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IMPLEMENTATION PLAN NAVY ENVIRONMENTAL LEADERSHIP PROGRAM TECHNOLOGY DEMONSTRATION OF THERMAL DESORPTION OF SLUDGE AND SOIL AT SOLID WASTE MANAGEMENT UNITS 6 AND 7 NS MAYPORT FL

2/1/1996

ABB ENVIRONMENTAL SERVICES

IMPLEMENTATION PLAN
NAVY ENVIRONMENTAL LEADERSHIP PROGRAM
TECHNOLOGY DEMONSTRATION FOR THERMAL DESORPTION OF SLUDGE AND SOIL AT SOLID WASTE MANAGEMENT UNITS 6 AND 7

U.S. NAVAL STATION
MAYPORT, FLORIDA

Unit Identification Code: N60201

Contract No. N62467-89-D-0317/028

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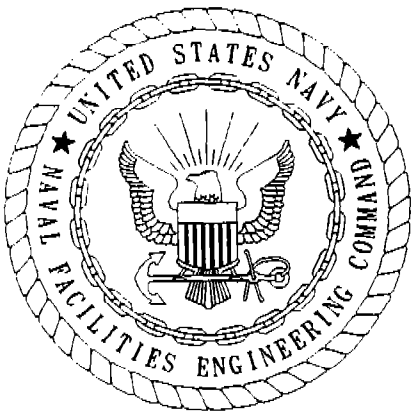
February 1996



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/028 are complete and accurate and comply with all requirements of this contract.

DATE: February 23, 1996

NAME AND TITLE OF CERTIFYING OFFICIAL: Terry Hansen, P.G.
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Frank K. Lesesne, P.G.
Project Technical Lead

(DFAR 252.227-7036)

This document Implementation Plan Navy Environmental Leadership Program Technology Demonstration for Thermal Desorption of Sludge and Soil at Solid Waste Management Units 6 and 7, U.S. Naval Station, Mayport, Florida has been prepared under the direction of a Florida Registered Professional Geologist. The implementation plan rendered in this document was developed in accordance with commonly accepted procedures consistent with applicable standards of practice. The implementation plan is a guide for ABB-Environmental Services, Inc. personnel to collect samples and evaluate the demonstration of thermal desorption of sludge and soil at SWMUs 6 and 7 by Southwest Soil Remediation, Inc.

If site conditions are determined to exist that differ from those described, or the technology demonstration is modified from what is described in the implementation plan, the undersigned geologist should be notified to evaluate the effects of any additional information on the proposed sampling plan presented in this document. This document was prepared for U.S. Naval Station, Mayport, Florida, and should not be construed to apply to any other site.

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Professional Geologist
State of Florida License No. 1020

Date: 27 Feb 96

FOREWORD

In order to meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense (DOD) initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA). The acts, passed by Congress in 1980 and 1986, respectively, established the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities. These acts are the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Navy Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adapted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages.

- The preliminary assessment (PA) identifies potential sites through record searches and interviews.
- A site inspection (SI) then confirms which areas contain contamination, constituting actual "sites." (Together, the PA and SI steps were called the initial assessment study (IAS) under the Navy's old NACIP program.)

- Next, the remedial investigation and the feasibility study (RI/FS) together determine the type and extent of contamination, establish criteria for cleanup, and identify and evaluate any necessary remedial action alternatives and their costs. As part of the RI/FS, a Risk Assessment identifies potential effects on human health or the environment in order to help evaluate remedial action alternatives.

- The selected alternative is planned and conducted in the remedial design and remedial action stages. Monitoring then ensures the effectiveness of the effort.

A second program to address present hazardous material management is the Resource Conservation and Recovery Act (RCRA) Corrective Action program. This program is designed to identify and clean up releases of hazardous substances at RCRA-permitted facilities. RCRA is the law that ensures that solid and hazardous wastes are managed in an environmentally sound manner. The law applies primarily to facilities that generate or handle hazardous waste.

This program is conducted in three stages.

- The RCRA facility assessment (RFA) identifies solid waste management units (SWMUs), evaluates the potential for releases of contaminants, and determines the need for future investigations.

- The RCRA facility investigation (RFI) then determines the nature, extent, and fate of contaminant releases.

- The corrective measures study (CMS) identifies and recommends measures to correct the release.

The hazardous waste investigations at Naval Station Mayport are presently being conducted under the RCRA Corrective Action program. Earlier preliminary investigations had been conducted at Naval Station Mayport under the Navy's old NACIP program and IR program following Superfund guidelines. In 1988, in coordination with the U.S. Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP), the hazardous waste investigations were formalized under the RCRA program.

Naval Station Mayport is conducting the cleanup at their facility by working through the Southern Division, Naval Facilities Engineering Command (SOUTHNAVFAC-ENGCOM). The USEPA and the FDEP oversee the Navy environmental program. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the RCRA program at Naval Station Mayport should be addressed to Mr. David Driggers, Code 1852, at (803) 743-0501.

EXECUTIVE SUMMARY

As part of the Navy Environmental Leadership program (NELP), the Navy has contracted for a technology demonstration of low temperature thermal desorption of petroleum-contaminated soil at Naval Station Mayport. The demonstration will be performed at Solid Waste Management Units 6 and 7, the Waste Oil Pit and Sludge Drying Beds. Target treatment levels are set according to Florida Administrative Code (FAC) 62-775, Thermal Treatment Facilities for Petroleum Contaminated Soil.

ABB Environmental Services, Inc., will collect baseline and performance evaluation samples of the soil and prepare a technology evaluation report describing the demonstration and its effectiveness.

TABLE OF CONTENTS

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

LIST OF FIGURES

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

LIST OF TABLES

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
BTEX	benzene, toluene, ethylbenzene, xylene
CAO	corrective action objective
CLP	Contract Laboratory program
CMS	corrective measures study
ESI	expanded site investigation
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
HSWA	Hazardous and Solid Waste Amendments
IAS	initial assessment study
LNAPL	light nonaqueous-phase liquid
LTTD	low temperature thermal desorption
NAVSTA	Naval Station
NEESA	Naval Energy and Environment Support Activity
NELP	Navy Environmental Leadership program
NIRP	Navy Installation Restoration program
OWTP	oily waste treatment plant
PAH	polynuclear aromatic hydrocarbon
ppm	parts per million
RAM	responsibility assignment matrix
RAP	remedial action plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA facility assessment
RFI	RCRA facility investigation
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SSR	Southwest Soil Remediation, Inc.
SWMU	solid waste management unit
TRPH	total recoverable petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
VOH	volatile organic halocarbon

