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SAMPLING AND ANALYSIS PLAN REVISION 1 FOR PRELIMINARY SITE CHARACTERIZATION SITES 100 AND 102 NAS PENSACOLA FL
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4/30/99

Sampling and Analysis Plan
for
Preliminary Site Characterization
Sites 100 and 102

Outlying Landing Field Bronson
Pensacola, Florida

DEPARTMENT OF THE NAVY
SOUTHERN DIV FACILITIES ENGINEERING COMD

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order CTO-0086

April 1999

SAMPLING AND ANALYSIS PLAN FOR PRELIMINARY SITE CHARACTERIZATION (SITES 100 AND 102)

OUTLYING LANDING FIELD BRONSON
PENSACOLA, FLORIDA

Submitted to:
Southern Division
Naval Facilities Engineering Command
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CONTRACT NUMBER N62467-94-D-0888
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1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS), under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) is submitting this Sampling and Analysis Plan (SAP) for Sites 100 and 102 at Outlying Landing Field (OLF) Bronson located west of Pensacola, Florida. The SAP is a planning document prepared for preliminary site characterization investigations to be completed at these sites. This SAP was prepared on behalf of the Navy at Naval Air Station (NAS) Pensacola under contract No. N62467-94-D-0888. The SAP was developed based on the results of a Phase I environmental site assessment (LAW Engineering and Environmental Services, Inc., Report of Phase I Environmental, 1997).

1.1 FACILITY BACKGROUND

OLF Bronson (Figure 1-1) is located in Escambia County, in Florida's northwest coastal area, approximately 5 miles west of the Pensacola City limits. The 950-acre installation was constructed in the early 1940s. Prior to construction, the site was undeveloped and sparsely vegetated. Several unpaved roads or airstrips are present which leads to a paved circular area. The original name of the airfield, Tarklin Field, was changed to OLF Bronson during the installation construction activities. The base was used as training base for naval aviators during World War II and the Korean War. The western portion of OLF Bronson was used to maintain sea planes and train sea plane pilots. OLF Bronson was closed as an active airfield in 1950, but the runways were still used for touch-and-go landing for helicopter training. After 1950, base dismantling activities were conducted. By 1968, all buildings located at OLF Bronson were raised (Law Engineering and Environmental Services, Inc., 1997).

Aerial photographs reviewed during the Phase I environmental site assessment identified areas to the south, east, and north of the facility as undeveloped with the exception of some residential properties along U.S. Highway 98 and Perdido Bay approximately 0.5 miles north of the facility.

