



DEPARTMENT OF THE NAVY  
INSTALLATION RESTORATION PROGRAM  
NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

**PROPOSED REMEDIAL ACTION PLAN  
FOR SITE 20 - AREA A WEAPONS CENTER**

**Introduction**

This Proposed Remedial Action Plan summarizes the Navy's preferred cleanup option for Area A Weapons Center (Site 20) at Naval Submarine Base New London, in accordance with Section 117 of the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**, the law more commonly known as Superfund. Site 20 (Figure 1) is 1 of 25 sites being addressed by the base's Installation Restoration Program. The goal of the Installation Restoration Program is to identify, assess, characterize, and cleanup or control contamination from past operations that does not meet today's environmental standards.

The purpose of this Proposed Remedial Action Plan is to:

- Identify opportunities for and solicit public comment on the proposed recommended cleanup alternative
- Summarize site history, site investigation findings, and results of the human health risk assessment
- Explain the rationale for the selection of the remedial alternative.

This Proposed Remedial Action Plan recommends remedial action for Site 20. Detailed descriptions of Site 20 are provided in the March 1997 (Brown & Root 1997) Phase II **Remedial Investigation<sup>1</sup> (RI)** and March 2000 (EA 2000) **Feasibility Study (FS)** reports which are available in the information repository at the locations identified on Page 7. The RI report concludes that there are unacceptable human health risks; therefore, remedial action is required.

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**CLEANUP PROPOSAL**

*After careful study of Site 20, the Navy proposes the following plan:*

- ✓ **Selective excavation of constituents of concern (COCs) in soil and sediment**
- ✓ **Offsite disposal or asphalt batching of excavated soil and sediment**

1. Text shown in **boldface** is defined in the Glossary.

**WHAT DO YOU THINK?**

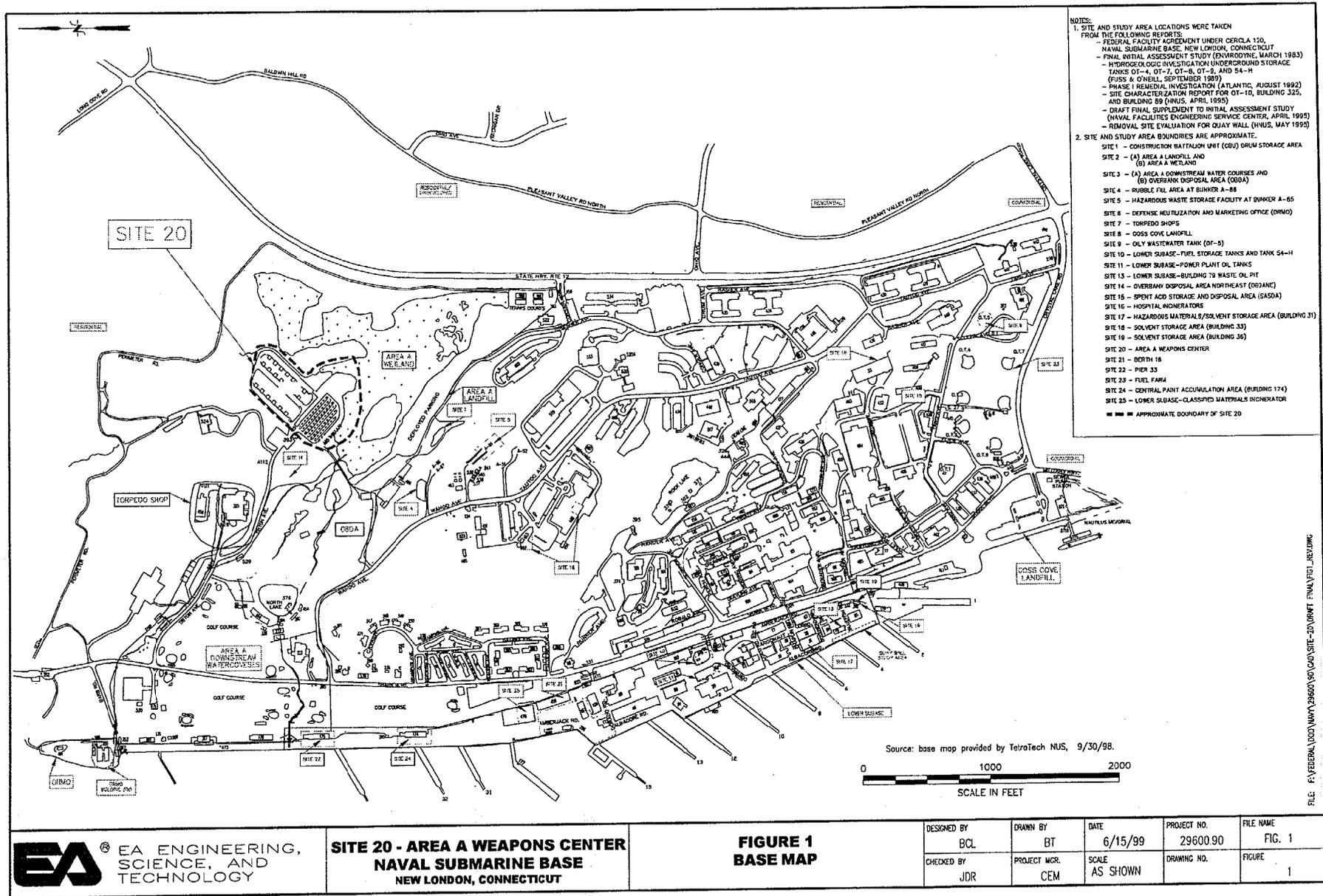
The Navy is accepting public comments on this Proposed Remedial Action Plan from 17 May to 15 June 2000. You do not have to be a technical expert to comment. If you have a comment or a concern, the Navy wants to hear it before making a final decision.

