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REMEDIATION WORK PLAN FOR OPERABLE UNIT 2 (OU 2) SITE 5 REVISION 1 NAS CECIL FIELD FL

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REMEDIATION WORK PLAN FOR SITE 5 - CECIL FIELD

FOR NAVAL AIR STATION - CECIL FIELD

JACKSONVILLE, FLORIDA

Prepared for

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

Under Contract No. N62467-93-D-0936

Prepared by

BECHTEL ENVIRONMENTAL, INC.
OAK RIDGE, TENNESSEE

MARCH 1995

REVISION 1

Bechtel Job No. 22567

Prepared:	for Lynn Sims Senior Scientist	5-16-95 Date
Approved:	Project Manager	5/16/95 Date
Approved:	Navy Contracting Officer	5-16-95 Date

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Senior Scientist Date

Approved: _____ _____
Project Manager Date

Approved: _____ _____
Navy Contracting Officer Date

DISCLAIMER

This Remediation Work Plan was prepared using background information including subsurface/geotechnical data, design basis, and other data provided to BEI by Southern Division Naval Facilities Engineering Command, the Navy's CLEAN Contractor, and/or third parties. Bechtel has relied on this information furnished.

FOREWORD

This Remediation Work Plan (RWP) has been prepared to document the scoping and planning process performed by the U.S. Navy to support remedial action activities at Site 5 of Operable Unit 2 located at the Naval Air Station (NAS) Cecil Field site in Jacksonville, Florida.

NAS Cecil Field is on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List. A negotiated, signed Federal Facilities Agreement is in place for the site. Under CERCLA guidelines, an interim remedial action is planned at Site 5 in accordance with this RWP.

Remedial action is necessary in selected areas of contamination for the protection of human health and the environment. This RWP describes the approach that will be used to conduct the remedial action and describes the organization that will be employed.

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ACRONYMS AND ABBREVIATIONS

ASL	Analytical Support Levels
CLEAN	Comprehensive Long-term Environmental Action Navy Contract
DQO	Data Quality Objectives
EPB	Evnironmental Protection Board
FDER	Florida Department of Environmental Regulation
HDPE	High density polyethylene
NAPL	Non-aqueous phase liquid
NAS	Naval Air Station
NEESA	Naval Energy and Environmental Support Activity
OWPT	Oily water treatment plant
O&M	Operations and Maintenance
PCB	Polychlorinated biphenyls
PPE	Personnel Protective Equipment
PSHP	Program Safety and Health Plan
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
QC	Quality Control
RAO	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RWP	Remediation Work Plan
SAP	Sampling Analysis Plan
SJUMP	Saint John's River Water Management District
SOPs	Standard operating procedures
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSHR	Site Safety and Health Representative
SVOC	Semivolatile organic compound
SWMU	Solid waste management unit
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total petroleum hydrocarbons
TRPH	Total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

The U.S. Department of Navy, Southern Division, Naval Facilities Engineering Command intends to conduct remedial actions at the Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. This Work Plan addresses Operable Unit 2, Site 5, which is the former Oil Disposal Area, Northwest, where waste oils, fuels, and grease were reportably dumped in an unlined pit. Bechtel Environmental, Inc. (BEI), the Environmental Response Action Contractor, will perform the remedial action on this site. This remedial action is required to address contaminated soils acting as a source of contamination at Site 5 at NAS Cecil Field.

This Remediation Work Plan (RWP) is intended to document the scope of the remediation effort and the procedures to be used.

The activities described in this plan are based on the following:

- Observations made during a site visit by BEI and Navy personnel to NAS Jacksonville on July 12, 1994
- Discussion and conclusions from a meeting held between BEI, ABB Environmental Services, Inc. (ABB-ES), and Navy personnel in Jacksonville on July 12, 1994
- Information contained in the Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, NAS Cecil Field, Jacksonville, Florida, prepared by ABB-ES, April 1994
- Discussion and conclusions from a Teaming Meeting of BEI, ABB, EPA, FDEP and Navy personnel in Jacksonville on April 5, 1995
- Final Design for Site 5 Bioremediation, NAS Cecil Field, Jacksonville, FL, prepared by ABB-ES, April 1995

In implementing this Plan, BEI will supply qualified personnel and equipment to the project; coordinate, manage, and supervise construction and soil remediation activities onsite; ensure compliance with contract and regulatory requirements; and lastly, provide documentation to the Navy that will include a data summary. BEI's approach to complete these tasks is presented in the following sections of this plan.

The remainder of Section 1.0 provides general site information and the justification and objectives for the proposed remediation.

Section 2.0 presents the BEI organization and responsibilities for completing the work.

Section 3.0 provides a site history and a brief description of Site 5.

Section 4.0 provides the scope of work, the approach BEI will take to achieve the remedial objectives, and a description of the remedial action components and field activities.

Section 5.0 presents BEI's sampling and analysis plan and includes details on the surveys and remediation activities planned.

Sections 6.0, 7.0, and 8.0 address the Waste Management Plan, Safety and Health Plan, and Quality Control Plan, respectively.

1.1 GENERAL SITE INFORMATION

NAS Cecil Field is located in southwestern Duval County approximately fourteen miles southwest of downtown Jacksonville. The site encompasses approximately 31,000 acres. The primary mission of the site is to provide a work place, service, and managerial support for the operation and maintenance of naval weapons and aircraft to activities and units of the operating forces as designated by the Chief of Naval Operations.

1.2 JUSTIFICATION AND OBJECTIVES FOR THE PROPOSED ACTION

The primary threat to human health and the environment associated with Site 5 is related to the potential for uncontrolled releases of contaminants from exposed surfaces and subsurface disposal areas. Contaminants could be released from these sources via infiltration and percolation, wind dispersion, gaseous emissions, runoff, leaching to groundwater, and disturbance by humans or animals. Even though the soil contamination does not pose an immediate threat to human health, the cleanup of uncontained materials is necessary for the longterm protection of human health and the environment.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 PROJECT ORGANIZATION

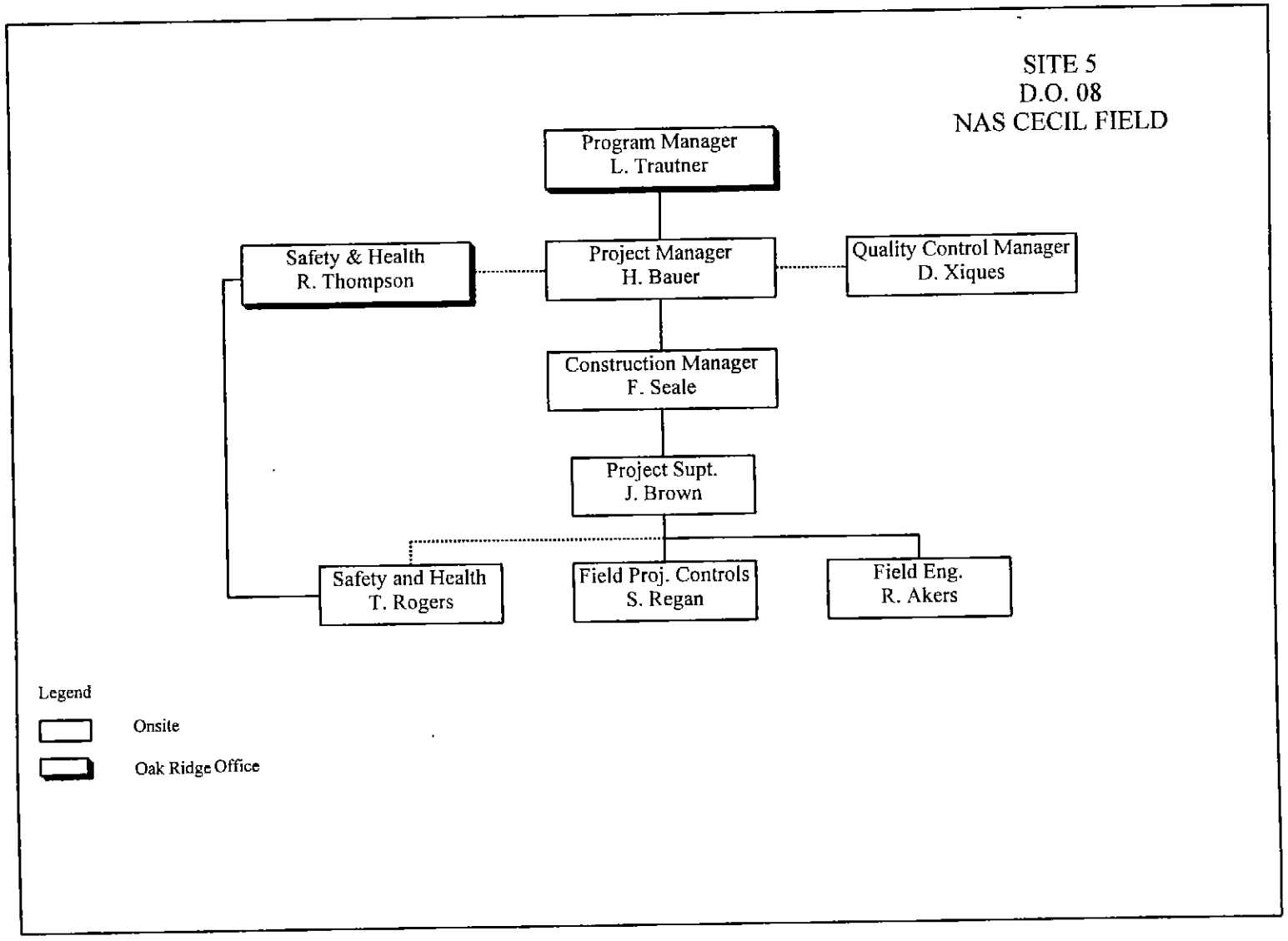
BEI is the Environmental Response Action Contractor for the Navy, Southern Division Naval Facilities Engineering Command. BEI will subcontract for necessary laboratory support and analyses required for NAS Cecil Field. A project organization chart is provided in Figure 2-1.

2.2 COORDINATION AND RESPONSIBILITIES FOR FIELD WORK

As the Environmental Response Action Contractor for the Navy, BEI provides support to the NAS Cecil Field and management of remedial action field activities, which includes all activities necessary to implement field work delineated in work plans. Typically, these activities include development and procurement of subcontract services; development, implementation, and overview of plans; collection and review of data, including sampling results, quality assurance/ quality control submittals, and sample tracking and custody; technical guidance to onsite personnel; report preparation; cost management; and schedule control.

The BEI program manager is responsible to the Navy for the completion of all aspects of the work. The program manager is supported by a project manager and representatives from engineering, construction, environmental safety and health, contract administration, quality control, project administration, and project controls. A brief description of the responsibilities of the project manager and each group are described below.

2-1 Project Organization



2.2.1 Project Manager

- Implements overall guidance provided by the BEI program manager on a site-specific basis
- Manages a team of professionals from each of the disciplines described below to accomplish the goals of the Naval Facilities Engineering Command project managers and the BEI program manager
- Interfaces directly with Navy project managers to implement directions on a site-specific basis

2.2.2 Engineering

- Develops bid packages and technical specifications needed to subcontract any remedial action work
- Provides site interface/coordination with regulatory agencies
- Modifies technical specifications and drawings, as required
- Provides geotechnical field support to remedial action efforts
- Provides onsite waste management and identification
- Participates in technology selection
- Develops work plans for remedial action
- Manages and evaluates chemical data obtained during remedial action activities

2.2.3 Construction

- Reviews all site plans for constructibility
- Provides field engineering services to monitor onsite work
- Administers subcontracts to complete work plans (i.e., cost, completion)
- Obtains manual craft
- Directs craft to implement work plans
- The project superintendent is responsible to the BEI project manager for day-to-day operations at the site.

2.2.4 Environmental Safety and Health

- Develops plans, objectives, evaluations, and documentation for all environmental compliance, safety, and health matters

- Ensures that all applicable federal, state, and local regulatory requirements are met
- Supports onsite waste management
- Provides site-specific safety and health training
- Provides a site safety and health representative (SSHR)
- Performs audits of site activities to ensure implementation of the Safety and Health Plan and to assess the effectiveness of the program.

2.2.5 Contract Administration

- Identifies bidders for subcontract work
- Coordinates bid and subcontract bid and award process
- Manages revisions to subcontracts
- Ensures compliance with Prime Contract

2.2.6 Quality Control

- Prepares site-specific quality control (QC) plan
- Implements the QC plan
- Audits quality assurance system and performance
- Conducts periodic reviews of program plans

2.2.7 Project Controls

- Provides cost and schedule support, including budgeting and monitoring
- Provides site automation services

2.2.8 Project Administration

- Provides administrative services such as document control, reproduction, archival, and mail distribution
- Provides document editing services

3.0 SITE BACKGROUND AND SETTING

3.1 GENERAL SITE DESCRIPTION

This RWP focuses on Site 5, Operable Unit 2 (Figures 1-1 and 1-4, Appendix A) located east of Perimeter Road and to the west of Lake Fretwell. Site 5 covers an area of approximately 2 acres where waste oil and fuel were disposed in a pit. Visible staining of soils is evident at the site and a distinct petroleum odor exists when soils are disturbed. Additionally, it is estimated that 300 gallons of free product are contained within Site 5.

3.2 SITE HISTORY

Disposal was conducted at Site 5 in the 1950s. Unknown quantities of waste fuel and oil were dumped at the site. Based on the appearance of soils and odor still present at the site, waste liquids may have been disposed of at the site more recently than the 1950s. Solvents, paints, and paint thinners may have also been mixed with waste oils and disposed at the site; however, specific records of such disposal are not available. A disposal pit can be seen on 1969 aerial photographs (ABB-ES 1994).

Samples have been collected within the area of the historical pit. Samples were analyzed for selected organics, metals, pesticides, and polychlorinated biphenyls (PCBs). Soils were found to be contaminated with ethylbenzene, toluene, xylenes, trichloroethylene, phenols, PCBs, and polynuclear aromatic hydrocarbons. Total recoverable petroleum hydrocarbons (TRPHs) were detected in all samples.

4.0 SCOPE OF WORK

4.1 REMEDIAL ACTION OBJECTIVES, SOIL ACTION LEVELS, AND INTERIM ACTION DESCRIPTION

4.1.1 Remedial Action Objectives (RAOs)

Waste oils and fuels were disposed of at Site 5. As a result, contaminated soils and free product are acting as a source of groundwater contamination. Remediation of contaminated soil as identified in the "Final Design for Site 5 Soil Bioremediation" (ABB, 1995) and the free product present above the water table would reduce the source of groundwater contamination and reduce risks associated with direct contact exposure. Therefore, RAOs at Site 5 for this interim remedial action are (ABB-ES 1995):

- Remediation of approximately 16,300 cubic yards of contaminated soils to reduce the source of contaminants to groundwater
- Remove free product to the extent practicable to reduce the source of contamination to groundwater
- Remediate contaminated surface soils to reduce health risks from direct contact exposure

4.1.2 Soil Action Levels

The soil action levels that are the basis for defining the extent of soil removal and for establishing a soil treatment standard are 50 ppm TRPH or the limits of construction and 1 ppm PCBs, Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives (ABB-ES 1994). TRPH data are extensive for the site and other contaminants including PCBs were found to be contained within the area of TRPH contamination.

4.1.3 Interim Action Description

The remedial alternative selected for the interim action to achieve the RAOs consists of excavation of contaminated soil from Site 5 with subsequent onsite biological treatment of contaminated soil Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives (ABB-ES 1995). A process-flow diagram for this alternative is provided in Figure 4-3, Appendix A. A schedule showing estimated durations of the work described in this work plan is also provided in Appendix A. The following subsections are descriptions of the scope of specific work items required to implement the interim remedial action.

4.2 MOBILIZATION

Mobilization will include delivering to the jobsite and work areas all construction equipment, tools, materials, supplies, and miscellaneous articles and establishing a work force sufficient to commence and sustain construction and remediation activities as required.

4.3 CLEARING

Clearing will consist of removing all designated vegetation and debris within the established limits of areas to support the remedial action activities. Clearing will be performed in accordance with the Technical Specification for Clearing and Grubbing, Appendix B.

Clearing will be required for the area of soil designated to be excavated, an area for installation of the onsite soil treatment system, including sufficient area for O&M of the system, a temporary contaminated soil stockpile, and an area for storage of materials, supplies, and equipment.

4.4 WELL CLOSURE/INSTALLATION

4.4.1 Monitoring Well Closure

Prior to soil remediation, six monitoring wells within the limits of excavation will be removed and closed by ABB-ES. Appropriate replacement monitoring wells will be installed by ABB-ES.

If Bechtel is tasked with the abandonment of the wells in the area of the excavation, Bechtel will ensure that the abandonment is in accordance with FAC Chapter 40C-3, local requirements (e.g., Environmental Protection Board (EPB) Rule 8, Proposed Amendments, Groundwater Resource Management, City of Jacksonville, EPB September 8, 1990), and any requirements of the St. John's River Water Management District and Duval County requirements.

4.5 WINDROW TREATMENT AREA CONSTRUCTION

Contaminated soil will be excavated from the designated area of Site 5 using conventional equipment and placed on top of a newly-constructed treatment area. The windrow treatment area will be constructed adjacent to the Site 5 excavation. The purpose of the treatment area is to allow aboveground treatment of soil while preventing offsite migration of contaminated soil or water (ABB-ES 1994). The primary components of the treatment pad include a hydraulic barrier, a drainage layer (sand or gravel), and a treatment layer (contaminated soil). For additional information, see the "Final Design for Site 5 Soil Bioremediation" (ABB 1995). The hydraulic barrier and sand/gravel will be graded to allow adequate drainage. Surface water runoff controls (e.g., earthen berms, ditches, drainage piping, sumps, etc.) will be constructed as necessary to prevent off site migration of contaminants (see Section 4.6.4).

The dimensions of the treatment area and facilities are included in the "Final Design for Site 5 Soil Bioremediation (ABB 1995).

4.5.1 Utilities

A water source and electrical generator will be provided for operation of the treatment system. Water will be necessary for moisture control of the soil windrows and electricity will be necessary for lighting, operation, maintenance of a storage facility, and equipment maintenance.

Water generated from the perforated drain pipe collection system within each windrow will be collected, stored, and used for future moisture control of the treatment windrows. The collected water will be applied to the treatment windrow area. Water, with the addition of rainfall, should be an adequate supply to control the treatment windrows. If sufficient water is not collected within the drainage system, a water tanker truck will be mobilized to supplement the recirculation and collection system.

4.6 CONTAMINATED SOIL EXCAVATION

4.6.1 Excavation Interferences

Prior to beginning excavation, the designated areas will be checked for existing utilities and other potential interferences. The BEI Construction Representative will perform a walkdown of the areas to be excavated to visually observe locations of manholes, hydrants, valves, open cuts, overhead obstructions, curbs, buildings, etc., and other unusual conditions. The NAS Cecil Field personnel will be consulted for as-built locations of underground utilities. In addition, the BEI Construction Representative will perform location surveys using standard field utility detection equipment. No excavation will be initiated until the subgrade interference survey is complete.

4.6.2 Limits of Excavation

The areal limits of excavation for Site 5 are indicated on the Figures presented in Appendix A. These boundaries are primarily based upon historical TRPH contamination data that indicate exceedance of 50 ppm TRPH (ABB-ES 1994). The corresponding figures in Appendix A present the limits of remediation (or limits of excavation) for depths of 0 to 2 ft, 2 to 4 ft, 4 to 6 ft, and 6 to 8 ft. The limits of remediation for the 0 to 2 ft depth range (Appendix A) encompass the

limits for the remaining depth ranges. Therefore, this boundary will define the areal limits of excavation on the ground surface. Excavation may proceed past the 0-2 ft depth range based on exceedance of the 50 ppm TRPH value in soil (using field test kits), however, not to exceed the limits of construction (Final Design for Site 5 Soil Bioremediation, ABB 1995). The vertical limits of excavation are based upon the estimated extent of TRPH exceeding 50 ppm. The total volume of unsaturated contaminated soil that will be addressed under this interim measure is estimated to be 16,300 yd^3.

Approximately 15 to 20 percent of the total contaminated soil volume will be remediated as a batch. The excavated material will comprise the treatment windrows. Once the initial batch of contaminated soil is successfully treated, the remaining material would be placed within the treatment windrows in four to six additional batches. Treated (bioremediated) soil will be returned to the excavation.

Confirmatory soil sampling of the sidewalls of the excavation will be completed in accordance with Section 5.0. Sampling will take place once excavation in an area, as determined in the field, has been completed (TRPH field test kits reading less than 50 ppm) or the limits of construction have been reached.

Once all material has been excavated and the extent of contaminated material requiring removal is verified, a registered land surveyor will provide the necessary survey information (coordinates, cross-sections, elevations, etc.) to prepare as-built drawings for the excavation.

4.6.3 Method of Excavation

Excavation will be performed in accordance with the Technical Specification for Contaminated Earthwork and Miscellaneous Demolition, Appendix B and transported in accordance with the Technical Specification for Transport of Contaminated Material, Appendix D.

All excavation will be by backhoe and/or excavator where practical. In areas where interferences are present and preclude use of mechanized equipment, excavation will be by hand. All interferences such as existing utilities will be properly maintained while the excavation is in progress and remain protected until the excavation is backfilled.

4.6.4 Run-on and Run-off Controls

Run-on and run-off controls will be constructed to prevent stormwater runoff from entering the open excavation and soil treatment area. The controls will also prevent potentially contaminated stormwater or groundwater seepage that may pond inside the open excavation and soil treatment area from migrating offsite. These controls will consist of earthen berms, diversion ditches, stormwater drainage piping and inlets, and silt fences, as necessary.

4.6.5 Free Product Removal

Based upon results of past investigations, a non-aqueous phase liquid (NAPL) or free product, is present at Site 5 (observed in monitoring well CEF-5-6S and surrounding temporary wells) directly above the water table (Appendix A), estimated to be 10 in. thick, with an estimated

volume of 300 gallons (Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, ABB-ES 1994). Analysis of the free product indicated the presence of PCBs at 26 mg/l.

Any free product encountered as a result of excavation and observed standing or floating within the excavation will be removed to the extent practicable. Free product will be removed by total fluids pumping (water and free product). All pumps, hoses, and appurtenances will be set up to preclude leaks, spills, explosion, etc., and will be flushed with water prior to disconnection to eliminate residual material within internal surfaces of the equipment. The free product and any free product/groundwater mixture will be pumped and containerized at a location adjacent to Site 5.

Excavation of soils saturated with free product will be a continuation of the excavation of vadose zone soils. This saturated soil will be separated from unsaturated soil, as practicable, during excavation activities. Saturated soil will be segregated as necessary and placed on a drainage pad that will allow the free product to drain from the saturated material. The drained, liquid material will be collected, containerized, and transported offsite for proper disposal. Free product and associated saturated soil will be removed to the extent practicable as directed by the BEI Construction Representative. The volume of saturated soils is estimated to be 10 yd^3 (ABB-ES 1994).

Absorbent media will also be used as necessary to remove free product. All free product recovered by pumping and expended absorbent media containing the recovered free product will be containerized and dispositioned in accordance with Section 6.0, Waste Management.

4.6.6 Material Transport

As contaminated soil is excavated, the material (unsaturated only) will be loaded into lined trucks for transport to the newly construction windrow treatment pad. All material will be loaded, transported, and off-loaded in accordance with the Technical Specification for Transportation of Contaminated Materials, Appendix D. The material will be off-loaded directly onto the treatment pad as directed by BEI Construction Representative, and as shown in Appendix A. Treated clean soil and clean backfill will be transported in accordance with the Technical Specification for Uncontaminated Earthwork, Appendix E.

4.7 SOIL STOCKPILE CONSTRUCTION

4.7.1 Contaminated Stockpile Construction

Contaminated soil excavated from Site 5 and awaiting treatment will be stored in the temporary contaminated soil stockpile, as necessary for staging.

The area designated for the contaminated soil stockpile will be cleared as indicated in Section 4.3. Once cleared, the site will be graded as required. A High Density Polyethylene (HDPE) liner will be placed to contain the material. The contaminated soil stockpile will be protected daily with a temporary, minimum 5 mil cover. The daily cover will be provided to totally contain the contaminated soil stockpile. The specified cover will be such that the effort to

remove and apply the cover is minimal. The cover will be held in place by nylon rope and steel drive anchors. The site, liner, and cover will be such that runoff resulting from the stockpile will be directed back into the excavation at Site 5.

The contaminated soil stockpile will be sized to provide containment for the excavated soil. A construction drawing for the contaminated stockpile is included in Appendix A.

4.8 OPERATION AND MAINTENANCE OF THE WINDROW COMPOSTING TREATMENT SYSTEM

Treatment of the unsaturated soil will be accomplished onsite using the windrow composting system or farming technique. This technique consists of creating optimal microbial conditions within the contaminated soil through the mechanical turning of the soil at regular intervals by mobile equipment. Initially, composting amendments including lime, animal manure, or other organic rich material will be added and mixed with the soil by mechanical means using conventional construction equipment (backhoe and/or front-end loader) or special windrow machinery. After initial mixing, the mixed materials will then be formed into windrows, as necessary.

The actual dimensions of the windrows are largely a function of the characteristics of the composting material and the equipment used for turning. Windrows are typically trapezoidal in shape (Appendix A). Windrow dimensions will be based on the "Final Design for Site 5 Soil Bioremediation (ABB 1995).

After the soil has been excavated, placed on the treatment pad, initial amendments added and mixed, and formed into a windrow fashion, operation and maintenance (O&M) of the treatment system will begin. O&M requirements will include periodic mechanical turning (mixing) of the soil windrows to provide oxygen, maintain proper soil pH, nutrient, and moisture levels. The frequency of soil mixing is estimated to be once every 5 to 7 days (ABB-ES 1994). Treatability testing by ABB-ES has been initiated to determine the optimum O&M parameters necessary to successfully treat the soil.

O&M will also include drainage and runoff control, placement of a cover (e.g., plastic sheeting) over the treatment area as necessary for rain infiltration control, dust and odor control, storage and maintenance of supplies, equipment and machinery maintenance, data evaluation, and progress reporting.

O&M of the composting treatment of soils will include periodic sampling and analysis to determine if treatment is being accomplished. Levels of TRPH and PCB concentrations and enumerations of total-and-petroleum-specific bacteria will be monitored. Decline in TRPH concentrations and increase in total and petroleum-specific bacteria over time are indications that removal of organic contaminants is occurring. ABB-ES will provide monitoring of the treatment system performance, including recommendations on adjustments of various nutrients and moisture levels.

The cleanup criteria established for Site 5 soil is to achieve reduction of TRPH to 50 ppm (ABB-ES 1994). Bioremediation of Site 5 soils would cease when the cleanup criteria (50 ppm TRPH and 1 ppm PCB) has been achieved or as directed by the Navy. It is estimated that it will

require approximately 120 days to treat one batch of Site 5 soil (ABB-ES 1994) or a total of approximately one year for total treatment time. More accurate predictions of treatment time can be made through treatability testing.

Because this treatment system is primarily aerobic, the treatment system developed for Site 5 is probably not conducive to PCB contamination (ABB-ES 1994). Soil monitoring for PCBs is required prior to backfilling treated soils into the excavation to ensure that PCB concentrations are below the PCB action level of 1 ppm established for this interim action.

4.9 BACKFILL

Backfill will be performed in accordance with the Technical Specification for Uncontaminated Earthwork, Appendix E.

Initially, the excavation will be backfilled, as required, with general fill from a borrow source reviewed and approved by BEI. Prior to obtaining treated soil, general fill will be used to bring the excavation up to within four feet of land surface. This will provide a safe, open excavation to accommodate the long treatment durations, and preclude water from filling the excavation during the treatment periods when the excavations is open. Additionally, the area of excavation remaining open will be protected using temporary fencing to avoid inadvertent intrusion until the areas are backfilled.

Backfill, consisting of the treated soil, will be used for the remaining areas of excavation once sampling of the treated soil meets cleanup criteria, or as directed otherwise by the Navy. Stormwater and/or groundwater seepage that may be present in the excavation will be removed by pumping and disposed of as directed by the Navy. Once sampling results indicate particular units of soil (e.g., one soil windrow) have been successfully treated, the treated soil will be used to backfill the open excavations. Sampling will be conducted in accordance with Section 5.0. All material placed within the excavation at Site 5 will be field compacted a minimum of four passes with the tracks of earth moving equipment. Material shall be compacted in lifts of approximately 1 ft.

4.10 SITE RESTORATION

After all disturbed areas of excavation have been successfully backfilled, the site will be graded to drain as required. The excavation grade will be raised above surrounding elevations and sloped from the center outward to a minimum slope of 50 horizontal to 1 vertical so that runoff will flow away from the backfill area. Runoff controls will be installed, as necessary, to control runoff into adjacent streams. If additional material is required to grade the area, general fill will be used from approved sources. At the completion of finish grading, all disturbed areas will be seeded.

4.11 TREATABILITY STUDY

As part of this interim action, a treatability study is presently being conducted by ABB-ES to optimize bioremediation treatment parameters at Site 5. Testing will involve simulation of

bioremediation of the Site 5 soils. Test results will be used to determine if conditions exist that inhibit bacterial activity and if windrow treatment is capable of reducing the levels of TRPH in soil. Treatability testing is not included as part of this Work Plan.

4.12 POST CLOSURE REPORTING

BEI will provide a final close-out report regarding the remedial action to Cecil Field personnel. This documentation will include as-built drawings of the excavation, sampling and analysis data, treatment results, etc. ABB-ES will prepare a final Remedial Action Report.

5.0 SAMPLING AND ANALYSIS PLAN

This section describes the sampling and analysis for field screening and laboratory testing of contaminated soils at the Site 5, Former Oil Disposal Area, Northwest. Sampling methodology and procedures described in this Sampling and Analysis Plan (SAP) are based on FDEP requirements as found in the Florida Department of Environmental Protection *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities* (DERQA-001/92) and *Quality Assurance Standard Operating Procedures for Petroleum Storage System Closure Assessments* and will be performed by ABB-ES.

Field screening techniques (EPA DQO Level I) using TRPH field screening test kits will be used to delineate the area where soil remediation is required. EPA DQO Level III data will be required for post-excavation confirmatory analysis to determine that remediation and/or treatment goals have been achieved.

5.1 SAMPLING PROTOCOL

5.1.1 Decontamination

Sampling equipment will be decontaminated prior to collection of each sample. Decontamination will be completed in accordance with Section 4.1, "Decontamination," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Used decontamination fluids will be containerized, stored and disposed of in accordance with the Navy Public Works Department.

5.1.2 Collection

Sampling, with the exception of field screening, will be performed in accordance with Section 4, "Sampling Procedures," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

5.1.3 Sample Identification

Sample identification will be in accordance with NAVRAC Project Procedure 6003, "Sample Identification and Data Encoding."

5.1.4 Logbooks

Field logbooks will be used for recording all field activities. Entries will include sufficient detail to reconstruct all significant activities. Logbook entries will be completed in accordance with the minimum requirements for recordkeeping included in Section 5.0, "Sample Custody and Documentation," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. This SOP includes the minimum requirements for recordkeeping.

5.1.5 Chain-of-Custody Records

In order to maintain sample traceability, each sample for offsite analysis will be properly documented on a chain-of-custody record. Chain-of-custody documentation will be completed in accordance with Section 5.3, "Custody Documentation Requirements for Field Operations," of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*.

5.1.6 Packaging and Holding Times

Sample volume requirements, frequencies, preservation techniques, minimum holding times, and container material requirements for samples are given in Tables 5-1 (unsaturated soil), and 5-2 (saturated soil associated with free product and decontamination water). The BEI Field Engineer is responsible for ensuring that a sufficient volume of each sample is collected and placed in the appropriate container with the proper preservation.

The preparation of all sampling containers and the container types, preservatives, and holding times are specified in the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Section 4.4, "Sample Handling," of the FDEP standard operating procedures contains the recommended container, preservation, and holding times for water, wastewater, soil, and sediment samples. Sample containers will meet all specifications outlined in the above-mentioned procedures.

5.1.7 Verification

Any confirmation or biological treatment sample data collected by Bechtel will be subject to a 100 percent verification. This includes data generated by field activities or as a result of laboratory analyses. The verification process will begin with manual entry or electronic loading of the data. Printouts of this information from the project database will be compared with the original hard copy of the data and resolved.

Documentation of all verification activities will be performed by the individual performing the verification. This documentation will consist of a signature of the person who performed the verification in the hard copy printouts from the project database. These signed verification printouts will be forwarded to the database manager or designee.

Table 5-1
Data Requirements for Site 5 Sampling
Unsaturated Soil (Vadose Zone) Sampling

Sample Event	Analytical Method	DQO Level	Sample Frequency	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required
Field Screening Sampling								
TRPH Test Kits		I	As required during escavation	fill jar 1/2 full	16 oz. canning jar	None	Analyze immediately following temperature equilibration	Dup: 1/10
Confirmatory Sampling								
TRPH[1] (< or > 50 ppm)	modified EPA 418.1	III	12	fill jar	glass 8 oz. widemouth w/Teflon lined cap	Cool @ 4°C	14 days	Dup: 1/10 or 5 samples (whichever is >) Dup: 1/20 (TRPH) RB: 1/20 or weekly

[1] TRPH: Total recoverable petroleum hydrocarbons

Table 5-2
Data Requirements for Site 5
Saturated Soil and Decontamination Water Sampling

Sample Event	Analytical Method	DQO Level	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required[1]
Saturated Soil							
TCLP Volatile Organics	SW-846	III	150 gms	4 oz. jar	Cool 4°C	14 days until extraction	N/A
TCLP BNAES	SW-846	III	800 gms	16 oz. jar	Cool 4°C	14 days until extraction	N/A
Flash Point	EPA 1010	I, III	400 gms	8 oz. jar	None	28 days	N/A
Paint Filter Test	EPA 9095	I, III	400 gms	8 oz. jar	None	None	N/A
PCBs	EPA 8080	III	150 gms	4 oz. jar	Cool 4°C	14 days until extraction	N/A
Decontamination Water							
As, Ba, Cd, Cr, Cu, Pb, Hg, Se, Ag, Zn, and Hexavalent Cr	EPA 6000 and 7000 series 7471 (Hg only)	III	fill container	1-gal amber glass w/Teflon lined cap	Cool @ 4°C	6 months (28 days for Hg)	N/A
Target Compound List, Semi-volatile Organic Compounds	EPA 8270	III	fill container	1-gal amber glass w/Teflon line cap	Cool @ 4°C	7 days until extraction, 40 days after extraction until analysis	N/A
Target Compound List, Volatile Organic Compounds	EPA 8240	III	fill container	(3) 40-ml vials w/Teflon septum seal	Cool @ 4°C	14 days	N/A
Total Organic Compounds	EPA 9060	III	100 ml	4 oz Amber glass	Cool @ 4°C pH<2	28 days	N/A
pH	EPA 9041	III	100 ml	4 oz plastic	Cool @ 4°C	Analyze immediately	N/A

5.2 FIELD SAMPLING AND ANALYSIS

Samples identified in this section will be collected in accordance with FDEP's standard operating procedures as outlined in Section 4.3.4, "Soil Sampling Procedures." Analysis of these samples will be in accordance with FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*, Sections 5.0 through 10.0. Tables 5-1 and 5-2 provide a summary of the data requirements and analytical parameters for samples to be collected from the Site 5, Former Oil Disposal Area, Northwest.

5.2.1 Field Screening Sampling

Field screening of samples for TRPHs will be used to guide remediation activities. Soil samples will be collected and analyzed using a TRPH test kit.

Field screening will be performed at locations as specified in Section 4.6, to aid in establishing limits of excavation of soil over 50 ppm for TRPHs. Soil will be excavated in the areas identified as contaminated with over 50 ppm as discussed in Section 4.6, after which field screening will be used to guide additional excavation activities. If necessary, additional field sampling may be completed in the field, at the discretion of the BEI Field Representative.

5.2.2 Biological Treatment Sampling

ABB will monitor the effectiveness of the biological treatment. ABB will collect and analyze treatment samples as required. ABB will provide guidance to Bechtel to optimize the soil treatment process.