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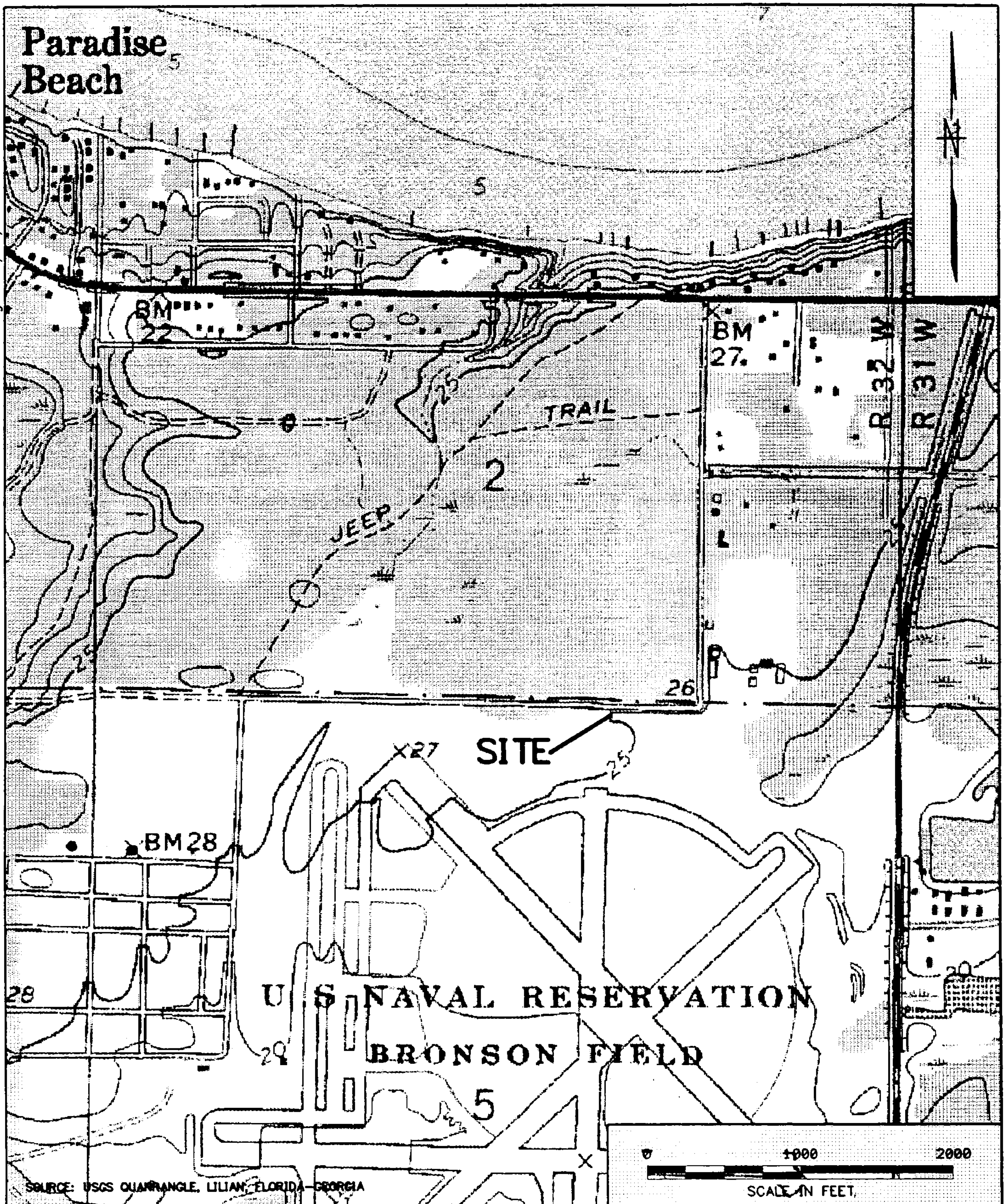


DRAWN BY MF DATE 2/12/99	FACILITY LOCATION MAP SITES 100 AND 102 OLF BRONSON NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0105
CHECKED BY DATE		APPROVED BY DATE
COST/SCHED-AREA		APPROVED BY DATE
SCALE AS NOTED		DRAWING NO. FIGURE 1-1 REV. 0

DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMD

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

1.2 PURPOSE OF THE SAP

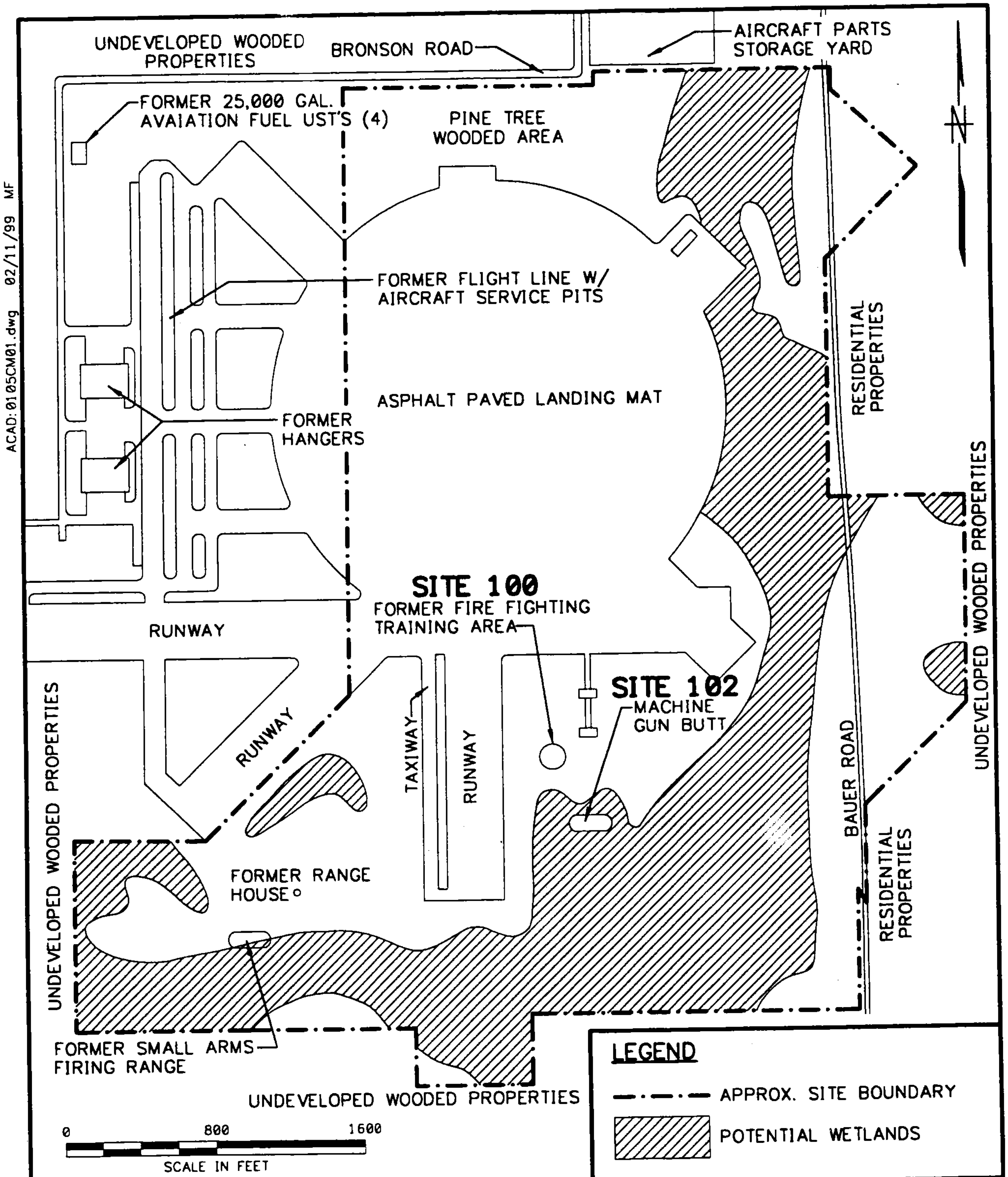
The SAP serves as a guide for the preliminary site characterization activities to be conducted at Sites 100 and 102. This plan documents the procedures for field activities and sample analyses. The SAP specifies sampling protocol and procedures for data collection and sample analysis, sample locations, frequency of samples to be collected, sample designations, sample handling and analysis, sampling equipment, and handling of investigative derived wastes (IDW). This plan was prepared in accordance with the Tetra Tech NUS, Inc. Quality Assurance Program Manual, dated October 1, 1998.

The field activities for the preliminary site characterization will include the collection of samples from sediment, surface soil, subsurface soil, surface water, and groundwater for submission to a qualified laboratory for analysis. The data collected during the preliminary site characterizations will be used in preparing a Site Characterization Report (SCR).

1.3 SITE DESCRIPTIONS

1.3.1 Site 100 – Former Fire-fighting Training Area

Site 100 is a former fire-fighting training area located in the south-central portion of the facility, as shown on Figure 1-2. The OLF Bronson Fire Department conducted practice burns at the training area during the time that OLF Bronson was active (1942 – 1958). Typical fire-fighting drills consisted of filling a shallow pit with water then pouring flammable material on top of the water and igniting it. Typically, material burned during the training exercises would consist of readily available flammable products such as waste aviation gasoline. Other flammable liquids such as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gas may have been burned (Law Engineering and Environmental Services, Inc., 1997).



