trucks are anticipated by these construction activities. To prevent excess noise and air pollution from construction traffic from disturbing the residential community, the Navy would build a temporary construction access road westward from Route 12 and along the steep slope of the woods adjacent to Area A Landfill. The access road will be needed until the end of 1997. An Environmental Assessment describing this proposal will be prepared, if required, and will be available at the repositories listed on page 3 of this Proposed Plan. The public is encouraged to review this document.

If the school goes to Groton, the Navy may need to accelerate construction of the Area A Landfill cap. As stated above, the Navy's Preferred Alternative includes an asphalt topped operating surface over the entire cap. The access road would be part of the landfill's operating surface (lines will be painted on the asphalt to delineate the road). Early construction will not delay the CERCLA cleanup. The access road will be designed so as not to damage the cap.

In addition, an analysis will be prepared to evaluate various configurations of the cap so that the alternative that minimizes adverse effects to the Area A Wetland can be identified. The Navy is committed to compensating for any adverse impacts to the wetlands. During cap construction, engineering controls will be used to minimize erosion and siltation into the Area A wetland.

Short term exposures to contaminated soil under this alternative would be of potential

concern as grading of soil may allow some ingestion of soil or dermal (through the skin) exposure. Fugitive dust particles and gases are also a concern in the short term. These risks are controllable through a health and safety plan which calls for protective clothing and other measures designed to reduce this exposure.

Installation of the cap in the long term would effectively eliminate human exposure to any unidentified isolated hot spots or to inaccessible soils. The cap will also minimize erosion and potential transport of contaminants to the Area A wetland. Installation of the cap does not eliminate the possibility that contaminants in the saturated zone may leach to groundwater.

A five year review would be required with this alternative as some hazardous substances will remain on-site.

*Estimated Time for Construction: less than 13 months*

*Estimated Capital Cost: \$3,634,000*

*Estimated Operation and Maintenance Cost: \$2,214,000*

*Estimated Total Cost: \$5,848,000*

## **Other Alternatives Evaluated in the FFS**

The other three alternatives that the Navy evaluated in detail are described briefly below. A more detailed description of each one can be found in the FFS report available at the Information Repositories listed on page 3 of this Proposed Plan.

**Alternative 2: Off-Site Disposal and Capping of the Landfill.** This alternative includes the removal and off-site disposal at a licensed chemical landfill of all PCB contaminated soil. The soil removal/disposal would be followed by the placement of a low permeability cap over the entire area where wastes have been disposed. The cap would be the same as described in the Preferred Alternative section above.

All surficial soils containing PCBs greater than 10 ppm and all deeper, accessible soils (to a depth of 10 feet) containing PCBs greater than 50 ppm would be excavated and disposed off-site. The excavation areas, totalling approximately 300 cubic yards, are located near the asphalt pad. After completion of the initial excavation, additional soil samples would be taken and analyzed to confirm that target-cleanup levels were met. If not, excavation would continue until samples confirmed that target cleanup levels were met or until a depth of 10 feet is reached.

The low permeability cap, which would cover up to 13 acres of the site, would consist of a bentonite composite liner overlain with a flexible membrane liner, drainage netting, nonwoven geotextile, and an operating surface. The operating surface would be 12 inches thick and consist of compacted, crushed stone. The cap would be graded to prevent run-on and promote runoff.

A groundwater interception system would be installed to collect shallow groundwater flowing to the landfill and reroute it around the landfill to reduce contact of the groundwater with landfill contents/soils. Existing storm drainage lines passing through the landfill will be plugged, and storm water will be re-routed around the landfill.

A leachate collection system will be installed to stabilize the cap and to further contain landfill wastes. The system isolates and collects the leachate for treatment and/or disposal off site.

Groundwater will be monitored to ensure that the cap is effective in preventing further

groundwater contamination. Access to the site would be controlled by continued maintenance of the existing perimeter fence and security procedures.