5.2.3 Confirmatory Soil Sampling

To confirm that soils contaminated with greater than 50 ppm TRPHs have been excavated, confirmatory soil sampling will be conducted. Samples will be collected on the sidewalls and at the bottom of the excavation above the water table. An estimated 16,300 yd^3 of soil contaminated with TRPH concentrations greater than 50 ppm will be excavated from Site 5.

For confirmatory sampling, the number of required samples for the estimated 56,190 ft^2 (Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, ABB-ES 1994) of the area to be excavated is twelve (*Michigan Department of Natural Resources, Guidance Document for Verification of Soil Remediation*, April 1994). A biased approach, based on the source areas and preferential pathways of contamination, will be used to select the twelve (including a minimum of one sample from each of the sideslopes) sampling locations. Using this approach, samples will be collected where TRPH contamination exceeding 50 ppm will most likely be encountered. This minimizes the number of samples necessary to verify that a site is remediated. Table 5-1 includes the sample confirmation and analysis requirements for soils.

6.0 WASTE MANAGEMENT

Waste management will be performed as directed by the Navy. Waste management practices, as defined in the Program Hazardous Waste Management Plan, will be used as guidance and appropriately followed for this work.

Hazardous waste, if identified, will be managed in accordance with RCRA, 40 CFR Parts 260, 261, 262, 264, 265, 268, 270, 271, and 761. Hazardous waste will not be offered to any transporters or treatment, storage, or disposal facilities that do not have an EPA identification number.

To minimize the amount of materials that must eventually be disposed, waste minimization practices will be implemented during operations. These practices will include, but not be limited to:

- No extraneous materials taken into contamination control areas
- Decontamination and free release of equipment used to support onsite activities, to the extent practicable
- Use of consumables that can be compacted or otherwise volume reduced, to the extent practicable

Personal protective equipment (PPE) that is not visibly soiled will be disposed of as conventional waste. Contaminated portions of PPE will be managed as non-hazardous petroleum contaminated waste.

Stormwater runon and runoff controls will be implemented to prevent offsite migration of sediment or contaminated stormwater during site activities.

Water generated during decontamination activities will be containerized in a temporary holding tank. Prior to release of the water, a representative sample for offsite laboratory analyses for required parameters will be collected (Section 5.0, Table 5-2). If the analytical results indicate that the water is not toxic, the water would be transported to the NAS Cecil Field wastewater treatment plant for management. If the analytical results indicate that the water is toxic, the water would be transported offsite for treatment in accordance with appropriate regulations.

All contaminated soil (unsaturated) excavated from Site 5 will be loaded into loose conveyance transport trucks and transported onsite to the windrow treatment pad for treatment.

Free product encountered during the excavation will be pumped into a portable tank and tested against disposal parameters. Any free product that is recovered with absorbent media will be containerized for subsequent transportation and disposal offsite. Saturated soil associated with free product will be placed on a drainage pad to separate as much as practicable, the free liquid from the soil. The saturated soil and free product will be sampled in accordance with Table 5-2.

If the concentration of PCBs in the saturated contaminated soil is less than 1 ppm, then the soil can undergo bio-treatment. If the concentration of PCBs is greater than 1 ppm but less than 50ppm, then the soil must be disposed of according to 40CFR 761.75 and 761.70 in a TSCA landfill. If the concentration of PCBs is greater than 50ppm but less than 500ppm, then the soil must be incinerated per 40 CFR 761.70. If the concentration of PCBs is greater than 500ppm, then the soil must be incinerated per 40 CFR 761.70.

Any nonhazardous solid waste that is generated as a result of mobilization and clearing activities will be properly disposed onsite or offsite as directed by the Navy.

7.0 SAFETY AND HEALTH

A Program Safety and Health Plan (PSHP) defines policies for work on the Navy RAC Project. A Site Safety and Health Plan (SSHP) has been prepared for Navy RAC bases. Addendum No. 6 to the SSHP, which is provided separately, defines task-specific requirements for remediation at Site 5.

8.0 QUALITY CONTROL PLAN

Quality control (QC) samples will be collected during sampling activities and will be used as a means of evaluating data quality in terms of precision and accuracy. QC checks also verify that sampling, handling, and analysis does not introduce contaminants in the sampling process. Section 5.0, Sampling and Analysis Plan, addresses the minimum field QC sampling frequency. A task specific quality control plan is provided separately.

APPENDIX A

FINAL DESIGN FOR SITE 5 BIOREMEDIATION
NAS CECIL FIELD, JACKSONVILLE, FLORIDA
PREPARED BY ABB-ES
APRIL 1995

004745

FINAL DESIGN FOR SITE 5 BIOREMEDIATION

NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA

CONTRACT NO. N62467-89-D-0317/090

APRIL 1995

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

RECEIVED
APR 1995
V. HERMANN SAUER

PRINTED ON RECYCLED PAPER

004745

ABB

April 17, 1995

Commanding Officer
ATTN. Brian Stockmaster
Engineer-in-Charge, Code 1876
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, S.C. 29418-9010

Subject: Final Design, Site 5 Bioremediation, NAS Cecil Field

Dear Mr. Stockmaster:

ABB Environmental Services, Inc. is pleased to forward one copy of the Final Design, Site 5 Bioremediation, recently completed for the Site 5 interim remedial action. D size drawings will be provided as indicated below.

Questions or comments should be directed to us at (904) 656-1293.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.

Robert C. Lunardini, Jr., P.E.
Senior Engineer

Jack Pittman
Senior Task Order Manager

cc: Mr. Bart Reedy, USEPA Region IV (3 copies)
Mr. Mike Deliz, Florida Department of Environmental Protection (1 copy)
Mr. John Dingwall, NAS Cecil Field (1 copy)
Mr. Steve Wilson, SOUTHNAVFACENGCOM (1 copy)
Mr. Alan Shoultz, SOUTHNAVFACENGCOM (1 copy)
Mr. Wayne Oehlman, ROINC Office (2 copies w/D size)
Mr. Herman Bauer, BEI (3 copies w/D size)
file

enclosure

APR 21 1995

ABB Environmental Services Inc.

FINAL DESIGN FOR
SITE 5 SOIL BIOREMEDIATION

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. N62467-89-D-0317/090

Prepared by:

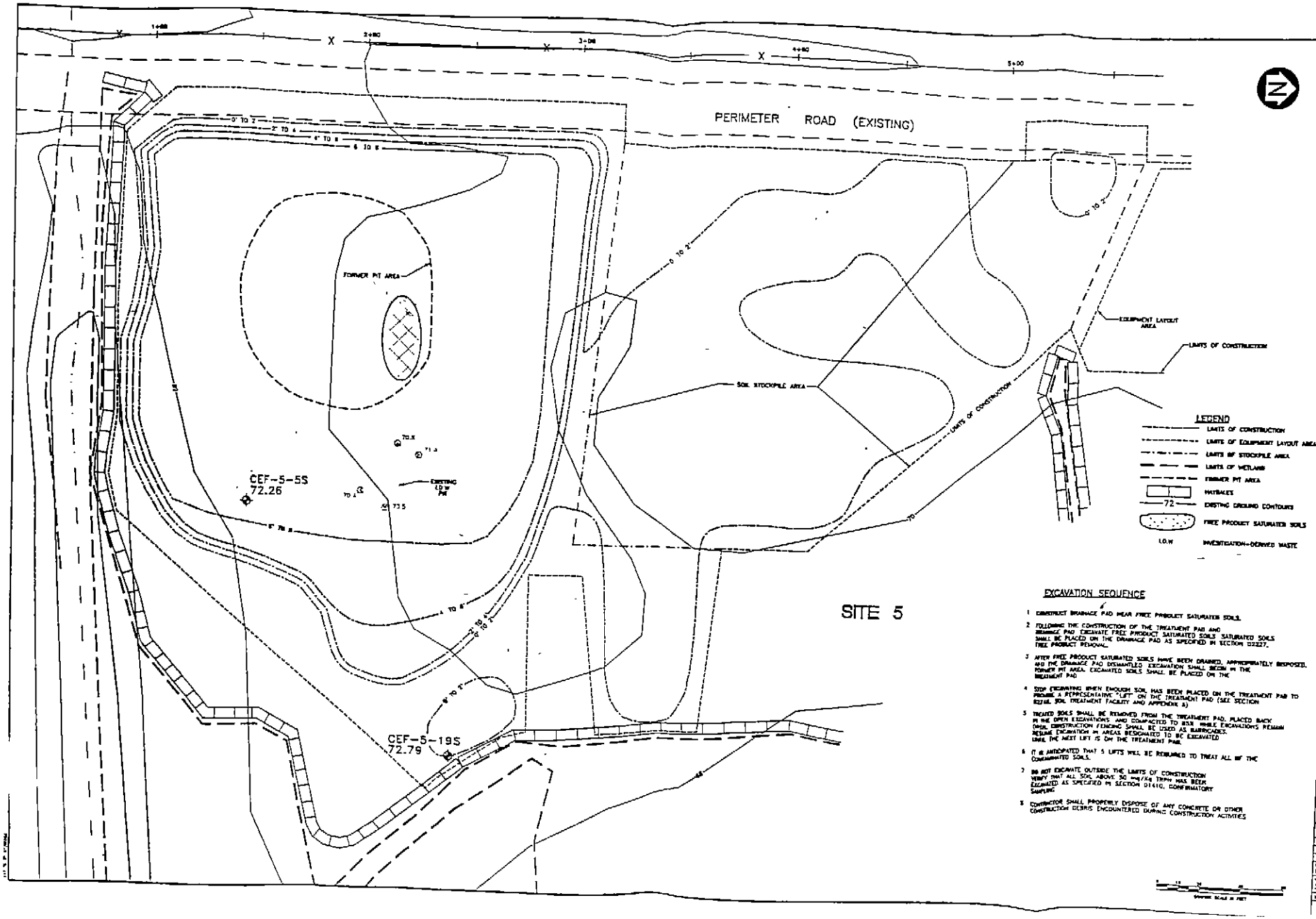
ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301

Prepared for:

Department of Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418

April 1995

APR 21 1995


PERIMETER ROAD (EXISTING)
FORMER PIT AREA
SOIL STOCKPILE AREA
EQUIPMENT LAYOUT AREA
LIMITS OF CONSTRUCTION
CEF-5-5S
72.26
CEF-5-19S
72.79
SITE 5
LEGEND
LIMITS OF CONSTRUCTION
LIMITS OF EQUIPMENT LAYOUT AREA
LIMITS OF STOCKPILE AREA
LIMITS OF WETLANDS
FORMER PIT AREA
HAYBALES
EXISTING GROUND CONTOURS
FREE PRODUCT SATURATED SOILS
INVESTIGATION-DERIVED WASTE
EXCAVATION SEQUENCE
1 CONSTRUCT DRAINAGE PAD NEAR FREE PRODUCT SATURATED SOILS.
2 FOLLOWING THE CONSTRUCTION OF THE TREATMENT PAD AND DRAINAGE PAD EXCAVATE FREE PRODUCT SATURATED SOILS. SATURATED SOILS SHALL BE PLACED ON THE DRAINAGE PAD AS SPECIFIED IN SECTION 02327, FREE PRODUCT REMOVAL.
3 AFTER FREE PRODUCT SATURATED SOILS HAVE BEEN DRAINED, APPROPRIATELY DISPOSED, AND THE DRAINAGE PAD DISMANTLED EXCAVATION SHALL BEGIN IN THE FORMER PIT AREA. EXCAVATED SOILS SHALL BE PLACED ON THE TREATMENT PAD.
4 STOP EXCAVATING WHEN ENOUGH SOIL HAS BEEN PLACED ON THE TREATMENT PAD TO PROVIDE A REPRESENTATIVE "LIFT" ON THE TREATMENT PAD (SEE SECTION 02240, SOIL TREATMENT FACILITY AND APPENDIX A).
5 TREATED SOILS SHALL BE REMOVED FROM THE TREATMENT PAD, PLACED BACK IN THE OPEN EXCAVATIONS, AND COMPACTED TO 85% WHILE EXCAVATIONS REMAIN OPEN. CONSTRUCTION FENCING SHALL BE USED AS BARRICADES. RESUME EXCAVATION IN AREAS DESIGNATED TO BE EXCAVATED UNTIL THE NEXT LIFT IS ON THE TREATMENT PAD.
6 IT IS ANTICIPATED THAT 5 LIFTS WILL BE REQUIRED TO TREAT ALL OF THE CONTAMINATED SOILS.
7 DO NOT EXCAVATE OUTSIDE THE LIMITS OF CONSTRUCTION. VERIFY THAT ALL SOIL ABOVE 50 mg/kg TRPH HAS BEEN EXCAVATED AS SPECIFIED IN SECTION 01410, CONFIRMATORY SAMPLING.
8 CONTRACTOR SHALL PROPERLY DISPOSE OF ANY CONCRETE OR OTHER CONSTRUCTION DEBRIS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES.
SOUTHERN DIVISION
SITE 5 SOIL BIOREMEDIATION
EXCAVATION SEQUENCE
JACKSONVILLE, FLORIDA
Environmental Services, Inc.
Tallahassee, Florida
REV. DESCRIPTION PREP BY DATE APPRVD
MILENAL AND CLIENT REVIEW E.S. 3/21/95
CLIENT AND REGULATORY REVIEW KHM 3/28/95
ISSUED FOR CONSTRUCTION KHM 4/14/95
N62467-89-D-0317
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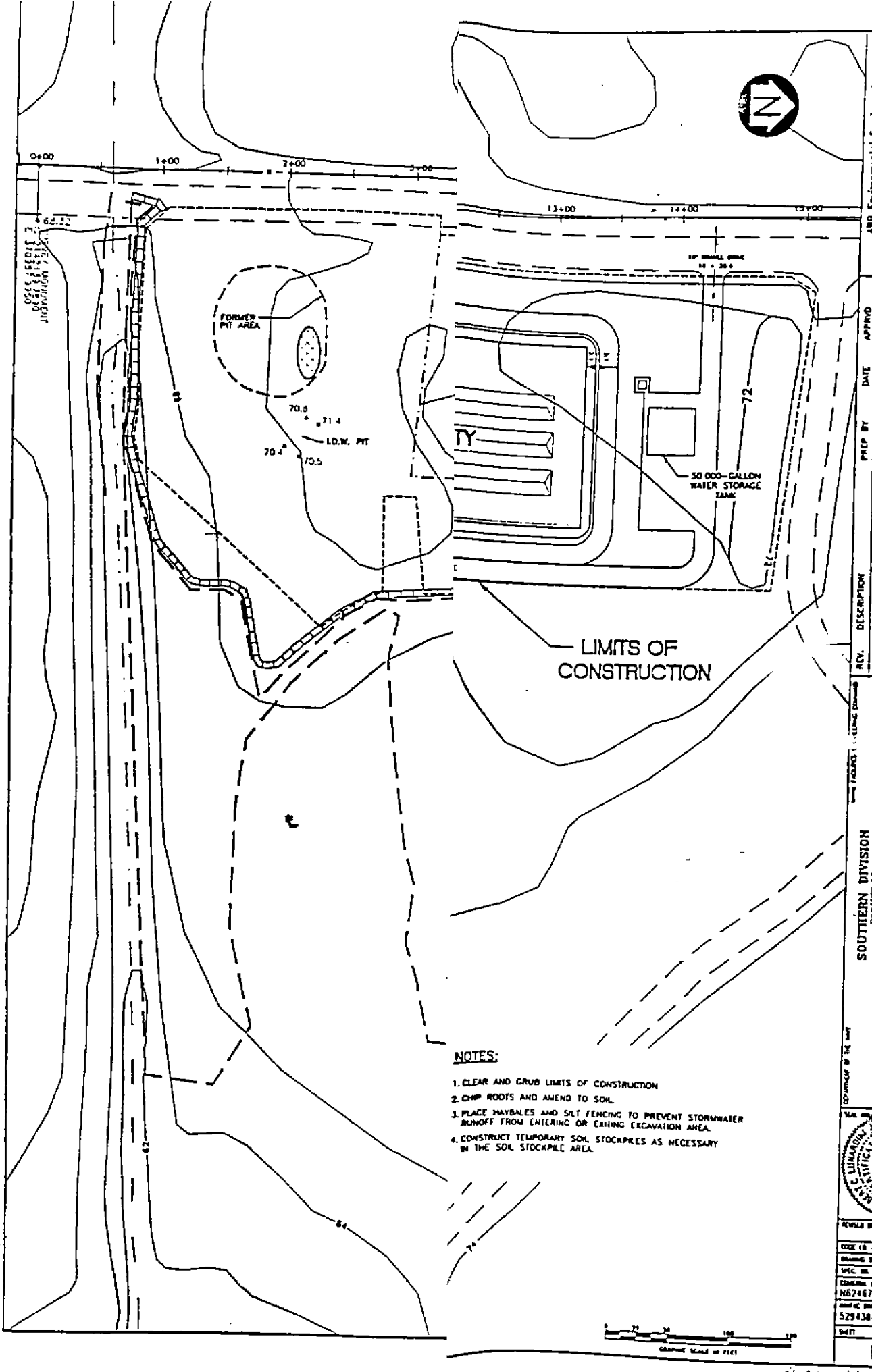
0+00
1+00
2+00
3+00
13+00
14+00
15+00
FORMER PIT AREA
70.6
71.4
70.4
70.5
L.D.W. PIT
72
50 000-GALLON WATER STORAGE TANK
LIMITS OF CONSTRUCTION
NOTES:
1. CLEAR AND GRUB LIMITS OF CONSTRUCTION
2. CHIP ROOTS AND AMEND TO SOIL
3. PLACE HAYBALES AND SILT FENCING TO PREVENT STORMWATER RUNOFF FROM ENTERING OR EXITING EXCAVATION AREA
4. CONSTRUCT TEMPORARY SOIL STOCKPILES AS NECESSARY IN THE SOIL STOCKPILE AREA
ABB Environmental Services, Inc.
Tallahassee, Florida
REV. DESCRIPTION PREP BY DATE APPRVD
A INTERNAL AND CLIENT REVIEW E.A. 3-21-95
B CLIENT AND REGULATORY REVIEW KHM 3-28-95
D ISSUED FOR CONSTRUCTION KHM 4/11/95
SOUTHERN DIVISION
JACKSONVILLE, FLORIDA
SITE 5 SOIL BIOREMEDIATION
SITE PLAN
NAVAL AIR STATION CECIL FIELD
N62467-89-D-0317
5294384
C-1

SITE 5 BIOREMEDIATION
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONSTRUCTION CONTRACT NO. N62467-89-D-0317
SPECIFICATION NO. 18-89-0317

FACILITY MAP

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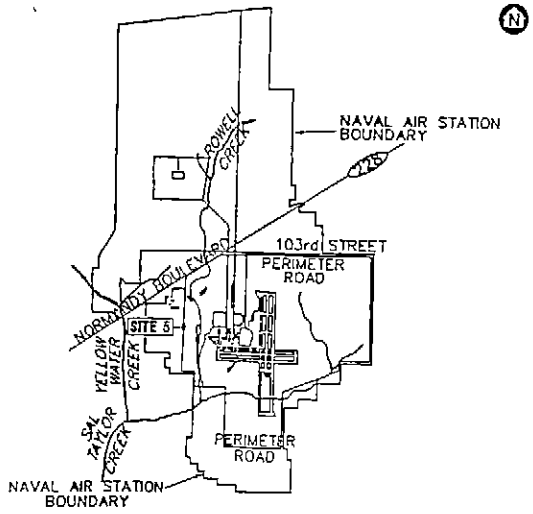
SCALE: 1" = 6000'



LOCATION MAP

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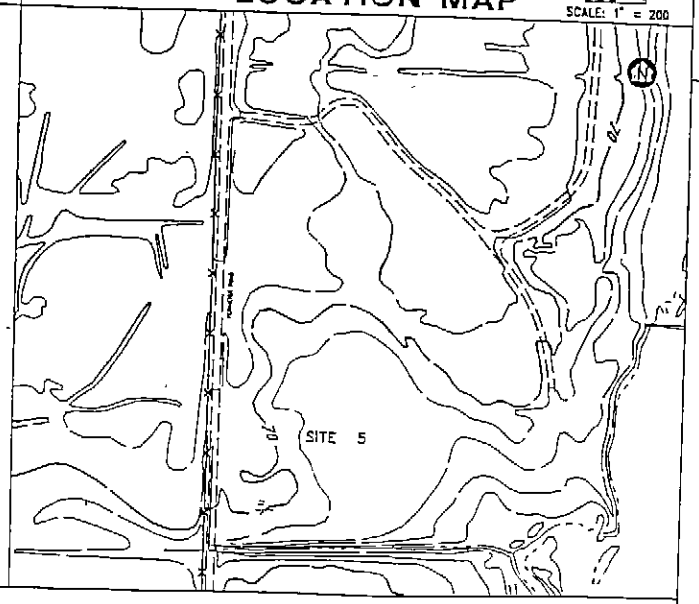
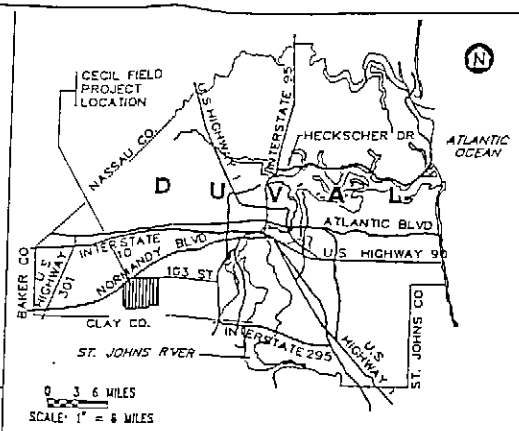
SCALE: 1" = 200



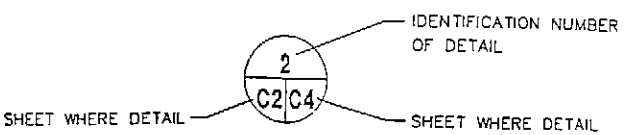
VICINITY MAP



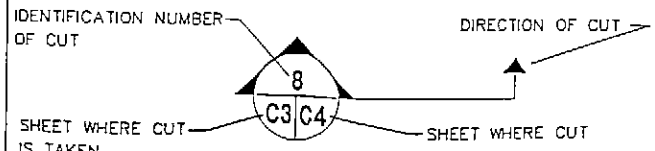
INDEX

SHEET NO.	NAVFAC DRAWING NO.	TITLE
T-1	5294383	INDEX SHEET
C-1	5294384	SITE PLAN
C-2	5294385	SOIL TREATMENT FACILITY & DETAILS
C-3	5294386	WINDROW/PAD SECTIONS AND DETAILS
C-4	5294387	SOIL STOCKPILE LAYOUT AND DETAILS
C-5	5294388	EXCAVATION SEQUENCE
P-1	5294389	PROCESS FLOW

EXAMPLE - DETAIL SYMBOL



EXAMPLE - SECTION SYMBOL



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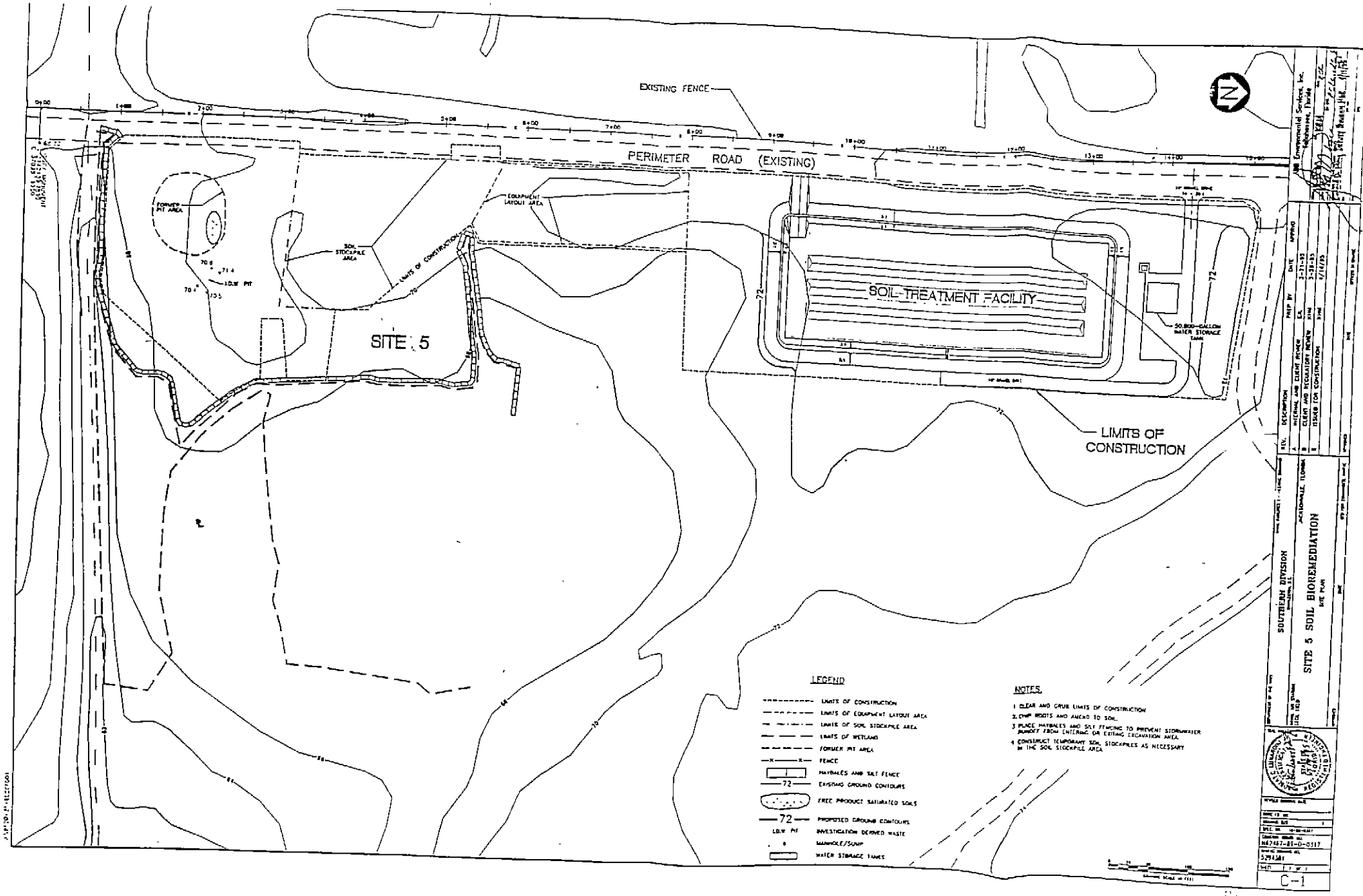
B	CLIENT AND REGULATORY REVIEW	RHM	3/30/93	
B	ISSUED FOR CONSTRUCTION	RHM	4/14/93	

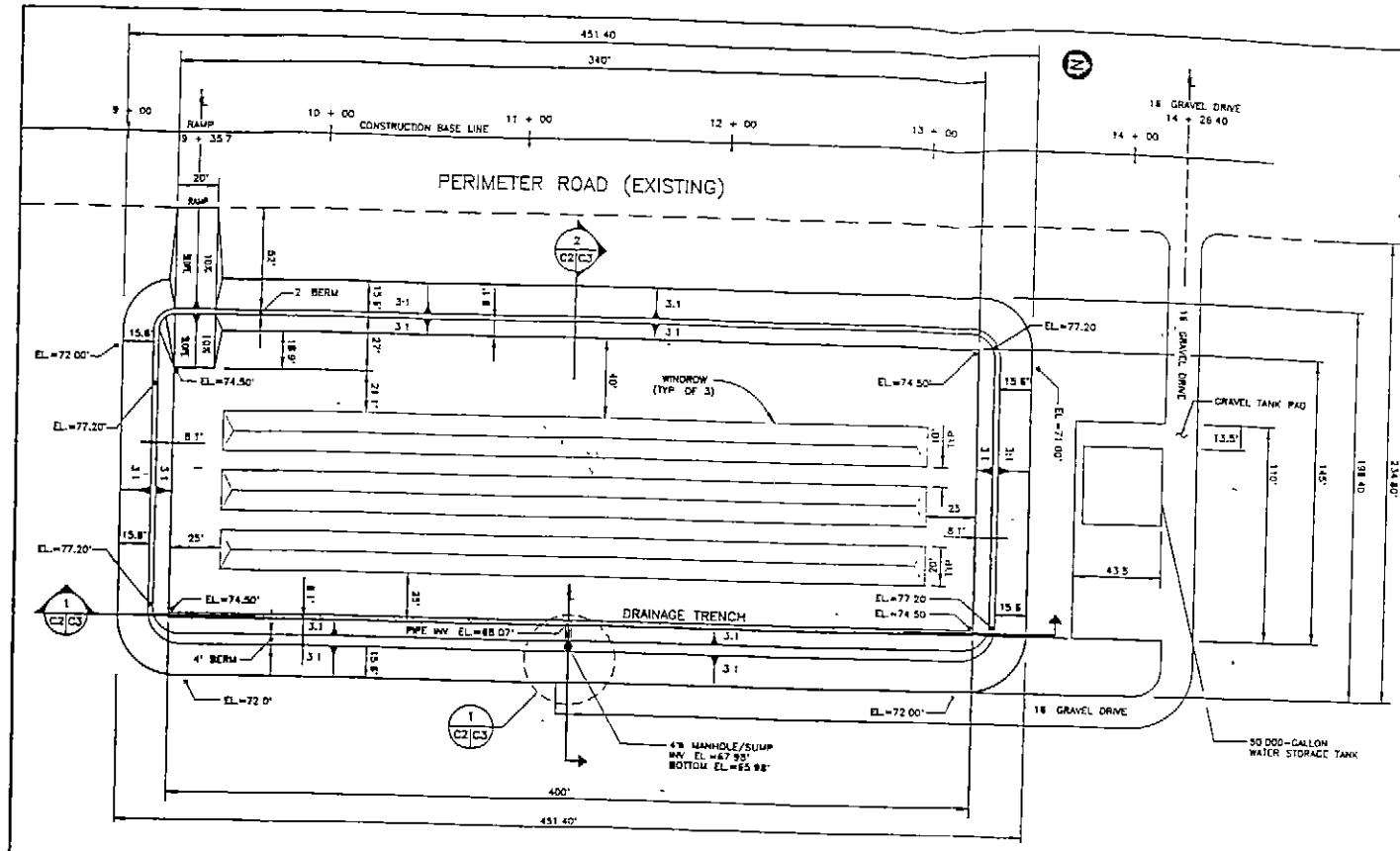
ABB Environmental Services, Inc.
Jacksonville, Florida

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
JACKSONVILLE, FLORIDA

SITE 5 SOIL BIOREMEDIATION
TITLE SHEET

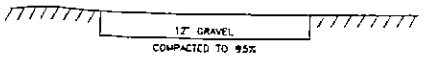
T-1


EXISTING FENCE
PERIMETER ROAD (EXISTING)
EQUIPMENT LAYOUT AREA
SOIL STOCKPILE AREA
LIMITS OF CONSTRUCTION
FORMER PIT AREA
I.D.W. PIT
SITE 5
SOIL TREATMENT FACILITY
50,000-GALLON WATER STORAGE TANK
LIMITS OF CONSTRUCTION
LEGEND
LIMITS OF CONSTRUCTION
LIMITS OF EQUIPMENT LAYOUT AREA
LIMITS OF SOIL STOCKPILE AREA
LIMITS OF WETLAND
FORMER PIT AREA
FENCE
HAYBALES AND SILT FENCE
EXISTING GROUND CONTOURS
FREE PRODUCT SATURATED SOILS
PROPOSED GROUND CONTOURS
I.D.W. PIT INVESTIGATION DERIVED WASTE
MANHOLE/SUMP
WATER STORAGE TANKS
NOTES
1 CLEAR AND GRUB LIMITS OF CONSTRUCTION
2 CHIP ROOTS AND AMEND TO SOIL
3 PLACE HAYBALES AND SILT FENCING TO PREVENT STORMWATER RUNOFF FROM ENTERING OR EXITING EXCAVATION AREA
4 CONSTRUCT TEMPORARY SOIL STOCKPILES AS NECESSARY IN THE SOIL STOCKPILE AREA
SOUTHERN DIVISION
SITE 5 SOIL BIOREMEDIATION
SITE PLAN
C-1



NOTES

1. THC ELEVATIONS SHOWN ARE BASED ON NAS CECIL FIELD DATUM OF 68.32 AT A SURVEY MONUMENT (EAST SIDE OF PERIMETER RD ACROSS FROM STATION 0+00) THE CONTRACTOR SHALL SET ALL GRADES RELATIVE TO THIS DATUM
2. PORTABLE DECON PAD SHALL BE PROVIDED AT RAMP TO DECONTAMINATE SOIL MOVING EQUIPMENT UPON EGRESS
3. GRAVEL DRIVE AND WATER TANK PAD SHALL BE CONSTRUCTED WITH 12 INCHES OF GRAVEL COMPACTED TO 95% SEE SPECIFICATION SECTION 02248, SOIL TREATMENT FACILITY
4. SITE GRADING SHOWN ON SITE PLAN SHEET C-1



GRAVEL DRIVE / TANK PAD DETAIL
NTS

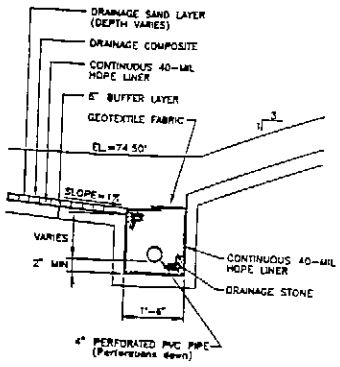
REV	DESCRIPTION	PREP BY	DATE	APPROV
A	INTERNAL AND CLIENT REVIEW	E.A.	3/31/93	
B	CLIENT AND REGULATORY REVIEW	JHM	3/26/93	
C	ISSUED FOR CONSTRUCTION	JHM	4/14/93	

ABB Environmental Services, Inc.
Tallahassee, Florida

SOUTHERN DIVISION
JACKSONVILLE, FLORIDA

SITE 5 SOIL BIOREMEDIA
SOIL TREATMENT FACILITY AND DETAILS

N62467-89-D-0317
S284385
C-2



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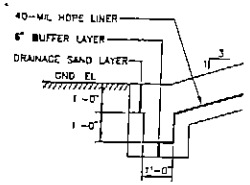
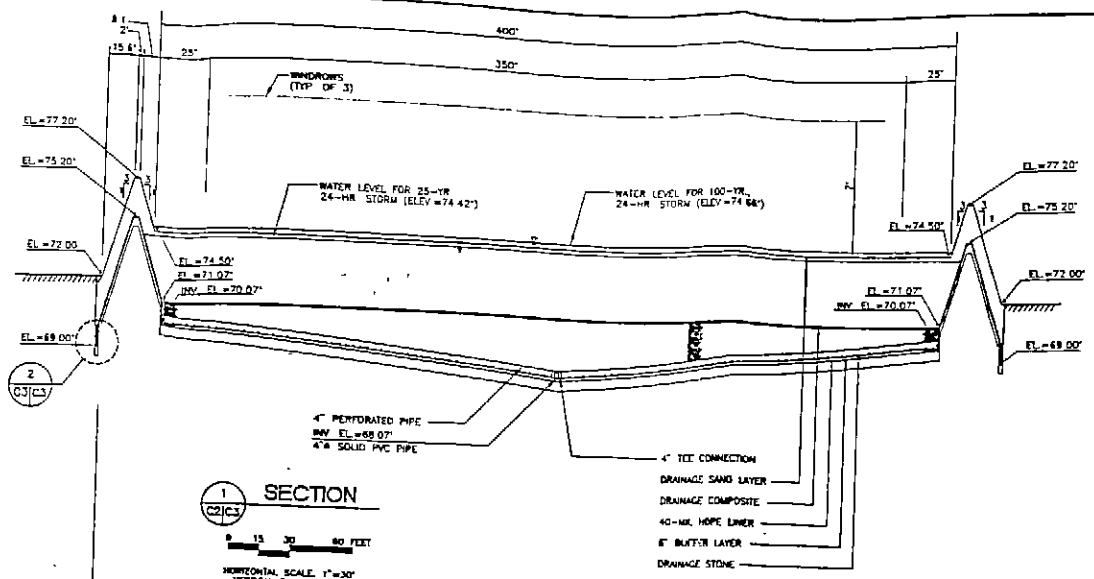


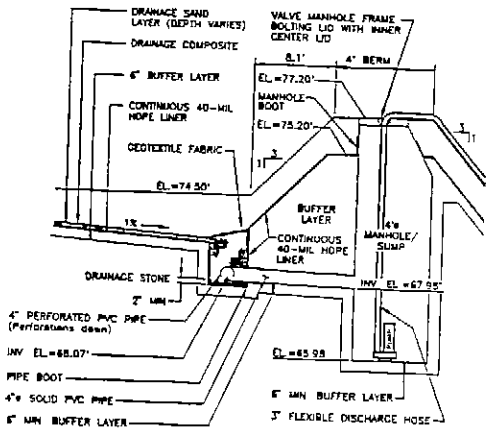
LINER KEYING DETAIL
1"=2

DETAIL 2 C3|C3



1 C2|C3 SECTION

HORIZONTAL SCALE 1"=30'
VERTICAL SCALE 1"=3'

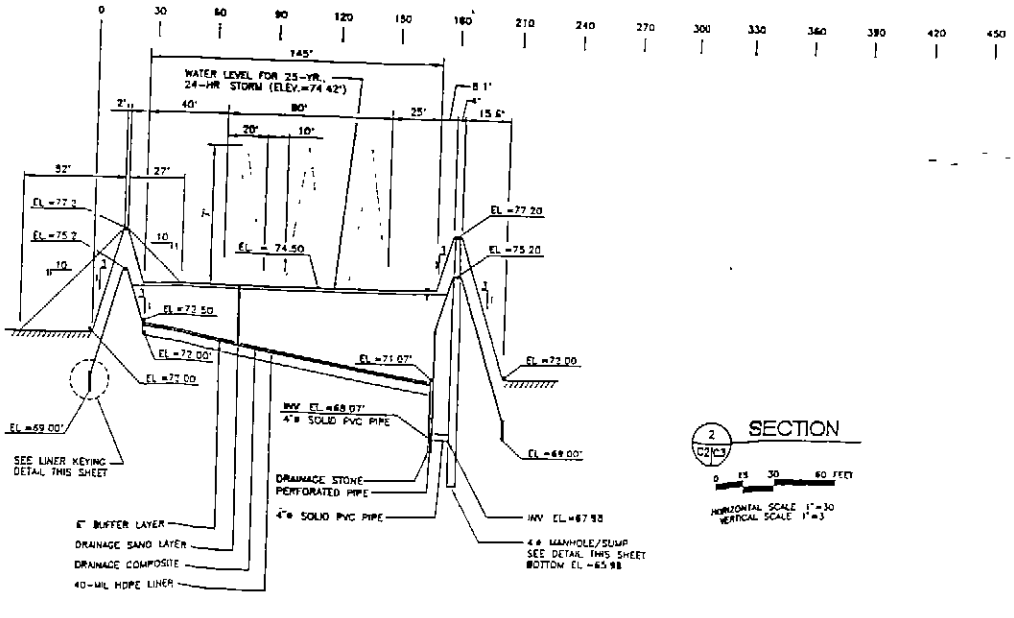


NOTES:

1 MATERIAL USED FOR PIPE AND MANHOLE BEDDING SHALL BE BUFFER LAYER MATERIAL

4'Ø MANHOLE/SUMP DETAIL
N.T.S.