DRAWN BY MF DATE 2/11/99		LOCATION OF SITES 100 AND 102 OLF BRONSON NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0105
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-2 REV. 0

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1.3.2 Site 102 – Former Machine Gun Butt

Site 102 is a former machine gun butt located on the south-central portion of the facility, as shown on Figure 1-2. The machine gun butt measures approximately 100 feet by 40 feet by 30 feet high. The mound was used by aircraft mechanics to calibrate 30- and 50-caliber aircraft machine guns. Bullets from aircraft guns were aimed at the machine gun butt to test and align aircraft gun sites. Remnants of bullets were discovered embedded in the machine gun butt (Law Engineering and Environmental Services, Inc., 1997).

1.4 REGULATORY SETTING

The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations, with the goal of expediting and improving environmental response actions while protecting human health and the environment. The IR program is conducted in accordance with Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that federal facilities comply with the act, both procedurally and substantively. Sites 100 and 102 at OLF Bronson are being investigated as part of the CERCLA requirements.

1.5 SAMPLING AND ANALYSIS PLAN ORGANIZATION

The SAP is organized into seven chapters (Chapters 1.0 to 7.0). Chapter 1.0 presents the purpose, site description, and regulatory setting for the Preliminary Assessment at OLF Bronson. Chapter 2.0 summarizes previous investigations. Chapter 3.0 presents the investigative methodology for conducting the assessment. Chapter 4.0 presents the site-specific data quality assessment. Chapter 5.0 addresses the waste resulting from investigation activities. Chapter 6.0 discusses the investigative results of the assessment. Chapter 7.0 presents the sampling and analysis schedule of operations for the site assessment activities. Chapter 8 includes the references used in preparing this planning document. Supporting data are provided in the Appendices.

2.0 PREVIOUS INVESTIGATIONS

This chapter summarizes previous investigations applicable to Sites 100 and 102 OLF Bronson. Previous investigations include a Preliminary Assessment Report and a Phase I environmental site assessment.

2.1 PRELIMIINARY ASSESSMENT REPORT, 1992

OLF Bronson was listed on the Federal Facilities Hazardous Waste Compliance Docket. In accordance with the Superfund Amendments and Reauthorization Act (SARA) Part 120, naval Facilities Engineering Command tasked the Naval Energy and Environmental Support Activity (NEESA) to conduct a preliminary assessment on OLF Bronson. The preliminary assessment included the investigation of available records at NEESA and the Naval Facilities Engineering Command. The NEESA team performed a site inspection to complete documentation of past and present operations and disposal practices. The site inspection included interviewing long term employees at the facility with the assistance of NAS Pensacola representatives. If a potential threat to human health or the environment was identified, further action was recommended. Results of the investigation identified the fire fighting and machine gun butt training areas as areas of potential environmental concern (Law Engineering and Environmental Services, Inc., 1997).

2.1.1 <u>Site 100 – Former Fire-fighting Training Area</u>

The fire-fighting training area was used for practice burns from approximately 1942 to 1958. The area is located in the south-central portion of the study area as shown on Figure 1-2. Flammable liquids burned in the study area may have consisted of waste aviation fuel as well as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gasoline. Polychlorinated biphynels (PCBs) originating from hydraulic fluids may have been burned in the area. The preliminary assessment concluded the fire-fighting training area should not pose a threat to local air quality; however, nearby surface waters and groundwater could potentially be impacted by the potential contaminants. The assessment report recommended that soil samples be collected in the vicinity of the former fire-fighting training area to evaluate if soils are impacted by potential contaminants (Law Engineering and Environmental Services, Inc., 1997).

2.1.2 Site 102 – Former Machine Gun Butt

The machine gun butt was utilized during the active period of OLF Bronson (1942 to 1958) as a backstop for aircraft machine gun targets. The machine gun butt is an earthen mound located in the south-central portion of the study area as shown on Figure 1-2. The preliminary assessment identified this area as a potential environmental concern since metals were fired into the machine gun butt. The metal fragments were identified to have the potential to impact local surface waters and groundwater in the area. The assessment report recommended soil sampling be conducted in the area of the machine gun butt to evaluate whether potential metal contaminants are migrating from the earthen mound (Law Engineering and Environmental Services, Inc., 1997).

2.2 PHASE I ENVIRONMENTAL SITE ASSESSMENT, 1997

In October 1997, LAW, under contract to the School district of Excambia County Florida Facilities Planning Department, initiated a Phase I environmental site assessment at OLF Bronson. The objective of the Phase I environmental site assessment was to characterize the facility and adjacent properties with respect to actual and potential recognized environmental conditions. The Phase I environmental assessment is provided as Appendix A.