1.0 INTRODUCTION

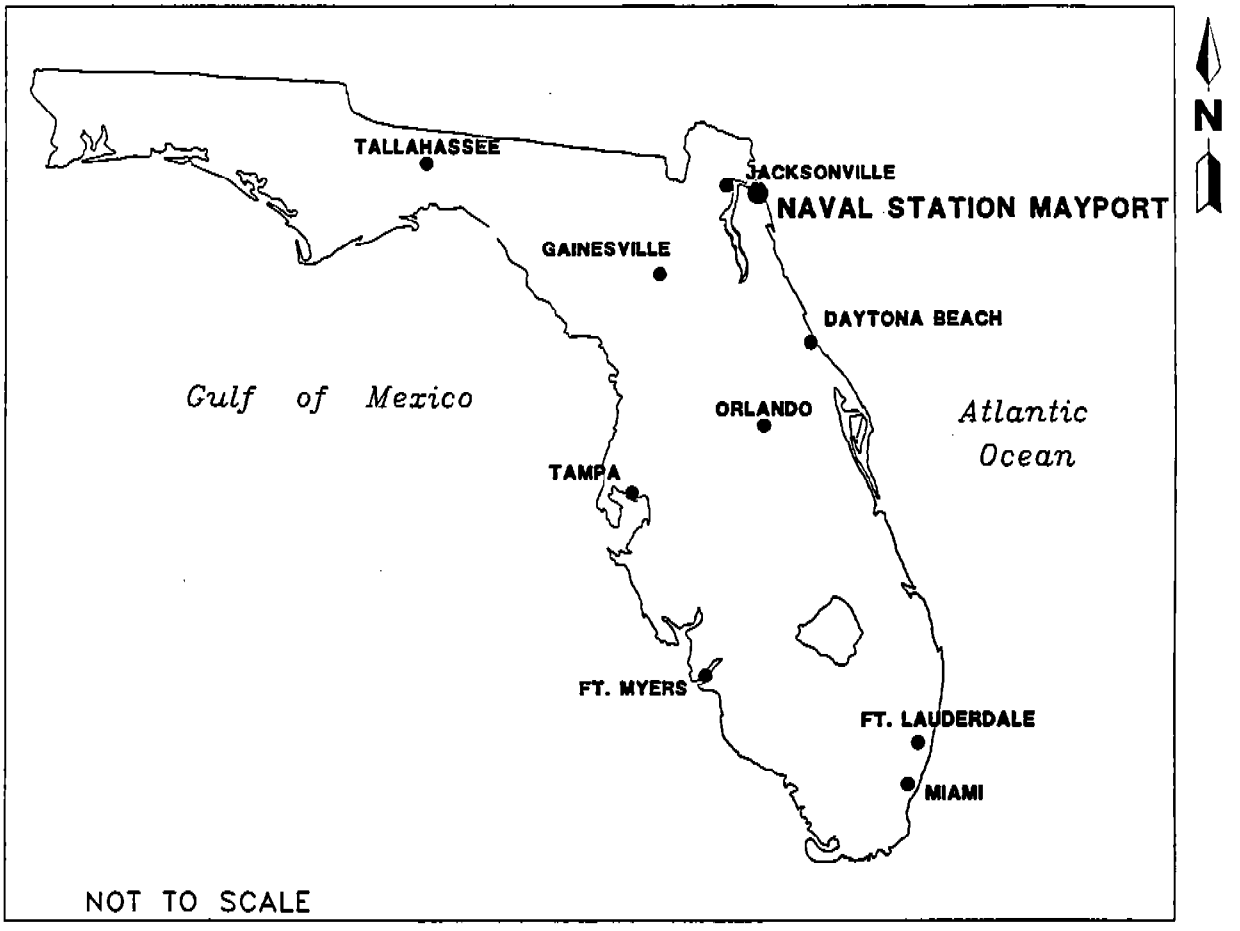
A technology demonstration is being conducted under the Navy Environmental Leadership program (NELP) for thermal desorption of sludge and soil containing petroleum and related organic compounds at Solid Waste Management Units (SWMUs) 6 and 7 at Naval Station (NAVSTA) Mayport, Mayport, Florida (Figures 1-1 and 1-2). NELP was created to promote the use of new and innovative technologies in the areas of compliance, conservation, cleanup, and pollution prevention within the Navy. NAVSTA Mayport was selected to participate in NELP because activities at this station are representative of similar activities at other naval stations.

ABB Environmental Services, Inc. (ABB-ES), has been contracted by the Department of the Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to provide technical oversight for the technology demonstration at SWMUs 6 and 7. This implementation plan was prepared to outline and describe activities and responsibilities necessary for technical oversight of the technology demonstration.

1.1 PURPOSE OF IMPLEMENTATION PLAN. This implementation plan includes the following activities:

- an overview of SWMUs 6 and 7, including summaries of site history, definition of areas where sludge and soil contain petroleum and related organic compounds, and identification of treatment levels;
- identification of the roles and responsibilities for implementation of the technology demonstration;
- a description of technical oversight activities to be performed by ABB-ES;
- an overview of the technology evaluation report to be prepared by ABB-ES upon completion of the technology demonstration; and
- a schedule of activities for the technology demonstration.

1.2 REGULATORY HISTORY FOR SWMUs 6 AND 7. SWMU 6 (Waste Oil Pit) is located beneath the westernmost sludge drying bed (SWMU 7) of the oily waste treatment plant (OWTP) (Figure 1-3). Historical information concerning the operation of SWMUs 6 and 7 was obtained from the Resource Conservation and Recovery Act (RCRA) facility assessment (RFA) conducted by A.T. Kearney in 1989 on behalf of the U.S. Environmental Protection Agency (USEPA). SWMU 6 was operated in the 1970s as an unlined pit for bilge water that contained oily wastes. The pit was excavated to a depth of approximately 6 feet beneath the land surface. Bilge water was pumped directly from the ships berthed at Mayport Turning Basin into the pit. Waste oil placed in SWMU 6 may have contained other substances such as solvents and transformer oils. Bilge water or oily wastes placed in SWMU 6 seeped into the underlying soils. Estimates indicate that over 250,000 gallons of bilge water and several thousand gallons of waste oil were disposed of in the pit (A.T. Kearney, 1989). In 1979, SWMU 6 was filled and covered; the western most sludge