DETAIL 1 C2|C3



2 C2|C3 SECTION

HORIZONTAL SCALE 1"=30'
VERTICAL SCALE 1"=3'

REV.	DESCRIPTION	PREP BY	DATE	APPROVD
A	INTERNAL AND CLIENT REVIEW	KHM	3-31-95	
B	CLIENT AND REGULATORY REVIEW	KHM	5/19/95	
C	ISSUED FOR CONSTRUCTION	KHM	4/14/95	

ABB Environmental Services, Inc.
Gainesville, Florida

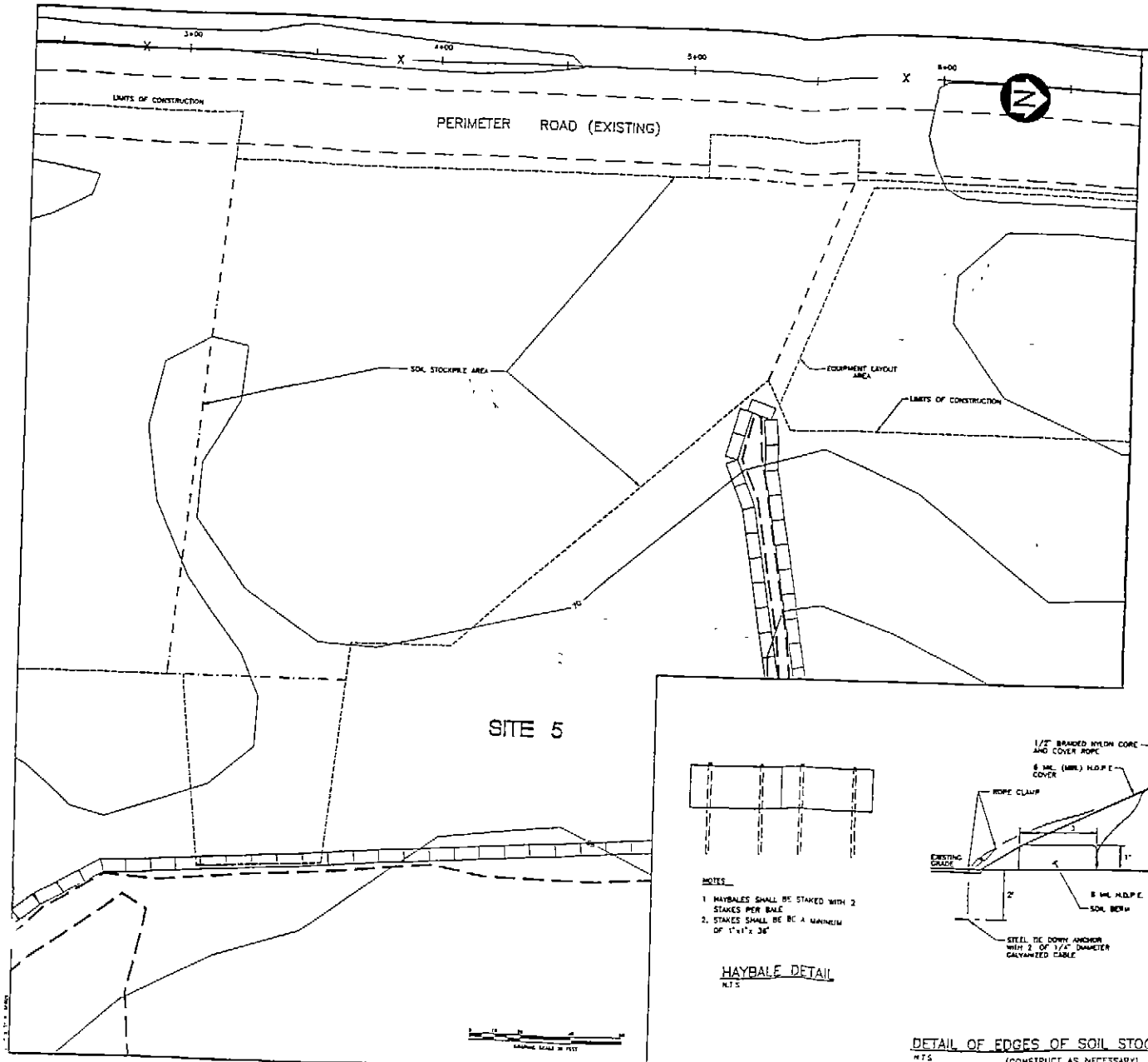
SOUTHERN DIVISION
JACKSONVILLE, FLORIDA

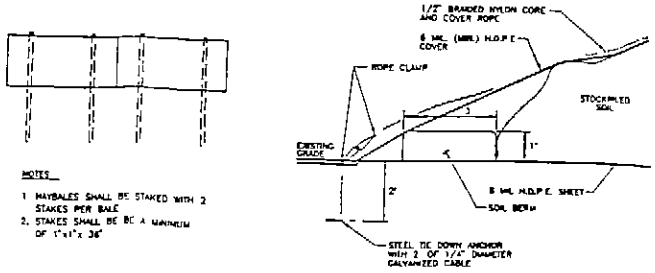
SITE 5 SOIL BIOREMEDIATION
HYDROLOGY/PIPE SECTIONS AND DETAILS

DATE AS SHOWN
CLIENT FILE

N62467-93-D-0312
5294556

C-3





DETAIL OF EDGES OF SOIL STOCKPILE AREA
N.T.S.
(CONSTRUCT AS NECESSARY)

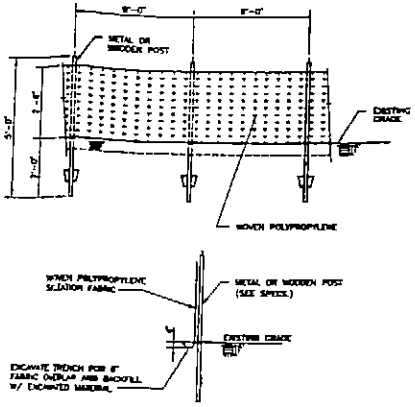
NOTES

1. HAYBALES SHALL BE STAKED WITH 2 STAKES PER BALE
2. STAKES SHALL BE BC A MINIMUM OF 1"x1"x 36"

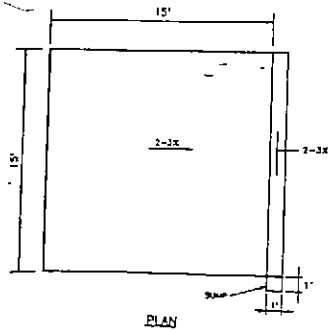
HAYBALE DETAIL
N.T.S.

LEGEND

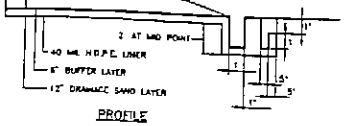
- LIMITS OF EQUIPMENT LAYOUT AREA
- LIMITS OF CONSTRUCTION
- LIMITS OF SOIL STOCKPILE AREA
- LIMITS OF WETLAND
- HAYBALES AND SILT FENCE
- 72 EXISTING GROUND CONTOURS



SILTATION FENCE
N.T.S.



PLAN



PROFILE

DRAINAGE PAD DETAIL
1/4" = 1'-0"

REV	DESCRIPTION	PREP BY	DATE	APPROV
A	INTERNAL AND CLIENT REVIEW	E.A.	3/31/93	
B	CLIENT AND REGULATORY REVIEW	DHM	3/30/93	
B	ISSUED FOR CONSTRUCTION	DHM	4/14/93	

AMEC Environmental Services, Inc.
Tallahassee, Florida

SOUTHERN DIVISION
JACKSONVILLE, FLORIDA

SITE 5 SOIL BIOREMEDIATION
SOIL STOCKPILE LAYOUT AND DETAILS

SITE 5

DRAWING NO. 3234387

C-4

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

SPECIFICATION
NO. 18-89-0317

CONTRACT NO.
N62467-89-D-0317

APPROPRIATION:
ENVIR

SITE 5 SOIL BIOREMEDIATION

at the

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE FLORIDA

DESIGN BY

ABB Environmental Services
2590 Executive Center Circle, East
Berkeley Building
Tallahassee, Florida 32301

SUBMITTED BY

Robert C. Lunardini, Jr.

Robert C. Lunardini, Jr., P.E.

Richard D. May

Rich May
Deputy Program Manager
April 17, 1995

SPECIFICATION PREPARED BY

Maureen McGlone, P.E.
Environmental

J.O. No.: _____ W/R: _____ SEIC: _____ EIC: _____

APPROVED BY

EFD Specification
Branch Head: _____ Design Director: _____

For Commander, NAVFAC: _____ Date: _____

The engineering design and professional opinions rendered in the set of planning documents that describes the Site 5 Soil Bioremediation, NAS Cecil Field, Jacksonville, Florida, were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. These planning documents are intended to be implemented by Southern Division, Naval Facilities Engineering Command's Response Action Contract (RAC) Contractor.

Robert C. Lunardini, Jr.

Professional Engineer No. 46657
Expires February 28, 1997

Robert C Lunardini Jr
17 Apr 95

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01300 SUBMITTALS
01410 CONFIRMATORY SAMPLING

DIVISION 02 -- SITE WORK

02248 SOIL TREATMENT FACILITY
02227 FREE PRODUCT REMOVAL

APPENDIX A

TREATMENT FACILITY STARTUP AND OPERATION AND MAINTENANCE

SPECIFICATION SECTIONS NOT INCLUDED
(assumed to be provided through the Response Action Contract Contractor's contract with Southern Division, Naval Facilities Engineering Command)

01025 MEASUREMENT AND PAYMENT
01041 PROJECT COORDINATION
01310 PROGRESS SCHEDULES
01400 QUALITY CONTROL
01500 CONSTRUCTION FACILITIES
01560 ENVIRONMENTAL PROTECTION
01700 PROJECT CLOSEOUT
02015 SUBSURFACE INFORMATION
02016 EXISTING UTILITIES AND UNDERGROUND STRUCTURES
02050 DEMOLITION AND REMOVAL
02057 EXCAVATED MATERIALS REMOVAL AND DISPOSAL
02102 CLEARING AND GRUBBING
02220 GENERAL EXCAVATION, FILLING, AND BACKFILLING
02229 VEHICLE AND EQUIPMENT DECONTAMINATION

SECTION 01010

SUMMARY OF WORK
04/15/95

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

1.1.1 Project Description

The work includes the removal of approximately 16,300 cubic yards of soil contaminated with petroleum products (greater than 50 milligrams per kilogram [mg/kg] of total petroleum hydrocarbons) and trace volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs); the removal and disposal of approximately 300 gallons of PCB contaminated free product; construction and operation of a soil treatment facility using *ex-situ* bioremediation; construction of a soil stockpile area; restoration of the site; and any incidental and related work.

1.1.2 Location and Former Site Use

Site 5 is located on Naval Air Station (NAS) Cecil Field, and was formerly a 2-acre liquid disposal pit for waste oil and fuel. Disposal occurred from the mid-1950's to approximately 1970. Contaminants at the site include total recoverable petroleum hydrocarbons (TRPH) at an average concentration of 2,500 mg/kg and the PCB Aroclor-1260 at an average concentration of 0.5 mg/kg.

1.2 WORK NOT COVERED BY CONTRACT DOCUMENTS

a. The demolition and closure of the soil treatment facility shall be covered under a separate contract and, therefore, is not addressed in these specifications.

b. The following specifications have been supplied wholly, or in part, in a workplan by the Response Action Contract Contractor. This technical specifications document was prepared with the understanding that the workplan submitted by the Contractor has been approved by Southern Division, Naval Facilities Engineering Command and, therefore, the specifications sections listed below need not be included.

1. 01025 MEASUREMENT AND PAYMENT
2. 01041 PROJECT COORDINATION
3. 01310 PROGRESS SCHEDULES
4. 01400 QUALITY CONTROL
5. 01500 CONSTRUCTION FACILITIES
6. 01560 ENVIRONMENTAL PROTECTION
7. 01700 PROJECT CLOSEOUT
8. 02015 SUBSURFACE INFORMATION
9. 02016 EXISTING UTILITIES AND UNDERGROUND STRUCTURES
10. 02050 DEMOLITION AND REMOVAL
11. 02057 EXCAVATED MATERIALS REMOVAL AND DISPOSAL
12. 02102 CLEARING AND GRUBBING

13. 02220 GENERAL EXCAVATION, FILLING, AND BACKFILLING
14. 02229 VEHICLE AND EQUIPMENT DECONTAMINATION

1.3 SUBMITTALS

Not used.

1.4 MINIMUM INSURANCE REQUIREMENTS

Not used.

1.5 CONTRACTOR PERSONNEL REQUIREMENTS

Not used.

1.6 CONTRACTOR ACCESS AND USE OF PREMISES

Not used.

1.7 PRECONSTRUCTION CONFERENCE

Prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program; preparation and submission of the schedule of prices, shop drawings, and other submittals; scheduling; programming; and prosecution of work. Major subcontractors who will be engaged in the work shall also attend.

1.7.1 Minimum Agenda

a. Distribute and discuss.
   1. List of major subcontractors.
   2. Tentative construction schedules.
b. Critical work sequencing.
c. Relation and coordination of subcontractors.
d. Designation of responsible personnel.
e. Processing of field decisions and change orders.
f. Submittal of shop drawings, project data, and samples.
g. Use of premises:
   1. Office and storage areas.
   2. Owner's requirements.
h. Payment and procurement of materials.
i. Safety and first-aid procedures.
j. Testing of materials.
k. Estimates for partial payments.
l. Environmental protection.

1.8 CONSTRUCTION SEQUENCE

The recommended construction sequence for this project is as follows:

a. Clearing and grubbing of areas within designated limits of construction.
b. Construction of the soil treatment facility.
c. Construction of the soil stockpile area (if necessary).

d. Construction of the saturated soil drainage pad.
e Excavation and removal of free product.
f. Excavation of one treatment lift of contaminated soil to a maximum depth of 8 feet.
g. Operation and maintenance of soil treatment facility.
h. Backfill excavations with treated soil and then seed.
i. Repeat steps f, g, and h, until all soil above 50 mg/kg TRPH has been treated.

1.8.1 Clearing and Grubbing

The Contractor shall clear all debris and vegetation from the site. Roots shall be grubbed and may be chipped and reused onsite. Clearing and grubbing shall be performed in accordance with the Technical Specification for Clearing and Grubbing included in the workplan prepared by Bechtel Environmental, Inc. (BEI).

1.8.2 Construction of Treatment Facility

The treatment facility shall consist of a lined treatment pad surrounded by a continuous earthen berm as shown on the Drawings. Construction of the treatment facility also includes provision of water collection, storage, and distribution systems as well as a gravel drive. Refer to Section 02248; Soil Treatment Facility.

1.8.3 Construction of Stockpile Area

The Contractor may construct a stockpile area as necessary to temporarily store site soil as shown on Drawing C-4. The stockpile area shall be located to the north of the former pit area and sloped such that runoff drains to the open excavation. The stockpile area shall be constructed by placing 6-mil polyethylene on top of contaminated surface soil and sand or gravel berms.

1.8.4 Construction of Drainage Pad

A drainage pad shall be constructed to drain free product saturated soil excavated from the site. See Drawing C-4 for drain pad construction details.

1.8.5 Free Product Removal

Soil saturated with free product shall be excavated, placed on the drainage pad, and allowed to drain to the drainage pad sump. The liquid collected from the sump of the drainage pad shall be containerized and disposed as outlined in Section 01410; Confirmatory Sampling. Soil from the drainage pad shall be tested and disposed as outlined in Section 01410; Confirmatory Sampling.

1.8.6 Soil Excavation

Contaminated soil shall be excavated from the areas designated on Drawing C-5. Confirmatory sampling of the excavations shall further delineate the limits of excavation as outlined in Section 01410; Confirmatory Sampling. All soil shall be excavated as directed by the Contracting Officer in the

manner described in the workplan prepared by BEI. All excavated materials shall be placed on the treatment pad as directed in the field by the Contracting Officer.

1.8.6 Treatment Facility Operation and Maintenance

Ex-situ bioremediation consists of creating optimal microbial conditions in excavated soil through the mechanical mixing of the soil and the addition of amendments. Soil shall be taken from the stockpile area and placed on the treatment pad as directed by the Contracting Officer. It is estimated that between 2,500 and 3,500 cubic yards (yds^3) of soil can be treated in the treatment facility at one time. This corresponds to five treatment cycles. Operation and maintenance of the treatment facility is discussed further in the Operation and Maintenance Plan included as Appendix A to these specifications.

1.8.7 Site Restoration

Treated soil shall be used to backfill excavations and shall be compacted to 85 percent dry density. The site shall be graded to match existing contours. Provide 4 inches of topsoil for newly graded surfaces and areas disturbed by the Contractor. Seed shall match existing vegetation. Provide seed at 5 pounds per 1,000 square feet. Provide CID A-A-1909, Type I, Class 2, 10-10-10 analysis fertilizer at 25 pounds per 1,000 square feet. Provide commercial agricultural lime of 94-80-14 analysis at 70 pounds per 1,000 square feet. Provide mulch and water to establish an acceptable stand of grass.

--End of Section--

SECTION 01300

SUBMITTALS
04/15/95

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Submittal

Submittals are shop drawings, product data, samples, and administrative submittals presented for review and approval. Contract clauses "Material and Workmanship," paragraph (b) and "Specifications and Drawings for Construction," paragraphs (d), (e), and (f), apply to all "submittals."

1.1.2 Types of Submittals

The following four groupings of submittals into which all submittal descriptions are classified, are as designated in the paragraph entitled "Schedule of Submittal Descriptions."

a. Shop drawings includes as used in this section, drawings, schedules, diagrams, and other data prepared specifically for this Contract, by the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate a portion of the work.

b. Product data are preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate a portion of the work, but not prepared exclusively for this Contract.

c. Samples are physical examples of products, materials, equipment, assemblies, or workmanship that are physically identical to a portion of the work, illustrating a portion of the work, or establishing standards for evaluating the appearance of the finished work or both.

d. Administrative submittals are data presented for reviews and approval to ensure that the administrative requirements of the project are adequately met but not to ensure directly that the work is in accordance with the design concept and in compliance with the Contract documents.

1.1.3 Approving Authority

The person authorized to approve a submittal.

1.1.4 Work

As used in this Section, work is on- and off-base construction required by the Contract documents, including labor necessary to produce the construction and materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.2 SUBMITTALS

Submit the following in accordance with the requirements of this section.

1.2.1 SD-18, Records

a. Submittal register G

1.2.1.2 Submittal Register Preparation

Prepare and maintain a submittal register. Forms are attached after the end of this section for use in developing the submittal register. The submittal register with columns (a), (b), (c), and (d) completed by the Contractor is designated the initial submittal register required as a part of the quality control plan. Information for completing columns (a), (b), (c), and (d) of the submittal register shall be obtained through the submittal requirements of the technical specification sections. The information needed to suit columns (a), (b), and (d) is self-explanatory. For column (c), the specification paragraph number that contains the performance requirements for the submittal item is intended. Other columns on the submittal register forms shall be completed as required by the approved quality control plan. Additional details concerning the use of the submittal register will be explained at the preconstruction conference.

1.3 PROCEDURES FOR SUBMITTALS

1.3.1 Reviewing, Certifying, and Approving Authority

The QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. The approving authority on submittals is the QC Manager unless otherwise specified for the specific submittal. At each "Submittal" paragraph in the individual specification Sections, a notation "G," following a submittal item, indicates the Contracting Officer is the approving authority for that submittal item.

1.3.2 Constraints

a. Submittals listed or specified in this Contract shall conform to the provisions of this Section, unless explicitly stated otherwise.

b. Submittals shall be complete for each definable feature of work; components of the definable feature interrelated as a system shall be submitted at the same time.

c. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, the submittal will be returned without review.

d. Approval of a separate material, product, or component does not imply approval of the assembly in which the item functions.

1.3.3 Scheduling

a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of the work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.

b. Except as specified otherwise, allow a review period, beginning with receipt by the approving authority, that includes at least 15 working days for submittals for QC Manager approval and 25 working days for submittals for Contracting Officer approval. The period of review for submittals with Contracting Officer approval begins when the Government receives the submittal from the QC organization. The period of review for each resubmittal is the same as for the initial submittal.

1.3.4 Variations

Variations from contract requirements require Government approval pursuant to the contract clause entitled "Specifications and Drawings for Construction" and will be considered where advantageous to the Government. When proposing a variation, submit a written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Government. If lower cost is a benefit, also include an estimate of the cost saving. Identify the proposed variation separately and include the documentation for the proposed variation along with the required submittal for the item. When submitting a variation for approval, the Contractor warrants the following.

1.3.4.1 Variation Is Compatible

The Contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work.

1.3.4.2 Contractor Is Responsible

The Contractor shall take actions and bear the additional costs, including review costs by the Government, necessary due to the proposed variation.

1.3.4.3 Review Schedule Is Modified

In addition to the normal submittal review period, a period of 15 working days will be allowed for consideration by the Government of submittals with variations.

1.3.5 Resubmittal Costs

Initial submittals requiring Government approval will be reviewed at no cost to the Contractor. The cost of reviewing resubmittals, for reason of failure of the initial submittal to meet contract requirements, shall be the responsibility of the Contractor. The Contracting Officer will issue a deductive contract modification to reduce the contract price by $100.00 for each resubmittal of items requiring Government review and approval. The contract completion date will not be extended due to non-compliance with submittal requirements.

1.3.6 Contractor's Responsibilities

a. Determine and verify field measurements, materials, and field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and Contract documents.

b. Transmit submittals to the QC organization in orderly sequence, in accordance with the Submittal Register, and to prevent delays in the work, delays to the Government, or delays to separate contractors.

c. Advise the Contracting Officer of variation, as required by the paragraph entitled "Variations."

d. Correct and resubmit submittal as directed by the approving authority. Direct specific attention, in writing or on resubmitted submittal, to revisions not requested by the approving authority on previous submissions.

e. Furnish additional copies of submittals when requested by the Contracting Officer, to a limit of 20 submittals.

f. Complete work that must be accomplished as a basis of a submittal in time to allow the submittal to occur as scheduled.

g. Ensure no work has begun until submittals for that work have been returned as "approved," or "approved as noted" or "approved except as noted; resubmission not required," except to the extent that a portion of the work must be accomplished as a basis of the submittal.

1.3.7 QC Organization Responsibilities

a. Note the date on which the submittal was received from the contractor on each submittal for which the QC Manager is the approving authority.

b. Determine and verify field measurements, materials, and field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and Contract documents.

c. Review submittals for conformance with project design concepts and compliance with the Contract documents.

d. Act on submittals, determining the appropriate action based on the QC organization's review of the submittal.

(1) When the QC Manager is the approving authority, take the appropriate action on the submittal from the possible actions defined in the paragraph entitled, "Actions Possible."

(2) When the Contracting Officer is the approving authority or when a variation has been proposed, forward the submittal to the Government with the certifying statement or return the submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of the submittal determines the appropriate action.

e. Ensure that material is clearly legible.

f. Stamp each sheet of each submittal with the QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.

(1) When the approving authority is the Contracting Officer, the QC organization will certify submittals forwarded to the Contracting Officer with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number _____, is in compliance with the Contract drawings and specification, can be installed in the allocated spaces and is submitted for Government approval. Government approval of proposed variation, if any, is recommended.

Certified by Submittal Reviewer _____, Date _____ (Signature when applicable)

Certified by QC Manager _____, Date _____ (Signature)

(2) When the approving authority is the QC Manager, the QC Manager will use the following approval statement when returning submittals to the Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number _____, is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is _____ approved for use, _____ approved for use subject to Government approval of proposed variation.

Certified by Submittal Reviewer _____, Date _____ (Signature when applicable)

Approved by QC Manager _____, Date _____" (Signature)

g. Sign the certifying statement or approval statement. The person signing the certifying statements shall be the QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.

h. Update the submittal register as submittal actions occur and maintain the submittal register at the project site until final acceptance of all work by the Contracting Officer.

i. Retain a copy of approved submittals at the project site, including the Contractor's copy of approved samples.

j. When the approving authority is the QC Manager, forward two copies of each approved submittal, except "Samples" where one set is required, to the Contracting Officer.

1.3.8 Government's Responsibilities

When the approving authority is the Contracting Officer, the Government will the following.

a. Note the date on which the submittal was received from the QC Manager on each submittal for which the Contracting Officer is the approving authority.

b. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with the Contract documents.

c. Identify returned submittals with one of the actions defined in the paragraph entitled "Actions Possible" and with markings appropriate for the action indicated.

d. Retain three copies of each submittal, except "Samples," where one copy will be retained.

1.3.9 Actions Possible

Submittals will be returned with one of the following notations:

a. Submittals marked "not reviewed" will indicate the submittal has been previously reviewed and approved, is not required as a submittal, does not have evidence of being reviewed and approved by the Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Returned submittals deemed to lack review by the Contractor or to be incomplete shall be resubmitted with appropriate action, coordination, or change.

b. Submittals marked "approved" or "approved as submitted" authorize the Contractor to proceed with the work covered.

c. Submittals marked "approved as noted" or "approved except as noted; resubmission not required" authorize the Contractor to proceed with the work as noted provided the Contractor takes no exception to the notations.

d. Submittals marked "revise and resubmit" or "disapproved" indicate the submittal is incomplete or does not comply with the design concept or the requirements of the Contract documents and shall be resubmitted with appropriate changes.

1.4 FORMAT OF SUBMITTALS

1.4.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels, to the office of the approving authority. Transmit submittals with a transmittal form prescribed by the Contracting Officer and standard for the project. The transmittal form shall identify the Contractor, indicate the date of the submittal, and include information prescribed by the transmittal form and required in the paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

1.4.2 Identifying Submittals

Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on the transmittal form. Mark each copy of each submittal identically, with the following:

a. project title and location;

b. construction Contract number;

c. the Section number of the specification Section by which the submittal is required;

d. the submittal description (SD) number of each component of the submittal;

e. when a resubmission, an alphabetic suffix on the submittal description, for example, SD-10A, to indicate the resubmission;

f. the name, address, and telephone number of the subcontractor, supplier, manufacturer, and any other second tier contractor associated with the submittal; and

g. product identification and location in project.

1.4.3 Format for Product Data

a. Present product data submittals for each Section as a complete, bound volume. Include a table of contents listing page and catalog item numbers for product data.

b. Indicate, by prominent notation, each product that is being submitted; indicate the specification Section number and paragraph number to which it pertains.

c. Supplement product data with material prepared for the project to satisfy submittal requirements for which product data do not exist. Identify this material as developed specifically for the project.

1.4.4 Format for Shop Drawings

a. Shop drawings shall not be less than 8 1/2 by 11 inches nor more than 30 by 42 inches.

b. Present 8 1/2 by 11-sized shop drawings as a part of the bound volume for the submittals required by the Section. Present larger drawings in sets.

c. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to the information required in the paragraph entitled "Identifying Submittals."

d. Dimension drawings, except diagrams and schematic drawings, prepare drawings demonstrating interface with other trades to scale. Identify materials and products for work shown.

1.4.5 Format of Samples

a. Furnish samples in the sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately the same size as specified.

(1) Sample of equipment or device: full size.

(2) Sample of materials less than 2 by 3 inches: built up to 8 1/2 by 11 inches.

(3) Sample of Materials exceeding 8 1/2 by 11 inches: cut down to 8 1/2 by 11 inches but ensure the size is adequate to indicate color, texture, and material variations.

(4) Sample of linear devices or materials: 10-inch length or length to be supplied if less than 10 inches. Examples of linear devices or materials are conduit and handrails.

(5) Sample of non-solid materials: pint. Examples of non-solid materials are sand and paint.

(6) Color selection samples: 2 inches by 4 inches.

(7) Sample panel: 4 feet by 4 feet.

(8) Sample installation: 100 square feet.

b. Samples showing range of variation: Where variations are unavoidable due to the nature of the materials, submit sets of samples of not less than three units showing the extremes and middle of the range.

c. Reusable samples: Incorporate returned samples into the work only if so specified or indicated. Incorporated samples shall be in undamaged condition at the time of use.

d. Recording of sample installation: Note and preserve the notation of the area constituting the sample installation but remove the notation at the final clean up of the project.

1.4.6 Format of Administrative Closeout Submittals

a. When the submittal includes a document that is to be used in the project or become a part of the project record, other than as a submittal, do not apply the Contractor's approval stamp to the document, but to a separate sheet accompanying the document.

1.5 QUANTITY OF SUBMITTALS

1.5.1 Number of Copies of Product Data

a. Submit three copies of submittals of product data requiring review and approval only by the QC organization and three copies of product data requiring review and approval by the Contracting Officer.

1.5.2 Number of Copies of Shop Drawings

a. For shop drawings presented on sheets larger than 8 1/2-inches by 14 inches, submit one reproducible and three prints of each shop drawing prepared for this project.

(1) Transmit reproducibles rolled in mailing tubes.

(2) After review, the approving authority will retain the prints and return only the reproducible with notations resulting from the review.

b. For shop drawings presented on sheets 8 1/2-inches by 14 inches or less, conform to the quantity requirements for product data.

1.5.3 Number of Samples

a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.

b. Submit one sample panel. Include components listed in the technical section or as directed.

c. Submit one sample per installation, where directed.

d. Submit one sample of non-solid materials.

1.5.4 Number of Copies of Administrative and Closeout Submittals

a. Unless otherwise specified, submit administrative and closeout submittals that are 8 1/2 inches by 14 inches or smaller in size in the quantity required for product data.

b. Unless otherwise specified, submit administrative and closeout submittals larger than 8 1/2 inches by 14 inches in size in the quantities required for shop drawings.

1.6 SCHEDULE OF SUBMITTAL DESCRIPTIONS (SD)

SD-01. Data

Submittals that provide calculations, descriptions, or other documentation regarding the work.

SD-02, Manufacturer's Catalog Data

Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. A type of product data.

SD-03. Manufacturer's Standard Color Charts

Preprinted illustrations displaying choices of color and finish for a material or product. A type of product data.

SD-04. Drawings

Submittals that graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrications, or layouts of particular elements, connections, and other relational aspects of the work. A type of shop drawing.

SD-05. Design Data

Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work. A type of shop drawing.

SD-06. Instructions

Preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions. A type of product data.

SD-07. Schedules

A tabular list of data or tabular list including location. features or other pertinent information regarding products. materials. equipment. or components to be used in the work. A type of shop drawing.

SD-08. Statements

A document. required of the Contractor. or through the Contractor by way of a supplier. installer. manufacturer, or other lower tier contractor. the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel. or qualifications or other verification of quality. A type of shop drawing.

SD-09, Reports

Reports of inspection and laboratory test. including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

SD-10. Test Reports

A report signed by an authorized official of a testing laboratory that a material. product, or system identical to the material. product, or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product, or system has passed or failed the test. Testing must have been within 3 years of the date of award of this Contract. A type of product data.

SD-11. Factory Test Reports

A written report that includes the findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product or system has passed or failed the test. A type of shop drawing.

SD-12, Field Test Reports

A written report that includes the findings of a test made at the job site. in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, or during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements, state the test results, and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

SD-13. Certificates

Statements signed by responsible officials of a manufacturer of a product. system, or material attesting that the product. system. or material meet specified requirements. The statements must be dated after the award of this contract. name the project, and list the specific requirements that it is intended to address. A type of shop drawing.

SD-14. Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work. A type of sample.

SD-15. Color Selection Samples

Samples of the available choice of colors, textures. and finishes of a product or material, presented over substrates identical in texture to that proposed for the work. A type of sample.

SD-16. Sample Panels

An assembly constructed at the project site in a location acceptable to the Contracting Officer and using materials and methods to be employed in the work; completely finished, maintained during construction; and removed at the conclusion of the work or when authorized by the Contracting Officer. A type of sample.

SD-17. Sample Installations

A portion of an assembly or material constructed where directed and, if approved. retained as a part of the work. A type of sample.

SD-18. Records

Documentation to ensure compliance with an administrative requirement or to establish an administrative mechanism. A type of administrative submittal.

SD-19. Operation and Maintenance Manuals

Data intended to be incorporated in an Operations and Maintenance Manual. A type of administrative submittal.