Proper maintenance of the cap would be necessary to ensure its long-term integrity. The Subbase would develop operations and maintenance procedures that prevent any digging or other activities (without prior approval) that could jeopardize the integrity of the cap. Also, institutional controls would be implemented that would provide notice of hazardous materials at the site, and could include a provision for proper approval of any site excavation/construction activities to ensure the integrity of the cap, adequate worker protection, and other environmental considerations.

*Risks associated with this alternative.* This alternative would effectively eliminate the principal threats posed by this site which are risks to human health from direct contact of contaminated soils. In addition, workers involved in future subsurface construction projects would be protected from risks because accessible soils containing contaminants above target-cleanup levels would be removed.

Because this alternative would require a substantial amount of material handling, there may be a short-term potential for exposure to contaminants from dust generated during removal, grading and transport of soil. These short term exposures would be reduced through the use of protective clothing and other measures specified by an on-site health and safety plan.

In the long term, removal and disposal of surface and subsurface soils off-site would permanently eliminate exposure to accessible contaminated soils, since all of these soils would be removed. In addition, installation of the low permeability cap would effectively eliminate human exposure to any unidentified isolated hot spots or to contaminants in inaccessible soils. Installation of the cap does not eliminate the possibility that contaminants in the saturated zone may leach to groundwater.

A five year review would be required with this alternative as some hazardous substances will remain on-site.

*Estimated Time for Construction: 12 months*

*Estimated Capital Cost: \$3,850,000*

*Estimated Operation and Maintenance Cost: \$2,214,000*

*Estimated Total Cost: \$6,064,000*

**Alternative 3: Off-Site Incineration and Capping of the Landfill.** This alternative includes the removal and off-site incineration of all PCB contaminated soil. The soil removal/incineration would be followed by the placement of a low permeability cap over the entire area where wastes have been disposed. The cap would be the same as described in the Preferred Alternative section above.

All surficial soils containing PCBs greater than 10 ppm and all deeper, accessible soils (to a depth of 10 feet) containing PCBs greater than 50 ppm would be excavated and incinerated off-site. The excavation areas, totalling approximately 300 cubic yards, are located near the asphalt pad. After completion of the initial excavation, additional soil samples would be taken and analyzed to confirm that target-cleanup levels were met. If not, excavation would continue until samples confirmed that target cleanup levels were met or until a depth of 10 feet is reached.

The low permeability cap, which would cover up to 13 acres of the site, would consist of a bentonite composite liner overlain with an flexible membrane liner, drainage netting,

nonwoven geotextile, and an operating surface. The operating surface would be 12 inches thick and consist of compacted, crushed stone. The cap would be graded to prevent run-on and promote runoff.

A groundwater interception system would be installed to collect shallow groundwater flowing to the landfill and reroute it around the landfill to reduce contact of the groundwater with landfill contents/soils. Existing storm drainage lines passing through the landfill will be plugged, and storm water will be re-routed around the landfill.

A leachate collection system will be installed to stabilize the cap and to further contain landfill wastes. The system isolates and collects the leachate for treatment and/or disposal off site.

Groundwater will be monitored to ensure that the cap is effective in preventing further groundwater contamination. Access to the site would be controlled by continued maintenance of the existing perimeter fence and security procedures.

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Proper maintenance of the cap would be necessary to ensure its long-term integrity. The Subbase would develop operations and maintenance procedures that prevent any digging or other activities (without prior approval) that could jeopardize the integrity of the cap. Also, institutional controls would be implemented that would provide notice of hazardous materials at the site, and could include a provision for proper approval of any site excavation/construction activities to ensure the integrity of the cap, adequate worker protection, and other environmental considerations.

*Risks associated with this alternative.* This alternative would effectively eliminate the principal threats posed by this site which are risks to human health from direct contact of contaminated soils. In addition, workers involved in future subsurface construction projects would be protected from risks because accessible soils containing contaminants above target-cleanup levels would be removed.