There are two ways to formally register a comment:

1. Offer oral comments during the 23 May 2000, 6:30 p.m. public meeting; or
2. Send written comments postmarked no later than Thursday, 15 June 2000 to:

Mr. Mark Evans, Code 1823/ME  
Northern Division, Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop 82  
Lester, Pennsylvania 19113-2090  
Email: [mdevans@efdnorth.navfac.navy.mil](mailto:mdevans@efdnorth.navfac.navy.mil)

To the extent possible, the Navy will respond to your oral comments during the 23 May 2000 public meeting. In addition, regulations require the Navy to respond to all formal comments in writing. The Navy will review the transcript of the comments received at the meeting, and all written comments received during the formal comment period, before making a final decision and providing a written response to the comments in a document called a **Responsiveness Summary**.



**EA** EA ENGINEERING, SCIENCE, AND TECHNOLOGY

**SITE 20 - AREA A WEAPONS CENTER  
NAVAL SUBMARINE BASE  
NEW LONDON, CONNECTICUT**

**FIGURE 1  
BASE MAP**

DESIGNED BY BCL	DRAWN BY BT	DATE 6/15/99	PROJECT NO. 29600.90	FILE NAME FIG. 1
CHECKED BY JDR	PROJECT MGR. CEM	SCALE AS SHOWN	DRAWING NO.	FIGURE 1

## Site History

The Area A Weapons Center at Naval Submarine Base New London is located in the northeastern portion of the Base, contiguous to the northwestern edge of Area A Wetland and at the southeastern end of Triton Avenue. The Area A Weapons Center consists of Building 524 and the southern bunker area. Building 524 is located near the top of a local topographic and bedrock high. Building 524 was constructed in 1990/1991. Prior to construction, the area was primarily woodlands. Portions of the site were blasted to remove bedrock during construction. The building was historically used for administration, minor torpedo assembly, and storage of simulator torpedoes. Chemicals, including cleaning and lubricating compounds, paints, adhesives, and liquid fuels, were used and stored in relatively small amounts at the site. No impacted soil or **sediment** was identified at Building 524; therefore, this building was not included as part of the Installation Restoration Program at Site 20, or in the FS.