The Phase I environmental site assessment included review of the facilities location, present and past land uses, topography soils, geology and hydrogeology, historical setting and document review, interviews, and site reconnaissance for environmental concerns. The testing of soils and groundwater, and the evaluations of air quality were not conducted as part of the Phase I assessment.

The Phase I identified the former fire-fighting training area, Site 100, and the former machine gun butt, Site 102, as areas of environmental concern. The Phase I reported surface staining and petroleum like odors at Site 101 and the potential for heavy metal contamination at Site 102. Heavy metal contamination is typically associated with firing ranges. The Phase I recommended the collection of soil and groundwater samples at each of the Sites (Law Engineering and Environmental Services, Inc., 1997).

3.0 TECHNICAL APPROACH

3.1 FIELD INVESTIGATION METHODS

The preliminary site characterization field investigations at Sites 100 and 102 will focuses primarily on identifying whether soil, groundwater, and surface water contamination exist at the sites. The Scope of Work (SOW) for the investigations was planned based on a review of the existing reports, regulatory guidance [e.g., FDEP Soil and Groundwater Cleanup Guidance], and in consultation with Navy personnel. Modifications to the SOW may be necessary as new data become available. If new field investigation methods or changes to existing methods are required, the revised methods will be presented by TtNUS to the Southern Division's Remedial Project Manager, FDEP and USEPA Region 4 regulatory representatives, and NAS Pensacola Environmental Coordinator for review and approval.

3.1.1 Standard Operating Procedures

A variety of field investigation activities will be conducted at OLF Bronson to meet the objectives of the preliminary site characterization SOW. To ensure that all data are consistent with regulatory requirements, the data collection activities will follow the Standard Operating Procedures (SOPs) issued by the USEPA in *Environmental Investigations Standard Operating Procedures Quality Assurance Manual* (1996b). As such all activities will comply with TtNUS FDEP COMPQAP #980038 (1998), approved by FDEP on August 24, 1998.

In some instances the planned investigation activities (e.g., well construction) may not be specifically addressed in the COMPQAP; in other cases a methodology presented in the COMPQAP, or a specific step thereof, may be deemed inconsistent with site-specific conditions or previous investigation methods used at OLF Bronson. In these cases the USEPA Region 4 Environmental Investigations SOPs (USEPA 1996b), Navy technical guidance, or project-specific SOPs adopted by or prepared by TtNUS will be invoked. A copy of the SAP and each of the guidance documents will accompany TtNUS field personnel at OLF Bronson and will be reviewed by the field team prior to assessment activities. Project-specific SOPs that are adopted by or prepared by TtNUS for this investigation are provided in Appendix B, and are discussed in the following sections.

3.1.2 General Site Operations

3.1.2.1 Field Team Organization

The TtNUS field team will consist of staff members assigned temporary duty at OLF Bronson and who will conduct the field investigation activities. The organization of the field team is described below.

- The Field Operations Leader (FOL) is responsible for the day-to-day direction of personnel in the field. The FOL will assign tasks to field team personnel, direct the sequence of activities, coordinate with OLF Bronson personnel, coordinate subcontractors, and review tasks in progress and those completed. The FOL will ensure that project-specific plans are implemented and that activities are in compliance with appropriate guidelines.

- The Project Safety Officer is responsible for ensuring that proper health and safety procedures are identified and implemented for the project and that project-related health and safety incidents are properly investigated. In the event that only a small number of project staff are required on site, the duties of the Project Safety Officer may be assigned to the FOL or another member of the field team. The Project Safety Officer or designee will report directly to the TtNUS Corporate Director of Health and Safety. The health and safety plan developed for the field investigations is included in Appendix C.

- The Field Geologist will oversee soil boring and monitoring well installation activities and may conduct various environmental sampling activities. Duties will include logging and documentation of drilling and well construction, environmental sample collection and handling, and ensuring that the approved methods are implemented. The field geologist may also conduct tests for identifying subsurface conditions and characterizing the groundwater flow regime.