-- End of Section --

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SUBMITTAL REGISTER (PART A)

Contract Number: Project Title:

Spec Section No.	SD No. and Type of Submittal MATERIAL OR PRODUCT	Spec Para No.	Classif/ Appr By CO	Gov't or A/E Reviewer	Trans Control No.	Planned Submittal Date
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1) 01300	SD-18 Submittal Register	1.2.1	G			
2) 01410	SD-18 Sampling and Analysis Plan	1.3	G			
3) 01410	SD-18 Analytical Test Results	1.3	G			
4) 02227	SD-01 HDPE Liner	1.3	G			
5) 02227	SD-09 Drainage Sand Layer	1.3	G			
6) 02227	SD-09 Buffer Layer	1.3	G			
7) 02227	SD-09 HDPE Liner	1.3	G			
8) 02227	SD-13 HDPE Liner Certificate	1.3	G			
9) 02227	SD-09 Laboratory Grain Size Results	1.3.1	G			
10) 02227	SD-09 Laboratory Moisture Density Relationship Test	1.3.1	G			
11) 02227	SD-09 Laboratory Permeability Test Results	1.3.1	G			
12) 02227	SD-09 Field Grain Size Results	1.3.1	G			
13) 02227	SD-09 Field Moisture Density Test Results	1.3.1	G			
14) 02227	SD-09 Field Permeability Test Results	1.3.1	G			
15) 02227	SD-09 Field Density and Moisture Content Test Results	1.3.1	G			
16) 02227	SD-09 Laboratory Quality Assurance Test on HDPE Liner	1.3.1	G			
17) 02227	SD-09 Field Quality Assurance Test on HDPE Liner	1.3.1	G			
18) 02248	SD-01 Drainage Composite	1.3	G			
19) 02248	SD-01 HDPE Liner	1.3	G			
20) 02248	SD-01 Geotextile Filter Fabric	1.3	G			
21) 02248	SD-01 Storage Tank	1.3	G			
22) 02248	SD-01 PVC Pipe	1.3	G			
23) 02248	SD-01 Precast Concrete Mannole	1.3	G			
24) 02248	SD-01 Water Distribution System	1.3	G			
25) 02248	SD-01 Sump Pump	1.3	G			
26) 02248	SD-01 Soil Stockpile Liner and Cover Material	1.3	G			

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SUBMITTAL REGISTER (PART A)

Contract Number: Project Title:

Spec Section No.	SD No. and Type of Submittal MATERIAL OR PRODUCT	Spec Para No.	Classif/ Appr By CO	Gov't or A/E Reviewer	Trans Control No.	Planned Submittal Date
(a)	(b)	(c)	(d)	(e)	(f)	(g)
27) 02248	SD-04 Precast Concrete Manhole	1.3	G			
28) 02248	SD-09 Drainage Sand Layer	1.3	G			
29) 02248	SD-09 Buffer Layer	1.3	G			
30) 02248	SD-09 Drainage Stone	1.3	G			
31) 02248	SD-09 HDPE Liner	1.3	G			
32) 02248	SD-09 Soil Stockpile Liner and Cover Material	1.3	G			
33) 02248	SD-13 PVC Piping, Fittings	1.3	G			
34) 02248	SD-13 Cast Iron Frames, Covers, and Gratings	1.3	G			
35) 02248	SD-13 Precast Concrete Manhole Sections	1.3	G			
36) 02248	SD-13 HDPE Liner	1.3	G			
37) 02248	SD-13 Drainage Composite	1.3	G			
38) 02248	SD-13 Geotextile Filter Fabric	1.3	G			
39) 02248	SD-13 Water Distribution System	1.3	G			
40) 02248	SD-13 Soil Stockpile Liner and Cover Material	1.3	G			
41) 02248	SD-09 Laboratory Grain Size Results	1.4.1	G			
42) 02248	SD-09 Laboratory Moisture Density Relationship Test	1.4.1	G			
43) 02248	SD-09 Laboratory Permeability Test Results	1.4.1	G			
44) 02248	SD-09 Field Grain Size Results	1.4.1	G			
45) 02248	SD-09 Field Moisture Density Test Results	1.4.1	G			
46) 02248	SD-09 Field Permeability Test Results	1.4.1	G			
47) 02248	SD-09 Field Density and Moisture Content Test Results	1.4.1	G			
48) 02248	SD-09 Laboratory Quality Assurance Test on HDPE Liner	1.4.1	G			
49) 02248	SD-09 Field Quality Assurance Test on HDPE Liner	1.4.1	G			
50) APP. A	SD-02 Windrow Construction/Aeration Equipment	1.0	G			

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SUBMITTAL REGISTER (PART A)

Contract Number: Project Title:

Spec Section No.	SD No. and Type of Submittal MATERIAL OR PRODUCT	Spec Para No.	Classif/ Appr By CO	Gov't or A/E Reviewer	Trans Control No.	Planned Submittal Date
(a)	(b)	(c)	(d)	(e)	(f)	(g)
51) APP. A	SD-13 Agricultural Lime Formulation	2.1	G			
52) APP. A	SD-13 Fertilizer Formulation	2.2	G			
53) APP. A	SD-13 Manure Type	2.3	G			
54) APP. A	SD-02 Gas Analysis Equipment	3.1	G			
55) APP. A	SD-02 Soil Moisture Probe	3.2	G			
56) APP. A	SD-02 Watering Equipment	3.2.1	G			

*Navy Notes:
Approved by:
G Contracting Officer
Blank: CQC Manager

*NASA Notes.
Approved by:
Blank: Contracting Officer

*Army Notes:
Classification:
GA: Gov't Approval
FIO: for Information Only

SECTION 01410

CONFIRMATORY SAMPLING
04/15/95

PART 1 GENERAL

1.1 SUMMARY

This section covers the Contractor's requirements for sampling and analysis during excavation activities. All activities conducted under this section shall be in accordance with the Contractor's approved Site Safety and Health Plan (SSHP).

Sampling is required for the following:

a. free product saturated soil.
b. free product,
c. total recoverable petroleum hydrocarbon (TRPH) contaminated soil, and
d. post excavation risk assessment.

1.2 REFERENCES

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261 Appendix I	Representative Sampling Methods
40 CFR 761.60-.79	Toxic Substances Control Act

U.S. ENVIRONMENTAL PROTECTION AGENCY (USEPA).

EPA/600/8-89/046	Soil Sampling Quality Assurance User Guide (Second Edition)
EPA/548/G-89/004	Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA
SW-846	Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd edition, November 1986, Revised December 1987 and December 1988
EPA/600/4-79-20	Methods for Chemical Analysis of Water and Wastes, Revised March 1983
EPA/600/4-84-076	Characterization of Hazardous Waste Sites, A Method Manual: Volume II. Available Sampling Methods, Second Edition, December 1984, NTIS No. PB85-168771.

EPA/540/G-87/003	Data Quality Objectives for Remedial Response Activities, Development Process
	Standard Operating Procedures and Quality Assurance Manual. USEPA Region IV, ESD, February 1991.

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY (NEESA)

NEESA 202-047B	Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program

1.2.1 Other References

ABB Environmental Services, Inc. (ABB-ES), 1994, Focused Feasibility Study, Site 5, Operable Unit 2, Source Control Remedial Alternatives, Naval Air Station Cecil Field, Jacksonville, Florida: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, August.

Bechtel Environmental, Inc. (BEI), 1994, Workplan for Site 5, Cecil Field: prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Charleston, South Carolina, August.

1.3 SUBMITTALS

SD-08, Statements

a. Sampling and Analysis Plan G

Submit a Sampling and Analysis Plan to the Contracting Officer that complies, as applicable, with USEPA SW-846, EPA/600/8-89/046, EPA/548/G-89/004, 40 CFR 261 Appendix I, and other applicable references cited in Paragraph 1.1 of this section. The Sampling and Analysis Plan shall also include a quality assurance and quality control (QA/QC) plan.

b. Test Results G

Submit analytical test results of offsite laboratory analysis to the Contracting Officer within 14 days of sample collection and prior to disposal of the contaminated materials at an approved disposal facility.

1.4 CONTRACTOR REQUIREMENTS

1.4.1 Laboratory Services

The Contractor shall provide and coordinate the services of an NEESA-approved environmental chemical laboratory.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 SAMPLING REQUIREMENTS

3.1.1 Documentation

Maintain a permanently bound field notebook onsite consisting of the date and time each sample was collected, sample identification, sample location (written description and map), depth of sample, name of sampling personnel, preservation method, type of analyses requested, and name of laboratory to perform analyses. A chain of custody and analysis request form shall be completed for each sample submitted for chemical analysis.

3.1.2 Free Product Saturated Soil

The Contractor shall collect one composite soil sample per drainage pad lift. Samples collected shall be sent to an NEESA-certified laboratory for confirmatory analysis. These samples shall be analyzed for polychlorinated biphenyls (PCBs) using USEPA SW-846 Method 8080. The Contractor shall request 24- or 48-hour turnaround for the laboratory samples. Analytical results shall dictate final disposal of soil as follows:

PCBs <1 ppm	Site 5 Soil Bioremediation
PCBs >1 ppm but <50 ppm	TSCA Chemical Waste Landfill per 40 CFR 761.75
PCBs >50 ppm but <500 ppm	Incinerate per 40 CFR 761.70
PCBs >500 ppm	Incinerate per 40 CFR 761.70

PCBs are defined as the sum of all Aroclors.

The Contractor shall also fulfill any other analytical requirements the approved disposal facility may have.

3.1.3 Free Product

Liquid wastes and free product shall be collected and drummed. The liquid waste and free product shall be incinerated per 40 CFR 761.75. The Contractor may manifest the drummed liquids based on knowledge of the waste or, if required, the Contractor shall sample liquids and free product to meet the analytical requirements of the disposal facility. The disposal facility analytical requirements shall be included in the Contractor prepared Sampling and Analysis Plan.

3.1.4 TRPH Contaminated Soils

The Contractor shall collect and analyze field screening soil samples as the excavation proceeds to confirm that all soils above 50 mg/kg TRPH have been excavated. The total number of samples collected and analyzed shall be statistically based. The Contractor shall use a portable/field TRPH analyzer that uses infrared absorption as the analytical method for determining TRPH levels. The portable/field TRPH analyzer shall detect TRPH at its 3.4 micrometer wavelength as specified in EPA Method 418.1, and be calibrated with EPA Method 418.1 reference oil. At a minimum, 10 percent of all field screening soil samples shall be sent to an offsite NEESA-certified laboratory and analyzed for TRPH using EPA Method 418.1 to confirm field results. A turnaround time of 24 to 48 hours is required for all samples sent offsite.

3.1.5 Decontamination

Sampling equipment will be decontaminated before each sample is collected. A decontamination procedure relative to sample collection shall be included as part of the Sampling and Analysis Plan.

As part of the Decontamination Plan, the Contractor shall verify that equipment, vehicles, and tools used during this work have been decontaminated prior to leaving the site.

3.1.6 Quality Assurance and Quality Control

The Contractor shall submit a QA/QC plan as part of the Sampling and Analysis Plan that will include: number of duplicate samples, number of field blanks, number of rinsate samples, number of trip blanks, analyses requested, and preservation and handling methods. QA/QC for samples collected for offsite laboratory analyses shall comply with NEESA Level C criteria.

3.2 CONFIRMATORY SAMPLING BY OTHERS

The following sampling and analyses will be completed to meet the requirements of the Operable Unit (OU) 2 Baseline Risk Assessment. Upon completion of the excavation of the contaminated soil from the designated excavation areas, confirmatory samples of the site will be collected by ABB-ES and analyzed for target analyte list (TAL) inorganics, target compound list (TCL) organics, and TRPH.

3.2.1 Subsurface Soil Sampling

A total of twelve (12) subsurface soil samples shall be collected from the sidewalls of the excavation. Sample locations will be biased toward source areas and preferential pathways of contamination, but will include a minimum of one sample per sidewall.

3.2.2 Sediment Sampling

A total of two (2) sediment samples from the drainage ditch south of the excavation area will be collected to establish whether overland contaminant transport has occurred. One sample will be collected adjacent to the site, and one sample shall be collected downgradient from the site.

3.2.3 Surface Soil Sampling

A total of six (6) surface soil samples shall be collected. Two (2) samples shall be collected from the truck loading area, two (2) samples shall be taken from the perimeter of the excavation, and two (2) samples shall be taken from locations topographically downgradient of the excavation. Surface soil samples shall be taken from 0 to 6 inches bls.

--End of Section--

SECTION 02227

FREE PRODUCT REMOVAL
04/15/95

PART 1 GENERAL

1.1 SUMMARY

This section covers the Contractor's requirements for the handling of free product and free product contaminated soil. A drainage pad shall be constructed as shown on the Drawings to separate free product from saturated, contaminated soil. Activities conducted under this section shall be in accordance with the Contractor's approved Site Safety and Health Plan (SSHP).

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. For all test methods, the most recent revision applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 638	1989 Test Method for Tensile Properties of Plastics
ASTM D 1004	1966 (R 1988) Test Method for Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1505	1985 Test Method for Density of Plastics by the Density-Gradient Method
ASTM D 1556	1986 Test Method for Density of Soil In Place by the Sand Cone Method
ASTM D 1557	1991 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb f/ft^3 (2,700 kN-m/m^3))
ASTM D 1621	1979 Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D 2167	1984 Test Method for Density and Unit Weight of Soil In Place by the Rubber Balloon Method
ASTM D 2434	1968 (R 1974) Test Method for Permeability of Granular Soils (Constant Head)

ASTM D 2922	1991 Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	1988 (R 1993) Test Methods for Water Content of Soil and Rock (Shallow Depth) in Place by Nuclear Methods
ASTM D 4355	1992 Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water
ASTM D 4491	1989 Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D 4533	1985 Test Method for Trapezoidal Tearing Strength of Geotextiles
ASTM D 4595	1986 (R 1991) Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes
ASTM D 4632	1986 Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)
ASTM D 4751	1987 Test Method for Determining the Apparent Opening Size of a Geotextile
ASTM D 4716	1987 Test Method for Constant Head Hydraulic Transmittivity (In-Plane Flow) of Geotextiles and Geotextile Related Products
ASTM D 4718	1987 Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D 4833	1988 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products

U.S. ARMY CORPS OF ENGINEERS (COE)

EM 385-1-1	(October 1992) Safety and Health Requirements Manual

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "FIO" designation are for information only.

The following shall be submitted in accordance with Section 01300, "Submittals":

SD-01, Data; G

Manufacturer's Catalog Data

a. High Density Polyethylene (HDPE) Liner

SD-09, Reports; G

a. Drainage Sand Layer
b. Buffer Layer
c. HDPE Liner

SD-13, Certificates; G

a. HDPE Liner

1.3.1 Reports

Laboratory test results of the soil materials proposed for the work:

a. Grain size analytical results (ASTM C 117, C 136) for drainage sand layer and buffer layer, including percent passing information for each sieve designation and grain size curve.
b. Moisture-density relationship test (ASTM D 1557) results for drainage sand layer and buffer layer, including density versus moisture content curve.
c. Permeability test results (ASTM D 2434) for drainage sand layer and buffer layer, including graph of density versus permeability.

Test results shall be submitted by the Contractor prior to earthwork operations involving material from the source being tested.

During construction, submit copies of the following field test reports:

a. Grain size analytical results including percent passing information for each sieve designation and grain size curve.
b. Moisture density relationship test results (when test is required), including density versus moisture content curve.
c. Permeability test results, if additional testing is required.
d. Field density and moisture content test results (ASTM D 2922, D 3017, ASTM D 1556, or ASTM D 2167).
e. Field and laboratory quality assurance testing performed on the HDPE liner.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to keep materials segregated and, thus, prevent cross contamination of materials.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Sources

Material for the construction of all fills may be obtained from a borrow source on NAS Cecil Field or, as necessary, from offsite borrow sources to comply with specifications. The Contractor must coordinate with the Contracting Officer prior to the use of any NAS Cecil Field borrow material. The Contracting Officer's representative shall be the sole judge of the suitability of any material for use as a fill material regardless of its source.

Material used for construction of the pad shall be screened to the gradation requirements specified in Section 02248, "Soil Treatment Facility."

2.1.2 Drainage Sand Layer

Provide well-graded, rounded sand or gravel, free from vegetative matter, lumps, or balls of clay and other deleterious substances, with a minimum compacted permeability of 5×10^{-3} centimeters per second. The material shall meet the gradation requirements as specified in Section 02248, "Soil Treatment Facility."

2.1.3 Buffer Layer

Provide well-graded, rounded sand or gravel, free from vegetative matter, lumps, or balls of clay and other deleterious substances. The material shall meet the gradation requirements as specified in Section 02248, "Soil Treatment Facility."

2.2 HDPE LINER

Provide 40-mil black HDPE liner in accordance with the liner specified in Section 02248, "Soil Treatment Facility."

PART 3 EXECUTION

3.1 SURFACE PREPARATION

3.1.1 Clearing and Grubbing

Clearing and grubbing shall be in accordance with the Technical Specification for Clearing and Grubbing included in the workplan prepared by BEI.

3.2 DRAINAGE PAD CONSTRUCTION

The drainage pad consists of a 15 feet by 15 feet lined pad with 12 inches of drainage layer material on top of the liner. The lined pad shall be sloped to a collection trench that shall transport drained liquids to a collection sump. Construction of the drainage pad shall be as shown on the Drawings and shall be placed in the vicinity of the free product removal area. The pad shall be located to allow placement of excavated, saturated soil without requiring equipment to travel across the site.

Soil stockpiled on the pad shall be covered by a 20-mil polyethylene sheet at all times; the soil shall be placed to promote positive drainage off of the cover. The cover shall be secured with sandbags to maintain the integrity of the cover and to prevent ripping, blowing, etc.

3.4 FREE PRODUCT REMOVAL

Excavated soil saturated with free product shall be placed on the drainage pad.

3.4.1 Free Product Disposal

Any liquid recovered from the sump of the drainage pad shall be pumped into Department of Transportation (DOT)-approved containers, manifested, and disposed as required in Section 01410, "Confirmatory Sampling."

3.4.2 PCB-Contaminated Soil

Soil placed on the pad shall be allowed to drain for a minimum of 24 hours, but may drain longer if deemed necessary by the Contracting Officer. This soil shall be sampled and disposed as required in Section 01410, "Confirmatory Sampling."

3.4.3 Non-PCB-Contaminated Soil

Soil that is determined to contain PCB concentrations less than 1 mg/kg shall be removed from the drainage pad and placed in the soil stockpile area.

-- End of Section --

SECTION 02248

SOIL TREATMENT FACILITY
04/15/95

PART 1 GENERAL

1.1 SUMMARY

This section covers the Contractor's requirements for construction of a Soil Treatment Facility (STF) to be used for remediation of contaminated soil at Site 5. The STF will not be enclosed and shall consist of a bermed, lined treatment pad as shown on the Drawings. Activities conducted under this section shall be in accordance with the Contractor's Site Safety and Health Plan (SSHP), which was approved under a previous contract.

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only. For all test methods, the most recent revision applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A-48	1993a Gray Iron Castings
ASTM C 32	1993 Sewer and Manhole Brick
ASTM C 33	1990 Concrete Aggregates
ASTM C 117	1987 Test Method for Material Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 136	1984 (Rev. A) Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 150	1989 Portland Cement
ASTM C 207	1988 Hydrated Lime for Masonry Purposes
ASTM C 478	1993 Precast Reinforced Concrete Manhole Sections
ASTM D 246	1989 Method for Distillation of Creosote and Creosote Coal Tar Solutions
ASTM D 413	1982 (R 1988) Test Methods for Rubber Property-Adhesion to Flexible Substrate
ASTM D 638	1989 Test Method for Tensile Properties of Plastics

ASTM D 751	1989 Method for Testing Coated Fabrics
ASTM D 1004	1966 (R 1988) Test Method for Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1505	1985 Test Method for Density of Plastics by the Density - Gradient Method
ASTM D 1556	1986 Test Method for Density of Soil In Place by the Sand Cone Method
ASTM D 1557	1991 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 Kn-m/m^3))
ASTM D 1621	1979 Test Method for Compressive Properties of Rigid Cellular Plastics
ASTM D 1777	1975 Method for Measuring Thickness of Textile Materials
ASTM D 2167	1984 Test Method for Density and Unit Weight of Soil In Place by the Rubber Balloon Method
ASTM D 2412	1993 Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
ASTM D 2434	1968 (R 1974) Test Method for Permeability of Granular Soils (Constant Head)
ASTM D 2922	1991 Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	1988 (R 1993) Test Methods for Water Content of Soil and Rock (Shallow Depth) in Place by Nuclear Methods
ASTM D 3034	1993 Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D 3776	1985 (R 1990) Test Methods for Mass per Unit Area (Weight) of Woven Fabric
ASTM D 3787	1989 Bursting Strength of Knitted Goods - Constant-Rate-of-Traverse Ball Burst Test
ASTM D 4355	1992 Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water

ASTM D 4491	1989 Test Methods for Water Permeability of Geotextiles by Permittivity
ASTM D 4533	1985 Test Method for Trapezoidal Tearing Strength of Geotextiles
ASTM D 4595	1986 (R 1991) Determining the Integrity of Factory Seams Used in Joining Manufactured Flexible Sheet Geomembranes
ASTM D 4632	1986 Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)
ASTM D 4751	1987 Test Method for Determining the Apparent Opening Size of a Geotextile
ASTM D 4716	1987 Test Method for Constant Head Hydraulic Transmittivity (In-Plane Flow) of Geotextiles and Geotextile Related Products
ASTM D 4718	1987 Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D 4833	1988 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM F 679	1989 Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F 789	1989 Specification for Type PS-46 Polyvinyl Chloride (PVC) Plastic Gravity Flow Sewer Pipe and Fittings

U.S. ARMY CORPS OF ENGINEERS (COE)

EM 385-1-1	(October 1992) Safety and Health Requirements Manual

FLORIDA DEPARTMENT OF TRANSPORTATION (DOT)

DOT SS-1	Road and Bridge Construction, 1991.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals having an "FIO" designation are for information only.

The following shall be submitted in accordance with Section 01300, "Submittals":

SD-01, Data; G

Manufacturer's Catalog Data

a. Drainage Composite
b. High Density Polyethylene (HDPE) Liner
c. Geotextile Filter Fabric
d. Storage Tank
e. Polyvinyl Chloride (PVC) Pipe
f. Precast Concrete Manhole
g. Water Distribution System (Flexible Piping, Sprinklers)
h. Sump Pump
i. Soil Stockpile Liner and Cover Material

SD-04, Drawings; G

a. Precast Concrete Manhole

SD-09, Reports; G

a. Drainage Sand Layer
b. Buffer Layer
c. Drainage Stone
d. HDPE Liner
e. Soil Stockpile Liner and Cover Material

SD-13, Certificates; G

a. PVC Piping Materials, Fittings, Etc.
b. Cast Iron Frames, Covers, and Gratings
c. Precast Concrete Manhole Sections
d. HDPE Liner
e. Drainage Composite
f. Geotextile Filter Fabric
g. Water Distribution System
h. Soil Stockpile Liner and Cover Material

1.4.1 Reports

Laboratory test results of the soil materials proposed for the work:

a. Grain size analytical results (ASTM C 117, C 136) for drainage sand layer, buffer layer, and drainage stone, including percent passing information for each sieve designation and grain size curve.
b. Moisture-density relationship test (ASTM D 1557) results for drainage sand layer and buffer layer, including density versus moisture content curve.
c. Permeability test results (ASTM D 2434) for drainage sand layer and buffer layer, including graph of density versus permeability.

Test results shall be submitted by the Contractor prior to earthwork operations involving material from the source being tested.

During construction. submit copies of the following field test reports:

a. Grain size analytical results including percent passing information for each sieve designation and grain size curve.
b. Moisture density relationship test results (when test is required), including density versus moisture content curve.
c. Permeability test results, if additional testing is required.
d. Field density and moisture content test results (ASTM D 2922, D 3017, ASTM D 1556, or ASTM D 2167).
e. Field and laboratory quality assurance testing performed on the HDPE liner.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to keep materials segregated and thus prevent cross contamination of materials

1.5 CRITERIA FOR ESTIMATING

Assume the following criteria:

a. A field survey shall be conducted prior to construction of the STF to document existing conditions and after construction to document as-built conditions.

1.6 QUALITY ASSURANCE AND QUALITY CONTROL

1.6.1 Codes and Standards

Perform any excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Sources

Material for the construction of all fills may be obtained from a borrow source on NAS Cecil Field or, as necessary, from offsite borrow sources to comply with specifications. The Contractor must coordinate with the Contracting Officer prior to the use of any NAS Cecil Field borrow material. The Contracting Officer's representative shall be the sole judge of the suitability of any material for use as a fill material regardless of its source.

Material excavated as part of the STF construction may be used as fill material for the STF. This material shall be screened to the gradation

requirements specified herein. Excavated material that does not meet requirements specified herein shall be disposed offsite in accordance with all local, State, and Federal regulations.

2.1.2 Drainage Sand Layer

Provide well-graded, rounded sand or gravel, free from vegetative matter, lumps, or balls of clay and other deleterious substances, with a minimum compacted permeability of 5×10^{-3} centimeters per second. The material shall meet the following gradation requirements:

Screen Size Square Openings	Percent by Weight Passing
3/8 inch	100
No. 4	85 to 100
No. 200	15 maximum

2.1.3 Buffer Layer

Provide well-graded, rounded sand or gravel, free from vegetative matter, lumps, or balls of clay and other deleterious substances. The material shall meet the following requirements:

Screen Size Square Openings	Percent by Weight Passing
3/8 inch	100
No. 4	85 to 100
No. 200	15 maximum

2.1.4 Drainage Stone

Provide crushed stone or uncrushed material, free from organic matter, meeting the gradation requirements of Florida Department of Transportation (FDOT) Specification 901-1.4 for coarse aggregate as follows:

Screen Size Square Openings	Percent by Weight Passing
3/4 inch	90 to 100
3/8 inch	20 to 55
No. 4	0 to 10
No. 8	0 to 5

2.1.5 Preconstruction Phase Soil Borrow Source Testing

Soil shall be tested for compliance with specifications prior to removal from borrow sources and placement at the STF. The testing requirements for each material are as follows:

Soil Material	MINIMUM TESTING FREQUENCY		
	Gradation (ASTM C-117, C-136)	Moisture-Density (ASTM D 1557)	Remolded Permeability (ASTM D 2434)
Drainage Sand Layer	1 test per material	1 test per material	1 test per material[1]
Buffer Layer	1 test per material	1 test per material	NR[2]
Drainage Stone	1 test per material	NR	NR

1 Tests shall be conducted at 85, 90, and 95 percent of maximum dry density (ASTM D 1557) so as to determine the range in density that produces the required permeability.
2 Not required.

2.1.6 Construction Phase Soil Borrow Source Testing

Collect soil samples at the borrow source(s) and test for specification compliance according to the following schedule:

Soil Material	MINIMUM TESTING FREQUENCY		
	Gradation (ASTM C-117, C-136)	Moisture-Density (ASTM D 1557)	Remolded Permeability (ASTM D 2434)
Drainage Sand Layer	1/2,000 yd^3	1 test per change in gradation	1 test per change in gradation and/or moisture and density
Buffer Layer	1 test	1 test per change in gradation	NR
Drainage Stone	1 test	NR	NR

Notes: yd^3 = cubic yards.
NR = not required.

2 2 HDPE LINER

Provide 40-mil black HDPE liner with the following physical characteristics:

PROPERTIES	MINIMUM VALUE	TEST METHOD
Density (g/cm^3)	0.930	ASTM D 1505
Percent Elongation at Yield (%)	13	ASTM D 638, Speed C, Type IV
Percent Elongation at Break (%)	700	ASTM D 638, Speed C, Type IV
Tensile Stress at Yield (lb/in)	88	ASTM D 638, Speed C, Type IV
Tensile Stress at Break (lb/in)	150	ASTM D 638, Speed C, Type IV
Thickness (mil ave/min)	40/36	ASTM D 751
Environmental Stress Crack Resistance (hours)	1,500	ASTM D 5397
Tear Resistance (lbs.)	30	ASTM D 1004, Die C

Notes:
g/cm^3 = grams per cubic centimeter.
ASTM = American Society for Testing and Materials
% = percent.
lb/in = pounds per inch.
mil ave/min =
lbs. = pounds.

There shall be no additives, fillers, or extenders unless otherwise specified. Add 2 to 3 percent carbon black to resin for ultraviolet resistance.

2.2.1 Field Seams

Fabricate calendared sheeting into large sections by using one of the following seaming techniques:

a. dual hot wedge fusion bonding, or
b. extrusion welding.

Seam strengths shall exhibit the same physical strength as the parent material.

2.2.2 Extrusion Joining Resin

Extrusion joining resin shall be produced from the same material as the sheet resin. Physical properties shall be the same as those of the resin used in the manufacture of the liner.

2.2.3 Other Materials

Pipe boots, patches, etc., shall be the same material as the membrane or a compatible, approved equal.

2.2.4 Mechanical Fastenings

Mechanical fastenings shall be of the material, size, and type detailed on the approved Shop Drawings.

2.3 DRAINAGE COMPOSITE

Drainage composite shall consist of a prefabricated polystyrene core with an attached polypropylene woven geotextile. The material shall exhibit the following physical characteristics:

PROPERTY	UNIT	MINIMUM VALUES	TEST METHOD
Composite System			
In Plane Flow Rate, Gradient. 0.1 Pressure. 14.5 psi	gpm/ft width	5	ASTM D 4716
Thickness	mils	405	ASTM D 1777
Weight	oz/ft^2	3.3	ASTM D 3776
Woven Geotextile			
Grab Tensile Strength	lb	250	ASTM D 4632
Water Flow Rate	gpm/ft^2	25	ASTM D 4491
Apparent Opening Size	U.S. Standard Sieve	70 to 100	ASTM D 4751
Weight	oz/yd^2	6.5	ASTM D 3776
Core, Net, and Mesh			
Weight	oz/ft^2	2.6	ASTM D 3776
Thickness	mils	260	ASTM D 5199
Compressive Strength at Yield	psi	145	ASTM D 1621

Notes:
psi = pounds per square inch.
gpm/ft gallons per minute per foot.
oz/ft^2 = ounces per square foot.
ASTM = American Society for Testing and Materials.
lb = pound.
oz/yd^2 = ounces per square yard.
gpm/ft^2 = gallons per minute per square foot.

2.4 NON-WOVEN GEOTEXTILE FILTER FABRIC

Geotextile filter fabric shall be a non-woven polypropylene and shall meet the following physical characteristics:

PROPERTY	UNIT	MINIMUM VALUE	TEST METHOD
Weight	oz/yd^2	6	ASTM D 3776
Grab Strength	lbs	150	ASTM D 4632
Grab Elongation	%	50	ASTM D 4632
Trapezoid Tear Strength	lbs	60	ASTM D 4533
Mullen Burst Strength	psi	315	ASTM D 3786
Puncture Strength[1]	lbs	90	ASTM D 4833[1]
Permittivity	sec^{-1}	1.3	ASTM D 4491[2]
Apparent Opening Size (AOS)	U.S. Standard Sieve	70	ASTM D 4751
Ultraviolet Stability	%[3]	70	ASTM D 4355

[1] Tension testing machine with ring clamp; steel ball replaced with a 5/16-inch diameter solid steel cylinder centered within the ring clamp.
[2] 5 centimeters constant head.
[3] Percent strength retained after 150 hours.

Notes: oz/yd^2 = ounces per square yard.
ASTM = American Society for Testing and Materials.
lbs = pounds.
% = percent.
psi = pounds per square inch.
sec^{-1} = per second.

2.5 WATER COLLECTION SYSTEM

The water collection system shall consist of perforated and solid wall PVC pipe, precast concrete manhole, and sump pump.

2.5.1 PVC Pipe

Perforated and solid wall PVC pipe shall be SDR-35 and shall meet the requirements of ASTM D-3034, ASTM F-679, and ASTM F-789. Perforations shall be less than or equal to 1/4-inch in width (slotted) or diameter.

2.5.1.1 Construction Requirements

The PVC pipe shall be suitable for use as a gravity drainage conduit. Standard installation lengths shall be 20 feet or 10 feet. Perforated pipe shall be installed with perforated side facing down. The Contractor shall provide for contraction and expansion at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-sectional rubber ring, factory assembled, securely locked in place to prevent displacement during assembly.

2.5.1.2 Fittings

Fittings shall be manufactured and furnished by the pipe supplier or approved equal having bell and spigot configurations compatible with that of the pipe. Fittings shall be of the same strength and quality as the pipe. Minimum "pipe stiffness" (F/AY) shall be 46 pounds per square inch gauge (psig) for all sizes when tested in accordance with ASTM D-2412, "External Loadings Properties of Plastic Pipe by Parallel-Plate Loadings." Pipe bedding shall consist of Buffer Layer, as specified in this section, in the zone 6 inches around the solid PVC pipe. Drainage stone, as specified in this section, shall be used to fill the collection trench and shall be used as pipe bedding in the zone 2 inches (minimum) around the pipe.

2.5.2 Precast Concrete Manhole

The precast concrete manhole shall consist of reinforced concrete riser sections, an eccentric or concentric top, and a monolithic base section conforming with the dimensions indicated on the Drawings, and shall be manufactured in accordance with ASTM C 478-89. The minimum compressive strength of the concrete shall be 4,000 psi. The circumferential steel reinforcement for riser pipe, cone sections, and base walls shall be 0.12 square inch per linear foot. Reinforcing shall extend into the tongue and groove of each manhole section wall. Casting methods must assure each unit to be very dense in structure and impervious to water.

A hole shall be cast in the base section for the 4-inch pipe so that there is a clear distance as shown on the Drawings between the inside bottom of the base section and the pipe invert. The tongue and groove shall be formed of concrete so as to receive gaskets. Sections shall be set so as to be vertical and in true alignment. The pipe to manhole joint shall be a rubber boot either cast-in-place or press-wedged in place, or otherwise must be approved by the Contracting Officer's representative. All precast sections and base shall have the date of manufacture and the name or trademark of the manufacturer impressed or indelibly marked on the inside wall.

Manhole steps shall be 1/2 inch steel reinforced polypropylene plastic manufactured to ASTM D 246-89 Type II grade 16906 and ASTM C 478-89 standards. The steps shall be cast into walls of the precast section so as to form a continuous ladder with a distance of 12 inches between steps. Provide 2 holes for the purpose of handling and laying. These

holes shall be tapered and shall be plugged with mortar after installation.

The frame shall be inches high. A 21-inch diameter clear opening shall be provided for the manhole frame and cover. The cover shall consist of a bolting outer lid 23 inches in diameter and an inner center lid a minimum of 5 inches in diameter. Four 1/2-inch stainless steel hex bolts shall be provided.

Castings shall be strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sandholes, and defects of every nature that would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined at the foundry before shipment to prevent rocking of covers in any orientation. Thoroughly clean and subject to a careful hammer inspection. Castings shall be Class 30 conforming to the ASTM A 48-90.

Brick used to build up the precast manhole to grade shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Contracting Officer's representative. It shall comply with the ASTM C 32-73 for Grade SS, hard brick. Rejected brick shall be immediately removed from the work.

Mortar shall be composed of Portland cement, hydrated lime, and sand, in the proportions of 1 part cement to 1/2 part lime to 4 1/2 parts sand, (by volume). The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime. Cement shall be Type II Portland cement conforming to ASTM C 150-89. Hydrated lime shall be Type S conforming to the ASTM C 207-88. Sand shall be inert natural sand conforming to FDOT Specification 902-2 for fine aggregate, as follows:

Screen Size Square Openings	Percent by Weight Passing
3/8 inch	100
No. 4	95 to 100
No. 8	85 to 100
No. 16	65 to 97
No. 30	25 to 70
No. 50	10 to 25
No. 100	0 to 7
No. 200	4 maximum
Fineness modulus	2.5 to 3.0

2.5.3 Sump Pump

Provide a pump that will meet the following criteria:

a. Pumping rate of 75 gallons per minute at 35 feet total dynamic head (TDH).
b. Cast iron construction with stainless-steel hardware and accessories compatible with contaminants of concern.
c. Mechanical seal with stainless steel, Buna N, and carbon and ceramic parts compatible with contaminants of concern.
d. 2-inch inlet and 3-inch National Pipe Thread (NPT) discharge.
e. Non-clogging vortex impeller that passes 2-inch spherical solids.
f. 1 Hp, 230 volt, hermetically sealed, oil filled, single-phase motors.
g. Automatic-reset thermal overload protection.
h. UL- and CSA-Listed.
i. Pump and all associated electrical components shall be explosion proof.