Site 20 consists of the southern area bunkers located southeast and downhill of Building 524 adjacent to the Area A Wetland (Figure 2). The southern bunkers are first evident in aerial photographs from 1969, and the northern area bunker is evident in photographs from 1974 (Brown & Root 1997). The southern bunkers were reconstructed in the mid-1980s, including removal of structurally unsuitable soils (most likely dredge spoils associated with the Area A Wetlands). The bunkers are currently used for the storage of live and simulator torpedoes and missiles. Site 20 also consists of three drainage areas in the southern bunker area, identified as Drainage Areas 1, 2, and 3.

## Findings of the Field Investigations and Summary of Site Risks

The Navy conducted a field investigation in 1997 to assess the type and distribution of **contaminants** at Site 20. A **risk assessment** was performed to evaluate the potential effects of the contamination on human health and the environment.

The investigations at Site 20 included sampling and laboratory analysis of soil, **ground water**, **sediment**, and

surface water. The Phase II RI identified **phthalate esters**, **polycyclic aromatic hydrocarbons**, and metals as the primary **COCs** in soil and **sediment** at Site 20. These chemicals were identified as chemicals of potential concern based on frequency of detection, toxicity, concentration, and mobility and persistence in the environment. The highest concentrations were reported in samples from Drainage Areas 1, 2, and 3.

It is believed that the **source of polycyclic aromatic hydrocarbons** is runoff/discharge from the northern and western portions of Site 20. The Phase II RI (Brown & Root 1997) concluded that **ground water** and surface water at Site 20 are not currently acting as a **source** of contamination for downstream or downgradient locations.

The Phase II RI indicated that there is limited impact to **ground water** and surface water at Site 20 (Brown & Root 1997). The **ground water** at Site 20 will be addressed separately as part of the base-wide **ground-water** operable unit.

A human health **risk assessment** was performed to evaluate the potential hazards of exposure to **COCs** in soil and **ground water** at Site 20. For carcinogens which exceeded U.S. Environmental Protection Agency and Connecticut Department of Environmental Protection risk target levels under future residential use of the site, risk-based cleanup goals were established. Arsenic was detected in excess of risk-based cleanup goals in 2 soil locations. One **polycyclic aromatic hydrocarbon** was detected in excess of risk-based cleanup goals in 1 **sediment** location. No unacceptable non-carcinogenic risks were identified for the full-time employee, construction worker, or future resident for soils or **sediment**. Four **polycyclic aromatic hydrocarbons** were detected in excess of Connecticut's Remediation Standard Regulation for soil in 1 location.

## Summary of Cleanup Alternatives Considered for Site 20

The Navy prepared an FS to evaluate alternatives for Site 20. Table 1 summarizes the remedial alternatives considered in the FS.