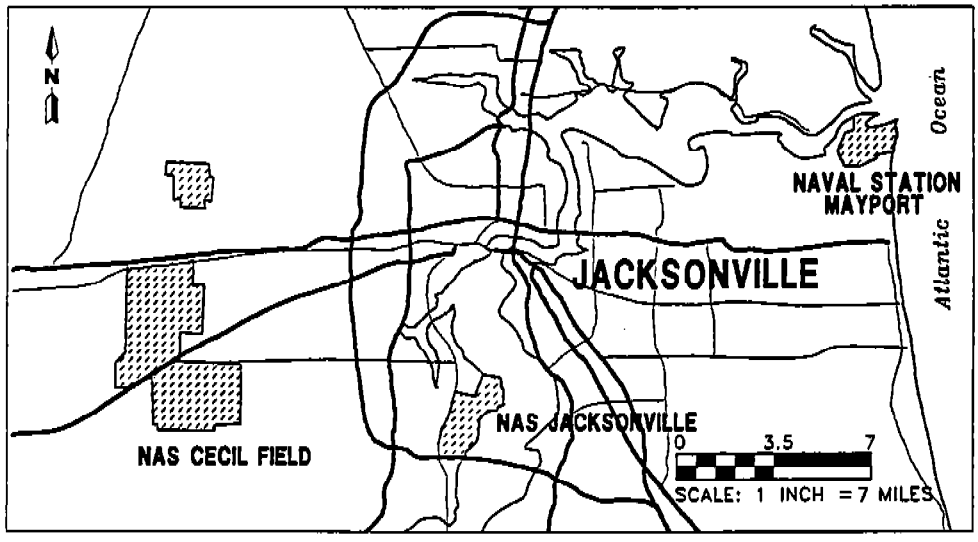


FIGURE 1-1
FACILITY LOCATION MAP

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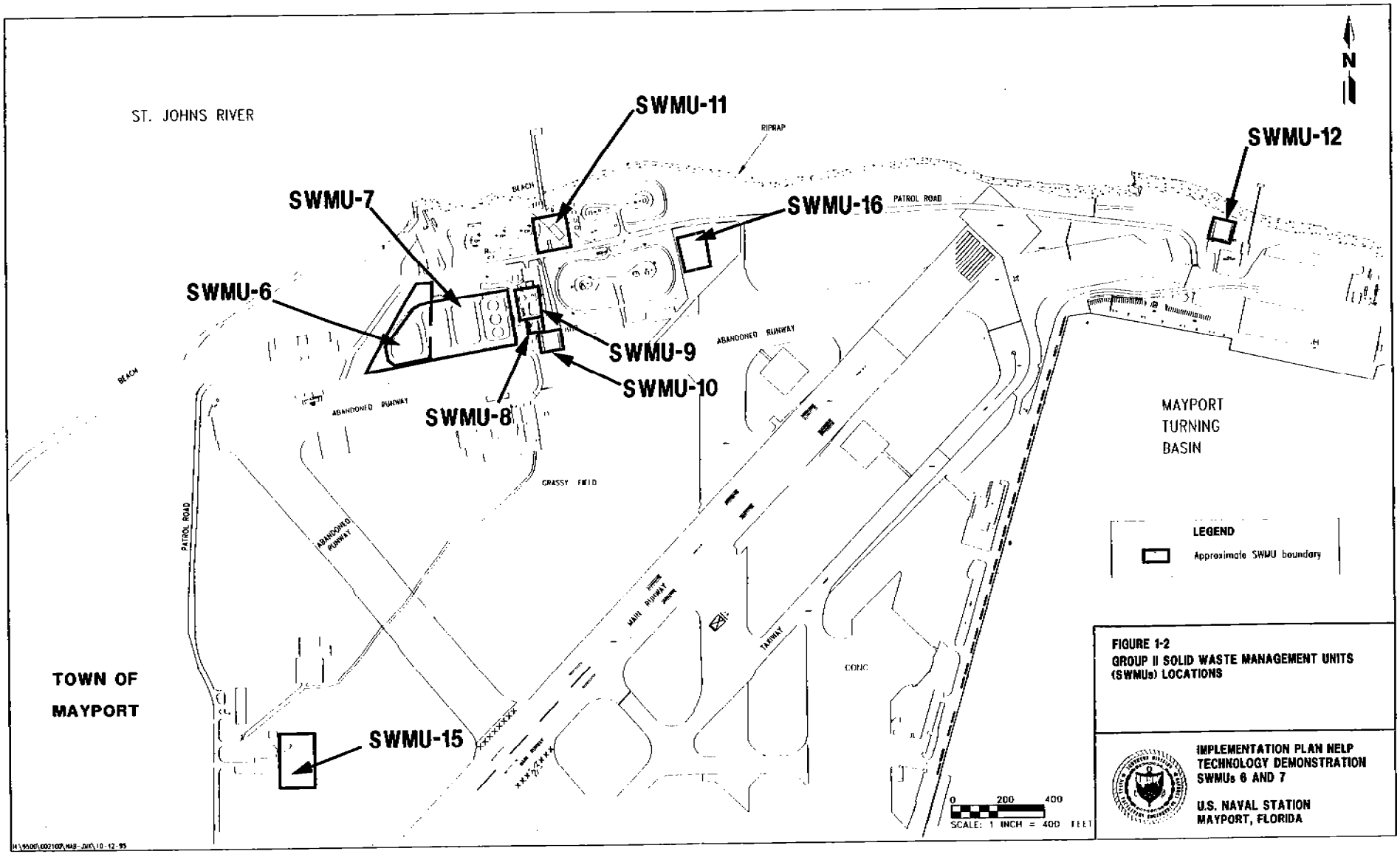
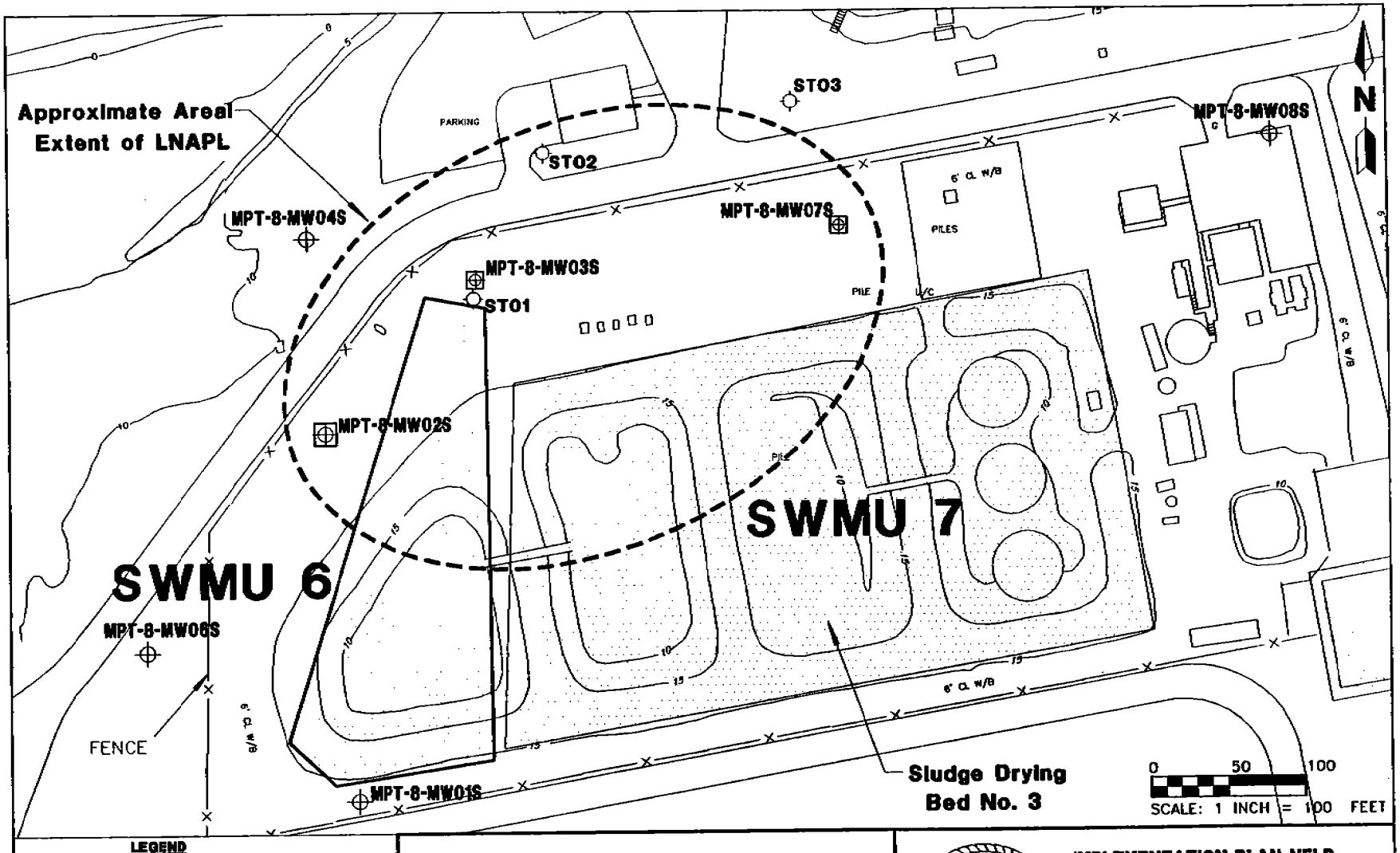
IMPLEMENTATION PLAN
NELP TECHNOLOGY DEMONSTRATION

U.S. NAVAL STATION MAYPORT, FLORIDA


ST. JOHNS RIVER
SWMU-11
RIPRAP
SWMU-12
SWMU-7
SWMU-16
PATROL ROAD
SWMU-6
SWMU-9
SWMU-10
SWMU-8
BEACH
ABANDONED RUNWAY
GRASSY FIELD
MAYPORT
TURNING
BASIN
PATROL ROAD
ABANDONED RUNWAY
MAIN RUNWAY
TAXIWAY
CONC
TOWN OF
MAYPORT
SWMU-15
N
LEGEND
Approximate SWMU boundary
0 200 400
SCALE: 1 INCH = 400 FEET
FIGURE 1-2
GROUP II SOLID WASTE MANAGEMENT UNITS
(SWMUs) LOCATIONS
IMPLEMENTATION PLAN NELP
TECHNOLOGY DEMONSTRATION
SWMUs 6 AND 7
U.S. NAVAL STATION
MAYPORT, FLORIDA



LEGEND

- Approximate SWMU location
- MPT-8-MW04S — Monitoring well location and designation
- MPT-8-MW03S — Monitoring well and designation containing LNAPL
- STO1 — Recovery sump location and designation

FIGURE 1-3
SOLID WASTE MANAGEMENT UNITS (SWMUs) 6 AND 7
GENERAL SITE FEATURES

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IMPLEMENTATION PLAN NELP TECHNOLOGY DEMONSTRATION (SWMUs) 6 AND 7

U.S. NAVAL STATION MAYPORT, FLORIDA

drying bed at SWMU 7 was constructed over the central and southern part of SWMU 6 (Figure 1-3) (A.T. Kearney, 1989).

SWMU 7 was constructed to receive sludge from the OWTP. Each bed is about 150 feet in length and 50 feet wide, unlined, and enclosed by an earthen berm. Sludge received by SWMU 7 was generated by the clarifier for the OWTP (SWMU 9) and from two bilge water receiving tanks that comprise SWMU 51. When these two holding tanks were at capacity, bilge water overflow was pumped directly into the sludge drying beds. Anecdotal information suggests that the drying beds received approximately 3,000 gallons of sludge a week while the OWTP was in operation (A.T. Kearney, 1989). Figure 1-3 shows the location and general features of SWMUs 6 and 7.

An initial assessment study (IAS), conducted as part of the Navy Installation Restoration program (NIRP), identified SWMU 6 as a NIRP site based on the potential for the bilge water to have been released to the environment and recommended an expanded site investigation (ESI) (ESE, 1986). SWMU 7 was not identified as a NIRP site. An ESI was conducted in 1988 for SWMU 6, which included the collection of soil and groundwater samples. During the ESI, light nonaqueous-phase liquid (LNAPL), related to petroleum products, was found on the water table hydraulically downgradient of SWMU 6 (E.C. Jordan, 1988). Both SWMUs 6 and 7 were identified in the Hazardous and Solid Waste Amendments (HSWA) permit for NAVSTA Mayport as requiring an RCRA facility investigation (RFI).

An RFI was completed for SWMUs 6 and 7 in 1994 (ABB-ES, 1995a). The results of the RFI for SWMUs 6 and 7 suggest that petroleum-related products have been released at these SWMUs and are contributing to the LNAPL hydraulically downgradient of the SWMUs. SWMU 6 was identified as the primary source of the LNAPL, as petroleum was often released directly to the unlined waste oil pit.