2.6 WATER STORAGE SYSTEM

Provide a temporary water-holding facility consisting of three onsite portable storage tanks with a minimum capacity of 20,000 gallons each. Inlet to storage tanks shall be fitted to accept discharge from sump or truck. Influent pipe from each source shall have a check valve and an easily accessible shut-off valve. Tanks shall be manifolded together.

2.7 WATER DISTRIBUTION SYSTEM

The water distribution system shall include 3-inch diameter HDPE piping as shown on Drawing P-1. The piping shall terminate at locations inside the treatment pad area with quick disconnect couplings sized as required to accommodate the water hose reel. Water will be supplied with a portable large diameter hose and reel such as the Reel Rain as Manufactured by Amadas or approved equal.

All piping connected to the water storage tanks shall be flexible to minimize leaking of storage water due to tank settlement.

Piping and sprinklers are required to deliver water to the windrows at a minimum rate of 0.5 inches per hour. The centrifugal pump must be capable of delivering water through the piping at an inlet pressure of 70 psi and a flow rate of 45 gpm. Each sprinkler shall have a minimum coverage width of 80 feet.

2.8 SOIL STOCKPILE LINER AND COVER MATERIAL

The soil stockpile area shall be underlain and covered with sheets of 6-mil polyethylene. The material shall be installed according to manufacturer's specifications.

PART 3 EXECUTION

3.1 SURFACE PREPARATI

3.1.1 Clearing and Grubbing

Clearing and grubbing shall be performed prior to excavation in accordance with the Technical Specification for Clearing and Grubbing included in the workplan prepared by BEI.

3.2 STF CONSTRUCTION

The STF consists of a lined treatment pad surrounded by a continuous earthen berm. Construction of the STF also includes provision of water collection, storage, and distribution systems, as well as disposal of any excess stormwater.

3.2.1 Initial Site Grading

Initial site grading involves excavation of material prior to treatment pad construction to provide a smooth, debris-free base for liner placement and to provide for drainage of free-standing water that accumulates on the treatment pad. The site shall be graded to a 1 percent slope to allow water to flow through the drainage sand layer along the drainage composite to a drainage trench. The drainage trench, which also slopes at 1 percent, shall flow to a sump where the water will be pumped into a temporary water storage facility.

3.2.2 Filling

3.2.2.1 General

Fills shall be constructed as shown on the Drawings unless otherwise directed. Compacted fills shall be constructed by placing fill material in layers and compacting each layer as specified. The Contractor shall maintain and protect all excavations and fills in completed and uncompleted parts of the work in a satisfactory condition at all times until final completion and acceptance of all work under the contract.

3.3.2.2 Backfill Around Structures (Collection System and Precast Concrete Manhole)

Place the material uniformly around a structure to approximately the same elevation in each lift. Take care to prevent wedging action of backfill against structures.

3.3.2.3 Filling Above Liner and Drainage Composite

Construction equipment including rubber-tired vehicles are not allowed to move directly on the deployed 40-mil liner or the drainage composite. The drainage sand layer shall be advanced above the drainage composite with a bulldozer or front-end loader. The Contractor shall use low

ground pressure placement equipment (contact pressure less than 5 psi) to place drainage sand layer. A minimum 12-inch buffer (1 lift) must be placed above the drainage composite prior to allowing low ground pressure construction equipment traffic. Routine construction equipment may traffic the drainage sand layer after a minimum of 2 feet has been placed.

3.3.2.4 Lift Thicknesses

Place fill materials in loose lifts of the following maximum thicknesses.

a. Buffer Layer: 6 inches.
b. Drainage Sand Layer: 12 inches.
c. Drainage Stone: 6 inches.

3.3.3 Compaction

Compaction shall be expressed as a percentage of maximum density (ASTM D 1557). Control soil compaction during construction to meet required percent maximum dry density for each soil and condition.

3.3.3.1 Moisture Requirements

Provide moisture control to the extent that the soil mix remains in a workable state during placement. Where a layer of soil material must be moisture-conditioned before compaction, uniformly apply water to the surface of the layer of soil material at such a rate as to avoid free water from appearing on the surface during or subsequent to compaction operations.

Remove, or scarify and air dry, soil material that is too wet to permit compaction to the specified density. Excessively wet soil that has been removed may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until the moisture content is reduced to a satisfactory value as determined by moisture-density relation tests.

3.3.3.2 Compaction Requirements

Material shall be spread with bulldozer, other approved equipment, or by hand to form uniformly loose layers not greater than the thickness specified. Each layer of fill shall be compacted using a vibratory roller or hand-operated vibrating plate compactor or similar equipment, where necessary. Material compaction shall be expressed as a percent of maximum dry density (ASTM D-1557). Material compaction requirements are as follows.

a. Drainage Sand Layer: Compact to an in-place density such that the sand meets the minimum permeability requirements of $5x10^{-3}$ cm/sec. The compaction requirements will be established from the results of the pre-construction phase soil borrow source testing.
b. Buffer Layer: Compact to 90 percent of maximum dry density.

3.3.3.3 Finish Operations

Finish elevations are as indicated on the Drawings. Grade areas to promote positive drainage and prevent ponding water. The Contractor shall restore all existing grades that [illegible] to remain and were disturbed by operations during execution of the work. Larger stones remaining after screening operations shall be placed on the outside slope of the berm to reduce soil erosion.

3.3.4 Soil Materials Field Quality Assurance

Compaction, moisture content, and permeability shall be measured during construction to assure specification compliance.

3.3.4.1 Compaction

Compaction will be measured as in-place density using ASTM D 2922 (nuclear methods), ASTM D 1556 (sand cone method), or ASTM D 2167 (rubber balloon method). Compaction of the Drainage Sand Layer and Buffer Layer shall be measured at a frequency of five per acre per lift. In place density results shall be corrected for oversize particles, where necessary, in accordance with ASTM D 4718.

3.3.4.2 Moisture

In place moisture shall be measured at all locations chosen for density measurements using ASTM D 3017 (nuclear methods), ASTM D 1556, or ASTM D 2167.

3.3.4.3 Permeability

Permeability of the Drainage Sand Layer shall be measured on remolded samples taken from the placed material using ASTM D 2434. The material shall be compacted to a density consistent with that measured in place using nuclear methods. Permeability testing shall be performed at a frequency of three per acre per lift.

3.3.5 HDPE Liner and Drainage Composite

The HDPE liner and drainage composite shall be placed in the locations as shown on the Drawings. The HDPE liner and drainage composite shall be installed according to manufacturer's recommendations. The drainage composite shall be installed with the geotextile fabric side facing upward.

3.3.6 HDPE Liner Quality Assurance

All HDPE liner seams shall be field and laboratory tested for leaks and faults.

3.3.6.1 Test Welds

Test welds shall be run from each seaming machine a minimum of 3 times per day or whenever a new operator takes over.

3.3.6.2 Vacuum Test

Perform vacuum tests using a vacuum box or other approved vacuum method along all extrusion bonds. Repair and retest structural faults in the seams.

3.3.6.3 Air Test

Perform air testing on all dual hot wedge fusion seams. Any leaks found shall be repaired by extrusion welding and shall be 100 percent vacuum tested.

3.3.6.4 Destructive Testing

Take random weld samples from in place liner at a frequency of 1 per 600 feet of welded seam. The test strip shall be cut into three 14-inch coupons and the following tests performed:

a. visually inspect for holes, blemishes, or other detrimental defects;
b. five field shear and peel tests according to ASTM D 4437; and
c. five shear and peel tests (ASTM D 4437) by an independent laboratory.

3.3.7 Water Collection System

3.3.7.1 PVC Pipe

Firmly support the pipe and fittings on bedding material as shown on the Drawings and as specified in this section. Do not permanently support the pipe or fittings on saddles, blocking stones, or any material that does not provide firm and uniform bearing along the outside length of the pipe. Thoroughly compact the material under the pipe to obtain a substantial unyielding bed shaped to fully support the pipe. Excavate suitable holes for the joints so that only the barrel of the pipe receives bearing pressure from the supporting material after placement. Lay each pipe length so it forms a close joint with the adjoining length and bring the inverts to the required grade, without high spots. Do not drive the pipe down to grade by striking it with a shovel handle, timber, hammer, or any other unyielding object. When each pipe length has been properly set, place and compact enough of the bedding material between the pipe and the sides of the trench to hold the pipe in correct alignment. After filling the sides of the trench, place and lightly tamp bedding material to complete the bedding as shown on the Drawings. Take all necessary precautions to prevent flotation of the pipe in the trench.

Connect pipe in accordance with the latest manufacturer's instructions and recommendations. Clear each pipe length, coupling, and fitting of

all debris and dirt before installing. Provide and use coupling pullers for jointing the pipe. Provide gasket feeler gauges for use by the pipe layer for checking the position of the rubber gaskets in the completed joints. Shove home each length of pipe against the pipe previously laid and hold securely in position. Do not pull or cramp joints. Make all pipe joints as watertight as possible with no visible leakage and no sand, silt, clay, or soil of any description entering the pipeline at the joints. Immediately after making a joint, fill the holes for the joints with bedding material and compact.

Cut in accordance with manufacturer's recommendations. Cut the pipe with a hand saw, metal-inserted abrasive wheel, or pipe cutter with blades (not rollers). Examine all cut ends for possible cracks caused by cutting.

Pipe installation shall be subject to inspection by the Contracting Officer's representative for quality, adherence to line and grade, jointing, and proper backfill. Any joint not satisfactory to the Contracting Officer's representative shall be removed and remade to his satisfaction at the Contractor's expense. No pipe shall be backfilled until it has been approved by the Contracting Officer's representative.

3.3.7.2 Precast Concrete Manhole

Place the precast concrete manhole on 6 inches of buffer layer material. Place barrel sections and cone in the appropriate combination of height. The frame and cover shall be placed on the top, or otherwise prevent accidental entry by unauthorized persons, animals, etc., until the Contractor is ready to make final adjustment to grade. The cover shall be flush with the final grade of top of berm.

3.3.7.3 Sump Pump

The sump pump shall be placed in the precast concrete manhole. Flexible piping shall be connected from the sump pump to convey collected water to the water storage system.

3.3.8 Water Storage System

The water storage system, which consists of one 50,000 gallon (minimum) water storage tank, shall be delivered and installed per the manufacturer's specifications onsite at the location shown on the Drawings.

3.3.9 Water Distribution System

Layout water distribution system in accordance with the drawings.

3.10 SOIL STOCKPILE AREA CONSTRUCTION

The soil stockpile area (if necessary) shall be as shown on the Drawings. A layer of 6-mil plastic shall be placed on top of surface contaminated soil. A berm shall be constructed on the outer edge of the plastic to contain excavated soil. Soil stockpiled on the pad shall be covered with 6-mil plastic and tied down at all times as shown on the Drawings. The soil shall be stockpiled to promote positive drainage off the cover, eliminating the need for a sump.

-- End of Section --

APPENDIX A

OPERATIONS AND MAINTENANCE

OPERATIONS AND MAINTENANCE

This section describes the activities required to operate the Biological Treatment system at Operable Unit 2, Site 5. Specific elements that are discussed include:

Section 1, Windrow Construction;
Section 2, Amendment Application;
Section 3, Process Monitoring;
Section 4, Water Storage and Management;
Section 5, Sampling and Analysis; and
Section 6, Communication.

1.0 WINDROW CONSTRUCTION

Windrows shall be constructed as follows:

- dimensions: 20 feet by 350 feet by 7 feet,
- Number windrows: three, and
- average total recoverable petroleum hydrocarbons (TRPH) concentration: 2,500 milligrams per kilogram (mg/kg).

and will include the following amendments at set-up:

- agricultural lime,
- fertilizer, and
- cow manure.

The estimated quantity of TRPH contaminated soil at Site 5 is 16,300 cubic yards (yd^3). The soil shall be excavated and treated biologically in five lifts of approximately 3,400 yd^3 each. Each lift shall be made up of three windrows of at least 1,100 yd^3 each.

Efforts should be made to have all windrows at an average concentration of 2,500 mg/kg TRPH. The contractor shall mix the excavated soil accordingly to try to achieve this concentration.

The soil shall be loaded onto the treatment pad in a north to south line, constructing one windrow at a time working from one end of the pad to the other. Amendments shall be placed on top of the soil in the order: lime, fertilizer, and manure. The windrows shall be assembled using a SCAT tow-type bioremediation turner (or approved equivalent). The contractor shall till the soil until amendments are fully mixed and windrows are at the specified dimensions.

2.0 AMENDMENT APPLICATION

2.1 Lime.

Lime addition is required to raise the Ph of the soil from 5.5 to near neutral (6.5 to 7.5). A total of 1.2 percent (by weight) agricultural lime, that has total neutralizing power of 146.9 percent (in terms of calcium carbonate), will be required for treatment (280 tons). The initial application shall be 0.6 percent lime by weight (29 tons per lift). Additional lime shall be added as needed based upon soil Ph analysis and as directed by ABB Environmental Services, Inc. (ABB-ES), technical staff.

The lime shall be delivered to the site either in bags or in bulk as needed. Excess lime shall be stored onsite and kept dry.

2.2. Fertilizer.

Based on an application requirement of 3.7 pounds (lbs) of fertilizer per cubic yard of soil approximately 30 tons of 34:11:6 fertilizer will be required to biologically treat 16,300 yd^3 of contaminated soil at Site 5.

During initial windrow construction, apply 1/4 of the total amount needed (0.925 lbs of fertilizer per yd^3 of soil) directly in dry form. It is estimated that the same amount of fertilizer will be added after two weeks of operation and then again at days 30 and 60. The actual amount and time fertilizer will be applied to the soil will be determined by ABB-ES based on nitrogen and phosphate process monitoring results. ABB-ES technical staff will recommend to the contractor when fertilizer should be applied during treatment.

Fertilizer shall be formulated if necessary and delivered to the site bags or in bulk, as needed. Assuming 3,400 yd^3 of soil are treated in the first lift, 3,150 lbs of fertilizer will be required for the initial application. Excess fertilizer shall be stored onsite and kept dry.

2.3 Manure.

Dehydrated cow manure shall be used to modify soil texture. One initial application of manure at a rate of 1 percent by weight will be required (232 tons total at 48.4 tons per lift). No additional manure applications will be required during treatment. Manure shall be delivered to the site in bulk as needed.

3.0 PROCESS MONITORING

3.1 Oxygen and Carbon Dioxide

TRPH biodegradation is dependent upon oxygen availability. It is critical that adequate oxygen levels be maintained in soil to stimulate biological activity. Soil gas samples shall be collected and analyzed for oxygen and carbon dioxide

by ABB-ES personnel using a Lantech oxygen and carbon dioxide meter (or equivalent). Soil gas samples shall be collected from the interior of the windrows and samples shall not be collected if the soil is saturated or near saturation. If the oxygen levels in the soil fall below 5 percent, then the soil shall be tilled within the next 2 days.

After major rain events, the soil should be allowed to drain for 24 hours and tilled if oxygen levels are low or if deemed necessary based on visual observations.

3.1.1 **Aeration Schedule.** Aeration will be accomplished by regularly tilling the soil in the windrows with a SCAT tow-type bioremediation turner (or approveld equivalent). For each lift, it is estimated the soil shall be tilled twice a week for the first 30 days of biotreatment and one time a week for the remainder of the operation.

Any recommended changes in the tilling schedule will be communicated to the contractor by ABB-ES technical personnel.

3.2 Moisture Content

Soil moisture must be maintained during treatment to facilitate biodegradation. Attempts should be made to maintain the moisture content near 50 percent of the field capacity, which is 15 percent moisture. The operating range during treatment shall be 5 to 25 percent moisture. Both visual observation by the contractor and process monitoring measurements taken by ABB-ES will be used to evaluate moisture content. Soil moisture will be measured as part of the process monitoring chemical analyses program and onsite inspections by ABB-ES. Field measurements will be taken using a moisture probe (Soilmoisture Equipment Corporation meter, or equivalent) no less than once a week and more frequently during dry periods.

Weather conditions will dictate when moisture will be added, so no schedule is provided here. However, as a guideline water should be added when moisture levels drop below 7 percent (laboratory measurement), soil suction is above 30 centibars (field measurement), or when the soil appears dry visually.

3.2.1 **Moisture Addition.** An Amadus Reelrain (or approved equivalent) mobile sprinkler watering system will be used to provide water to the windrows. Treatment soil could require up to 90,000 gallons of water per watering event during dry periods. Normal watering operations will likely require applications of 1 inch of water (approximately 17,000 gallons) per event. Using a flow rate of 45 gallons per minute, the sprinkler system can apply that volume of water in approximately 7 hours.

The hose sprinkler shall be placed on the outer edge of the treatment pad, parallel to one of the exterior windrows. The water shall be applied in one direction so all three of the windrows are covered. The sprinkler system shall be set to automatically reel the hose in and water will be applied along that line at the desired rate. Efforts shall be made to avoid over saturating the soil when it is being watered.

The ABB-ES oversight engineer will work with the contractor and oversee watering operations.

4.0 WATER STORAGE AND MANAGEMENT

Water collected during rain events shall be stored and recycled as the primary source of water. A minimum of 50,000 gallon storage capacity will be maintained onsite. If water is not available, either potable or nonpotable water shall be delivered to the site to restock the water supply.

When there is no available tank capacity, and it is raining or a significant rain event is predicted, arrangements shall be made by the contractor to have water removed from the tank. Every effort shall be made to collect stormwater and avoid any leachate discharge from the treatment cell area. Excess water removed from the storage tank shall be trucked to the Base Wastewater Treatment Plant (WWTP) for disposal. This activity shall be coordinated with the WWTP.

5.0 SAMPLING AND ANALYSIS

Samples will be collected for process monitoring, field, and treatment confirmation analysis according to the schedule shown in Tables 1 through 3. ABB-ES will be responsible for collecting the samples and sending samples to ABB-ES' treatability laboratory or an off-site laboratory (when designated) for analysis. The turn around time required for each analysis is shown in Table 4. ABB-ES will also be responsible for taking onsite process monitoring analysis such as soil gas, moisture, temperature, and Ph measurements.

Results from field and laboratory analyses will be reviewed by ABB-ES technical staff to evaluate system conditions. Any recommended alteration to the operation plan will be communicated to the contractor and ABB-ES oversight engineer. Information will be summarized onto spreadsheets by ABB-ES.

Table 1
Process Monitoring Samples

Operable Unit 2, Site 5
NAS Cecil Field
Jacksonville, Florida

Day	Analyses[1]				
	TPH-IR	TPH-GC/FID	N P, Ph	Moisture	Bacteria
0	9	3	3	9	3
10	3	3	3	3	3
30	3	3	3	3	3
60	3	3	3	3	3
90	9	3	3	3	3
100					
Subtotal	27	15	15	27	15
QC Samples	1 dup per batch	1 dup per batch	1 dup per batch	1 dup per batch	1 dup per batch
Subtotal	5	5	10	5	5
Total Per Lift	32	20	25	32	20
Program Total	160	100	125	160	100

[1] Nine samples = three composite samples will be prepared from each windrow; three samples = one composite sample will be prepared from each windrow.

Notes: This sample schedule was prepared under the assumption that there will be five lifts of 3,400 cubic yards each. All analyses will be performed in the ABB Environmental Services, Inc., laboratory in Wakefield, Massachusetts.

TPH-IR = total petroleum hydrocarbons by infrared.
TPH-GC/FID = total petroleum hydrocarbons by gas chromatograph and flame ionization detector
N = nitrogen.
P = phosphorus.
Ph = expression of the intensity of the hydrogen ion concentration.
QC = quality control.
dup = duplicate.
MS = matrix spike.

Table 2
Process Monitoring Samples, Field

Operable Unit 2, Site 5
NAS Cecil Field
Jacksonville, Florida

Field Analysis	Sample Frequency (Days)			Sample Location
	0 to 30	30 to 60	60 to 90	
Soil gas, O_2/CO_2	Weekly	Weekly	Weekly	Three different windrows will be sampled per event
Moisture	Weekly	Weekly	Weekly	Three different windrows will be sampled per event
Temperature	Weekly	Weekly	Weekly	Three different windrows will be sampled per event
Ph	Weekly	Weekly	Weekly	Three different windrows will be sampled per event

Note: O_2 = oxygen.
CO_2 = carbon dioxide.

Table 3
Treatment Confirmation Samples

Operable Unit 2, Site 5
NAS Cecil Field
Jacksonville, Florida

Time	Analyses and Method			
	TRPH-IR USEPA 418.1	PAH USEPA Method 8270	VOA USEPA Method 8010	PCB USEPA Method 8080
Day 0				9
Day 100	9	9	9	
Total Lift	9	9	9	9
QC Samples per Program	1 dup per batch	1 dup per 20 1 MS/MSD program	trip blank 1 dup per 20 1 MS/MSD program	1 dup per 20 1 MS/MSD program
Program Total	50	50	55	50

Notes:

Nine samples per lift are the number required for 3,400 cubic yards (yd^3) under Chapter 17-775, Florida Administrative Code (FAC).

Metals will not be analyzed as part of this program because they have not historically exceeded standards in soil designated for biological treatment.

This sample schedule was prepared under the assumption that there will be five lifts of 3,400 yd^3 each. All analyses will be performed in a Florida-certified laboratory.

USEPA = U.S. Environmental Protection Agency.
QC = quality control.
dup = duplicate.
MS/MSD = matrix spike and matrix spike duplicate.

Table 4
Analytical Program Summary

Operable Unit 2, Site 5
NAS Cecil Field
Jacksonville, Florida

Analysis	Method	Laboratory	Number of Samples (includes QA/QC)	Turnaround Time
Treatment Samples				
TRPH	USEPA 418.1	ABB-ES	160	24 hours
GC Fingerprint	Mod. EPA 8100	ABB-ES	100	72 hours
Bacteria	Mod. STD Method	ABB-ES	100	2 weeks
Mineral Nutrients	Mod. Std Methods	ABB-ES	125	24 hours
Moisture		ABB-ES	160	24 hours
Treatment Confirmation Samples				
PCB (Day 0 of Operation)	USEPA 8080	Florida Certified, Level III	50	Standard
TRPH (at completion)	USEPA 418.1	Florida Certified, Level III	50	7 days
Semivolatile (PAHs) (at completion)	USEPA 8270	Florida Certified, Level III	55	7 days
Volatile (at completion)	USEPA 8010	Florida Certified, Level III	50	7 days

Notes:
QA/QC = quality assurance and quality control.
TRPH = total recoverable petroleum hydrocarbons.
USEPA = U.S. Environmental Protection Agency.
ABB-ES = ABB Environmental Services, Inc.
GC = gas chromatograph.
Mod. = modified.
Mod. Std. = modified standard.
PCB = polychlorinated biphenyl.
PAHs = polynuclear aromatic hydrocarbons.

6.0 COMMUNICATION

Regular communication between the contractor and ABB-ES will be necessary to ensure the goals of this project are met. The contractor is responsible for construction and physical operations of the remedial operation; however, ABB-ES will assist with the operation by providing technical oversight. ABB-ES input to the project will include construction oversight. ABB-ES will provide input as it relates to amendment application, water management, and maintenance of TRPH degrading conditions. ABB-ES will also be responsible for sampling and analysis (process monitoring and treatment confirmation).

The schedule specified in the operation and maintenance plan will be used to establish initial maintenance schedules. As the project progresses, any recommendation or modification to the schedule will be communicated by ABB-ES directly to a person designated by the contractor. The contractor shall inspect the treatment operation daily and report any observations, particularly anything out of the ordinary, to either the ABB-ES oversight engineer or one of the designated ABB-ES technical staff located in Wakefield, Massachusetts.

Results from data analysis and recommendations made by ABB-ES will be summarized and distributed to the contractor and Southern Division, Naval Facilities Engineering Command, in a monthly progress report. Any progress reports prepared by the contractor shall in turn be distributed to ABB-ES.

APPENDIX B

TECHNICAL SPECIFICATION FOR CLEARING AND GRUBBING

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CLEARING AND GRUBBING

NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
0	7/21/94	Issued for use	KK	RD		

ORIGIN			
BECHTEL	CLEARING AND GRUBBING	JOB NO. 22567	
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TECHNICAL SPECIFICATION
FOR
CLEARING AND GRUBBING

1.0 GENERAL

This specification defines the technical requirements and establishes the quality and workmanship required for clearing and grubbing. Not all operations defined herein may be required. Reference is directed to applicable subcontract Scope of Work and engineering drawings for specific services required.

2.0 ABBREVIATIONS

None.

3.0 CODES AND STANDARDS

The Subcontractor shall control the quality of items and services to meet the requirements of this specification, applicable codes and standards, and other Subcontract documents.

4.0 SUBMITTALS

4.1 Engineering documentation requirements are summarized on the Subcontractor Submittal Requirements Summary, Exhibit F, and are augmented by detailed requirements listed herein. Bechtel Environmental, Inc., (BEI) will determine if documentation is complete as submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.

4.2 Unless noted otherwise, all Subcontractor submittals shall be made to BEI at least two (2) weeks prior to use, fabrication, or implementation.

4.3 For those submittals needed within the [illegible] (2) weeks following [illegible] contract award, submittals shall be made no later than [illegible] commencement of work. [illegible] will notify the Subcontractor of the status of the submittal [illegible] telephone within three (3) work days following receipt of the submittal.

5.0 FIELD OPERATIONS

5.1 CLEARING

5.1.1 Clearing shall consist of removing and disposing of only designated trees and shrubs, and mowing grass inside the work area. Trees and shrubs designated for removal shall be cut to no more than 2 inches high, measured on the side adjacent to the highest ground. Grass within the work area shall be mowed to a maximum height of one inch prior to excavation.

5.1.2 The Subcontractor shall clear only areas designated on the engineering drawings or as directed by BEI in the field. The Subcontractor shall protect all trees, shrubs, or plants which are not specified for removal. The Subcontractor shall be responsible for restoring any unauthorized removal or damage to trees, shrubs, or plants at no additional cost to BEI.

5.1.3 All removed trees and shrubs shall be cut or otherwise suitably reduced in size for safe transport. Grass clippings shall be placed in heavy duty garbage bags.

5.1.4 All above-ground cleared materials shall be hauled and disposed of at a licensed local sanitary landfill or stockpiled as directed by BEI.

5.1.5 All stumps with a trunk diameter exceeding 6 inches shall be treated by one of the following methods:

a. Stumps shall be ground in place with a stump cutter.

b. Stumps shall be uprooted, broken down, and checked for contamination. Stump debris shall be disposed of at a licensed local sanitary landfill or stockpile as directed by BEI.

5.2 GRUBBING

5.2.1 Material to be grubbed, together with logs and other organic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below original surface level of the ground in areas indicated to be grubbed. Depressions made by grubbing shall be filled with a suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

5.2.2 Subcontractor shall verify that grubbed material is uncontaminated as directed by BEI.

APPENDIX C

TECHNICAL SPECIFICATION FOR CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
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ORIGIN			
BECHTEL	CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION	JOB NO. 22567	
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TECHNICAL SPECIFICATION FOR CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

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ORIGIN	CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION	JOB NO. 22567	
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TECHNICAL SPECIFICATION
FOR
CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

1.0 GENERAL

This Specification provides the technical requirements for the excavation of contaminated earthwork and miscellaneous demolition. Not all work defined herein is necessarily required for this contract; reference is directed to the Scope of Work and engineering drawings for specific services required.

Contaminated earthwork includes excavating, loading, placing, and compacting contaminated materials. Transporting and unloading of contaminated materials is covered in Specification 001-SP000-003, "Transport of Contaminated Material." Backfilling of excavation is covered in Specification 001-SP000-006, "Uncontaminated Earthwork".

2.0 QUALITY STANDARDS

Unless otherwise specified or shown, the latest edition at the time of bid of the following Codes and Standards shall apply to the extent indicated herein:

OSHA 29 CFR 1910	Occupational Safety and Health Regulations for General Industry
OSHA 29 CFR 1926	Occupational Safety and Health Regulations for Construction

3.0 SUBMITTALS

3.1 GENERAL

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements Summary (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. BEI will determine if documentation is complete as submitted and reserves the right to require the resubmittal of any submittals that do not meet specified requirements. Unless indicated otherwise, submittals shall be made to BEI at least 2 weeks prior to delivery, implementation, or use.

3.2 LIST OF EQUIPMENT

Submit list of equipment for use in contaminated earthwork. The list shall include the type, size, and rated capacity of the equipment proposed.

3.3 TESTING REPORTS

Submit testing reports within 24 hours of conclusion of physical tests. Submittals shall include 2 unbound copies of test results, including calibration curves and results of calibration.

3.4 TESTING LABORATORY CERTIFICATIONS AND QUALIFICATIONS

Submit qualifications and certifications of the commercial testing laboratory.

3.5 DRAINAGE DESIGN

Submit proposed drainage design in accordance with this specification.

3.6 SHORING DESIGN AND CALCULATIONS

Submit proposed shoring design and engineering calculations or alternate slope protection measures, in accordance with this specification.

4.0 MATERIALS

4.1 INSPECTION AND TESTING OF MATERIALS

BEI reserves the right to inspect and test any and all materials in order to verify conformance with requirements.

4.2 NONCONFORMANCE

Materials not in conformance with the Specification requirements shall be removed from the site and replaced.

4.3 SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, hay bales, geotextile filter fabric made expressly for use as a silt screen, or other materials approved by BEI prior to their use. Straw and hay bales shall not be used for permanent sediment barriers unless approved by BEI.

4.3.1 Hay/Straw Bales and Reinforcing Bars

Baled hay or straw shall be laid end to end such that no gap exists between bales. Reinforcing bars shall be #4 bar and a minimum of $2^1/_2$ feet long.

4.3.2 Filter Fabric

Filter fabric shall be a material made expressly for the purpose of sediment control such as Exxon GTF 101S Silt Screen or approved equal.

4.4 EROSION CONTROL BLANKETS

Erosion control blankets shall be Curlex Blankets manufactured by American Excelsior Company, or approved equal.

5.0 FIELD OPERATIONS

5.1 EROSION AND SEDIMENT CONTROL

Potentially contaminated material shall be prevented from being eroded or otherwise transported into an uncontaminated area or an area that has a lower level of contamination.

Install temporary sediment barriers in accordance with the contract documents and shall be maintain during construction until permanent sediment barriers are in place.

Permanent sediment barriers shall be installed in accordance with the engineering drawings.

Erosion and sediment shall be controlled by the following techniques subject to BEI review on a case-by-case basis:

- Covering with synthetic liner material
- Covering with uncontaminated soil material
- Sediment barriers

5.2 DUST CONTROL

Dust shall be controlled by the following techniques subject to BEI review:

- Wetting with water
- Wetting with BEI-approved synthetic dust suppressant
- Establishing temporary vegetative cover
- Compaction
- Sealing by rolling with a smooth drum
- Maintaining slopes of exposed surfaces within defined limits

5.3 CLEARING AND GRUBBING

Clearing and grubbing shall be performed in accordance with Specification 001-SP000-002.

5.4 DRAINAGE, DEWATERING, AND STREAM DIVERSION

5.4.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grading shall be developed and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be sloped at a minimum of 3% to promote runoff and shall be protected to prevent erosion and sloughing. Submit a proposed design to BEI for review prior to constructing any drainage systems not indicated by the engineering drawings.

5.4.2 Dewatering

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with excavation progress. Water which has come in contact with contaminated material shall be collected and transported to an onsite location in accordance with Specification 001-SP000-003, "Transport of Contaminated Material."

5.4.3 Stream Diversion

Stream diversion(s) shall be developed as shown on the engineering drawings and maintained to prevent the spread of contamination. Blasting is not permitted.

5.6 EXCAVATION

5.6.1 General

All excavation shall conform to lines, grades, and depths defined on the engineering drawings and field verified by BEI.

Rocks 6 inches or greater in any dimension shall be separated from the soil and given a gross decontamination (i.e., removal of most soil material by scrapers, brushes, etc.). These rocks shall be left in the excavation area.

Areas being excavated shall be maintained in a clean condition, free from leaves, brush, sticks, trash and other debris. Excavations shall be inspected in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work each day. All daily inspections shall be documented.

5.6.2 Contamination Control

Dust generated during construction shall be controlled by water spraying with potable water or other approved methods.

Excavation shall be performed in such a manner that the spread of contamination is prevented. Unless indicated otherwise, the cutting edge of the excavator(s) shall be toothless and the excavation performed in the direction of surface run-off (i.e., from higher to lower elevation). Contamination spread through the improper execution of the subcontract documents shall be cleaned up to the satisfaction of BEI at the Subcontractor's expense.

Barriers (draped plastic sheeting, plastic mounted on wooden frame, or plywood) shall be placed against the sides of truckbeds to prevent contamination of the exteriors of transport vehicles while being loaded.

When transport vehicles are loaded in uncontaminated areas, those areas shall be protected from contamination with plastic overlain with plywood adjacent to the vehicle or with other BEI approved materials and arrangement.

Transport vehicles shall be maintained and used in accordance with Specification 001-SP000-003, "Transport of Contaminated Material."

At least 1 ft of freeboard shall be maintained between top of soil and sideboards on loaded haul trucks.

5.6.3 Excavation Slopes

Excavation slopes shall be established in strict accordance with Subpart P, "Excavation, Trenching, and Shoring," of 29 CFR 1926. Side slopes shall be protected to prevent materials from eroding or sloughing. Any additional material removal and handling caused by erosion or sloughing shall be performed at the expense of the Subcontractor.

5.6.4 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, and adjacent paving, structures, and utilities. Shoring design and installation plans including engineering calculations shall be developed by the Subcontractor in accordance

with 29 CFR 1926 Subpart P and submitted to BEI for review. Shoring, bracing, and sheeting shall be removed as excavations are backfilled in a manner to prevent cave-ins.

Alternate methods (e.g., benching, sloping, trench boxes, etc.) may be used where applicable. Alternate methods proposed by the Subcontractor shall be developed in accordance with 29 CFR 1926 Subpart P and submitted to BEI for review.

Provide a shoring inspector that is qualified in accordance with 29 CFR 1926, Subpart P. The scope and frequency of inspections shall be in accordance with 29 CFR 1926 Subpart P.

Care shall be taken to minimize exposure of shoring or other slope protection devices to contamination. These items shall not be released from the site until they have been decontaminated in accordance with this specification.

5.6.5 Excavation Sequence

The sequence for excavation of contaminated material shall be as follows:

(1) Define and isolate exclusion zones per engineering drawings.

(2) Construct haul roads per engineering drawings.

(3) Perform initial excavation to indicated lines and grades indicated on engineering drawings.

(4) Allow excavated area to be sampled to determine if the area meets the remedial cleanup standards. Sampling is outside the scope of this Specification.

(5) Continue excavation as directed by BEI, if an area within the excavation does not meet cleanup standards. Allow the excavated area to be resampled after each lift of material is removed. Repeat the process until all areas within the excavation meet the cleanup standards as directed by BEI.

(6) Cease excavation upon direction by BEI.

(7) Load contaminated material in accordance with this specification.

5.7 DEMOLITION

5.7.1 General

Demolition shall consist of demolishing, rubblizing or scabbling and/or disposing of asphalt, concrete, or bituminous concrete surfaces within the limits to be excavated as shown on the engineering drawings and/or as directed by BEI.

Construction joints shall be saw cut in existing concrete or asphalt where new concrete or asphalt will be placed.

Demolished debris shall be reduced to a size no larger than 2 feet long, 2 feet wide and 2 feet thick.

Reinforcing bars encountered during concrete removal shall be cut with an approved method.

5.7.2 Inspection

Work areas shall be inspected in accordance with OSHA 29 CFR 1910 and 1926 when fuel powered tools are used indoors. No personnel shall enter the work area until required corrective measures are completed. Inspections shall include review of administrative and engineering controls and measurement of air quality in confined spaces. These daily inspections shall be documented.