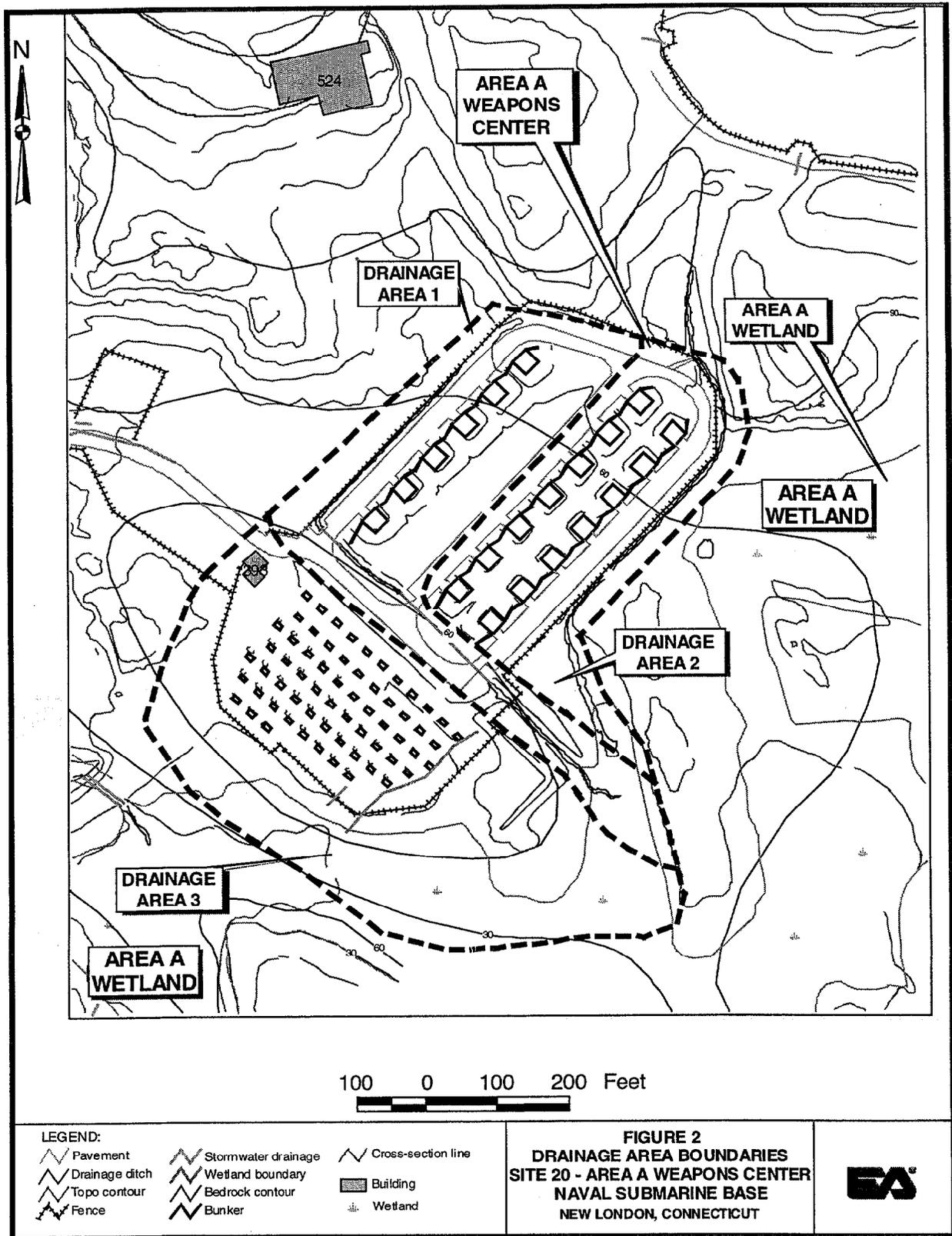


TABLE 1 SUMMARY OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY

Remedial Alternatives	Components	Comment
1. No Action	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• Would not protect human health or the environment.</li> <li>• Does not comply with chemical-specific applicable or relevant and appropriate requirements (ARARs)</li> <li>• Total Cost: \$142,500 (present worth) over a projected 30-year period</li> </ul>
2. Institutional Controls and Monitoring	<ul style="list-style-type: none"> <li>• Environmental Land Use Restriction to prevent exposure to COCs in soil and sediment and to prevent residential use of the site</li> <li>• Tiered monitoring</li> <li>• Five-year reviews</li> </ul>	<ul style="list-style-type: none"> <li>• Would protect human health and the environment</li> <li>• Would not achieve chemical-specific ARARs but would comply with the location-specific and action-specific ARARs</li> <li>• Total Cost: \$258,100 (present worth) over a projected 30-year period</li> </ul>
3a. Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (Industrial Scenario)	<ul style="list-style-type: none"> <li>• Selective excavation of COCs in soil and sediment</li> <li>• Offsite disposal or asphalt batching of excavated soil and sediment</li> <li>• Institutional Controls, Monitoring, and Five-Year Review (industrial land use scenario)</li> </ul>	<ul style="list-style-type: none"> <li>• Would protect human health and the environment</li> <li>• Would achieve chemical-specific ARARs by means of selective excavation of affected soil and sediment</li> <li>• Land would be limited to industrial and/or commercial re-use as per an Environmental Land Use Restriction</li> <li>• May require additional protective measures of compliance</li> <li>• Total Cost: \$217,800 (present worth) assuming the excavated materials are sent offsite for asphalt batching; \$217,700 (present worth) assuming the excavated materials are sent offsite for disposal (landfill)</li> </ul>
3b. Selective Excavation, and Asphalt Batching or Offsite Disposal (Residential Scenario)	<ul style="list-style-type: none"> <li>• Selective excavation of COCs in soil and sediment</li> <li>• Offsite disposal or asphalt batching of excavated soil and sediment</li> </ul>	<ul style="list-style-type: none"> <li>• Would protect human health and the environment</li> <li>• Land would be available for unrestricted re-use</li> <li>• Would achieve chemical-specific ARARs by means of selective excavation of affected soil and sediment</li> <li>• Asphalt batching would satisfy the National Contingency Plan preference for treatment</li> <li>• Total Cost: \$63,300 (present worth) assuming the excavated materials are sent offsite for asphalt batching; \$81,200 (present worth) assuming the excavated materials are sent offsite for disposal (landfill).</li> </ul>