- The Sampling Personnel will be responsible for properly locating, collecting, preserving, packaging, documenting, and shipping environmental samples to the laboratory.

3.1.2.2 Mobilization

TtNUS must perform several internal tasks before the field mobilization. These tasks include the following:

- Preparation of technical and subcontractor bid specifications;
- Selection and mobilization of subcontractors;
- Acquisition and preparation of equipment for transportation to the field;
- Acquisition and preparation of expendable supplies for transportation to the field; and
- Arrangement of transportation and lodging for field personnel.

In addition to internal efforts, external mobilization efforts will be coordinated with the OLF Bronson Point of Contact (POC). A list of the steps to be taken includes the following:

- Obtain keys to existing locks on wells (other than those installed by TtNUS);
- Set up the investigation field office and coordinate utilities hookup;
- Select staging areas for equipment and IDW;
- Select decontamination area(s) with electrical hookup, potable water, and drainage to an oil/water separator;
- Complete security procedures for project and subcontractor personnel to gain access to the Base;
- Ensure that supplies of potable water are accessible; and
- Coordinate with Base personnel to locate buried utilities.

A location will be assigned by the Base POC to be used as a personnel/communication field office. Multiple decontamination facilities may be selected or constructed by the drilling subcontractor before the beginning of field activities at locations deemed appropriate by the Base POC and TtNUS.

Site reconnaissance will be performed before initiation of field activities. Some of these activities will be performed with the assistance of OLF Bronson personnel. These activities are listed below:

- Locating and setting up of decontamination facilities;
- Identifying the potable water source(s), electrical outlets, and other utilities to be used during field activities;
- Collecting and shipping to the laboratory a field blank of the potable water source to be used for field decontamination activities;
- Locating temporary storage for soil cuttings and purge/development water drums as well as solid wastes generated during field activities (e.g., Tyvek suites, gloves, plastic sheeting);
- Reconnoitering and marking/staking sample locations;
- Erecting any necessary barricades and/or temporary fencing; and
- Locating underground and aboveground utilities within the work areas (including water, gas, sanitary sewer lines, drainage lines, telephone cable, and electric lines). Electric lines may be shielded, if necessary.

3.1.3 Field Investigation Activities

The SOW for the preliminary site characterization includes the following categories of field investigation activities:

- Collection of surface soil samples;
- Collection of sediment samples;
- Collection of surface water samples;
- Installation of soil borings and collection of subsurface soil samples using direct-push, hand auger, or conventional drilling techniques;
- Installation of groundwater monitoring wells in the shallow zone of the aquifer;
- Collection of groundwater samples;
- Measurement of groundwater piezometric level;

- Measurement of physical and chemical properties of soil and groundwater samples;
- Decontamination of investigation equipment;
- Sample management;
- Field QC, documentation, and record keeping;
- IDW management; and
- Location survey.

As described in Section 3.1.1, all field investigation activities will be performed in accordance with the appropriate regulatory and project-specific SOPs. Project-specific SOPs will be given priority, followed by the FDEP COMPQAP and then USEPA Region 4 SOPs when SOPs for the same task differ. Copies of all guidance documents will be located in the TtNUS field office at OLF Bronson. Table 3-1 presents a cross-reference guide to the applicable SOPs for the general field activities listed above, and the SOPs to be used by the field investigation team. If activities arise that are not referenced in Table 3-1, then the project-specific SOPs, COMPQAP, the USEPA Region 4 SOPs, or Navy guidance will be invoked (in that order) with approval by USEPA, FDEP, and Navy personnel. Project-specific SOPs referenced in Table 3-1 is discussed in the following sections.

3.1.3.1 Direct-Push Sampling

A direct-push technology (DPT) soil sampling device (e.g., Geoprobe® system) will be used to obtain subsurface soil samples at OLF Bronson. Unlike conventional drilling techniques, DPT probing tools do not create an open borehole into which soil sampling devices are inserted. DPT allows investigators to push a closed sampler to depth, open the sampler, and obtain a discrete soil sample that is relatively undisturbed.