5.8 LOADING

5.8.1 Onsite Disposal or Storage

All excavated materials shall be transported to and placed in areas indicated on the engineering drawings or as directed by BEI. Material shall be loaded into designated haul trucks using the contamination control techniques defined in this specification.

5.8.2 Offsite Disposal

Excavated contaminated soils designated for offsite disposal shall be loaded into designated haul trucks using the contamination control techniques defined in this specification. Haul trucks for offsite disposal will be provided by others.

5.9 TEMPORARY STORAGE OF CONTAMINATED MATERIALS

Material designated for temporary storage shall be off loaded at the temporary storage pad unless directed otherwise by BEI. Material shall be positioned with rubber-tired equipment (e.g., bobcat or front-end loader).

Compaction shall be performed with rubber-tired equipment well suited to the type of material being compacted. Material compaction and slope stability shall be sufficient to support the equipment and earthwork activities, as determined by BEI. Compacted material should not remain deformed under foot traffic. Activities shall be conducted in a manner that will prevent contact of contaminated materials with areas outside the asphalt pad.

In the event a permanent disposal area is used for temporary storage of contaminated material, placement shall comply with requirements for temporary storage. In addition, the area used for temporary storage shall be clearly identified by fencing, sediment barriers, or other BEI-approved methods.

5.10 EQUIPMENT DECONTAMINATION

Where discussed below, the term decontamination facility shall mean both the site decontamination facility and portable decontamination facilities, if any.

5.10.1 Procedure

All equipment and tools used in contaminated areas shall be decontaminated by the Subcontractor in accordance with field procedure EP-003, "Procedures for Equipment Decontamination."

5.10.2 Authorization

The Subcontractor shall obtain authorization from BEI before entering or exiting the decontamination facility.

5.10.3 Operations

Operation of a decontamination facility is outside the scope of this Specification. Subcontractor(s) or person(s) responsible for operating the decontamination facility are identified elsewhere in the control documents.

5.10.4 Decontamination

Equipment that has been in contaminated areas shall be decontaminated. The decontamination facility shall be used only for light and final decontamination and not for operations that would require gross decontamination (i.e., removal of most visible materials by scrapers, brushes, etc). Gross decontamination, if required, shall be performed as part of the specified earthwork at the area where trucks are loaded or unloaded. Decontamination shall be repeated as required.

5.10.5 Inspection

Following decontamination, all equipment shall be made available for inspection by BEI. Equipment shall be cleaned to the satisfaction of BEI.

5.11 VEHICLE RELEASE

Subcontractor shall obtain written approval from BEI prior to removing trucks from the site.

5.12 PROTECTION OF WORK

Settlement or erosion that occurs in compacted materials prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

5.13 SECURITY

When necessary and practical, as determined by BEI, work areas shall be secured using barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

APPENDIX D

TECHNICAL SPECIFICATION FOR TRANSPORTATION OF CONTAMINATED MATERIALS

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

TRANSPORTATION OF CONTAMINATED MATERIALS

0	8/2/94	Issued for Use	KCN			
No.	Date	REASON FOR REVISION	BY	CHECK	SUPV	PE

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TECHNICAL SPECIFICATIONS FOR TRANSPORTATION OF CONTAMINATED MATERIALS

1.0 GENERAL

1.1 PURPOSE

This Specification addresses requirements and conditions that apply to transportation of hazardous material(s) (HM), hazardous waste(s) (HW), and contaminated material(s) (CM) at U.S. Department of Navy sites under the Naval Facilities Engineering Command, Southern Division. The Subcontractor, Common Motor Carrier (if different), and motor vehicle operator(s) shall be knowledgeable of and comply with Federal Department of Transportation (DOT) regulations (49 CFR), and Environmental Protection Agency (EPA) regulations (40 CFR). Not all transport operations defined herein may be required. Reference is directed to applicable Subcontract Scope of Work and Design Drawings for specific services required.

1.2 ABBREVIATIONS

The abbreviations listed below, when used in this Specification, have the following meanings:

AAR	Association of American Railroads
BEI	Bechtel Environmental, Inc.
CDL	Commercial Driver's License
CFR	Code of Federal Regulations
CM	Contaminated Material
COFC	Container on flat car
DOT	Department of Transportation
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
HM	Hazardous Material
HW	Hazardous Waste
ICC	Interstate Commerce Commission
ISO	International Standards Organization
LSA	Low Specific Activity
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
RCRA	Resource Conservation and Recovery Act
RQ	Reportable quantity
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage, and Disposal Facility

1.3 QUALITY STANDARDS

The quality standards, as defined by Bechtel Environmental, Inc. (BEI) and Federal DOT and EPA regulations [i.e., Code of Federal Regulations (CFRs)] applicable to this Specification are identified herein and are applicable directly or indirectly to:

- roll-on/roll-off bimodal containers
- transporting vehicle (also referred to as motor vehicle)
- rail cars (flat, box, gondola)
- equipment and material
- packaging, labeling, marking, placarding, handling, and transporting of HM, HW, and CM
- qualifications of Subcontractor provided personnel.

The following CFRs, which are a codification of the general and permanent rules published in the Federal Register by the Executive departments and agencies of the Federal Government, are identified in this Specification for the purpose of quality standards. Failure to identify an applicable CFR does not imply elimination of required Subcontractor knowledge and compliance.

Title	No.	CFR Regulations Title
40	262	"Standards Applicable to Generators of Hazardous Waste"
40	263	"Standards Applicable to Transporters of Hazardous Waste"
40	761	"Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"
49	171	"General Information, Regulations and Definitions"
49	172	"Hazardous Materials Table, Special Provisions, Communications, Emergency Response Information and Training Requirements"
49	173	"Shippers - General Requirements for Shipments and Packagings"
49	174	"Carriage by Rail"
49	177	"Carriage by Public Highway"
49	178	"Specifications for Packagings"
49	215	"Railroad Freight Car Safety Standards"
49	383	"Commercial Driver's License Standards; Requirements and Penalties"
49	385	"Safety and Fitness"
49	387	"Minimum Levels of Financial Responsibility for Motor Carriers"
49	391	"Qualifications of Drivers"

49 392 "Driving of Motor Vehicles"

49 393 "Parts and Accessories Necessary for Safe Operation"

49 395 "Hours of Service of Drivers"

49 396 "Inspection, Repair, and Maintenance"

49 397 "Transportation of Hazardous Materials; Driving and Parking Rules"

49 1300 "Passenger and Freight Tariffs and Schedules (of Subtitle B, "Other Regulations Relating to Transportation"; Subchapter D, "Tariffs and Schedules")

Quality, where standards are not identified in this Specification, will be reviewed by BEI for approval on a case-by-case basis. Replacement of material, equipment, or personnel (including time lost) due to failure to meet the Subcontract specified quality standards, or BEI approval when standards are not identified, shall be at the Subcontractor's expense. When requested, and at no cost to BEI, the Subcontractor shall provide material samples, manufacturer specifications, and documentation in support of quality standards.

1.4 EQUIPMENT, MATERIAL, AND PERSONNEL REQUIRED

Equipment, material, and personnel provided to BEI by the Subcontractor shall be as follows:

1.4.1 Transportation by Highway

- Transport vehicles (e.g., dry van, flatbed, roll-off, lowboy, and ocean style trailers; truck tractors; and roll-off and ocean style containers) that meet the requirements of Title 49 CFR 393 and 396.

- Securement systems, especially tiedown assemblies (e.g., chains, cables, steel straps, and fiber webbing); load binders and hardware (e.g., hooks, bolts, welds, or other connectors); and winches or other fastening devices that are without visual damage from wear or misuse and that meet the requirements of Title 459 CFR 393, Subpart I.

- Weatherproof tarpaulins that are without visual damage from wear or misuse and of a quality highly resistant to tears, rips, snags, punctures, abrasion, cracking, peeling, weathering, and that are suitable for use as an external cargo wrap.

- Side boards that are suitable as a frame for use with tarpaulins to form a closed transport vehicle.

- Motor vehicle operators who meet the requirements of Title 49 CFR 383, 391, 392, 395, 397, and 172 Subpart H, and 177. A signed affidavit stating that all vehicle operators handling Navy waste are HAZMAT trained in accordance with 49 CFR Part 172, Subpart H; and an outline of the course program may be submitted.

1.4.2 Roll-On/Roll-Off Bimodal Containers

Delivery

The Subcontractor shall deliver to Navy job sites roll-on/roll-off bimodal containers for BEI use. BEI will order containers through use of work releases which identify the job site, delivery rate (e.g., two per day), and the date of the first delivery. At least 10 work days of advance notice will be given by BEI to the Subcontractor.

Design, Construction, and Testing

All Subcontractor roll-on/roll-off bimodal containers provided for BEI use shall be designed, constructed, and tested in accordance with the Association of American Railroads (AAR) Specification M-930-90 and shall be capable of meeting the DOT requirements as a strong-tight container. Each container offered to BEI shall be identified with a certification plate as prescribed in Section 6.13 of AAR Specification M-930-90. The Subcontractor shall provide BEI with a drawing of the roll-on/roll-off bimodal container that displays the materials of construction, door closure and fastener details, and hold down and lifting pad details.

Size of Roll-On/Roll-Off Bimodal Containers

The roll-on/roll-off bimodal container to be provided by the Subcontractor shall be either 20 cubic yard or 25.5 cubic yard capacity. Quantity and identification of container size shall be identified in the work release. The Subcontractor shall provide BEI, on the same drawing identified in 1.4.2.2. the external and internal dimensions and the tare weight and gross weight rating of the container.

Condition of Containers

At the time of delivery, the Subcontractor shall provide containers janitorially clean (broom clean), free of extraneous debris, and free of excess scale and corrosion which could be an impediment to decontamination in the event the containers should become contaminated.

Liners

The Subcontractor shall provide polyethylene bag liners that have a polyethylene nominal thickness of at least 6 mils. The polyethylene used in fabrication of the liner shall be prime virgin resins. The bag liner shall be fabricated to fit squarely in the corners to virtually eliminate tearing on filling and shall be watertight. The Subcontractor shall provide manufacturer's data sheets and certifications that bag liners provided meet the Specification's requirements.

Alternate materials and thicknesses for the liner may be offered by the Subcontractor, but the proposed change must be approved in advance by BEI as an equivalent bag liner.

The Subcontractor shall provide written procedures for the bag liner installation and proper assembly of roll-on/roll-off bimodal containers to meet DOT requirements as strong-tight containers during transport.

1.4.3 Rail Freight Cars and Siding Requirements

Defects and Restrictions

The Subcontractor shall provide BEI with rail freight cars consisting of mainly gondola cars, some flat cars, and a few box cars. All rail freight shall be in good order and shall contain no defects in accordance with 49 CFR Part 215, Subpart B, or any restrictions at time of delivery as defined in 49 CFR Part 215, Subpart C.

Freight Car Load Ratings

The Subcontractor shall provide rail freight cars having a load capacity of not less than 75 tons nor more than 100 tons. The ratings of the rail gondola cars shall be mainly 95- and 100-ton cars. Written approval, in advance, shall be obtained from BEI in order to supply rail gondola cars having a load capacity rating of less than 90 tons.

Qualification of Rail Transportation Crew

All Subcontractor personnel who handle and process BEI loaded rail freight cars and intermodal packages shall be HAZMAT trained in accordance with 49 CFR 172.700, Subpart H. A signed affidavit stating that all railroad crew members handling rail freight cars containing Navy waste are HAZMAT trained and an outline of the course program may be submitted.

Freight Car Cleanliness

The rail freight cars provided by the Subcontractor shall be free of loose debris and be janitorially clean (broom clean).

Rail Gondola Car

The Subcontractor shall provide to BEI rail gondola cars that are free of internal appurtenances which could affect the integrity of sift-proof liners that BEI will provide and install.

The Subcontractor-provided rail gondola cars shall have an internal height of not less than 4.5 feet nor greater than 5.75 feet.

The Subcontractor shall provide cars whose internal surfaces, in BEI's opinion, are free of major rust or scale which could affect the ability to easily decontaminate the car in the event it became contaminated.

Rail Siding Maintenance

Subcontractor provided rail sidings (i.e., frogs, switches, ballast, crossties, rails, fastenings) shall be maintained to at least a Class 1 standard throughout any shipping campaign in accordance with 49 CFR Part 213. The Subcontractor shall notify BEI in writing of the names and qualifications of persons designated to inspect track.

1.5 PACKAGING, LABELING, MARKING, AND PLACARDING

1.5.1 Transportation by Highway

Packaging, labeling, marking, and placarding will be performed by BEI [or Treatment, Storage, and Disposal Facility (TSDF)] in compliance with Title 49 CFR 172, 173, 178, and Title 40 CFR 262, 263, and 761. The motor vehicle operator(s) shall perform an inspection to verify, based on his training in accordance with Title 49 CFR 172, Subpart H, and experience, the packaging, labeling, marking, and placarding are in accordance with the requirements listed above and the accompanying shipping documents. Upon acceptance of the load for transport, the Subcontractor shall be responsible for maintaining the integrity of BEI's packaging, labeling, marking, placarding, and the accompanying shipping documents in compliance with 49 CFR 177.800, Subpart A. BEI shall be notified immediately (see Section 6.0, Accidents Involving Transport Vehicles, for notification procedures) upon the Subcontractor's discovery of a change in the condition of BEI's packaging, labeling, marking, or placarding (e.g., changes due to equipment failure, packaging failure, accident, adverse weather conditions, vandalism, or theft). Concerns or questions related to the inspection, maintenance, or notification procedures are to be addressed to the BEI site manager or his designee prior to the motor vehicle operator's load acceptance.

1.5.2 Roll-On/Roll-Off Bimodal Containers

BEI will inspect the roll-on/roll-off bimodal container in accordance with the Specification at the time of Subcontractor delivery and, upon acceptance, will direct where to place the container.

BEI may elect to survey the roll-on/roll-off bimodal container at the time of delivery for the presence of hazardous materials. BEI will install the Subcontractor provided bag liner, fill the container, and seal it for shipment in accordance with Subcontract provided packaging procedures. BEI will mark, label, placard, certify the packaging, and prepare required shipping documents in accordance with DOT requirements.

1.5.3 Rail Freight Cars

BEI will offer strong-tight packages to be used for packaging of some waste. These packages will be designed to meet AAR Specification M-930-90, "Closed Van-Type Dry Cargo Containers for Domestic Container-on-Flat-Car (COFC) Service." BEI will mark, label, certify, and provide shipping papers describing the packaged container contents in full compliance with 49 CFR Parts

171, 172, and 173. These containers will be turned over to the Subcontractor for loading and shipment.

Schedule adjustments shall be made by BEI, when needed, that result from weather conditions that prevent loading of Navy waste into or onto rail freight cars. The BEI Site Superintendent or designee will notify the Subcontractor of all necessary schedule adjustments due to inclement weather.

The Subcontractor shall provide equipment, such as but not limited to, clevis, slings, cranes and bridges, lifting and handling procedures, training of workers and supervision in order to transfer BEI packages to rail flat cars and to provide blocking, bracing, and load securement for the packages such that the packages will not move or fall during conditions normally incident to transportation.

The Subcontractor shall provide BEI copies of the latest certification of load testing of all lifting equipment used for COFC services for BEI packages. The Subcontractor shall also provide BEI with copies of each load test of the equipment and reason for load test (e.g., maintenance repair, periodic retest).

BEI shall placard the rail freight cars and intermodol packages in accordance with 49 CFR Part 172, Subpart F. Subcontractor rail crew members shall replace placards and car certificates that become lost in transit at the next inspection point in accordance with 49 CFR Part 174.59.

2.0 MOTOR VEHICLE REQUIREMENTS

2.1 GENERAL

The Subcontractor shall provide equipment that is appropriate to accomplish successful transportation of HM, HW, or CM either from Navy sites or to or from the TSDF. Motor vehicles shall be maintained and operated in accordance with the manufacturer's recommendations, Occupational Safety and Health Administration (OSHA) requirements, federal regulations as specified in Title 49 CFR 393, 396, and 397, and applicable state and local regulations. The Subcontractor shall take all precautions necessary for safe operation of his equipment/vehicle and to safeguard the public and the environment from injury or accidental release of HM, HW, or CM.

The Subcontractor shall provide to BEI a list of the transport vehicles to be used, broken down by identification number, type, and size.

2.2 MOTOR VEHICLE INSPECTIONS

All vehicles shall be inspected by the Subcontractor in accordance to Title 49 CFR 393, "Parts and Accessories Necessary for Safe Operation," and shall conform to all applicable local, state, and federal requirements for registration, insurance, inspection, certification, and performance.

All motor vehicle inspections shall be performed by qualified inspectors as required by Title 49 CFR 396.19, "Inspector Qualifications." The Subcontractor shall submit a copy of the current certificate of commercial motor vehicle inspection and the inspector's certificate of training to BEI prior to any transportation activities (or may provide a statement certifying that all motor vehicles supplied to BEI have been inspected in accordance with the requirements of Title 49 CFR 396.17, 396.19, and 396.23).

Brake inspections shall be performed by a certified brake inspector for commercial motor vehicles as described in Title 49 CFR 396.25, "Qualifications of Brake Inspectors." The Subcontractor shall submit a copy of the current certificate of brake inspection and the inspector's certification of training to BEI prior to transportation activities (or may provide a statement certifying that all motor vehicles supplied to BEI have been inspected in accordance with the requirements of Title 49 CFR 396).

Prior to being placed into use, and at least once each day, in accordance with the requirements of Title 49 CFR 396.11, "Driver Vehicle Inspection Report," and 396.13, "Driver Inspection," the motor vehicle operator shall perform a safety inspection of the motor vehicle. The vehicle operator upon arrival, shall provide BEI with a copy of the current signed daily safety inspection report. BEI will confirm that the transporting vehicle has been inspected in accordance with 49 CFR 396, "Inspection, Repair, and Maintenance."

All motor vehicles (and equipment) provided to BEI shall be subject to a quality surveillance by BEI prior to loading to determine that the motor vehicle (and equipment) in accordance with Title 49 CFR 393 and 396. Such inspection and approval shall not relieve the Subcontractor of responsibility for the use of proper equipment. **INSPECTION OF VEHICLES BY BEI DOES NOT IMPLY CERTIFICATION.** The Subcontractor shall allow six hours for motor vehicle inspection, loading/unloading, and release from a BEI site (or TSDF).

Motor vehicles determined by BEI to be potentially unsafe and/or unsuitable for their intended use shall be removed from the site until repaired by the Subcontractor at his expense or replaced with a different motor vehicle. Repaired or replaced motor vehicles will receive new inspections to determine if repairs are correct and meet inspection standards. Time lost due to reinspection shall be at the Subcontractor's expense.

3.0 MOTOR VEHICLE OPERATOR REQUIREMENTS

3.1 QUALIFICATION OF MOTOR VEHICLE REQUIREMENTS

Before transportation services are rendered, motor vehicle operators (drivers) shall meet the requirements, including all required endorsements (and shall provide evidence of such) specified in Title 49 CFR 383, " Commercial Driver's License Standards: Requirements and Penalties"; 391, "Qualifications of Drivers"; and 172, Subpart H, "Training."

The following information must be submitted to BEI prior to any transportation activity:

- A medical examiner's certificate, or a legible photographic copy of a certificate, or a statement attesting to a record on file with the Subcontractor of a medical examiner's certificate on each motor vehicle operator's physical qualifications to operate a motor vehicle in accordance with Title 49 CFR 391.43, "Medical examination; Certification of Physical Examination," and Title 49 CFR 391.41, "Physical Qualifications for Drivers."

- A statement certifying the Subcontractor, at least once every 12 months, reviews the driving record of each motor vehicle operator it employs in accordance with Title 49 CFR 391.25, "Annual Review of Driving Record." Included in this review shall be a list of all violations of motor vehicle traffic laws in accordance with Title 49 CFR 391.27, "Record of Violations."

- A valid commercial driver's license (CDL) for each motor vehicle operator provided to BEI (and a legible photographic copy of the CDL to be retained by BEI).

3.2 MOTOR VEHICLE OPERATORS NOT QUALIFIED

Motor vehicle operators may not be deemed qualified or acceptable in accordance with Title 49 CFR 391.51, "Disqualification of Drivers." Motor vehicle operators deemed not acceptable for transporting HW, HM, or CM shall be replaced at Subcontractor's expense, including time lost.

4.0 OTHER REQUIREMENTS

4.1 MOTOR VEHICLE WEIGHT REQUIREMENTS

Prior to arrival for loading, all Subcontractor motor vehicles provided to BEI, shall be weighed at an offsite certified (certified calibrated) scale. Upon arrival for loading, each vehicle operator shall provide BEI a legible copy of the certified tare (empty) weight receipt for that motor vehicle.

Prior to releasing the loaded motor vehicle for transport, BEI will verify motor vehicle and load weight by requiring all loaded motor vehicles (truck, trailer and load) to be weighed at an offsite certified scale located within 30 miles of the Navy site. Subcontractor shall provide BEI with a legible copy of the certified loaded weight receipt for each motor vehicle.

BEI will only accept certified tare and loaded weight receipts containing the following information:

- Motor Vehicle identification number

- Date motor vehicle was weighed

- Name, address, and telephone number of offsite certified scale

- Weigh master's signature

Gross weight of loaded motor vehicles (tractor, trailer, and load) released from the site(s) shall not exceed 80,000 pounds (except for BEI authorized permitted over-dimension/over-weight shipments). If a motor vehicle (tractor, trailer, and load) exceeds 80,000 pounds, or the maximum axle weight limits, the motor vehicle is to return to the site to off-load the excess weight.

4.2 TRANSPORTATION SAFETY RATING

The Subcontractor shall submit to BEI a current copy of his Federal Motor Carrier Safety Rating assigned by the Federal Highway Administration (FHWA) as set forth in Title 49 CFR 385, "Determination of Safety Rating." A Subcontractor receiving notification by the FHWA of a "conditional" or "unsatisfactory" rating will be ineligible to transport HM, HW, or CM for BEI.

4.3 CONTROLLED SUBSTANCE TESTING

The Subcontractor shall submit to BEI proof of compliance with Title 49 CFR 391, Subpart H, "Controlled Substance Testing." (The Subcontractor may provide an affidavit attesting that in compliance with Title 49 CFR 391, Subpart H, a controlled substance testing program is in place with a copy of the program available to BEI by request.)

4.4 TRANSPORTER EPA ID NUMBER

The Subcontractor shall submit to BEI his EPA ID number and the EPA ID numbers of each railroad it is subcontracting with, if applicable, as specified per the Toxic Substances Control Act (TSCA) or Resource Conservation and Recovery Act (RCRA). If polychlorinated biphenyls (PCBs) are being transported, the Subcontractor is also required to have submitted a separate "Notification of PCB Activity" Form 7710-53 to the EPA as required by Title 40 CFR 761.202 and 761.205. A legible copy shall be provided to BEI prior to BEI's release of the load.

4.5 CARRIER SURETY BOND OR POLICIES OF INSURANCE

The Subcontractor shall submit to BEI proof of insurance on DOT Form MCS-82 or MCS-90, as required in Title 49 CFR 387.

4.6 TRANSPORTATION REPRESENTATIVE

The Subcontractor shall designate a competent, authorized representative, acceptable to BEI, that is knowledgeable in DOT hazardous materials regulations to represent and act for the Subcontractor. The Subcontractor shall inform BEI in writing of the name and address of such a representative. A background statements of the representative's qualifications, along with copies of training certificates or any other documented source of training or establishment of knowledge of the DOT hazardous materials regulations, shall be submitted to BEI in writing.

4.7 REQUIRED PERMITS AND LICENSES

The Subcontractor shall obtain all required permits and/or licenses and shall make all required notifications for transporting HM, HW, or CM from Navy sites to the TSDF (or to another Navy site), including any over-dimension/over-weight permits and/or notifications. The Subcontractor shall submit to BEI a legible copy of all required permits, licenses, and/or notifications made (or the Subcontractor may provide an affidavit attesting that all permits, licenses, and/or notifications shall be obtained or made with copies available at BEI's request).

4.8 DOCUMENTATION

The Subcontractor shall be responsible for all documents/shipping papers provided by BEI prior to shipment in accordance with 49 CFR 177.817 or 49 CFR 174.24, "Shipping Papers." The Subcontractor shall comply with the directions provided by BEI prior to shipment regarding documents/shipping papers. All documents/shipping papers shall be kept with BEI's shipments at all times. BEI documents will include the following when applicable:

- Signed Uniform Hazardous Waste Manifest/Bill of Lading
- Exclusive Use Control Instruction
- Vehicle Survey Release Form (completed at the site prior to vehicle release)
- TSDF specific forms
- Emergency Response Guide Information

A copy of the signed Bill of Lading, the Uniform Hazardous Waste Manifest (when required), and any TSDF specific forms shall be included with the Subcontractor's invoice for payment of transportation services.

4.9 TRANSPORTATION ROUTES AND EMERGENCY RESPONSE PLAN

4.9.1 Transportation by Highway

The Subcontractor shall meet all existing federal, state, and local regulations for traffic control and motor vehicle operation for transportation of HM, HW, or CM on public roads and highways.

The Subcontractor shall submit a written transportation Emergency Response Plan, which includes instructions for compliance with Title 49 CFR 171.15, "Immediate Notice of Certain Hazardous Materials Incidents," and 172, Subpart G, "Emergency Response Information." The plan shall include all aspects and considerations for HM, HW, or CM transportation hazards that may arise during transportation operations, and shall be submitted to BEI for review ten working days prior to any waste hauling. The plan shall include, at a minimum:

- Procedures for incident response

- Methods to contain and clean up releases
- Details of manpower and equipment available
- The coordination necessary to mobilize the above forces in an emergency
- Traffic maintenance/warning procedures
- List of emergency numbers for information and notification on HM, HW, or CM for each applicable state
- Name of emergency response coordinator

The Subcontractor shall notify BEI immediately upon learning that a transportation-related accident has occurred as stated in Section 6.0, "ACCIDENTS INVOLVING TRANSPORT VEHICLES" of this Specification.

The Subcontractor shall be responsible for providing BEI with the proposed transportation route that is in compliance with Title 49 CFR 397, "Transportation of Hazardous Materials; Driving and Parking Rules [397.9, "Routes," and 397, Subpart D, "Routing of Class 7 (Radioactive) Materials"] to be used between the Navy site (or TSDF) and TSDF (or another Navy site) prior to transport. Except for authorized deviations due to city hazardous material by-pass routes or detours mandated by powers of authority (e.g., detours due to construction, emergency situations, or inclement weather conditions), deviations from the submitted routes are not permitted without prior written approval by BEI. Transportation routes may be shown on BEI Design Drawings, when drawings are provided.

The cleanup cost for any release of HM, HW, or CM by the Subcontractor shall be the responsibility of the Subcontractor. The cleanup operations shall be performed at the expense of the Subcontractor. Cleanup shall be performed immediately.

A shipment that is designated by BEI to be a RCRA HW will require the Subcontractor to submit to BEI a current EPA ID# as proof of being an EPA-approved transporter of RCRA waste.

4.9.2 Railroad Routing Map

The subcontractor shall provide to BEI a map showing the proposed routing of rail freight cars from point of origin to the disposal facility. The routing map should identify all utilized railroads and indicate key milestones expressed in travel days from the time leaving the point of origin.

4.10 TRACKING AND NOTIFICATION

4.10.1 Transportation by Highway

The Subcontractor shall have in operation a satellite tracking system to be used on all BEI shipments. At least once a day, the motor vehicle/load shall be located with the time and location recorded. In conjunction with the satellite tracking system, the Subcontractor shall implement a procedure for daily contact with the motor vehicle operator. BEI will not consider messages forwarded, left with answering services, or on answering machines as daily contact. As an alternative, the Subcontractor may implement a scheduled daily telephone call-in/call-back location verification system and the call-in/call-back system require the Subcontractor to notify BEI immediately if the Subcontractor is unable to verify the motor vehicle/load location, or if the motor vehicle operator fails to make scheduled daily contacts. Motor vehicle/load location verification and motor vehicle operator daily contact information must be made available to BEI by telephone or facsimile transmittal with one hour of request. A written description of the tracking and notification system shall be submitted to BEI for approval.

The Subcontractor shall provide the capability to recall or reroute a shipment due to unforeseen events which may require the motor vehicle/load to return to the origination point or be rerouted to an alternate TSDF. This capability may be provided through the use of the satellite tracking/daily call-in system or the telephone call-in/call-back system. BEI shall be notified immediately if the Subcontractor is unable to recall or reroute a shipment.

The Subcontractor shall notify BEI immediately upon learning that a scheduled time of arrival, at either the TSDF or at a Navy site, has changed. BEI shall be notified immediately if the Subcontractor's motor vehicle is delayed due to equipment failure, accident, inclement weather, or any condition that prevents the motor vehicle/load from continuing on the approved route and/or transportation schedule. BEI shall be informed of the exact location and condition of the Subcontractor's motor vehicle and of BEI's load when a change of schedule or delay as described above occurs.

The Subcontractor shall contact the TSDF, or other destination, 24 hours in advance to schedule an arrival time. The Subcontractor shall be responsible for contacting the pickup and destination facilities before shipments begin, to identify appropriate procedures at the individual facilities (i.e., opening and closing times, pass requirements, etc.). Any cost incurred due to failure to comply with these procedures, or due to lack of appropriate planning, shall be the responsibility of the Subcontractor. The contact and telephone number for the pickup and destination facilities will be provided with the Work Release or as otherwise provided. BEI shall be notified within 24 hours of the scheduled delivery date if the shipment was not delivered to the TSDF on the scheduled delivery date.

If, during BEI's business day, the Subcontractor becomes aware of an inability to track, recall, or reroute BEI loads, or that the Subcontractor's motor vehicle is unable to maintain the approved transportation route and/or schedule, the Subcontractor shall notify BEI immediately, and if initially

unsuccessful, shall continue to attempt to notify BEI. If, after the close of BEI's business day, the Subcontractor becomes aware of a condition as described above, notification of such condition shall be made at the start of BEI's next business day. BEI will provide a contact telephone number for such notification prior to each shipment.

In addition to immediate notification by telephone, the Subcontractor shall submit to BEI within five days of loss of verified daily contact with the motor vehicle/load, a written report which shall include:

- Time, date, and location of last daily contact.
- Time, date, location, and condition of the motor vehicle/load when contact was reinstated.
- A description of the methods/agencies used to reinstate contact and to verify location of the motor vehicle/load.
- A description of the methods used to reinstate transportation services, if an interruption of services occurred.
- Any additional pertinent information concerning the incident.

4.10.2 Transportation by Rail

The Subcontractor shall notify BEI of any abnormal occurrences identified in the following subsections or any similar, but not identified, occurrences.

Location Tracking and Notification

The Subcontractor shall have in operation a system which identified the location of each BEI rail freight car grouping in transit from the Navy site to the designated TSDF. At least once per work day, the Subcontractor shall notify BEI as to the location of each rail freight car grouping. This may be accomplished by facsimile.

The Subcontractor system may be automated using bar coding reader stations, satellite tracking, or manual telephone call-in/call-back systems. Daily location verification information must be made available to BEI by telephone, computer, or facsimile transmittal within one hour of request.

The Subcontractor shall contact the disposal site 24 hours in advance of the scheduled arrival time.

Movement of Defective Cars for Repair

The Subcontractor shall notify BEI as soon as practical whenever a loaded rail freight car has been determined to have a defective component. The Subcontractor shall relay to BEI's Subcontractor

Administrator the related information and restrictions imposed by the designated inspector in accordance with 49 CFR Part 215.9.

Reporting Hazardous Material Incidents and Abnormal Occurrences

The term *abnormal occurrences* means any of, or similar to, the following conditions noted during transport of hazardous materials, substances, or wastes:

- failure of the watertight, sift-proof liner
- broken tamper-indicating devices or package seals
- deviation from the designated routing maps
- any transportation condition that is not normally incident to transportation

As soon as practical, the Subcontractor shall notify BEI of an incident which occurs during transportation in which Navy wastes are involved, whether a report is or is not required by 49 CFR Parts 171.15 and 171.16.

Leaking Rail Freight Cars and/or Intermodal Packages

The Subcontractor shall notify BEI immediately of any noted leakage of Navy waste material from any rail freight car or intermodol package during transportation.

Emergency Response Plan

The Subcontractor shall submit a written transportation Emergency Response Plan. The plan shall include instructions for compliance with 49 CFR Part 171.15, "Immediate Notice of Certain Hazardous Material Incidents." The plan shall include all aspects and considerations arising from transport incidents involving hazardous substances, materials, or wastes. The plan shall be submitted to BEI for review at least 10 working days in advance of any waste transportation as scheduled. The plan shall include the name of the Subcontractor emergency response coordinator.

4.11 PUBLISHED TARIFF RATES

The Subcontractor shall submit to BEI proof that each subcontracted item listed in Part III, Pricing and Data, b. Schedule of Quantities and Prices, of the Subcontract has been submitted and published through the Interstate Commerce Commission (ICC) tariff system as defined in Title 49 CFR 1300 through 1319.

4.12 ADDITIONAL REQUIREMENTS FOR LOOSE CONVEYANCE LOADS

Vehicles used for loose conveyance transport of soil shall meet the following requirements:

(1) The truckbed shall be free of drain holes, cracks, or other conditions that may allow leakage of soil.

(2) If the vehicle has a tailgate for dumping, the Subcontractor vehicle operator shall demonstrate to the BEI site superintendent or designee that the tailgate can maintain a seal. A vehicle that cannot maintain a seal will be repaired or replaced by the Subcontractor before being placed into service. If seals fail after the vehicle is placed into service, they are to be repaired immediately, and BEI shall be notified.

(3) Vehicles are not to be equipped with side boards while transporting loose conveyances.

(4) Material shall not be loaded higher than one foot below the top of the vehicle side walls.

(5) Tarpaulin covers shall be installed and used on all vehicles. Before being installed, sharp objects and/or protrusions are to be eliminated to prevent cutting or puncture of the tarpaulin.

(6) Tarpaulins are to be firmly secured over the soil with sufficient overlap so that the material will not be blown from the vehicle during transport. BEI will inspect the tarpaulin for adequate installation.

5.0 MOTOR VEHICLE LOADING AND UNLOADING OPERATIONS

All areas and buildings of the Navy sites (or TSDF) are off limits to Subcontractor motor vehicles (and motor vehicle operators) except those areas and buildings designated by BEI (or TSDF). Motor vehicle operators will be supervised by BEI (or TSDF) at all times while at BEI (or TSDF) sites and shall remain inside the tractor cab at all times, unless directed otherwise by BEI (or TSDF).

All Subcontractor motor vehicles will be monitored by BEI for external contamination prior to being allowed onto Navy sites. Subcontractor motor vehicles shall arrive at the site sufficiently clean to allow accurate monitoring. Motor vehicles shall be free of dried mud, dirt, grease, or other accumulations. If accurate monitoring is unsuccessful, due to excess mud, dirt, grease, or other accumulations, the motor vehicle shall be removed from the site and cleaned. Motor vehicle cleaning and time lost will be at the Subcontractor's expense. Only motor vehicles determined to be free of contamination will be allowed onto Navy sites.

Loading and unloading operations will be the responsibility of BEI (or TSDF) and will be conducted in a highly controlled manner that prevents contamination of motor vehicles. BEI (or TSDF) will verify that motor vehicles are free of contamination before their release from the loading/unloading area. Subcontractor motor vehicles will be checked for contamination as appropriate prior to leaving the loading/unloading area.

Motor vehicles that become contaminated during loading/unloading operations will be decontaminated by BEI (or TSDF). After decontamination, the motor vehicle will be checked again by BEI (or TSDF) to verify that it is free of contamination prior to its release for transport.

Load configurations shall be a joint effort of BEI and the motor vehicle operator(s). After loading, and prior to leaving the site (or TSDF), the motor vehicle operator(s) shall perform an inspection to verify the load is arranged and secured properly (based on experience and training, and in accordance with Title 49 CFR 393, Subpart I, "Protection Against Shifting or Falling Cargo," and 392.9, "Safe Loading").