### Alternative Evaluation Criteria

The following is a summary of the nine Superfund-mandated criteria established by the **National Contingency Plan** (Title 40 CFR 300.430[e][g]), used to balance the pros and cons of the remedial alternatives. The FS alternatives have already been evaluated using the first seven criteria. Once comments from the state and the public are received, the alternatives will be compared using the last two criteria, State and Community Acceptance, to select the remedy for Site 20. Table 2 on the following page shows a comparison of each of the remedial alternatives compared to the nine Evaluation Criteria.

1. *Overall protection of human health and the environment*—The alternative should protect human health as well as plant and animal life on and near the site.
2. *Compliance with ARARs*—The alternative should meet all federal and state legally required cleanup levels that are applicable and relevant and appropriate.
3. *Long-term effectiveness and permanence*—The alternative should maintain reliable protection of human health and the environment over time.
4. *Reduction of toxicity, mobility, or volume through treatment*—CERCLA contains the statutory preference that the selected alternative should use treatment to permanently reduce the level of toxicity of contaminants at the site, the spread of contamination away from the source of contamination, or the amount of contamination at the site.
5. *Short-term effectiveness*—The alternative should minimize short-term hazards to workers, residents, or the environment during the implementation of the remedy.
6. *Implementability*—The alternative should be technically feasible, and the materials and services needed to implement the remedy should be readily available.
7. *Cost*—The alternative should provide the necessary protection for a reasonable cost.
8. *State acceptance*—The state environmental agencies should agree with the proposed remedy.
9. *Community acceptance*—The community should agree with the proposed remedy. Community acceptance is based on the comments received during the public meeting and public comment period.

TABLE 2 COMPARISON OF ALTERNATIVES

Alternative	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction in Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness	Implementability	Cost
1 – No Action	Not protective	Does not comply with Connecticut Department of Environmental Protection's Remediation Standard Regulations	Neither effective nor permanent	None	Not applicable	Nothing to implement	\$38,050/5 years <i>Present Worth:</i> \$142,500
2 – Monitoring and Institutional Controls	Protective of human health only	Does not comply with Connecticut Department of Environmental Protection's Pollutant Mobility Criteria or Residential Direct Exposure Criteria	Neither effective nor permanent	None	Concerns cannot be effectively controlled. Remedial action objectives cannot be achieved.	Easier to implement than Alternative 3	<i>Capital:</i> \$12,000 <i>Operations and Maintenance:</i> \$22,550 + \$38,050 per 5-year review <i>Present Worth:</i> \$258,100
3a – Excavation of Soils Exceeding Industrial Standards with Asphalt Batching/Offsite Disposal and Institutional Controls	Protective of human health and the environment	Complies with Connecticut Department of Environmental Protection's Remediation Standard Regulations (except the Residential Direct Exposure Criteria)	Effective and permanent	Treatment achieved only if <b>asphalt batching</b> is conducted	Concerns can be effectively controlled. Remedial action objectives can be achieved in 6 months.	Equipment readily available	<i>Capital:</i> \$32,404 <i>Operations and Maintenance:</i> \$15,275 + \$30,775 per 5-year review <i>Present Worth</i> Landfill: \$217,700 Asphalt Batching: \$217,800
3b – (Preferred Remedy) Excavation of Soils Exceeding Residential Standards with Asphalt Batching/Offsite Disposal	Protective of human health and the environment	Complies with Connecticut Department of Environmental Protection's Remediation Standard Regulations	Effective and permanent	Treatment achieved only if <b>asphalt batching</b> is conducted	Concerns can be effectively controlled. Remedial action objectives can be achieved in 6 months	Equipment readily available	<i>Capital:</i> \$63,312 <i>Operations and Maintenance:</i> \$0 <i>Present Worth</i> Landfill: \$63,300 Asphalt Batching: \$81,200