A corrective measures study (CMS) for SWMUs 6 and 7 identified one corrective action objective (CAO) for sludge and soil: "Eliminate petroleum-contaminated sludge and soil at SWMUs 6 and 7 that contributes to the presence of LNAPL" (ABB-ES, 1995b). During the selection and evaluation of corrective action alternatives for the CMS, the NELP technology demonstration was taken into consideration. The CMS evaluated technologies for petroleum-containing sludge and soil that would not be treated through the NELP program, because the funding available through NELP would only allow for about 10 percent of the sludge and soil at SWMUs 6 and 7 to be treated.

1.3 TARGET TREATMENT LEVELS FOR SLUDGE AND SOIL CONTAINING PETROLEUM-RELATED PRODUCTS AT SWMUs 6 AND 7. Because remedial activities were planned at SWMUs 6 and 7, a human health and ecological risk assessment for exposure to sludge and soil was not conducted; therefore, no remedial goal options were selected.

Target treatment levels selected in the CMS for sludge and soil containing petroleum-related products at SWMUs 6 and 7 were based on the FDEP regulation, Thermal Treatment Facilities for Petroleum Contaminated Soil, Florida Administrative Code (FAC) 62-775. This regulation provides treatment standards for soil containing petroleum-related products when thermal treatment is used (ABB-ES, 1995b). Table 1-1 shows the treatment levels that thermal treatment must achieve based on FAC 62-775.

Table 1-1
Target Treatment Levels for SWMUs 6 and 7 Sludge and Soil

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

Constituent	Target Treatment Level (ppm)[1]
Total recoverable petroleum hydrocarbons (TRPH)[2]	50
Volatile organic aromatics (BTEX)	0.1
Volatile organic halocarbon (VOH)	0.05
Polynuclear aromatic hydrocarbons (PAHs)	1.0
Arsenic	10
Barium	4,940
Cadmium	37
Chromium	50
Lead	108
Mercury	23
Selenium	389
Silver	353

[1] Treatment levels are specified in the Florida Administrative Code (FAC), 62-775.
[2] If TRPH is below 10 parts per million (ppm), PAHs and VOHs do not have to meet the target treatment levels listed in this table, as per FAC 62-775.

Notes: BTEX = benzene, toluene, ethylbenzene, and xylene.
SWMU = solid waste management unit.

1.4 VOLUME OF SLUDGE AND SOIL CONTAINING PETROLEUM-RELATED PRODUCTS AT SWMU 6 AND 7. The volume of sludge and soil containing petroleum-related products was calculated as part of the CMS. Appendix A provides detailed information on these calculations. In summary, the volume of sludge and soil containing petroleum-related products at SWMUs 6 and 7 was calculated using the following assumptions:

- Sludge and soil in the vadose zone at the sludge drying beds is contaminated with petroleum hydrocarbons.
- Soil berms surrounding the sludge drying beds are not contaminated.
- SWMU 6 was backfilled with clean soil to a depth of 3 feet and, therefore, is not contaminated (except where SWMU 7 overlaps).
- Sludge disposed of in the easternmost sludge drying bed was excavated and placed in the adjacent sludge drying bed during construction of the load equalization tanks in 1989. Therefore, the easternmost sludge drying bed is not contaminated.
- One sump, for recovery of LNAPL, has been installed in the northern section of SWMU 6. Therefore, soil in this area has already been excavated.

The total volume of sludge and soil containing petroleum-related products at SWMUs 6 and 7 was estimated to be 29,800 cubic yards or approximately 35,200 tons (ABB-ES, 1995b).

2.0 PROPOSED NELP ACTIVITIES FOR SWMUs 6 AND 7

Through NELP, the Navy proposes to demonstrate low temperature thermal desorption (LTTD) of sludge and soil containing petroleum-related products at SWMUs 6 and 7. Southwest Soil Remediation, Inc. (SSR), has been contracted by the Navy to perform this demonstration.

SSR will excavate approximately 2,700 tons (two batches of 1,350 tons) of sludge and soil containing petroleum-related products from the SWMU 7 sludge drying beds and stockpile this sludge and soil less than 50 feet from the mobile LTTD unit. The stockpile will be contained in a bermed area lined with plastic. The berm will be constructed to store 2,000 tons of soil and will be made of clean soil excavated from the top of the SWMU 7 berms. The sludge and soil will be sampled prior to treatment in order to evaluate the concentration of total recoverable petroleum hydrocarbons (TRPH) in the sludge and soil to be put through the LTTD unit.

An initial small-scale treatability test of the LTTD unit will be run using approximately 100 tons of the contaminated sludge and soil and operating the unit for 12 hours a day. Soil will be tested in batches of 20 tons to ensure that the unit will produce soil meeting target treatment levels. Based on operating parameters determined by SSR from the initial treatability test, the LTTD unit will then be operated full scale (24 hours/day), and treatment of the 2,600 tons of remaining soil and retreating of any of the treatability testing soil, if necessary, will occur (SSR, 1995). The treated soil will be placed by SSR in an area designed to hold 1,500 tons. The treated soil will be stored as individual 100-ton stock piles until treatment is confirmed by chemical analysis. SSR will take soil samples to monitor the performance of their technology and to meet the requirements of FAC 62-775.

3.0 IMPLEMENTATION OF NELP TECHNOLOGY FOR SWMUs 6 AND 7

This chapter includes an overview of the activities necessary for implementation of the technology, the oversight activities to be conducted by ABB-ES, the sampling and analysis program, and how analytical results will be evaluated upon completion of the technology demonstration.

3.1 OVERVIEW OF ACTIVITIES FOR IMPLEMENTATION. As a part of implementing the NELP technology demonstration, the following activities are planned.

- SSR submits a final remedial action plan (RAP) for the technology demonstration.
- ABB-ES submits a final implementation plan for the technology demonstration.
- SSR RAP and ABB-ES implementation plan are approved by SOUTHNAVFACENGCOM, Florida Department of Environmental Protection (FDEP), and USEPA.
- Sludge and soil containing petroleum-related products will be excavated and sampled by SSR prior to and during the technology demonstration to meet the requirements of FAC 62-775.
- Technology demonstration occurs (as described in the SSR RAP).
- Baseline and performance evaluation soil samples are collected by ABB-ES and analyzed to assess the effectiveness of the technology demonstration in achieving target treatment levels.
- A technology evaluation report is prepared by ABB-ES describing the implementation and results of the technology demonstration.

A responsibility assignment matrix (RAM) outlines the activities necessary for the technology demonstration and identifies the parties who have lead, support, review, or approval responsibility (Table 3-1).

3.2 TECHNICAL OVERSIGHT OF TECHNOLOGY DEMONSTRATION. ABB-ES will provide technical oversight of the technology demonstration contractor, SSR. ABB-ES will be onsite during the technology demonstration to observe the contractor's activities, including:

- site preparation,
- construction,
- operation and maintenance activities, and
- the administration of any ancillary equipment or services to evaluate the technology (e.g., air monitoring or laboratory analytical services).

Table 3-1
Responsibility Assignment Matrix

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

Task	ABB-ES	SSR	SOUTHNAV-FACENGCOM	Activity	FDEP	USEPA
Provide technology demonstration workplan (RAP)	Review	Lead	Approval	Review	Approval	Approval
Provide implementation plan	Lead	Information	Approval	Review	Approval	Approval
Perform baseline sludge and soil sampling	Lead	Support	Support	Support	--	--
Implement technology demonstration	Support	Lead	Support	Support	--	--
Implement performance evaluation sampling	Lead	Support	Support	Support	--	--
Technology evaluation report	Lead	Support	Approval	Review	Approval	Approval

Notes: SWMU = solid waste management unit.
ABB-ES = ABB Environmental Services, Inc.
SSR = Southwest Soil Remediation, Inc.
SOUTHNAVFACENGCOM = Southern Division, Naval Facilities Engineering Command.
Activity = Naval Station, Mayport.
FDEP = Florida Department of Environmental Protection.
USEPA = U. S. Environmental Protection Agency.
RAP = remedial action Plan.
– = not applicable.

ABB-ES will collect sludge and soil samples as outlined in Section 3.3. Oversight activities and sludge and soil sample analytical results will be described in a technology evaluation report (see Section 3.4).

3.3 SAMPLING AND ANALYSIS PROGRAM. The methodology for sludge and soil sample collection will be consistent with standard operating procedures described in the NAVSTA Mayport RFI workplan (ABB-ES, 1991), the NAVSTA Mayport general information report (ABB-ES, 1995c), and USEPA Region IV standard operating procedures (USEPA, 1991). The sludge and soil samples will be shipped to the laboratory by express-overnight delivery under the chain-of-custody protocol.