Upon acceptance of the load for transport, the Subcontractor shall be responsible for maintaining the integrity of the load, the load arrangement, and any security seals. The motor vehicle operator shall examine and periodically reexamine the load (load inspections during transit do not apply to sealed trailers, only to the inspection of security seals) and its load-securing devices as may be necessary to maintain the integrity of the load and the load arrangement in accordance with Title 49 CFR 392.9.

The Subcontractor shall be in compliance with the requirements of Section 6.0, "Accidents Involving Transport Vehicles," of the Specification upon discovery of a change in the condition of BEI's load, load arrangement, or security seals (e.g., changed due to equipment/packaging failure, motor vehicle accident, adverse weather conditions, vandalism, or theft) which involves a release of HM, HW, or CM.

6.0 ACCIDENTS INVOLVING TRANSPORT VEHICLES

In the event of an accident, the Subcontractor shall follow the procedures outlined in his Emergency Response Plan and shall be in compliance with the requirements of Title 49 CFR 390.15, "Assistance in Investigations and Special Studies, Subpart E, Accidents and License Revocation: Duties of Driver," and 172, Subpart G, "Emergency Response Information."

In the event of an accident involving a release of HM, HW, or CM, the Subcontractor shall notify BEI immediately upon learning of the accident, and if initially unsuccessful, will continue to attempt to contact BEI. The Subcontractor shall use a 24-hour telephone contact number for accident notification, when notification attempts are outside BEI's business day. BEI will provide the 24-hour telephone contact number for such notification prior to each shipment.

Notification of an accident shall include location, date and time of the accident, resultant damage or injury, person(s) involved, probable cause, condition of the load, if HM, HW, or CM was released and the amount, and any other pertinent information concerning the accident. Also to be included if applicable, are weather conditions, distance to water sources, government agencies on the scene and a telephone number where communications can be maintained.

The motor vehicle operator shall comply with all directions provided by BEI, unless counter to FHWA regulations, and/or the laws and ordinances of the jurisdiction in which the motor vehicle was in operation at the time of the accident. BEI will issue instructions regarding continued transportation of the load. The motor vehicle operator shall remain with the motor vehicle until assistance arrives or until otherwise directed.

The Subcontractor shall submit to BEI within five days of an accident or incident involving a release of HM, HW, or CM a written report which shall include the location, date and time of the accident or incident, resultant damage or injury, person(s) involved, probable cause, the amount of HM, HW, or CM released, government agencies involved, and any other pertinent information concerning the accident or release. In addition, when an accident or incident occurs involving the release of HM, HW, or CM, the Subcontractor shall submit to BEI copies of any accident/incident reports required by State or other governmental entities.

7.0 SUBMITTALS

BEI engineering documentation requirements are summarized in the Subcontractor Submittal Requirements Summary of the issued Subcontract package. BEI will determine if documentation is complete as submitted by the Subcontractor, and reserve the right to reject and require resubmittal of any submittal that in BEI's opinion does not meet the Subcontract requirements.

Submittals that are specific to each individual motor vehicle operator (e.g., Brake Inspection Certificate, Brake Inspector's Certification, copy of CDL, Medical Examiner's Certificate) must be received and accepted by BEI within five working days of BEI's notification to the Subcontractor for motor vehicles. Nonshipment specific submittals (e.g., Motor Carrier Safety Rating, Carrier Surety Bond, or Policies of Insurance) required upon acceptance of the Subcontract award, must be received within five working days from time of Subcontract award notification and acceptance. Status of the submittals will be made to the Subcontractor by BEI within three working days following the receipt of required submittals. Rejected submittals must be corrected and received by BEI within three working days of notification of submittal rejection. All submittals must be accepted by BEI prior to the start of onsite work.

Affidavits submitted in lieu of specific Subcontract submittal certificates, licenses, or permits must be signed using the Subcontractor representative's full name and his/her company title. The affidavit must be dated, notarized, and have a reference to the submittal number found in BEI's Subcontractor Submittal Requirements Summary. The CFR number, if applicable, must be referenced with its relationship to the specific submittal requirement. The affidavit must be in statement form with an explanation of how the affidavit fulfills the submittal requirement. Acceptance of an affidavit in lieu of certificates, licenses, or permits is at the direction of BEI.

APPENDIX E

TECHNICAL SPECIFICATION FOR UNCONTAMINATED EARTHWORK

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

UNCONTAMINATED EARTHWORK

NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
0	7/21/94	Issued for Use	KK	PD		RBB

ORIGIN			
	Uncontaminated Earthwork	JOB NO. 22567	
		TECHNICAL SPECIFICATION	REV
		001-SP000-006	0
		SHEET 1 OF 20	

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TECHNICAL SPECIFICATION FOR UNCONTAMINATED EARTHWORK

1.0 GENERAL

This specification defines the technical requirements for uncontaminated earthwork. Not all operations defined herein are necessarily required for this Subcontract; reference is directed to the contract Scope of Work for specific services required.

This specification includes requirements for

a) Filling and backfilling for general site work
b) Building perimeter and site structure backfilling
c) Consolidation and compaction
d) Miscellaneous earthwork
e) Trenching and backfilling for utilities

This specification does not provide requirements for construction of low-permeability clay liners and closure caps, roadway and railroad earthwork, and contaminated earthwork, except as referenced by specifications for those activities.

2.0 QUALITY STANDARDS

Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition at the time of bid, including addendums, shall be effected as a part of this specification.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556 (1990) Density of Soil in Place by the Sand-Cone Method

ASTM D 1557 (1991) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop

ASTM D 2167 (1984) Density and Unit Weight of Soils in Place by the Rubber Balloon Method

ASTM D 2216 (1992) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures

ASTM D 2487 (1992) Classification of Soils for Engineering Purposes

ASTM D 2922 (1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

ASTM D 3017 (1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

ASTM D 4253 (1988) Minimum Index Density of Soils Using A Vibratory Table

ASTM D 4254 (1983) Minimum Index Density of Soils and Calculation of Relative Density

ASTM D 4318 (1984) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OSHA 29 CFR 1910 Occupational Safety and Health Regulations for General Industry

OSHA 29 CFR 1926 Occupational Safety and Health Regulations for Construction Industry

3.0 DEFINITIONS

3.1 COHESIONLESS MATERIALS

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

3.2 COHESIVE MATERIALS

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH.

3.3 DEGREE OF COMPACTION

Degree of compaction required is expressed as a percentage of the maximum density obtained in accordance with ASTM D 1557 for cohesive materials and as a percentage of relative density obtained in accordance with ASTM D 4253 and ASTM D 4254 for cohesionless materials.

3.4 EXPANSIVE SOILS

Soils that have a plasticity index equal to or greater than 20 when tested in accordance with ASTM D 4318.

3.5 UNYIELDING MATERIAL

Unyielding materials are rock and gravelly soils with stones greater than 6 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

3.6 UNSTABLE MATERIAL

Unstable materials are materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

3.7 ROCK

Rock shall consists of (1) boulders measuring approximately 1/2 cubic yard or more, (2) materials that cannot be removed without systematic drilling and blasting, such as rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits, and (3) below-grade concrete or masonry structures, exceeding 1/2 cubic yard in volume and greater than 9 inches in thickness. Asphaltic or portland cement pavements will not be considered as rock.

3.8 UNSATISFACTORY FILL AND BACKFILL

Unsatisfactory fill and backfill material is defined as material that is (1) too wet or too soft to properly support the associated construction as determined by Bechtel, (2) expansive soils (Section 1.3.4), (3) contaminated, or (4) materials classified in accordance with ASTM D 2487 as PT, OH, and OL (5) stones larger than 3 inches in any dimension, or (6) man-made fills, refuse, or backfills from previous construction.

3.9 BEDDING MATERIAL FOR UTILITIES

Bedding material for utilities shall consist of select granular material or satisfactory materials free from rocks 2 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 1 inch in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

4.0 SUBMITTALS

4.1 GENERAL

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements Summary (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. Bechtel will determine if

documentation is complete as submitted by the Subcontractor and reserves the right to disapprove and require the resubmittal of any submittal that does not meet the specified requirements. Unless indicated otherwise submittals shall be made to Bechtel at least two weeks prior to delivery, use, or implementation.

4.2 TESTING REPORTS

Submit testing reports within 24 hours of conclusion of physical tests. Submittals shall include two unbound copies of test results, including calibration curves and results of calibration.

4.3 TESTING LABORATORY CERTIFICATIONS AND QUALIFICATIONS

Submit qualifications and certifications of the commercial testing laboratory.

4.4 LIST OF EQUIPMENT

Submit a list of equipment proposed for use. This list shall include the type, size, and rating of the equipment proposed to be used. For compactive rollers, the weight, drum, or wheel size and cleat size, if any, shall also be given.

4.5 ONSITE BORROW PIT OPERATION

Bechtel will provide the information on onsite borrow pit location and available test reports on the borrow material. Proposed operation plans for any onsite borrow pit(s) shall be submitted. The operation plan shall include proposed procedures and plans for water control, erosion and dust control, access road construction and maintenance, equipment type and purpose, and borrow excavation.

4.6 OFFSITE BORROW PIT MATERIALS

Submit the following information on the proposed offsite borrow pit: (1) borrow pit location and address, (2) owner's name and state permit/licensing number, and (3) reports of the ASTM tests required to satisfy requirements listed in Section 5.0.

4.7 AGGREGATE SOURCE

Submit the following information on the proposed offsite aggregate source: (1) aggregate source location and address, (2) owner's name and state permit/licensing number, and (3) reports of the ASTM tests required to satisfy the requirements listed in Section 5.0.

4.8 PROTECTION OF EXISTING FOUNDATIONS

Submit proposed modifications to protect existing foundations in accordance with Section 6.7.4.

4.9 SHORING DESIGN AND CALCULATIONS

Submit proposed shoring design or alternate slope protection methods in accordance with Section 6.7.4.

4.10 SOILS LABORATORY TEST RESULTS

Submit the following laboratory tests results (1) Proctor curves, (2) soil classification test results, (3) relative density test results.

5.0 PRODUCTS

5.1 COARSE AGGREGATE

Coarse aggregate shall consist of clean, well-graded crushed stone with all particles passing the 3" sieve and no more than 5% passing the $1^1/_2$" sieve. Fines shall be limited to not more than 2 percent by weight passing the No. 4 size sieve.

5.2 BACKFILL

5.2.1 General Backfill

General backfill shall include cohesive or cohesionless materials free of trash, debris, roots or other organic matter, frozen material, stones or other material larger than 4 inches in any dimension, and contamination.

5.2.2 Structural Backfill

Structural backfill shall include materials classified in accordance with ASTM D 2487 as GW, SW, GC, GM, SC, and SM and shall be free of trash, debris, roots or other organic matter, frozen material, and contamination. It shall have no more than 15 percent of the material passing a number 200 sieve, and no material shall exceed 2 inches in any dimension.

5.3 TEMPORARY SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, synthetic sediment fencing, geotextile filter fabric made expressly for use as a silt screen, or other suitable materials

reviewed by Bechtel prior to use. Straw bales shall not be used for permanent sediment barriers unless specifically required by Bechtel.

5.4 SELECT GRANULAR MATERIAL

Select granular material shall consist of well-graded sand, gravel, crushed gravel, crushed stone, or crushed slag composed of hard, tough, and durable particles and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and no less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be 3/4-inch or the maximum size recommended by the pipe manufacturer, whichever is smaller.

5.5 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6-inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil backing, or other means to enable detection by a metal detector when the tape is buried in soil up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other metallic core type to protect it from corrosion. Tape color shall be as specified below and shall bear a continuous printed inspection describing the specific utility.

Tape Color	Utility
Red	Electric
Yellow	Gas, Oil, Dangerous Materials
Orange	Telephone, Telegraph, Television, Police, Fire and Communication
Blue	Water Systems
Green	Sewer Systems

6.0 FIELD OPERATIONS

6.1 PRE-EARTHWORK EVALUATION

Before beginning any earthwork, carefully examine the work area to identify any pre-existing conditions (e.g., overhead power lines, access, etc.) that could impact the performance and completion of work. Bechtel will provide available information concerning the location of underground utilities, and the Subcontractor shall verify those locations, coordinate any required inspection with utility companies, provide support to utility companies, and provide structural support to utility lines. Unless noted otherwise, the Subcontractor shall maintain the services of all underground utilities encountered during excavation activities and shall restore the services to

their original condition. The Subcontractor shall obtain all applicable permits prior to commencing work, unless noted otherwise in the contract documents.

6.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment control shall be provided and maintained in accordance with the engineering drawings.

Temporary sediment barriers shall be installed and maintained during the construction period until permanent sediment barriers are in place. Permanent sediment barriers shall be installed in accordance with the engineering drawings.

6.3 CLEARING AND GRUBBING

Clearing and grubbing shall be performed in accordance with specification 22567-001-SP000-002.

6.4 TOPSOIL REMOVAL

Topsoil within the designated excavations and grading lines shall be stripped and stockpiled in the designated onsite areas. The actual depth of stripping will be determined in the field by Bechtel. Measures (e.g., erosion control, stable slopes, adequate compaction, etc.) shall be taken to prevent loss of stockpiled topsoil.

6.5 DRAINAGE, DEWATERING, AND STREAM DIVERSION

6.5.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grades shall be developed and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing.

6.5.2 Dewatering

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with the orderly progress of excavation. French drains, sumps, ditches, or trenches will not be permitted within three feet of the foundation of any existing structure, and only with written Bechtel approval. Water control measures shall be taken prior to excavating to groundwater level in

order to maintain the integrity of the in situ material. Water collected during dewatering shall be pumped or collected and transported to designated onsite discharge points.

6.5.3 Stream Diversion

Stream diversion(s) shown on engineering drawings shall be developed and maintained.

6.6 BLASTING

Blasting will not be permitted.

6.7 EXCAVATION

6.7.1 General

Excavations shall include the removal of materials to the lines, grades, and elevations indicated on contract documents. Grading shall conform with the typical sections shown on the engineering drawings and the tolerances specified herein. Positioning of heavy equipment, stockpiles, etc. shall be outside the edges of excavation a distance equal to or greater than the full depth of the excavation, unless otherwise allowed by Bechtel.

Excavations shall be maintained until final acceptance of the work by Bechtel.

6.7.2 Classification of Excavation Materials

Materials from uncontaminated excavations shall be unclassified regardless of the nature encountered. Disintegrated rock will not be considered as rock excavation. Excavation materials shall include all materials encountered (e.g., soils, concrete, rock, asphalt, stumps, rubbish, etc.).

6.7.3 Excavation Slopes

Excavation slopes shall be established in strict accordance with OSHA 2207, specifically 29 CFR 1926, Subpart P, "Excavation, Trenching, and Shoring." Slopes shall be protected to prevent erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

6.7.4 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, adjacent paving, structures, and utilities. Shoring design and installation plans, including engineering calculations, shall be developed in accordance with OSHA 2207,

specifically 29 CFR 1926 Subpart P, and submitted to Bechtel for review. Shoring, bracing, and sheeting shall be removed as excavations are backfilled in a manner to prevent cave-ins.

Alternate slope protection methods (e.g., benching, sloping, trench boxes, etc.) may be used where applicable. Proposed alternate methods, including plans and calculations, shall be developed by the Subcontractor in accordance with 29 CFR 1926 Subpart P and submitted to Bechtel for review prior to implementation.

Shoring inspections, including qualifications and frequency, shall be in accordance with 29 CFR 1926 Subpart P.

6.7.5 Excavation for Foundation Systems of Structures

Excavations shall extend a sufficient distance from walls and footings to allow for placement and removal of forms. Excavation to final grade shall be performed within 48 hours of subsequent concrete placement. Only excavation methods that will leave the foundation soils in a solid condition shall be used.

6.7.6 Excavation for Utilities

Trench Excavation

Trench walls below the top of the pipe shall be sloped or made vertical as recommended by the manufacturer of the pipe to be installed subject to conformance to OSHA 2207, specifically 29 CFR 1926, Subpart P, "Excavation, Trenching, and Shoring." Trench walls more than 5 feet deep shall be shored, cut back to a stable slope at least equal to the angle of repose, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Special attention shall be given to slopes that may be adversely affected by construction vibration forces, weather conditions, or moisture content. Slopes shall be protected to prevent erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

Excavation Widths

The trench width below the top of pipe shall not exceed 24 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter (I.D) and shall not exceed 36 inches plus pipe (O.D.) for pipes larger than 24 inches (I.D). Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized.

Rock

Rock in either ledge or boulder formation shall be replaced with suitable materials to provide a compacted earth cushion having a thickness between unremoved rock and the pipe of at least 9 inches or 1/2 inch for each foot of fill over the top of the pipe, whichever is greater, but not more than three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell as well as under the straight portion of the pipe. Rock faces shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown on the engineering drawings or as directed by Bechtel. Loose disintegrated rock and thin strata shall be removed.

Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members of sufficient size to allow the placement and removal of forms for the full length and width of structure footings and foundations as shown on the engineering drawings. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown on the engineering drawings or as directed by Bechtel. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified herein. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the structure is to be placed.

Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe.

Replacement of Unstable and Unyielding Material

Where unstable and/or unyielding material is encountered in the bottom of the trench, such material shall be removed to 6 inches below the required grade and replaced with select granular material or initial backfill material. The select granular backfill shall be compacted as specified in Section 6.10.

6.7.7 Ditches, Gutters, and Channels

Ditches, gutters, and channel changes shall be cut accurately to the cross sections and grades indicated on the engineering drawings. All roots, stumps, rock, and foreign matter in the sides

and or bottom of ditches, or gutters, and channel changes shall be trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated.

6.7.8 Overexcavation

Care shall be taken not to excavate outside the elevations, grades, and lines indicated. Overexcavation shall be backfilled to design grade with general backfill and compacted to a density equal to or greater than that required for the subsequent fill material.

6.7.9 Boulders

Unless otherwise directed by Bechtel, boulders shall be removed from excavations for drainage routes and areas of structural backfill.

6.7.10 Stockpiling and Stockpiles

Excavated materials satisfying the requirements of Section 5.2 for backfill shall be transported to and placed in designated fills or stockpiled at Bechtel designated onsite locations. All materials to be stockpiled (e.g., soil and aggregate from offsite sources) shall be placed in areas that have been cleared and grubbed.

Stockpiles shall be kept in a neat and well-drained condition, giving due consideration to drainage. Excavated satisfactory and unsatisfactory materials shall be stockpiled separately. Stockpiles of satisfactory materials shall be protected from contamination. If the material in the stockpile becomes unsatisfactory for use as backfill, such material shall be removed and replaced with satisfactory material from approved sources. Locations of stockpiles of satisfactory materials shall be subject to prior approval of Bechtel.

6.8 SUBGRADE PREPARATION

Subgrades in structural areas shall be proof-rolled prior to placement of fill. Unsatisfactory material identified by proof-rolling shall be removed and replaced with general backfill and compacted in accordance with this specification to meet the compaction requirements for subsequent fill material.

Slopes steeper than 1 vertical to 4 horizontal shall be stepped or benched during placement of lifts so that the fill material will bond with the existing material.

The subgrade material shall be scarified in accordance with Section 6.10.2.

6.9 BORROW AND AGGREGATE MATERIAL

Unless directed otherwise, all borrow material shall be obtained from onsite areas designated by Bechtel. Subcontractor shall clear, grub, dispose of all debris, and control surface water flow and erosion of borrow areas. All work shall be considered operations related to onsite borrow excavation and shall be performed in accordance with applicable portions of this specification.

If required by Bechtel, the Subcontractor shall identify offsite borrow and/or aggregate sources, provide to Bechtel for review certification that borrow/aggregate material meets the requirements of this specification, and transport material to the fill area. No borrow and/or aggregate shall be brought from an offsite source without prior written approval by Bechtel.

6.10 BACKFILLING

6.10.1 General

Unless noted otherwise in contract documents, general fill and backfill shall be used in bringing fills and excavations to the lines and grades indicated and for replacing unsatisfactory subgrade materials. Compaction shall be accomplished by segmented pad foot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other Bechtel reviewed equipment suited to the type of material being compacted. Backfill shall be placed in horizontal layers not exceeding 8 inches in loose thickness when using conventional compaction equipment or 6 inches when using hand-operated compaction equipment. Backfill shall not be placed on unsatisfactory materials.

Each lift shall be moisture conditioned or aerated as necessary and compacted to not less than the percentage of maximum density specified below:

a) General and trench fill using cohesionless material (e.g., cover soil) shall be compacted to at least 70% relative density.

b) General and trench fill using cohesive material (e.g., cover soil) shall be compacted to at least 85% maximum density.

c) Structural fill using cohesionless material (e.g., buildings, steps, paved areas, sidewalks, footings, trenches, etc.) shall be compacted to at least 85% relative density.

d) Structural fill using cohesive material (e.g., buildings, steps, paved areas, sidewalks, footings, trenches, etc.) shall be compacted to at least 95% maximum density.

e) Bedding material for utilities shall be compacted to at least 85% relative density.

Compacted subgrades that are disturbed by the Subcontractor's operations shall be repaired as specified herein to the required density prior to further construction thereon.

6.10.2 Scarifying

All subgrades and compacted lifts in the following applications shall be scarified 3 to 4 inches prior to placement of the subsequent lift: (a) embankments, (b) roadway routes, (c) railway routes, and (d) fill areas adjacent to and immediately below structural foundations.

In lieu of scarifying, compaction may be performed by sheepsfoot roller or similar equipment designed to compact the lift from the bottom to the top.

6.10.3 Additional Requirements for Structural Backfilling

Structural backfilling shall not begin until construction below finish grade has been inspected by Bechtel, forms removed, and the excavation cleaned of trash and debris.

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Backfill shall not be placed against concrete or masonry foundation walls prior to 7 days after completion of the walls. To the extent practical, backfill shall be brought up evenly on both sides of walls and sloped to drain away from the wall. Construction equipment and methods that will overload immediate and adjacent structures during backfilling and embankment formation operations shall not be used.

6.10.4 Additional Requirements For Trench Backfilling

General

Trenches shall be backfilled to the grades shown on engineering drawings and in the following order. The bedding material shall be placed, followed by the initial backfill, and completed by the final backfill. Lift thickness shall be as specified in Section 6.10.1.

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Construction machinery shall not be moved over a culvert or storm drain at any stage of construction in a manner that might damage the culvert or drain. Any damaged pipe shall be repaired or replaced.

Bedding

Bedding shall be select granular material as described in Section 5.4. Care shall be taken to ensure thorough compaction of the bedding under the haunches of the pipe. Bedding material

shall be placed and compacted with approved tampers to a height of 1 foot above the utility pipe or as specified on the engineering drawings. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. The joints and/or couplings shall be left uncovered during pressure tests.

Final Backfill

Final backfill shall not be placed until all specified tests are satisfactorily performed. The remainder of the trench, except at roadways and railroads shall be filled with satisfactory material. Backfill material shall be placed and compacted to grade in accordance with Section 6.10.

Backfill for Appurtenances

Manholes, catch basins, inlets, or similar structures shall be placed in such a manner that the structure will not be damaged by the shock of falling earth while backfilling. Backfill material shall be deposited and compacted as specified for final backfill and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

Plastic Marking Tape

Plastic marking tape per Section 5.5 shall be installed directly above the pipe, at a depth of approximately 18 inches below finished grade unless otherwise shown on the engineering drawings.

6.11 AGGREGATE BASES

Aggregate bases shall be constructed under pavements, foundations, and slabs-on-grade and placed directly on the subgrade. The aggregate base shall be placed in 4 inch lifts and compacted with a minimum of two passes of a hand-operated plate-type vibratory compactor or equivalent compactive effort. Minimum compacted thickness of the aggregate base is 4 inches unless noted otherwise.

6.12 GRADING

Graded areas shall be constructed true-to-grade, shaped to drain, and maintained free of trash and debris until final inspection has been completed and the work has been accepted. The surfaces of embankments and excavations shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown on engineering drawings. Unless indicated otherwise, tolerances for all graded areas shall be $\pm$ 0.1 foot for the grades and elevations indicated.

6.13 PROTECTION OF WORK

Settlement or erosion that occurs in backfilled, filled, graded, or topsoiled areas prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

6.14 SECURITY

When necessary and practical, as determined by Bechtel, work areas shall be secured using barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

7.0 QUALITY CONTROL AND VERIFICATION

7.1 RESPONSIBILITY

The Subcontractor shall verify that placement of backfill meets the requirements of this specification. Unless noted otherwise, testing shall be the responsibility of the Subcontractor and shall be considered part of earthwork.

7.2 TESTING LABORATORY

Testing shall be performed by a Bechtel approved commercial testing laboratory.

7.3 MOISTURE-DENSITY RELATION

Moisture-density relation shall be determined in accordance with ASTM D 1557 for each type of material or source of material, including borrow materials, to determine the optimum moisture and laboratory maximum density values.

7.4 IN-PLACE MOISTURE CONTENT

In-place moisture content of soil backfill shall be determined in accordance with ASTM D 3017. Accuracy of the ASTM D 3017 tests shall be checked by performing ASTM D 2216 test for every ten ASTM D 3017 tests performed.

7.5 IN-PLACE DENSITY

Field in-place density shall be determined in accordance with ASTM D 2922. Accuracy of the ASTM D 2922 tests shall be checked by performing one ASTM D 1556 or ASTM D 2167 test for every ten ASTM D 2922 tests performed.

When ASTM D 2922 is used, the calibration curves shall be checked and adjusted if necessary by the procedure described in ASTM D 2922, paragraph ADJUSTING CALIBRATION CURVE. The calibration curves furnished with the moisture gauges shall also be checked, along with density calibration checks, as described in ASTM D 3017. The calibration checks of the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at the beginning and ending of each day that the equipment is used.

Additional compaction and/or moisture conditioning shall be performed if the compaction or slope stability do not satisfy the requirements of this specification.

7.6 TESTING FREQUENCY

The following number of tests, if performed at the appropriate time, shall be the minimum acceptable for each type operation.

7.6.1 Moisture-Density Relation

a) One representative test per 5,000 cubic yards of fill and backfill or when any change in material occurs that may affect the optimum moisture content or laboratory maximum density.

b) One representative test per 1,500 cubic yards of bedding, fill and backfill for the utility excavation or when any change in material occurs that may affect the optimum moisture content or laboratory maximum density.

7.6.2 In-Place Density of Subgrades

a) One test per 40,000 square feet or a minimum of 2 tests per area, whichever is greater, for subgrades of general backfill.

b) One test per 20,000 square feet or a minimum of 2 tests per area, whichever is greater, for subgrades of structural backfill.

c) The in-place density of subgrades of trenches and other areas less than 10 feet in width, shall be tested with 1 test per 1,000 square feet or one test for each 100 linear feet of length, whichever yields the greater number of tests.

7.6.3 In-Place Density and Moisture Content of Fills and Backfills

a) One test per 20,000 square feet or minimum of 1 test per lift, whichever is greater, for general backfill areas compacted by other than hand or hand-operated machines.

b) One test per 10,000 square feet or minimum of 1 test per lift, whichever is greater, for general backfill areas compacted by hand or hand-operated machines.

c) One test per 2,000 square feet or minimum of 2 tests per lift, whichever is greater, for structural backfill areas compacted by other than hand or hand-operated machines.

d) One test per 1,000 square feet or minimum of 2 tests per lift, whichever is greater, for structural backfill areas compacted by hand or hand-operated machines.

e) The density of each lift of backfill materials for trenches, pits, building perimeters, or other structures or areas less than 10 feet in width, and compacted with hand or hand-operated machines shall be tested with 1 test per each area less than 1,000 square feet, or one test for each 100 linear foot of length, whichever is greater.

7.6.4 Particle-Size Analysis

A minimum of one particle-size analysis shall be performed or data shall be provided for each different type of material to be used for bedding and backfill.

7.7 TEST RESULTS

Test results for a lift shall be submitted for review prior to placement of the next lift above that area. Approved lifts shall be covered by subsequent lifts within 24 hours of testing to protect the compacted condition of the fill. Any lift left exposed for longer than 24 hours shall be removed and replaced.

Proposed Plan for Interim Remedial Action
Naval Air Station Jacksonville
Operable Unit 2
Potential Sources of Contamination (PSCs) 2, 41, and 43

Jacksonville, Florida July 1994

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Terms that appear in **bold** within the text are defined in the glossary starting on Page 13.

1.0 INTRODUCTION

This **proposed plan** presents background information and a discussion of cleanup methods, or **alternatives**, for source control at potential sources of contamination (PSCs) 2, 41, and 43 located at Naval Air Station (NAS) Jacksonville in Jacksonville, Florida (see Figure 1). It then focuses on the preferred **source control** cleanup alternatives, or **Interim Remedial Actions (IRA)**, for these PSCs.

The source control alternatives discussed in this plan were developed by the U.S. Navy (Navy), the **U.S. Environmental Protection Agency (USEPA)**, and the **Florida Department of Environmental Protection (FDEP)**. The Navy, USEPA, and FDEP are working together under a **Federal Facility Agreement (FFA)** at NAS Jacksonville. The FFA creates a framework for decision making in the environmental cleanup process at NAS Jacksonville. Public input, a key element in the decision-making process, is discussed in this plan.

The areas discussed in this plan are PSC 2, a former fire-fighting training area; PSC 41, abandoned domestic waste sludge drying beds; and PSC 43, abandoned industrial waste sludge drying beds (Figure 2). These three PSCs comprise part of **Operable Unit (OU)** 2, one of three OUs currently designated at NAS Jacksonville.

This plan is based on a recently completed **Focused Remedial Investigation and Feasibility Study (FRI/FFS)** for PSCs 2, 41, and 43. The source control cleanup actions described in this plan are not intended to be the final actions at these areas. Additional studies of these areas, and at the three other PSCs at OU 2, will be completed and cleanup actions are anticipated to be initiated by 1996. However, these interim actions are intended to be final with regards to soil remedial actions. The Navy completed **field investigations** and the FRI/FFS report to develop the best alternatives for source control measures as IRAs. The Navy, USEPA, and FDEP will decide on the recommended alternatives after evaluating comments received from the local community.

This document fulfills the public participation requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 117(a), which specifies that the lead agency (the Navy) must publish a proposed plan outlining the alternatives, including the preferred alternatives, outlined in the

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mented at a site. It includes the Navy's responses to comments on the proposed plan and the FRI/FFS report.

Interim Remedial Action: Steps taken to manage or remove a source or potential source of contamination at a site at which a full investigation and cleanup recommendations are not yet complete.

Installation Restoration Program: The Department of Defense program to identify, investigate, evaluate, and, if necessary, clean up sites to protect human health and the environment.

Land Disposal: placement of a waste in or on the land, such as a landfill or waste pile.

Land Disposal Restriction (LDR) Treatment Standard: Concentrations of chemicals in an RCRA hazardous waste that must be treated before the waste can be placed in a land disposal unit. The chemical concentrations must be reduced to the specified standards in the LDR.

Media: Naturally occurring physical matter such as soil, groundwater, surface water, or sediment.

Milligrams per Kilogram (mg/kg): Units used to describe the concentration of a chemical in soil and liquid wastes. One milligram per kilogram is equivalent to one part per million.

Monitoring Well: Special wells drilled at specific locations within or surrounding a waste site where groundwater can be sampled at selected depths and studied to obtain such information as the direction in which groundwater flows and the types and amounts of contaminants present.

Nonhazardous debris: Debris that is not contaminated, such as portions of the walls surrounding the sludge drying beds not in contact with the sludge. This material could be disposed at a non-hazardous **solid waste landfill** (also known as a RCRA Subtitle D landfill).

Operable Unit (OU): Grouping of sites based on types of wastes disposed, physical proximity, similar past uses, and/or the suspected contaminants of concern.

Petroleum Products: Waste (either solid or liquid) that is contaminated with chemicals found in petroleum products such as gasoline, jet fuels, kerosene, and other fuel oils.

Preliminary Assessment and Site Inspection (PA/SI): A two-phase site identification process in which potential sites are identified through record searches and interviews (the PA), and areas containing contamination are later confirmed through site visits and limited sampling and analysis (the SI). The PA/SI determines the need for additional investigation at a site.

Proposed Plan: A document that describes all of the alternatives considered by the Navy for addressing contamination at a site or sites, including a description of the preferred alternative or alternatives for Interim Remedial Action.

Remedial Action Objective: The final cleanup goals that must be met by the selected alternative for a site.

Remedial Investigation (RI): The first part of a two-part Remedial Investigation and Feasibility Study (RI/FS). The RI involves collecting and analyzing information about a site to evaluate the nature and extent of contamination that may be present in environmental media. The investigation also assesses how conditions at the site may affect human health and the environment.

Resource Conservation and Recovery Act (RCRA): The Federal law that establishes requirements for the definition, storage, treatment, and disposal of hazardous wastes and corrective action on hazardous waste releases to the environment.

Responsiveness Summary: A section within the Record of Decision that presents the Navy's responses to public comments on the FS or FFS and the proposed plan.

Semivolatile Organic Compounds (SVOCs): Compounds containing carbon and hydrogen that are slightly prone to evaporation (i.e., the compound has a relatively high vapor pressure, but it is lower than 77.6 millimeters of mercury). See the definition for volatile organic compounds.

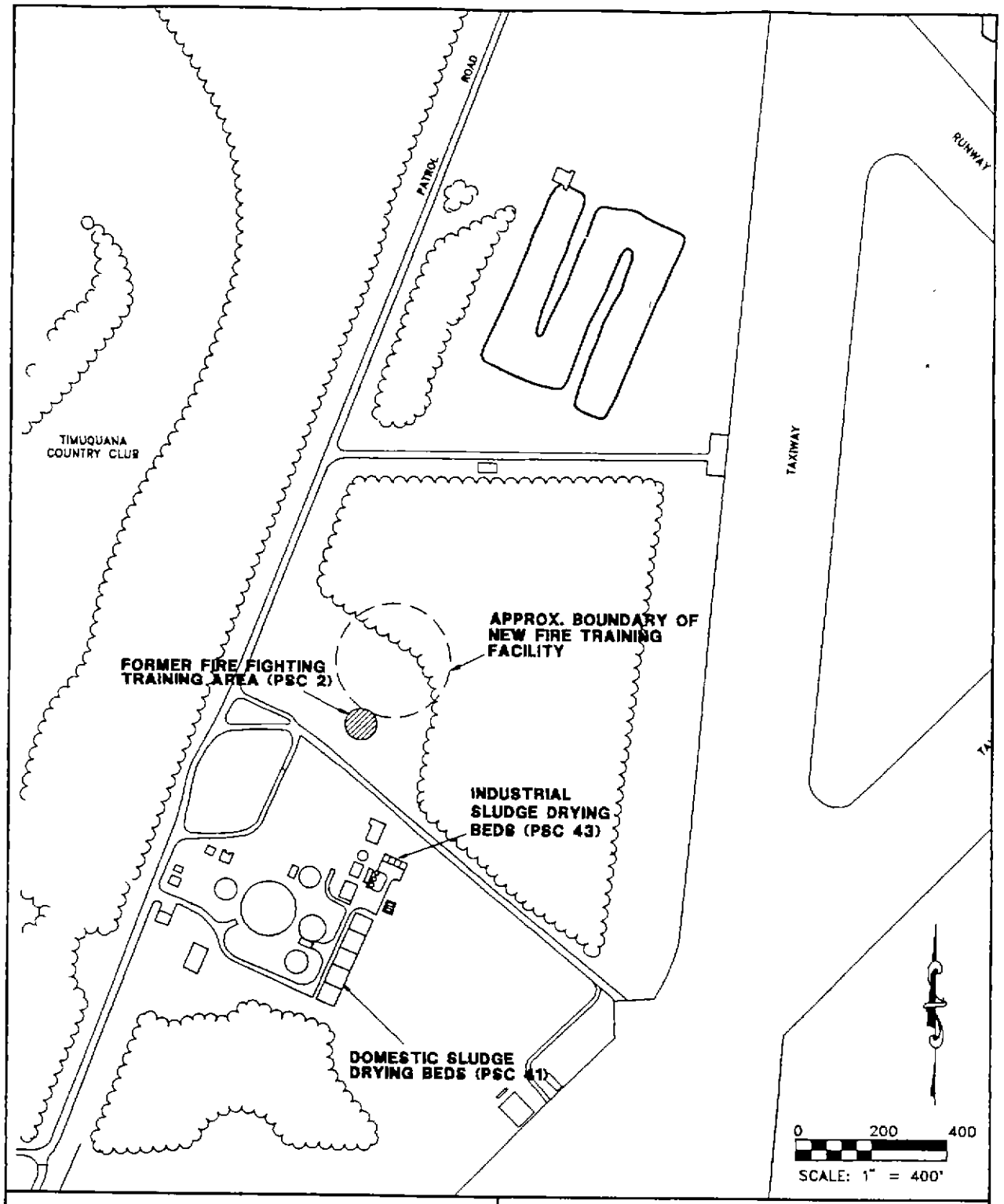

FIGURE 2
LOCATIONS OF PSCs 2, 41, AND 43 AT OU 2

PROPOSED PLAN FOR PSCs 2, 41, AND 43 AT OU 2

NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

OU2AREA/DRM/7-18-94

FRI/FFS report. This plan is a companion document to the report and is a required part of the **Administrative Record** for OU 2. This document does not replace the FRI/FFS but highlights key information from the report. It also summarizes background information on each PSC, including results of the most recent field investigation. Other documents relating to these PSCs are available for public review at the Charles D. Webb Wesconnett Branch of the Jacksonville Public Library (see *Available Information* on page 13).