**The Navy's Proposed Remedy**

The Navy's proposed remedy for Site 20 is Remedial Alternative 3b: Selective Excavation, and Asphalt Batching or Offsite Disposal of soils and sediments above risk-based cleanup goals.

Based on the locations and depths of COCs in soil/sediment, it is anticipated that a total of approximately 199 cubic yards of soil/sediment would be removed under Alternative 3b to achieve compliance with this alternative's cleanup goals for soil and sediment under the future residential land use scenario. Cleanup goals for Site 20 are shown in the following table:

Soil Cleanup Goals for the Area A Weapons Center		
Constituent	Concentration	Criteria
Arsenic	9.62 ppm	Risk-based
Benz(a)anthracene	1.0 ppm	Connecticut regulations
Benzo(a)pyrene	1.0 ppm	Connecticut regulations
Benzo(b)fluoranthene	1.0 ppm	Connecticut regulations
Dibenz(a,h)anthracene	2.04 ppm	Risk-based
Chrysene	1.0 ppm	Connecticut regulations

The excavated materials will be either disposed of in an approved offsite waste acceptance facility, or will be used as a material component in asphalt batching. Asphalt batching is a treatment technology where soils are mixed with asphalt and heated to form a stable solid which will immobilize the chemical contaminants. The asphalt can then be used to pave roads, parking lots, etc. Final determination will be made during implementation of the Record of Decision. The preferred alternative is asphalt batching and will be pursued, if available.

The selected remedy complies with seven of the nine Superfund mandated criteria in that removal of contaminated soil is protective of human health and the environment; complies with ARARs; is permanent; utilizes alternative treatment technologies; significantly reduces the toxicity, mobility, and volume of contaminants; and is cost effective. Compliance with the remaining two criteria, State Acceptance and Community Acceptance, will be assessed based upon comments received on this Proposed Remedial Action Plan.

**The Public's Role in Remedy Selection**

Community input is integral to the selection process. The Navy and regulatory agencies will consider all comments in selecting the remedial action prior to signing the Record of Decision. The public is encouraged to participate in the decision-making process. This Proposed Remedial Action Plan for Site 20 is available for review, along with supplemental documentation, at the following locations:

- Groton Public Library  
52 Newton Road  
Groton, Connecticut 06340  
**Hours:**  
Mon.-Thurs.: 9:00 a.m.-9:00 p.m.  
Fri.: 9:00 a.m.-5:30 p.m.  
Sat.: 9:00 a.m.-5:00 p.m.  
Sun.: noon-6:00 p.m.  
(860) 441-6750

- Bill Library  
718 Colonel Ledyard Highway  
Ledyard, Connecticut 06339  
**Hours:**  
Mon.-Thurs.: 9:00 a.m.-9:00 p.m.  
Fri. and Sat.: 9:00 a.m.-5:00 p.m.  
Sun.: 1:00 p.m.-5:00 p.m.  
(860) 464-9912

For further information, please contact:

- Ms. Darlene Ward, Installation Restoration Manager  
Naval Submarine Base New London  
Environmental Department, Building 166  
Groton, Connecticut 06349-5100  
(860) 694-4256  
email: wardda@subasenlon.navy.mil
- Ms. Kimberlee Keckler, Remedial Project Manager  
U.S. Environmental Protection Agency  
1 Congress Street, Suite 1100 (HBT)  
Boston, Massachusetts 02114-2023  
(617) 918-1385  
email: keckler.kimberlee@epa.gov
- Mr. Mark Lewis, Environmental Analyst 3  
Connecticut Department of Environmental Protection  
Water Management Bureau  
Permitting, Enforcement, and Remediation Division  
79 Elm Street  
Hartford, Connecticut 06106-5127  
(860) 424-3768  
email: mark.lewis@po.state.ct.us

**Glossary of Technical Terms**

**Applicable or Relevant and Appropriate Requirements (ARARs)**—The federal and state environmental rules, regulations, and criteria which must be met by the selected remedy under Superfund.

**Asphalt Batching**—A treatment technology where soils are mixed with asphalt and heated to form a stable soil which will immobilize the chemical contaminants.

**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**—A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Act created a trust fund, known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous substance facilities.

**Constituents of Concern (COCs)**—Chemical contaminants identified which pose a potential threat to human health or the environment based on frequency of detection, toxicity, concentration, and mobility and persistence in the environment.

**Contaminants**—Any physical, biological, or radiological substance or matter that, at a certain concentration, could have an adverse effect on human health and the environment.

**Excavation**—Earth removal with construction equipment such as backhoe, trencher, front-end loader, etc.

**Feasibility Study (FS)**—A report that presents the development, analysis, and comparison of remedial alternatives.

**Ground Water**—Water found beneath the earth's surface. Ground water may transport substances that have percolated downward from the ground surface as it flows towards its point of discharge.

**National Contingency Plan**—U.S. Environmental Protection Agency's list of the nation's top priority hazardous substance facilities that may be eligible to receive Federal money for response under CERCLA.

**Phthalate Esters**—Organic chemicals associated with plastics manufacturing.

**Polycyclic Aromatic Hydrocarbons**—Organic chemicals associated with the decomposition of gasoline/diesel type fuels.

**Present Worth**—Cost of a long-term project in today's dollars.

**Record of Decision**—An official document that describes the selected Superfund remedy for a site. The Record of Decision documents the remedy selection process and is issued by the Navy and U.S. Environmental Protection Agency following the public comment period, with concurrence from the Connecticut Department of Environmental Protection.

**Remedial Investigation (RI)**—A report which describes the site, documents the type and distribution of contaminants detected at the site, and presents the results of the risk assessment.

**Responsiveness Summary**—A summary of written and oral comments received during the public comment period, together with Navy and U.S. Environmental Protection Agency responses to these comments.

**Risk Assessment**—Evaluation and estimation of the current and potential future risk for adverse human health or environmental effects from exposure to contaminants.

**Sediment**—Sediment consists of soil, sand, and minerals occurring in a stream channel, pond, or other body of water.

**Source**—Area(s) of a site where contamination originates.

**Tiered Monitoring**—A tiered monitoring program consists initially of sampling soil and sediments on an annual basis. Once baseline conditions have been established, the number of sample locations and the frequency of sampling may be decreased.

## References

EA Engineering, Science, and Technology. 2000. Draft Final Feasibility Study, Site 20 – Area A Weapons Center, Naval Submarine Base, New London, Groton, Connecticut. March.

Brown & Root Environmental. 1997. Phase II Remedial Investigation for Naval Submarine Base, New London, Groton, Connecticut. Wayne, Pennsylvania. March.

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**COMMENT SHEET - Proposed Remedial Action Plan for  
Site 20 – Area A Weapons Center**

You may use this form to send in your written comments on this Proposed Remedial Action Plan. Please send your comments to the address shown below **postmarked no later than 14 June 2000.**

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Affix  
Postage

Mr. Mark Evans  
Northern Division  
Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop 82  
Lester, PA 19113-2090