Because this alternative would require a substantial amount of material handling, there may be a short-term potential for exposure to contaminants from dust generated during removal, grading and transport of soil. These short term exposures would be reduced through the use of protective clothing and other measures specified by an on-site health and safety plan.

In the long term, removal and disposal of surface and subsurface soils off-site would permanently eliminate exposure to accessible contaminated soils, since all of these soils would be removed. In addition, installation of the low permeability cap would effectively eliminate human exposure to any unidentified isolated hot spots or to contaminants in inaccessible soils. Installation of the cap does not eliminate the possibility that contaminants in the saturated zone may leach to groundwater.

A five year review would be required with this alternative as some hazardous substances will remain on-site.

*Estimated Time for Construction: less than 14 months*

*Estimated Capital Cost: \$4,132,000*

*Estimated Operation and Maintenance Cost: \$2,214,000*

*Estimated Total Cost: \$6,346,000*

**Alternative 4: No Action.** Analysis of the No Action alternative is required by Federal law and is included for comparison with other alternatives. A No Action alternative is developed for each Superfund site to assess impact on public health and the environment if no measures are taken to correct current site conditions. The no-action alternative would only be used if the site posed little or no risk to public health and the environment.

The No-Action alternative for the Area A Landfill would consist of taking no action to either contain, treat, or otherwise minimize risk. In addition, no long-term maintenance, monitoring, or institutional controls would be implemented at the site.

*Risks associated with this alternative.* The alternative provides no control of exposure to contaminated soils, and therefore, does not reduce the risk to human health or the environment. It also does not prevent further migration of contaminated soils. This alternative is unacceptable, as it would not provide adequate protection to either persons or the environment.

*Estimated Time for Construction: no construction*

*Estimated Total Cost: 0*

## **The Navy's Rationale for Selecting the Preferred Alternative**

Based on current information and analysis of the RI and FFS reports, the Navy believes that the Proposed Plan for the containment of the Area A Landfill is consistent with the requirements of the IRP, the Superfund law and its amendments, and to the extent practicable, the National Contingency Plan. The preferred alternative, and alternatives 2 and 3 would each provide overall protection of human health and the environment with a few differences.

In the Navy's analysis of the alternatives that provide the greatest protection, the preferred alternative identified in this Proposed Plan is easier to implement and is more cost effective than the other alternatives considered. In addition, the preferred alternative would not involve any risks associated with the transportation of contaminated soils, and would achieve the best balance among the criteria used by the Navy to evaluate such alternatives. The preferred alternative will attain all federal and state ARARs, would effectively contain landfill wastes, and would utilize permanent solutions to the maximum extent practicable.

## **For More Information**

If you have any questions about the site or would like more information, you may call or write to:

Andy Stackpole  
Installation Restoration Manager  
Naval Submarine Base New London  
Groton, CT 06349-5100  
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## Glossary