Members of NAS Jacksonville and the surrounding community are encouraged to submit their comments on all the alternatives developed in the FRI/FFS report, including the preferred alternatives, during a public **comment period** from August 10, 1994 to September 23, 1994. If a public meeting to further explain the proposed plan is needed, it will be provided. The dates of this public meeting will be announced later. When the comment period ends, the Navy will summarize and respond to public comments in a **responsiveness summary**, which is a part of the **Interim Record of Decision (IROD)**.

2.0 PSC BACKGROUNDS

PSC 2 is a former fire-fighting training area. It consists of a shallow, unlined, roughly circular pit of soil approximately 120 feet in diameter. Since 1966, obsolete vehicle chassis and parts were periodically placed on the pit; covered with jet fuels, aviation gasoline, or other **petroleum products**; and ignited to simulate aircraft crashes. An estimated 6,000 gallons of fuel were burned annually. NAS Jacksonville ceased using PSC 2 as a fire-fighting training area in 1991 and completed construction of a new lined fire-fighting training pit in 1992, just northeast of the old pit.

PSC 41 consists of abandoned domestic waste sludge drying beds. They were constructed in 1970 and were used until 1987 for drainage of sludge received from the wastewater treatment plant located within OU 2. Before construction of the industrial waste sludge drying beds, sludge from the industrial wastewater treatment plant was also sent to the domestic drying beds. There are five beds, each measuring an area of 50 feet by 50 feet, which are surrounded by 3-foot high concrete cinder block walls. The beds contain layers of sand and fine gravel, and coarse gravel along with underdrain pipes that collected drainage from the beds and returned it to the wastewater treatment plant. Approximately 300 cubic yards of sludge were removed from the beds each year and disposed by land spreading at other areas of OU 2.

In 1987, the USEPA required that a closure plan be developed for the domestic sludge drying beds because they had been used at times to drain sludge from the industrial wastewater treatment plant, which was determined to contain **hazardous wastes** according to **Resource Conservation and Recovery Act (RCRA)** waste identification requirements. Specifically, the industrial sludge contained hazardous wastes from electroplating and aluminum coating operations. The domestic waste sludge drying beds were removed from service on June 10, 1987, followed by the subsequent issue of a RCRA closure permit. The remaining sludge within the drying beds was removed and taken to an offsite disposal facility. Presently, the domestic waste sludge drying beds contain sand, gravel, and some apparent soil and sludge material at the surface.

PSC 43 consists of industrial waste sludge drying beds. They were constructed in 1980 and operated until 1988 for the drainage of sludge from the industrial wastewater treatment plant located within OU 2. This sludge had previously been routed to the domestic waste sludge drying beds at *PSC 41*. The construction and composition of the beds are similar to those for the domestic waste sludge drying beds. There are four beds, each measuring an area of 15 feet by 18 feet, which are surrounded by a concrete cinder block wall. The beds contain layers of sand and fine and coarse gravel, along with underdrain pipes that returned the drained liquids to the industrial wastewater treatment plant. During operations, approximately 40 cubic yards of sludge were excavated from the beds each year and disposed by land spreading in areas within OU 2. In 1988, FDEP required that a closure plan be developed for the industrial waste sludge drying beds because of suspected contamination of groundwater at OU 2 caused by their use. The beds were removed from service in November 1988, and a RCRA closure permit has been issued. The remaining sludge was removed and

taken to an offsite disposal facility. Presently, the beds contain sand and gravel.

Summary of Previous Investigations

This plan focuses on cleanup of soil and sludge bed material and emphasizes the most recent investigation of these materials at PSCs 2, 41, and 43.

Prior Investigations. A **Preliminary Assessment and Site Inspection (PA/SI)** of PSC 2 was completed in the mid-1980's by Fred C. Hart & Associates and Geraghty & Miller, Inc. The SI included the installation of one groundwater **monitoring well**, which has since been abandoned. No soil samples were collected at PSC 2 during the SI.

PSCs 41 and 43 have been investigated for groundwater compliance with RCRA standards since 1983. Though several groundwater monitoring wells were installed at PSCs 41 and 43, neither soil nor the contents of the sludge drying beds were sampled and analyzed for contamination during previous investigations.

Focused Remedial Investigation. An FRI was initiated by the Navy and completed by ABB Environmental Services, Inc. (ABB-ES), from June to September 1993. The investigation included:

- sampling and analysis of soil within and surrounding the fire-fighting training pit at PSC 2,
- installation of temporary observation wells within the fire-fighting training pit at PSC 2 to confirm the presence and characterize petroleum product within the subsurface soil, and
- sampling and analysis of sludge drying bed material and soil immediately surrounding the sludge drying beds at PSCs 41 and 43.

Samples were screened by an onsite field laboratory, and confirmed at a USEPA-certified analytical laboratory located offsite.

Soil samples at PSC 2 contained **semivolatile organic compounds (SVOCs)** and **volatile organic compounds (VOCs)** characteristic of weathered and/or burned waste petroleum products. Also, the **total petroleum hydrocarbon (TPH)** content of soil samples within the pit was measured, indicating the presence of contamination due to past use of the area. The temporary observation wells installed at PSC 2 were used to collect samples of the product at the site. The results of the analyses completed on a sample of the product present at OU 2 indicate that it is a petroleum product.

Unlike PSC 2, the materials sampled at PSCs 41 and 43 (soil and sludge drying bed materials) contained few VOCs and SVOCs at very low concentrations. Metals, particularly cadmium, chromium, lead, nickel, and silver, were detected at concentrations higher than those for natural background soils in the area in the sludge drying bed materials at both PSCs 41 and 43. The hazardous constituents in the sludge drying bed materials developed from contact of the beds with the industrial sludge that was previously found to contain these hazardous wastes. Concentrations of metals in the soil immediately surrounding the sludge drying beds were within the range of natural soil background concentrations. Sampling results from the FRI indicate that the concentrations were slightly above requirements for offsite disposal without treatment. However, due to the nature of the sludge drying bed materials and the sampling methodology used, repeatability of analytical results is difficult and could indicate no treatment requirements. Thus, a no treatment option will be evaluated to account for the possibility of not treating the soils and materials prior to offsite disposal. Additional sampling will be conducted before treatment and/or disposal to determine if treatment would be required prior to disposal.

A **Remedial Investigation (RI)**, which will include investigations of soil at the remaining PSCs, and groundwater at OU 2 and the three remaining PSCs, is scheduled to be completed by 1996. The results of these subsequent investigations will be used to evaluate the need for additional cleanup actions at OU 2.

3.0 INTERIM REMEDIAL ACTION OBJECTIVES AND SUMMARY OF PSC RISKS

Based on the most recent investigation and evaluation of legal requirements that may be either **applicable or relevant and appropriate requirements (ARARs)** for these sites, **remedial action objectives** were established for PSC 2 and both PSCs 41 and 43. These objectives were as follows.

PSC 2:

- remove **free product** from the subsurface soil in accordance with FDEP regulations specific to sites contaminated with petroleum products, and
- reduce petroleum contamination in the soil to: (1) reduce a source of contamination to groundwater and (2) reduce current and future exposure to soil contaminants by humans and wildlife.

PSCs 41 and 43:

- complete closure under RCRA to: (1) reduce metals contamination of sludge drying bed materials and debris, (2) reduce source contaminants to groundwater, and (3) reduce current and future exposure to humans and wildlife.

These objectives are only intended as an interim remedial action for source control at these locations. If necessary, supplementary remedial actions for residual contamination in soil and/or groundwater at PSCs 2, 41, and 43 will be implemented following completion of the OU 2 RI and an assessment of residual risk for the OU.

Summary of PSC Risks

The qualitative preliminary risk evaluation reported in the FRI/FFS was completed to evaluate the need for IRA based on current and future risks. This evaluation indicated that a source removal at PSC 2 was required for compliance with ARARs, and for reducing current and future risks. It also warranted a source removal at PSCs 41 and 43 for completion of the RCRA closure, as well as reducing current and future risks at those PSCs.

4.0 SUMMARY OF ALTERNATIVES

This section presents a summary of the interim remedial alternatives evaluated for PSCs 2, 41, and 43. They are as follows.

PSC 2:

Alternative 1, collection of free product and disposal to a waste oil disposal facility, and excavation of soil and offsite treatment and disposal at a stationary thermal treatment facility; and

Alternative 2, collection of free product and disposal to a waste oil disposal facility, and excavation and onsite thermal treatment and disposal of soil.

PSCs 41 and 43:

Alternative 3, excavation and offsite disposal of sludge drying bed materials and all **debris**;

Alternative 4, excavation and offsite treatment and disposal of sludge drying bed materials and **hazardous debris**, and offsite disposal of **nonhazardous debris**; and

Alternative 5, excavation and onsite treatment and disposal of sludge drying bed materials and hazardous debris, and offsite disposal of nonhazardous debris.

Common Elements of Alternatives

All of the alternatives involve excavation of contaminated materials at PSCs 2, 41, and 43.

Each alternative proposed for PSC 2 calls for collection and disposal of petroleum product present in the subsurface soil. Based on the analysis of the product, it is a waste petroleum product. Both alternatives propose to treat petroleum-contaminated soil using the same technology; however, Alternative 2 proposes that treatment take place onsite at OU 2.

Alternatives 3 and 4 for PSCs 41 and 43 propose offsite disposal, but Alternative 4 calls for offsite treatment prior to disposal. Alternatives 4 and 5 propose to treat contaminated material using the same technology, but Alternative 5 proposes that treatment and disposal take place onsite at OU 2.

Alternatives for PSC 2

Alternative 1, Collection of Free Product and Disposal to a Waste Oil Disposal Facility, and Excavation of Soil and Offsite Treatment and Disposal at a Stationary Thermal Treatment Facility

Total Cost:	$697,000
Weeks to Implement:	5

Alternative 1 includes the following activities:

- prepare the site,
- excavate a trench to collect free product in the subsurface soil,
- dispose of collected free product,
- excavate soil with TPH concentrations above 50 **milligrams per kilogram (mg/kg)**,
- transport contaminated soil to a State-permitted **thermal treatment** facility for treatment and disposal,
- backfill excavated areas with clean fill,
- dispose of water used to decontaminate equipment and machinery, and
- cleanup, grade, and revegetate.

Free Product. This alternative, as with Alternative 2 for PSC 2, calls for excavation of a trench within the fire-fighting training pit to collect petroleum product present in the subsurface soil at PSC 2. As both water and product would flow into the trench, specially designed pumps would be used to separate and recover the product from the water's surface. The product would be temporarily stored onsite in lined drums. Once collection was complete, the drums would be transported to a disposal facility accepting waste petroleum products. Dissolved constituents in the groundwater will be investigated during the RI for OU 2.

Soils. After collecting free petroleum product from the subsurface soils at PSC 2, soils with TPH concentrations greater than 50 mg/kg would be excavated. The action level of 50 mg/kg was selected because a level of 50 mg/kg TPH is one criterion for judging soil to be free of petroleum contamination according to Florida Administrative Code (FAC) Chapter 17-775. As soil is excavated, it would be sampled and analyzed to establish the boundaries of removal. For purposes of the IRA, an upper volume limit on soil excavation of 3,400 cubic yards was established for the FFS. The volume limit was based on removing all soil at PSC 2 at concentrations above 50 mg/kg.

Following excavation, soils would require treatment prior to disposal to comply with ARARs. Thermal treatment, which involves heating the soil to remove petroleum constituents by **volatilization** (evaporation), would take place at an offsite facility permitted by the State of Florida. The State maintains a list of such facilities and their locations. Contaminated soil from PSC 2 would be transported to the treatment facility following excavation. Typically, the facility disposes the soil or resells it as clean fill following treatment. As a final step in this alternative, the excavated areas at PSC 2 would be backfilled with clean material, graded, and revegetated.

Alternative 2, Collection of Free Product and Disposal to a Waste Oil Disposal Facility, and Excavation and Onsite Thermal Treatment and Disposal of Soil

Total Cost:	$614,000
Weeks to Implement:	6

This alternative includes the same activities as Alternative 1 with the following exceptions:

- treatment of soil onsite using thermal treatment, and

- backfill of treated soil into excavated areas at PSC 2.

Free Product. The petroleum product would be collected and disposed as described for Alternative 1.

Soils. Like Alternative 1, this alternative assumes that soils would be treated using thermal treatment. However, soils would be treated adjacent to PSC 2 and would not require transportation to an offsite facility.

Treated soil would be sampled and analyzed to demonstrate that the soil contains TPH at less than the action level of 50 mg/kg prior to backfilling into the excavated areas at PSC 2. The mobile thermal treatment equipment and concrete pad would be removed when soil treatment is finished.

Alternatives for PSCs 41 and 43

Alternative 3, Excavation and Offsite Disposal of Sludge Drying Bed Materials and all Debris

Total Cost:	$2,064,000
Weeks to Implement:	5

This alternative includes the following activities:

- remove nonhazardous debris from the sludge drying bed areas (cinder block walls) and temporarily store onsite;
- excavate sludge drying bed materials, including sand, gravels, and hazardous debris (subsurface cinder block and drainage pipes);
- transport sludge drying bed materials to a **hazardous waste landfill**;
- transport nonhazardous debris to a solid waste landfill;
- backfill excavated areas with clean fill;
- dispose water used to decontaminate equipment and machinery; and
- cleanup, grade, and revegetate the site.

Nonhazardous Debris. The concrete cinder block walls which did not come into contact with the industrial sludge containing hazardous waste is assumed to be nonhazardous. As a first step in this alternative, nonhazardous debris would be removed from PSCs 41 and 43 and stored separately from other excavated materials. This debris would later be transported to a solid waste landfill for disposal.

Sludge Drying Bed Materials. After removal of nonhazardous debris, the materials within the sludge drying beds would be excavated and removed. Due to the uncertainties associated with the repeatability of analytical results in the sludge drying bed materials, the excavated material will be analyzed prior to disposal to verify that treatment is not required, i.e. **Land Disposal Restrictions (LDRs) treatment standards** have been met.

Further, this alternative assumes that hazardous debris would be treated in the same manner as the sludge drying bed materials.

As a final step in this alternative. the excavated areas at PSCs 41 and 43 would be backfilled, and the area would be graded and revegetated.

Alternative 4, Excavation and Offsite Treatment and Disposal of Sludge Drying Bed Materials and Hazardous Debris, and Offsite Disposal of Nonhazardous Debris

Total Cost:	$2,220,000
Weeks to Implement:	5

This alternative includes the same activities as Alternative 3; however, the material would be treated offsite by stabilization prior to disposal in a hazardous waste landfill.

Nonhazardous Debris. Nonhazardous debris would be removed and disposed as described for Alternative 3.

Sludge Drying Bed Materials. The treatment technology proposed in this alternative is stabilization, which involves immobilizing the metals in the contaminated material by adding a setting

agent such as cement, lime, or flyash. Metals are not destroyed by this treatment process, but rather become entrapped in the resulting material, which can range from a semisolid to a solid. The treated (stabilized) material can then be disposed at a hazardous waste landfill.

Further, this alternative assumes that hazardous constituents contaminating the debris found within the sludge drying beds would be removed using treatment technologies made available through a recently passed regulation entitled *Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris Rule*, commonly known as the Debris Rule. This regulation established different treatment technologies and options for management of debris contaminated with hazardous wastes. Treatment of debris to remove hazardous wastes would take place at the disposal facility. Any residuals resulting from treatment (such as sand and blasting grit from sandblasting, or water from pressure washing) would require management as a hazardous waste under the Debris Rule. Stabilization is an approved treatment technology for debris contaminated with metals under the Debris Rule. If necessary, debris would be crushed to an appropriate size (typically 4 inches or less) prior to stabilization. The treated material would be disposed at a hazardous waste landfill along with the other treated sludge drying bed material.

Alternative 5, Excavation and Onsite Treatment of Sludge Drying Bed Materials and Hazardous Debris, and Offsite Disposal of Nonhazardous Debris

Total Cost:	$558,000
Weeks to Implement:	7

This alternative includes the same activities as Alternative 3 with the following exceptions:

- contaminated material would be treated onsite using stabilization, and
- stabilized material would be backfilled into excavated areas at PSCs 41 and 43.

Nonhazardous Debris. Nonhazardous debris would be removed and disposed as described for Alternative 3.

Sludge Drying Bed Materials. The sludge drying bed material, including hazardous debris, would be treated using stabilization. However, the materials would be treated onsite adjacent to PSCs 41 and 43 and would not require transportation to an offsite facility. Treated material would be sampled and analyzed to demonstrate that metals in the soil were treated by the stabilization process to concentrations below treatment standards. The treated material would then be backfilled into the excavated areas at PSCs 41 and 43. As long as the concentrations of the treated material are below the LDR treatment standards for those hazardous wastes, the material can be redeposited onsite within the **Area of Contamination (AOC)** after treatment.

5.0 EVALUATION OF THE ALTERNATIVES AND THE PREFERRED ALTERNATIVES

In selecting the preferred alternatives for PSC 2 and PSCs 41 and 43, nine criteria were used to evaluate the alternatives developed during the FFS for source control. The first seven are technical criteria based on degree of protection of the environment, cost, and engineering feasibility issues. The preferred alternatives were further evaluated based on the final two criteria: acceptance by the USEPA and FDEP, and acceptance by the community.

The nine criteria may be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The alternatives implemented must satisfy the threshold criteria. Primary balancing criteria weigh the major tradeoffs among alternatives. Modifying criteria are considered after public comment on this proposed plan. An explanation of each criteria is provided on Table 1. The evaluation of the alternatives and the preferred alternatives for PSC 2 and PSCs 41 and 43 follow.

Table 1 Explanation of Evaluation Criteria	
Criteria	Description
Threshold	**Overall Protection of Human Health and the Environment.** This criteria evaluates the degree to which each alternative eliminates, reduces, or controls threats to human health and the environment through treatment, engineering methods, or institutional controls (e.g., access restrictions). **Compliance with State and Federal Regulations.** The alternatives are evaluated for compliance with environmental protection regulations determined to be applicable or relevant and appropriate to the site conditions.
Primary Balancing	**Long-Term Effectiveness.** The alternatives are evaluated based on their ability to maintain reliable protection of human health and the environment after implementation. **Reduction of Contaminant Toxicity, Mobility, and Volume.** Each alternative is evaluated based on how it reduces the harmful nature of the contaminants, their ability to move through the environment, and the amount of contamination. **Short-Term Effectiveness.** The length of time needed to implement each alternative is considered. The risks that implementation of a particular remedy may pose to workers and nearby residents (e.g., whether contaminated dust will be produced during excavation) is assessed. **Implementability.** The technical feasibility and administrative ease (e.g., the amount of coordination with other government agencies that is needed) of a remedy, including availability of necessary goods and services, is assessed. **Cost.** The benefits of implementing a particular alternative are weighed against the cost of implementation.
Modifying	**U.S. Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP) Acceptance.** The Navy requests USEPA and FDEP comments on the FFS report and the proposed plan as part of the Federal Facility Agreement. The FFS and the proposed plan, which is placed in the Information Repository, therefore, represents a consensus by the Navy, USEPA, and FDEP. **Community Acceptance.** The Navy assesses community acceptance of the preferred alternative by giving the public an opportunity to comment on the remedy selection process.

Evaluation of Alternatives for PSC 2

The preferred alternative for source control at PSC 2, the former fire-fighting training area, is Alternative 2, which calls for collection and disposal of free product and onsite treatment and disposal of petroleum-contaminated soil. This section discusses the preferred alternative relative to the nine criteria, noting how it compares to the other alternative under consideration for PSC 2 (e.g., Alternatives 1).

Threshold Criteria

Overall Protection of Human Health and the Environment. Both alternatives would provide increased protection of human health and the environment because free product and contaminated soil would be removed from the site. Removal of this contamination reduces exposure to humans and wildlife and reduces a source of soil and groundwater contamination.

Compliance with ARARs. Both alternatives comply with ARARs because the soil contains petroleum product above the action level required by FDEP regulations, and requires treatment prior to disposal. If offsite transfer of the weathered petroleum hydrocarbon is required, the transfer will comply with the CERCLA offsite policy.

Primary Balancing Criteria

Long-term Effectiveness and Permanence. The reduction of contamination at PSC 2 would be permanent because free product and petroleum-contaminated soil above the action level would be removed from the site. Alternatives 1 and 2 further reduce contamination in the soil by treatment.

Short-term Effectiveness. Dust control would be required during excavation of soil. Volatilization of soil contaminants would be monitored and controlled during excavation and transport. Alternative 2 would require that air emissions be monitored during onsite thermal treatment.

Implementability. Both alternatives are relatively easy to implement and use equipment and technologies that are generally available. They would require a demonstration of the effectiveness of the proposed treatment prior to implementation. In addition, approval by the USEPA and FDEP is required prior to the onsite treatment proposed in Alternative 2.

Reduction of Toxicity, Mobility, or Volume of Contaminants. Alternatives 1 and 2 would reduce the **toxicity**, mobility, and volume of contaminants onsite by removing free product and soils. Alternative 2 would accomplish this reduction onsite rather than offsite.

Cost. Although the estimated costs of the alternatives proposed for PSC 2 differ slightly, the cost of Alternative 2 is the lowest. It is estimated at $614,000.

Modifying Criteria

State and Federal Acceptance. The FDEP and USEPA have concurred with the Navy's selection of Alternative 2 as the preferred alternative.

Community Acceptance. Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be addressed in the Responsiveness Summary prepared for the IROD for PSCs 2, 41 and 43.

Summary of the Preferred Alternative for PSC 2

In summary, Alternative 2 was selected as the preferred alternative. It would achieve reduction of contamination onsite by removal of free product and soil containing TPH above 50 mg/kg, and would further reduce petroleum contamination in the soil by onsite thermal treatment to 50 mg/kg TPH or below. Unlike Alternative 1, onsite treatment eliminates the need for offsite transportation and management and minimizes risks to offsite humans and wildlife because contamination never leaves the boundaries of PSC 2. This alternative is expected to meet Federal and State ARARs.

The Navy estimates that the preferred alternative for PSC 2 would cost approximately $614,000 and would take 6 weeks to implement.

Evaluation of Alternatives for PSCs 41 and 43

The preferred alternative for source control at PSCs 41 and 43, the domestic and industrial waste sludge drying beds, is Alternative 5, which calls for removal and disposal of nonhazardous debris along with excavation and onsite treatment of sludge drying bed materials, including hazardous debris. This section profiles the preferred alternative relative to the nine criteria, noting how it compares to the other alternatives under consideration for PSCs 41 and 43 (e.g., Alternatives 3 and 4).

Threshold Criteria

Overall Protection of Human Health and the Environment. All alternatives would provide increased protection of human health and the environment because contaminated sludge drying bed materials would be removed from the sites. Removal of this contamination reduces exposure to humans and wildlife and reduces a source of soil and groundwater contamination.

Compliance with ARARs. All alternatives would meet Federal and State regulations for the management of hazardous wastes and hazardous debris present at PSCs 41 and 43.

Primary Balancing Criteria

Long-term Effectiveness and Permanence. The reduction of contamination at PSCs 41 and 43 would be permanent because contaminated sludge drying bed materials would be removed from the sites. Alternatives 4 and 5 further reduce contamination by treatment.

Short-term Effectiveness. Dust control would be required during excavation activities. Volatilization of soil contaminants is expected to be minimal because few VOCs were detected at PSCs 41 and 43 during the field investigation; however, VOCs would be monitored and controlled during excavation and transport of materials. Alternative 5 would require that air emissions (dust and gas) be monitored during onsite stabilization.

Implementability. All of the alternatives are relatively easy to implement and use equipment and technologies that are generally available. Alternatives 4 and 5 would require a demonstration of the effectiveness of the proposed treatment prior to implementation. In addition, approval by the USEPA and FDEP would be required prior to the onsite treatment proposed in Alternative 5.

Reduction of Toxicity, Mobility, or Volume of Contaminants. Alternative 3 would reduce the toxicity, mobility, and volume of contaminants onsite by removing contaminated sludge drying bed materials, but they would be transferred to an offsite landfill. Alternatives 4 and 5 would achieve significant and permanent reduction of mobility of metal contaminants via treatment; however, the volume of contaminated material would increase because of the addition of setting agents required for stabilization. Alternative 5 would accomplish treatment of metals onsite rather than offsite.

Cost. The estimated cost for the preferred alternative (Alternative 5) is approximately one-fourth the cost of Alternative 3 or 4. The cost for Alternative 5 is estimated at $558,000.

Modifying Criteria

State and Federal Acceptance. The FDEP and USEPA have concurred with the Navy's selection of Alternative 5 as the preferred alternative.

Community Acceptance. Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be addressed in the Responsiveness Summary prepared for the IROD for PSCs 2, 41, and 43.

Summary of the Preferred Alternative for PSCs 41 and 43

In summary, Alternative 5 was selected as the preferred alternative. It would achieve reduction of contamination onsite by removal of metal-contaminated sludge drying bed materials and hazardous debris, and would treat metal contaminants in the excavated materials by onsite stabilization. Unlike Alternatives 3 and 4, onsite treatment eliminates the need for costly offsite transportation and management and minimizes risks to offsite humans and wildlife because contamination never leaves the boundaries of PSCs 41 and 43.

The Navy estimates that the preferred alternative for PSC 41 and 43 would cost approximately $558,000 and would take 7 weeks to implement.

6.0 UPCOMING RELATED COMMUNITY PARTICIPATION ACTIVITIES

Public Comment Period

The public comment period for the FRI/FFS report and the proposed plan is the next step in selecting source control IRAs for PSCs 2, 41, and 43 at NAS Jacksonville. A public comment period will be held from August 10, 1994 to September 23, 1994, to accept comments on the report and the proposed plan from NAS Jacksonville, the surrounding community, and other interested parties. During the public comment period, interested parties may submit written comments to Ms. Miriam Lareau, the NAS Jacksonville Deputy Public Affairs Officer, at the address listed below. Comments must be postmarked no later than September 23, 1994. Based on public comments or new information, the Navy may modify the preferred alternatives or choose another one of the alternatives developed during the FFS.

Signing of the IROD

Following the public comment period, the USEPA, FDEP, and the Navy will sign an IROD for PSCs 2, 41, and 43 at OU 2, NAS Jacksonville. The IROD will detail the remedial action chosen for the site and will include the Navy's responses to comments received during the public comment period. Once the engineering and designs for the preferred alternatives are complete, the IRAs will begin.

Ongoing Informational Updates

NAS Jacksonville will keep the local community informed about new developments at PSCs 2, 41, and 43, and at the base as a whole, by preparing fact sheets and distributing them to individuals on the mailing list (see *Mailing List Additions*).

Available Information

Copies of the documents prepared by the Navy during its investigations and studies of PSCs 2, 41, and 43, including the FRI/FFS report and the proposed plan, are available for review at the following **information repository**:

Charles D. Webb Wesconnett Branch
Jacksonville Public Library
6887 103rd Street
Jacksonville, FL 32210
(904) 778-7305

For further information on PSCs 2, 41, and 43, or any other **Installation Restoration Program** activities at NAS Jacksonville, please contact:

Ms. Miriam Lareau
Deputy Public Affairs Officer
Naval Air Station Jacksonville
Jacksonville, FL 32212
(904) 772-4032

Mailing List Additions

If you would like to be added to the NAS Jacksonville mailing list, please provide the following information to Ms. Miriam Lareau at the address above.

Name: _____

Address: _____

_____

Telephone: _____

Affiliation: _____

You may also contact Ms. Lareau by telephone.

7.0 GLOSSARY

Action Level: Concentration of a chemical or chemicals in an environmental **media** (e.g. soil, sediments, groundwater, surface water, etc.) above which cleanup of that media is required.

Administrative Record: A required file of documents that contains the information used to make site-management decisions, including the proposed plan and the responsiveness summary. The record is a maintained file specifically for public review.

Alternative: A combination of technical and administrative methods, developed and evaluated in a feasibility study, that can be used to address contamination at a site.

Applicable or Relevant and Appropriate Requirements (ARARs): The Federal, State, and local requirements that a selected alternative must meet. These requirements may vary among sites, chemicals of concern, and remedial alternatives considered.

Area of Contamination (AOC): An area found to contain similar wastes. The preliminary Area of Contamination for OU 2 is defined by the boundary of the Operable Unit.

Comment Period: A specified period of time, usually 30 days for **Interim Remedial Actions,** during which the public is encouraged to comment on a particular decision or document in the remedial process, such as the proposed plan and the FRI/FFS report.

Debris: A manufactured object, plant, or animal matter that exceeds 2.5 inches in size and is discarded or intended to be discarded. Debris encountered at PSCs 41 and 43 may include the walls surrounding the sludge drying beds and the drainage collection pipes.

Feasibility Study: A description and engineering study of the potential cleanup alternatives for a site.

Federal Facility Agreement (FFA): An agreement among government agencies for joint decision making. FFAs are frequently used at Federal facility National Priority List (NPL) sites, such as NAS Jacksonville.

Field Investigation: The component of the study of a waste site that includes sampling and analysis of environmental media and studies of the physical characteristics of the site.

Florida Department of Environmental Protection (FDEP): The State agency that is involved in identifying regulations and concurring with the preferred remedy at a site. The FDEP is one of three parties (along with the USEPA and the Navy) in the Federal Facility Agreement.

Focused Feasibility Study (FFS): A concise version of a feasibility study that involves identifying and evaluating the most appropriate technical approaches for addressing contaminant problems at a site undergoing an Interim Remedial Action. The alternatives are evaluated for their effectiveness in completing **RCRA** closure, and protecting human health and the environment. An FFS usually addresses only one environmental medium.

Focused Remedial Investigation (FRI): A field investigation that is usually scoped to provide information on the extent of contamination in a single environmental medium at a site or sites. Analytical data from the FRI are used to identify alternatives during an FFS.

Free Product: A non-water waste that can flow in subsurface soil, such as a petroleum product or solvent.

Hazardous debris: Debris that is contaminated with a waste determined to be hazardous according to **RCRA** waste identification requirements. Portions of the sludge drying bed walls and the collection pipes would be considered hazardous because they were in contact with sludge containing hazardous wastes from the industrial wastewater treatment process.

Hazardous Waste: A waste defined as hazardous according to RCRA regulations.

Hazardous Waste Landfills: Also known as **RCRA** Subtitle C landfills, these facilities are designed and permitted to accept wastes determined to be hazardous by **RCRA** waste identification requirements. Wastes that are subject to the **land disposal restriction (LDR) treatment standards** must be treated prior to disposal in a Subtitle C landfill.

Information Repository: A public file containing the administrative record, site information, documents on site activities, and general information about a site or sites.

Interim Record of Decision: A document that outlines the Interim Remedial Action to be imple

mented at a site. It includes the Navy's responses to comments on the proposed plan and the FRI/FFS report.

Interim Remedial Action: Steps taken to manage or remove a source or potential source of contamination at a site at which a full investigation and cleanup recommendations are not yet complete.

Installation Restoration Program: The Department of Defense program to identify, investigate, evaluate, and, if necessary, clean up sites to protect human health and the environment.

Land Disposal: placement of a waste in or on the land, such as a landfill or waste pile.

Land Disposal Restriction (LDR) Treatment Standard: Concentrations of chemicals in an RCRA hazardous waste that must be treated before the waste can be placed in a land disposal unit. The chemical concentrations must be reduced to the specified standards in the LDR.

Media: Naturally occurring physical matter such as soil, groundwater, surface water, or sediment.

Milligrams per Kilogram (mg/kg): Units used to describe the concentration of a chemical in soil and liquid wastes. One milligram per kilogram is equivalent to one part per million.

Monitoring Well: Special wells drilled at specific locations within or surrounding a waste site where groundwater can be sampled at selected depths and studied to obtain such information as the direction in which groundwater flows and the types and amounts of contaminants present.

Nonhazardous debris: Debris that is not contaminated, such as portions of the walls surrounding the sludge drying beds not in contact with the sludge. This material could be disposed at a non-hazardous **solid waste landfill** (also known as a RCRA Subtitle D landfill).

Operable Unit (OU): Grouping of sites based on types of wastes disposed, physical proximity, similar past uses, and/or the suspected contaminants of concern.

Petroleum Products: Waste (either solid or liquid) that is contaminated with chemicals found in petroleum products such as gasoline, jet fuels, kerosene, and other fuel oils.

Preliminary Assessment and Site Inspection (PA/SI): A two-phase site identification process in which potential sites are identified through record searches and interviews (the PA), and areas containing contamination are later confirmed through site visits and limited sampling and analysis (the SI). The PA/SI determines the need for additional investigation at a site.

Proposed Plan: A document that describes all of the alternatives considered by the Navy for addressing contamination at a site or sites, including a description of the preferred alternative or alternatives for Interim Remedial Action.

Remedial Action Objective: The final cleanup goals that must be met by the selected alternative for a site.

Remedial Investigation (RI): The first part of a two-part Remedial Investigation and Feasibility Study (RI/FS). The RI involves collecting and analyzing information about a site to evaluate the nature and extent of contamination that may be present in environmental media. The investigation also assesses how conditions at the site may affect human health and the environment.

Resource Conservation and Recovery Act (RCRA): The Federal law that establishes requirements for the definition, storage, treatment, and disposal of hazardous wastes and corrective action on hazardous waste releases to the environment.

Responsiveness Summary: A section within the Record of Decision that presents the Navy's responses to public comments on the FS or FFS and the proposed plan.

Semivolatile Organic Compounds (SVOCs): Compounds containing carbon and hydrogen that are slightly prone to evaporation (i.e., the compound has a relatively high vapor pressure, but it is lower than 77.6 millimeters of mercury). See the definition for volatile organic compounds.

Solid Waste: Discarded materials that are not contaminated with a hazardous waste, such as household garbage.

Solid Waste Landfill: A landfill that is designed and permitted to accept solid wastes as defined above.

Source Control: Remedial actions taken to prevent continued releases of substances into the environment.

Stabilization: The use of a setting agent (such as cement or a plasticizer) to immobilize or stabilize contaminants in soil or similar solid material.

Thermal Treatment: The use of heat to remove or destroy contaminants in soil.

Total Petroleum Hydrocarbon (TPH): A measure of the gross amount of contamination in a material that takes into account a number of chemicals typically found in petroleum products. TPH is not a specific chemical but measures the total concentration of a range of chemicals.

Toxicity: A relative measure of a substance's ability to damage living tissue or impair normal biological functions.

U.S. Environmental Protection Agency (USEPA): The Federal agency responsible for identifying regulations and concurring with the preferred remedy at a site. The USEPA has the authority to make the ultimate decision on selection of an alternative if consensus cannot be reached among the FFA parties.

Volatile Organic Compounds (VOCs): Compounds containing carbon and hydrogen that evaporate easily into the environment (i.e., has a vapor pressure of 77.6 millimeters of mercury or greater).

Volatilization: Evaporation of a contaminant into the environment.