As a part of the technology demonstration for SWMUs 6 and 7, sludge and soil samples will be collected by ABB-ES and analyzed by a NEESA-approved laboratory. The analytical results will be evaluated to assess whether the technology demonstration, performed by SSR, has achieved target treatment levels. SSR will be collecting sludge and soil samples before, during, and after the NELP technology demonstration independent of the sampling to be conducted by ABB-ES.

Baseline and performance sludge and soil samples will be collected prior to and upon completion, respectively, of the technology demonstration to assess whether thermal desorption has achieved target treatment levels. Table 3-2 provides a summary of the sampling and analysis program. The following provides the rationale for collection and analysis of sludge and soil samples during the technology demonstration.

3.3.1 Baseline Sampling of Sludge and Soil All sludge and soil to be treated must be sampled to quantify the concentrations of petroleum and related constituents entering the thermal treatment unit. FAC 62-775 requires sludge and soil entering a thermal treatment unit be analyzed for volatile organic aromatics (benzene, toluene, ethylbenzene, and xylene [BTEX]), TRPH, volatile organic halocarbons (VOHs), and metals (total).

Sludge and soil to be treated will be excavated and stockpiled onsite. Based on FAC 62-775, five composite samples must be collected for the first 1,400 tons of soil to be treated and an additional composite sample for each 700 tons thereafter (FDEP, 1992). SSR proposes to treat approximately 2,700 tons of sludge and soil. Therefore, seven composite samples are necessary (MPT-7-CS01 through MPT-7-CS07). Each composite sample will consist of four discreet samples taken from locations randomly distributed throughout the composite sampling area at a minimum depth of 6 inches below the surface of the sludge and soil stockpile. Appendix B shows the calculation for determining the number of sludge and soil samples. The total number of samples to be collected is summarized as follows:

- seven composite sludge and soil samples will be collected, and
- four grab samples will be collected per composite.

The composite samples will be analyzed for volatile organic aromatics (BTEX), TRPH, VOHs, and metals (total) using the testing methods listed in Table 3-3.

3.3.2 Performance Evaluation Sampling of Treated Sludge and Soil During the technology demonstration, SSR will collect samples of treated sludge and soil exiting the LTTD unit to evaluate the operation of the LTTD and to ensure that the treated sludge and soil meets the requirements of FAC 62-775. Treated soil

Table 3-2
Sampling and Analysis Program

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

Sample Number	Sample Depth (feet)	Purpose	Analytical Parameters and Methods[1]
MPT-7-CS01	> 0.5	Baseline	Table 3-3
MPT-7-CS02	> 0.5	Baseline	Table 3-3
MPT-7-CS03	> 0.5	Baseline	Table 3-3
MPT-7-CS04	> 0.5	Baseline	Table 3-3
MPT-7-CS05	> 0.5	Baseline	Table 3-3
MPT-7-CS06	> 0.5	Baseline	Table 3-3
MPT-7-CS07	> 0.5	Baseline	Table 3-3
MPT-7-CS07D	0.5	QA/QC - Baseline	Table 3-3
MPT-7-CS07MS	0.5	QA/QC - Baseline	Table 3-3
MPT-7-CS07MSD	0.5	QA/QC - Baseline	Table 3-3
MPT-7-TB	NA	QA/QC - Baseline	Table 3-3[2]
MPT-7-RB	NA	QA/QC - Baseline	Table 3-3
MPT-7-FB	NA	QA/QC - Baseline	Table 3-3
MPT-7-CS08	variable[3]	Performance	Table 3-3
MPT-7-CS9	variable[3]	Performance	Table 3-3
MPT-7-CS10	variable[3]	Performance	Table 3-3
MPT-7-CS11	variable[3]	Performance	Table 3-3
MPT-7-CS12	variable[3]	Performance	Table 3-3
MPT-7-CS13	variable[3]	Performance	Table 3-3
MPT-7-CS14	variable[3]	Performance	Table 3-3
MPT-7-CS15	variable[3]	Performance	Table 3-3
MPT-7-CS15D	variable[3]	QA/QC - Performance	Table 3-3
MPT-7-CS15MS	variable[3]	QA/QC - Performance	Table 3-3
MPT-7-CS15MSD	variable[3]	QA/QC - Performance	Table 3-3
MPT-7-TB	NA	QA/QC - Performance	Table 3-3[2]
MPT-7-RB	NA	QA/QC - Performance	Table 3-3
MPT-7-FB	NA	QA/QC - Performance	Table 3-3

[1] Analytical Parameters and Methods are specified in the table listed in this column.
[2] Trip blanks will only be analyzed for volatile organic compounds.
[3] Variable indicates a sample depth between 0 and 3 feet.

Notes: SWMU = solid waste management unit.
MPT = U.S. Naval Station, Mayport, Florida.
CS = composite sample.
QA/QC = quality assurance and quality control.
NA = not applicable.

Table 3-3
Laboratory Analyses, Baseline and Performance Evaluation Sampling

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

Constituent	Testing Method[1]
Volatile organic aromatics (BTEX)	USEPA Method 5030/8020
Volatile organic halocarbons (VOH)	USEPA Method 5030/8010
Total recoverable petroleum hydrocarbons (TRPH)	USEPA Draft Method 3540/9073
Polynuclear aromatic hydrocarbons (PAHs)	USEPA Method 8100
Total organic halides	USEPA Method 5050/9056
Metals[2] (total)	USEPA Methods 6010 and 7471

[1] U.S. Environmental Protection Agency (USEPA) SW846 as specified by Florida Administrative Code (FAC) 62-775.
[2] Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver

Notes: SWMU = solid waste management unit.
BTEX = benzene, toluene, ethylbenzene, and xylene.

will be stockpiled onsite (approximately 100-ton stockpiles) by SSR until verification through sample analysis at an analytical laboratory approved by SSR and SOUTHNAVFACENGCOM indicates the treated sludge and soil meets target treatment levels. ABB-ES will also collect samples from the stockpiles to assess whether target treatment levels have been achieved. This subsection describes the sampling frequency that ABB-ES will use when collecting samples of treated sludge and soil designated as meeting target treatment levels (see Appendix B for further calculations).

When determining the number of samples necessary, the following information and assumptions were used.

- Methods of analysis for samples of sludge and soil exiting the treatment unit collected by SSR will meet the requirements of FAC 62-775.
- The LTTD unit, when at full scale, will operate for 24 hrs/day at a throughput rate of 12.5 tons/hr (300 tons/day).
- Approximately 2,700 tons of soil would be treated in 9 days under this demonstration.

SSR proposes to collect one grab sample every hour and composite these grabs at a minimum of every 100 tons (SSR, 1995). Based on a throughput rate of 12.5 tons/hour, 100 tons would be treated every 8 hours. As a result, three stockpiles would be created each day. Each stockpile will be marked to indicate the SSR sample number and the day the pile was created. The number of samples that would be collected by SSR will meet the requirements of FAC 62-775.

The Guidelines for Assessment and Remediation of Petroleum Contaminated Soil (FDEP, 1994) stipulates that a grab sample should be collected every 50 tons of treated soil and composited every 400 tons. ABB-ES will collect one composite sample for every 400 tons of treated soil designated as achieving target treatment levels by SSR. Each composite will consist of eight grab samples: two grab samples collected from each 100-ton stockpile. Over the 9-day treatment period the total number of samples collected by ABB-ES will be:

- seven composite samples (MPT-7-CS08 through MPT-7-CS15), and
- eight grabs per composite.

Treated soil samples will be analyzed for volatile organic aromatics (BTEX), TRPH, polynuclear aromatic hydrocarbons (PAHs), VOHs, total organic halides, and metals, as stated in FAC 62-775. The testing methods to be used are listed in Table 3-3.

3.3.3 **Analytical Program** The analysis of the soil samples will be conducted using the appropriate USEPA method listed in Table 3-3 by the methodology contained in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, USEPA SW846 (USEPA, 1986). The analytical data package produced by the laboratory will be Naval Energy and Environment Support Activity (NEESA) Level C. The rationale for using NEESA Level C is to provide analytical data that could be validated substituting the SW846 method criteria for USEPA's Contract Laboratory program (CLP) method criteria using National Functional Guidelines for Organic Data Review (USEPA, 1990). The data will be validated so that the appropriate decision can be made as to whether or not soil at the site should be further

evaluated by the corrective measures study under NAVSTA Mayport RCRA corrective action program.

3.3.4 Interpretation of Analytical Results Analytical results from the sampling program will be evaluated by direct comparison to target treatment levels listed in Table 1-1. If analytical results from the performance evaluation sampling program indicate the presence of substances in excess of target treatment levels (Table 1-1), the technology demonstration will not be considered effective in meeting the goal of the corrective measures study. Treated soils that do not meet the target treatment levels (FAC 62-775) should be retreated by SSR.