- ARARs:** Applicable or relevant and appropriate requirements of all state and federal laws for particular conditions or cleanup options at a site.
- CERCLA:** The Comprehensive Environmental Response, Compensation, and Liability Act is a federal law passed in 1980 and amended by Congress by the Superfund Amendments and Reauthorization Act of 1986. The law establishes a national trust fund (known as Superfund) to investigate and remediate abandoned or uncontrolled hazardous waste sites.
- Contaminant:** Any physical, chemical, biological, or radiological substance or matter that, at certain levels, could have an adverse affect on human health or the environment.
- Dioxin:** Dioxin is a generic term that refers to a class of organic chemicals comprised of several different compounds. Dioxins are by-products of certain chemical processes such as bleaching paper pulp. They are also formed during incomplete combustion of organic compounds such as wood, paper, fossil fuels, garbage, and leaded gasoline.
- FFS:** The Focused Feasibility Study (FFS) is the description or analysis of potential remedial alternatives for only one operable unit (such as soils) and normally includes a few selected remedial alternatives that use commercially available, proven technologies.
- FS:** The Feasibility Study (FS) is a report that summarizes the development and analysis of the cleanup alternatives considered for the site.
- Low permeability cap:** A cover system for a landfill constructed of man made and natural materials designed to prevent rainfall and stormwater from entering the landfill and transporting landfill contaminants away from the landfill.
- Infiltration:** The flow of water downward from the land surface through landfill materials.
- Installation Restoration Program (IRP):** The program established by the Department of Defense in 1975 to investigate, identify, and clean up hazardous waste contamination at federal facilities.
- Leachate:** Water within a landfill that has been contaminated by contact with the landfill contents.
- Lead:** A toxic metal known to be harmful to human health if ingested or inhaled. Too much lead in the human body can cause damage to the brain, kidneys, nervous system, and red blood cells.
- Media:** Soil, Air, and ground or surface water are the three things most often examined for contamination. Each of these is referred to as a medium; collectively, they are referred to as media.
- National Contingency Plan (NCP):** The federal regulation that guides implementation of the Superfund Program. Commonly referred to as the NCP, the full name of the regulation is the National Oil and Hazardous Substances Contingency Plan.
- National Priorities List (NPL):** EPA's list of the nation's top priority hazardous waste sites identified for possible long-term cleanup action. Abandoned or otherwise uncontrolled NPL sites are eligible for funding from the trust fund known as the Superfund.
- Operable Units:** Contaminated areas defined at Superfund sites for decision-making purposes. Operable units could include air, soil and groundwater.

- Parts per million (ppm)*: A unit of measurement used to describe levels of contamination. For example, one gallon of a liquid contaminant (such as a solvent) in one million gallons of water is equal to one part per million.
- PCBs—Polychlorinated Biphenyls*: A family of organic compounds used since 1926 in electrical transformers as insulators and coolants, in lubricants, carbonless copy paper, adhesives, and caulking compounds. PCBs can be stored in the fatty tissues of humans and animals. Because PCBs have caused cancer in laboratory animals, EPA banned the use of PCBs in 1979.
- PAHs*: Polycyclic Aromatic Hydrocarbons (PAHs) are one type of semi-volatile organic compounds that contains carbon that are not volatile or soluble and therefore tend to adsorb (stick to) soil and sediments. PAHs include chemical constituents found in substances such as coal tar and asphalt. Some PAHs are known to cause cancer.
- Presumptive Remedies*: Presumptive Remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. EPA has evaluated technologies that have been consistently selected at past sites using the remedy selection criteria set out in the National Contingency Plan (NCP); reviewed currently available performance data on the application of these technologies; and has determined that a particular remedy, or set of remedies, is *presumptively* the most appropriate for addressing specific types of sites.
- Proposed Plan*: A brief summary of the preferred cleanup method(s) and other alternatives that have been considered for use at the site.
- Remedial Investigation (RI)*: A summary report of the information collected on the nature and extent of contamination found at a Superfund site and the problems that the contamination causes. It directs the types of cleanup options that are developed in the Feasibility Study.
- Responsiveness Summary*: A summary of written and oral comments received during the public comment period, together with the Navy or EPA response to these comments.
- ROD*: The Record of Decision (ROD) is a public document that explains the remedial alternative selected by DOD or EPA after considering all information and technical analysis, as well as all public comments and concerns.
- Semi-Volatile Organic Compounds (SVOCs)*: SVOCs are compounds containing carbon that slowly evaporate from water or soil. They include substances contained in plastics and cleaning agents. Some SVOCs are known to cause cancer.
- Superfund*: The common name of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).
- TBC*: To-be-considered standards are based on any state or federal guidance that may be useful in evaluating site chemical concentrations or developing a cleanup remedy. Although final decisions include a consideration of TBCs, more weight is given to ARARs and health and environmental risk assessments.
- Volatile Organic Compounds (VOCs)*: A group of chemical compounds composed primarily of carbon and hydrogen that are characterized by their tendency to evaporate (or volatilize) into the air from water or soil. Some VOCs are known to cause cancer.