If analytical results indicate that a soil sample contains concentrations of substances below target treatment levels, the soil will be considered to have met the requirements of FAC 62-775 and may be used as backfill material.

3.4 TECHNOLOGY EVALUATION REPORT. A technology evaluation report will be prepared for the Navy by ABB-ES to export information on the innovative technology within SOUTHNAVFACENGCOM and the Navy. The report will include descriptions of the technology demonstration and oversight activities performed by ABB-ES, photographs of the technology demonstration, a discussion of the results of the sampling and analysis activities, and an evaluation of the effectiveness of the technology at achieving target treatment levels (Table 3-4).

The effectiveness of the technology demonstration will be evaluated by comparing the analytical results from soil samples collected during the sampling and analysis program to target treatment levels (Table 1-1). The percent reduction in TRPH will be calculated and will be based on comparison of the baseline data with the performance evaluation samples.

The uncertainties associated with measuring the technology demonstration's ability to meet target treatment levels (Table 1-1) will also be discussed.

The findings from the technology demonstration will be summarized in a conclusions section.

Correspondence separate from the technology evaluation report will identify whether additional corrective action activities are necessary. An outline of the technology evaluation report is provided in Table 3-4.

Table 3-4
Outline of Technology Evaluation Report

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

1.0 INTRODUCTION

2.0 SUMMARY OF TECHNOLOGY DEMONSTRATION

- 2.1 PROPOSED ACTIVITIES
- 2.2 FIELD DEMONSTRATION
- 2.3 MONITORING ACTIVITIES DURING DEMONSTRATION

3.0 SUMMARY OF OVERSIGHT ACTIVITIES

- 3.1 GENERAL OBSERVATIONS AND NOTES
- 3.2 RESULTS OF BASELINE SAMPLING AND ANALYSIS
- 3.3 RESULTS OF PERFORMANCE EVALUATION AND ANALYSIS

4.0 EVALUATION OF TECHNOLOGY DEMONSTRATION

- 4.1 COMPARISON OF BASELINE PERFORMANCE EVALUATION RESULTS

5.0 UNCERTAINTIES

6.0 CONCLUSIONS

Note: SWMU = solid waste management unit.

4.0 TECHNOLOGY DEMONSTRATION SCHEDULE

A schedule for the implementation of the technology demonstration is included in Table 4-1.

Table 4-1
Schedule of Navy Environmental Leadership Program Activities, SWMUs 6 and 7

Implementation Plan, Navy Environmental Leadership Program
Technology Demonstration for Thermal Desorption at SWMUs 6 and 7
U.S. Naval Station
Mayport, Florida

Task	Start Date	Submittal Date
Provide technology demonstration workplan (RAP)	December 1994	January 1996
Provide implementation plan	August 1995	February 1996
Perform baseline sampling on sludge and soil	April 1996	April 1996
Implement technology demonstration	November 1995	April 1996
Implement performance evaluation sampling	November 1995	May 1996
Technology evaluation report	June 1996	August 1996

Notes: SWMU = solid waste management unit.
RAP = remedial action plan.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1991, Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan, U.S. Naval Station, Mayport, Florida, Volumes I, II, and III (Interim Final): prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES, 1994, Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Workplan, U.S. Naval Station, Mayport, Florida: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina.

ABB-ES, 1995a, Resource Conservation and Recovery Act (RCRA) Facility Investigation Group II Solid Waste Management Units (SWMUs), U.S. Naval Station, Mayport, Florida: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina.

ABB-ES, 1995b, Corrective Measures Study Group II Solid Waste Management Units (SWMUs), U.S. Naval Station, Mayport, Florida: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina.

ABB-ES, 1995c, Resource Conservation and Recovery Act (RCRA) Corrective Action Program General Information Report, U. S. Naval Station, Mayport, Florida: prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

E.C. Jordan Company, Inc., 1988, Navy Installation Restoration Program Expanded Site Investigation, Final Report, U.S. Naval Station, Mayport, Florida: prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina, April.

Environmental Science and Engineering, Inc. (ESE), 1986, Initial Assessment Study, Naval Station, Mayport, Florida: prepared for Naval Energy and Environmental Support Activity, U.S. Navy, May.

Florida Department of Environmental Protection (FDEP), 1992, Thermal Treatment Facilities for Petroleum-Contaminated Soil, Florida Administrative Code (FAC) 62-775.

FDEP, 1994, Guidelines for Assessment and Remediation of Petroleum-Contaminated Soil, Division of Waste Management, Bureau of Waste Cleanup, Engineering Support Section, May.

Kearney, A. T., 1989, RCRA Facility Assessment of the Naval Station Mayport, Jacksonville, Florida, (Final Report): prepared for the U.S. Department of the Navy, SOUTHNAVFACENGCOM, Charleston, South Carolina, April.

Southwest Soil Remediation, Inc. (SSR), 1995, Low Temperature Thermal Desorption Workplan, SWMUs 6 and 7, U.S. Naval Station, Mayport, Florida: prepared for SOUTHNAVFACENGCOM, Charleston, South Carolina.

U.S. Environmental Protection Agency (USEPA), 1985, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods: SW846.

USEPA, 1990, National Functional Guidelines for Organic Data Review: December (revised June, 1991).

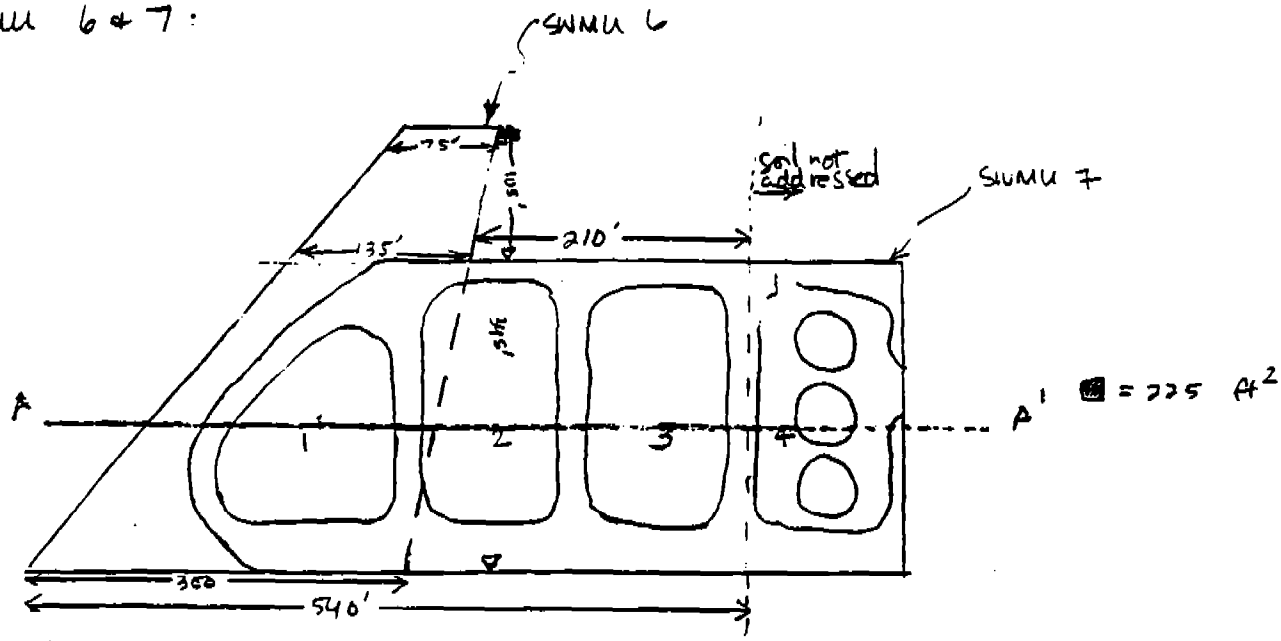
USEPA, 1991, Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual, USEPA Region IV, Environmental Services Branch, Athens, Georgia, February.

APPENDIX A

VOLUME ESTIMATES

PROJECT	COMP. BY	JOB NO.
NSMA Report Volume Est. - Contam Sludge/Soil SWMU 6 & 7	CAB	8533-29
	CHK BY DJH	DATE 6/5/95

SWMU 6 & 7:



Assumptions:

1) Sludge/soil in beds 1, 2, and 3 are source of LNAPL (RFI, ABB-ES, 1995)
2) Sludge/soil in bed 4 is not source of LNAPL, and will not be addressed
3) Sludge/soil in SWMU 6 (that lies beneath SWMU 7) is a source of LNAPL and will be addressed.
4) Sludge/soil in vadose zone will be addressed — avg depth to water table over SWMU 6 & 7 is ~7 feet (taken from bottom of Sludge beds)
5) see attached cross section for depths of contamination:

Area 1 ⇒  depth of contam = 7'

Area 2 ⇒ (1) [2] depth = 6'

Area 3 ⇒ (1)(2)(2) depth = 5'

Area 4 ⇒ [3] depth = 7'

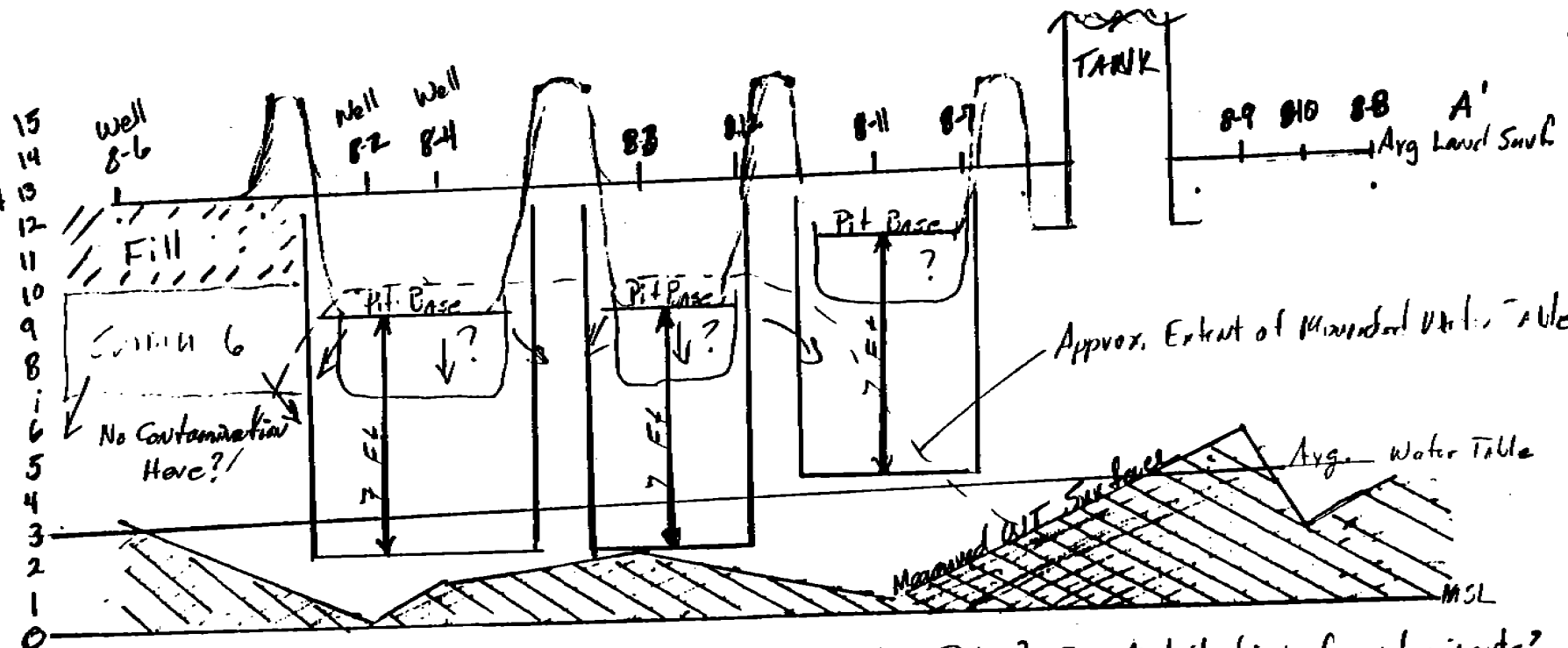
Pg 1

JOB NO. 8553-08	DATE 6/6/95
COMP. BY LWS	CHK. BY

PROJECT SWMU 6-7 Sludge Soil Contamination Extent

Cross section Elevations from
A. Avg land Surface TOC of Flush mount Wells
B. Pit Base Elevations of Sludge Sampler
C. Avg Water Table Potentiometric Surface of Aug. 30, '94
D. Hatched Zone Actual WT Readings Aug. 30, '94

Vert Exaggeration Approx x 3



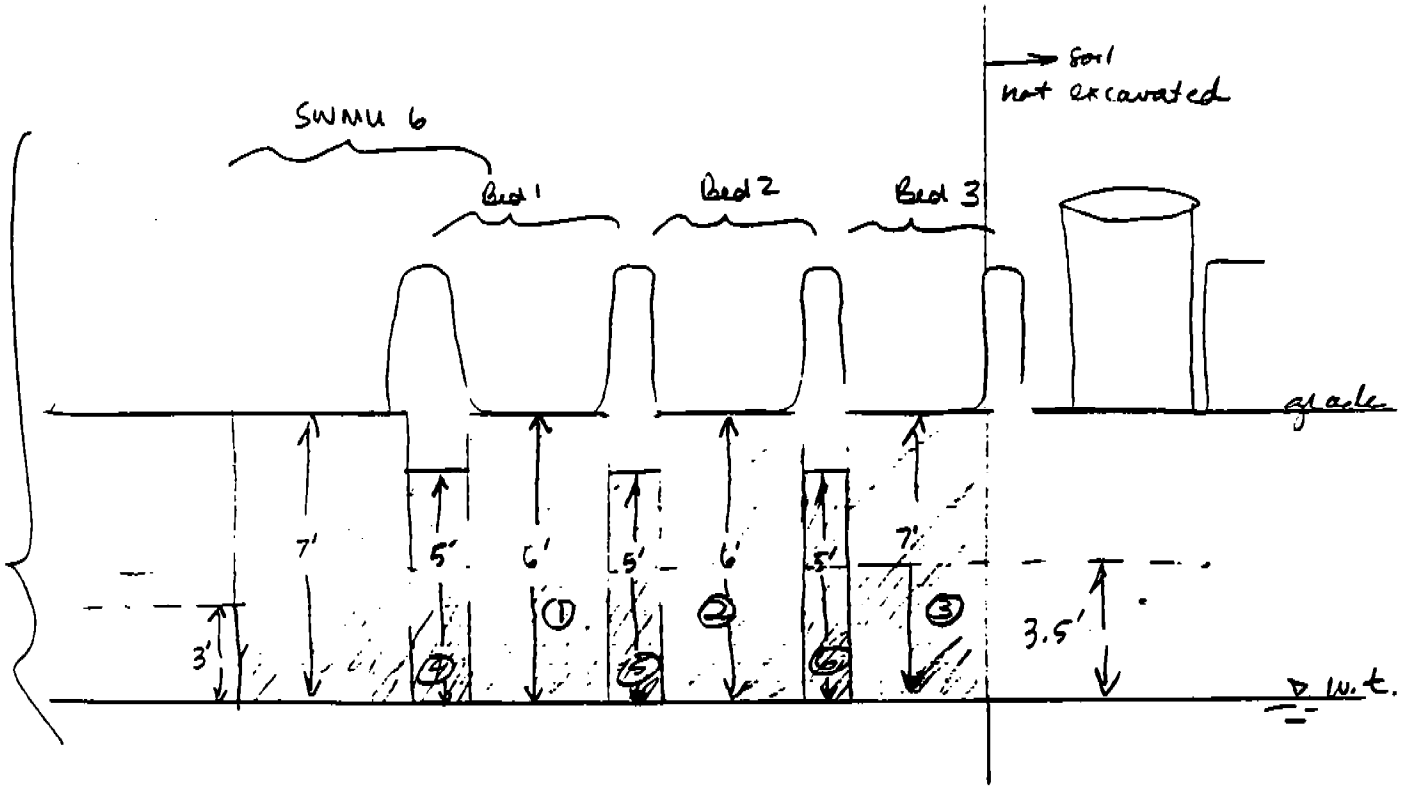
?! 1. Should we include mounding of surface water within Pits? For distribution of contaminants?
2. Would SWMU 6 have caused contamination from the Land Surface to the Water Table?

ABB Environmental Services, Inc.

FORM 00.01 REV 4/91

PROJECT	COMP. BY	JOB NO.
NS Mayport Volume Est - Carbon Sludge/Soil SWMU 6+7	SCB	8533.29
	CHK BY TJH	DATE 6/5/95

Cross Section A - A'



① From RFI (ABB ES, 1995), depth to water table below beds is approximately 6 to 7'.

② From RFI, vadose soil beneath beds 1, 2 and 3 is source of LNAPL (see shaded areas beneath beds ① ② and ③)

③ Berm materials are considered "clean" because beds were constructed from excavation of "clean" fill. However, there would be some smearing between beds in vadose zone. See additional shading between beds (④ ⑤ and ⑥)

④ RFI indicates that SWMU 6 was originally excavated 6' below grade, and then filled to surface grade. Hi estimated that top of bed would lie ~ 3' below grade.

PROJECT	COMP. BY	JOB NO.
NS Maypaint Catan Sludge/soil	Sab	E-3329
	CHK. BY	DATE
	[illegible]	6/5/95

Volumes:

Note: surface areas determined by box method

Area 1

Area = Area of trapezoid − area in cutout

= ½ (b+t) h (area of trapezoid) − 34,875 (area of cut out) (determined by box method from figure in page 1)

= ½ (300 + 75) 345 − 34,875

= 64,688 − 34,875

= 29,813 feet²

Volume = 29,813 × 7'

≅ 208,700 feet³

Area 2 (1)(2)

Area = Bed 1 + Bed 2

= 17,100 + 18,225

= 35,325 ft²

Volume = 35,325 × 6'

≅ 212,000 ft³

All areas & volumes determined by box Method

Area 3 (000)

Area = Area of whole − Area of muscle

= 92,925 − Area 2

= 92,925 − 53,500

= 39,425 ft²

Volume = 39,425 × 5'

≅ 197,000 ft³

PROJECT	COMP. BY	JOB NO.
NB Mayport Cantam Soil/Sludge SWMU 6+7	SAB	8533.29
	CHK. BY	DATE
	BH	6/7/95

Area 4 ③

Area = Bed 3

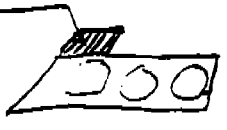
= 18,225 ft²

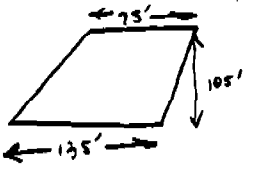
Volume = 18,225 x 7'

= 127,600 ft³

6/12/95 -

The IM being completed for SWMUs 6+7 includes installation of sumps for free product recovery. One sump will be located within the northern-most portion of SWMU 6. Therefore, the volume of soil to be removed must be decreased by an area:





Area = ½ (b+t) h

= ½ (135+75)(105)

= 11,025 sq ft

Volume = (11,025)(7')

= 77,175 cu ft.

≅ 77,000 feet³

PROJECT	COMP. BY	JOB NO.
NS Mayport Volume of Soil/Sludge Cubic Yards	SAB	8533.29
	CHK. BY	DATE
	[illegible]	6/5/95

Total Volume = Area 1 + Area 2 + Area 3 + Area 4

= 208,700 + 20,000 + 197,000 + 127,600

= 745,300 ft^3 - Area in [illegible] for sump

= 745,300 − 77,000

= 668,300 ft^3

≅ 24,800 cy

$$\text{Density (from RFI)} = \frac{1.4 \text{ grams}}{cm^3} \cdot \frac{2.205 \times 10^{-3} \text{ lbs}}{\text{gram}} \cdot \frac{1 \text{ ton}}{2000 \text{ lb}} \cdot \frac{cm^3}{1.308 \times 10^{-6} \text{ cy}}$$

= 1.18 ton/cy

Bulking factor (say 20% expansion upon excavation)

24,800 cy × 1.2 ≅ 29,800 cy

weight of soil

$$(29{,}800 \text{ cy}) \left(1.18 \frac{\text{ton}}{\text{cy}}\right) \cong 35{,}200 \text{ tons}$$

APPENDIX B

SAMPLING CALCULATIONS

PROJECT	COMP. BY	JOB NO.
IMPLEMENTATION PLAN THERMAL DESORPTION OF SLUDGE & SOIL AT SWMUs 6 and 7	F	08534.33
	CHK. BY	DATE 2-14-96

SAMPLING REQUIREMENTS

BASELINE SAMPLING[1]

ACCORDING TO FAC 62-775 if you have a quantity of soil over 1,400 tons you would need:

5 composite samples for the first 1,400 tons
1 composite sample for each additional 700 tons

SSR proposes to treat 2,700 tons of Sludge and Soil

$$\begin{array}{r} 2{,}700 \text{ tons} \\ - \ 1{,}400 \text{ tons} \\ \hline 1{,}300 \text{ TONS} \end{array} \quad - \ 5 \text{ composite samples}$$

$$700 \text{ tons} \overline{)\ 1{,}300 \text{ tons}} = 1.8 \approx 2 \text{ composite samples}$$

$\therefore 5 + 2 = 7$ Composite samples

ACCORDING TO FAC 62-775 4 GRAB SAMPLES MUST BE COLLECTED PER COMPOSITE SAMPLE

$$7 \text{ composite samples} \times 4 \frac{\text{grab samples}}{\text{composite samples}} = 28 \text{ grab samples}$$

SUMMARY

7 composite samples ARE required for treating 2,700 tons of Soil
5 composits for the first 1,400 tons and 2 composits for the remaining 1,300 tons.

4 grab samples will be collected per composite sample $\therefore$ 28 grab samples will be collected during the treatment of 2,700 tons of soil.

1 = Sampling AND Analysis PRIOR TO TREATING the Soil

PROJECT	COMP. BY	JOB NO.
IMPLEMENTATION PLAN THERMAL DESORPTION OF SLUDGE AND SOIL AT SWMUS 6 AND 7	FJ	08534.33
	CHK. BY	DATE 2-14-96

SAMPLING REQUIREMENTS

PERFORMANCE EVALUATION SAMPLING

BASIS: Guidelines for Assessment and Remediation for Petroleum Contaminated Soil (FDEP, 1994)

1 composite sample should be collected for every 400 tons

1 grab sample should be collected for every 50 tons to make the 400 ton composite sample.

∴ Assuming 2,700 tons of soil and a 100 ton treatability test.

2,700 tons – total throughput
100 tons – treatability test
2,600 tons

100 tons = 1 composite sample and 4 grab samples at 20 tons per batch.

2,600 tons / 400 tons = 6.5 ≈ 7 composite samples

2,600 tons / 50 tons = 52 grab ~~composite~~ samples

1 + 7 = 8 composite samples

4 + 52 = 56 grab samples

APPENDIX C

RESPONSE TO REGULATORY COMMENTS

February 20, 1996

Commanding Officer
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, SC 29418

Attention: Mr. David Driggers (Code 1582)

SUBJECT: **FDEP Technical Review Comments Implementation Plan, Navy Environmental Leadership Program (NELP) Technology Demonstration for Low Temperature Thermal Desorption of Sludge and Soil at SWMUs 6 and 7**
U.S. Naval Station, Mayport, FL
Contract No. N62467-87-D-0317 CTO#028

Dear Mr. Driggers:

The following presents response to comments made in correspondence dated February 7, 1996 by the Florida Department of Environmental Protection (FDEP) concerning the Navy Environmental Leadership Program (NELP) Technology Demonstration for Low Temperature Thermal Desorption of Sludge and Soil at SWMUs 6 and 7, U.S. Naval Station (NAVSTA) Mayport, Florida dated October 1995.

Comment 1. The Contractor (SSR) will be obtaining pre and post-treatment samples; I suggest that the results of these samples be incorporated (or at least included as an addendum) in the final report.

Response. Comment acknowledged, analytical results from the contractor will be summarized and compared to the target treatment criteria in Table 1-1. Discrepancies, if any, between the analytical results from SSR's samples and baseline and performance samples conducted to evaluate the technology will also be discussed.

Comment 2. Documentation of direct costs associated with the technology demonstration are also suggested for inclusion in the final report in order to help the Navy evaluate not only the technical aspects but the financial aspects as well.

Response. Direct costs associated with the technology demonstration will be addressed in a separate cost evaluation report.

Comment 3. This demonstration will occur within a named SWMU. Adequate documentation of the description, location, geometry, and volume of material treated and backfilled should be obtained during the course of the demonstration and included in the report.

Response. Comment acknowledged, the description, location, geometry, and volume of material treated and backfilled will be documented in the technology evaluation report.

Commanding Officer
Southern Division
February 23, 1996

Comment 4. Since this is a demonstration project, the Navy should consider including limited photographic documentation as part of the project and within the body of the report.

Response. Comment acknowledged, photographic documentation is to be conducted and will be included in the technology evaluation report.

If you have any questions regarding the response to FDEP's comments, please call me at 904-656-1293.

Very truly yours,

ABB ENVIRONMENTAL SERVICES INC.

Francis K. Lesesne, P.G.
Principal Geologist

Terry J. Hansen, P.G.
Task Order Manager

cc: Ms. Cheryl Mitchell, NAVSTA Mayport.