The DPT sampler can be used to collect samples from discrete intervals above and below the zone of groundwater saturation. The DPT sampler typically has an inner diameter of 1 to 2 inches and recovers a soil core measuring 3 feet in length. If necessary, liners made of material compatible with the contaminants of interest will be used inside the soil sampler to keep the sample intact after it is extruded. This procedure will reduce the likelihood of cross-contamination or false-positive laboratory results.

TABLE 3-1

STANDARD OPERATING PROCEDURES CROSS REFERENCE[a]
PRELIMINARY SITE CHARACTERIZATION WORK PLAN FOR
SITES 100 AND 102
OLF BRONSON
PENSACOLA, FLORIDA
PAGE 1 OF 2

ACTIVITY	FDEP[b]		EPA-4[c]		Tetra Tech NUS, Inc.(d)	
SOIL SAMPLING						
General	A	4.0 / 4.3.1-4.3.2	A	12.3		
Manual Sampling	A	4.3.4	A	12.3.1		
Power-Driven Sampling	A	4.3.4.5	A	12.3.2		
VOC Samples	A	4.3.2	A	5.13.9 / 12.4.1		
Sample Mixing	A	4.3.2	A	5.13.8		
DRILLING						
Safety			A	6.7		
Direct-Push					A	3.1.3.1
Augering			A	6.3.1		
Rotary			A	6.3.3		
Abandonment			A	6.9		
WELL CONSTRUCTION						
Overdrilling			A	6.4.2		
Annular Space			A	6..4.1		
Casing and Screen			M	6.6.2	A	3.1.3.2
Installing the Well			M	6.5.1 / 6.5.2		3.1.3.3
Filter Pack			A	6.4.3 / 6.6.3		
Filter Pack and Screen Design			M	6.6.4	A	3.1.3.4
Well Seal and Grouting			A	6.4.4 / 6.4.5		
Surface Completion			A	6.4.6 / 6.4.7 / 6.4.8		3.1.3.3.4
Development			A	6.8		3.1.3.3.6
Temporary Wells			A	6.1		
GROUNDWATER SAMPLING						
General	A	4.0 / 4.2.1 / 4.2.5.2				
Purging		4.2.5.3-4.2.5.5	A	7.2.1 / 7.2.2 / 7.2.4		
Sample Methods		4.2.5.6	A	7.3.1 / 7.3.3		
Sample Containers / Preservation	A	4.2.2	A	7.3.4		
Trace Organic and Metals	A	4.2.5.6 (g)	M	5.13.9 / 7.3.5	A	3.1.3.5
Temporary Wells	A	4.2.9				
Auxillary Data			A	7.3.7		
FIELD MEASUREMENTS						
Groundwater Levels	A	4.2.5.4	M	15.8	A	3.1.3.6
pH, Temperature, Conductivity	A	7.5.2 / 7.5.3 / 7.5.5	A	16.2-16.4		
Dissolved Oxygen	A	7.5.4	A	16.7		3.1.3.11
Turbidity			A	16.5		
Redox Potential					A	3.1.3.7
Ferrous Iron (Fe++)					A	3.1.3.8
Air Monitoring / Head Space	A	7.5.7			A	3.1.3.9
Residual Product Detection					A	3.1.3.10

TABLE 3-1

STANDARD OPERATING PROCEDURES CROSS REFERENCE[a]
PRELIMINARY SITE CHARACTERIZATION
WORK PLAN FOR
SITES 100 AND 102
OLF BRONSON
PENSACOLA, FLORIDA

ACTIVITY	FDEP[b]		EPA-4[c]		Tetra Tech NUS, Inc. [d]	
DECONTAMINATION						
General	A	4.1.1 / 4.1.3			A*	3.1.3.3.5
Reagents	A	4.1.2				
Sampling Equipment	A	4.1.4			A*	3.1.3.3.6-7
Filters	A	4.1.6				
Tubing	A	4.1.7.1-4.1.7.5				
Pumps	A	4.1.8				
Field Equipment	A	4.1.9.1 / 4.1.9.2			A*	3.1.3.3.10
Analyte-Free Water Containers	A	4.1.10				
Ice Chests / Shipping Containers	A	4.1.11				
SAMPLE HANDLING						
General			A	5.13.3 / 5.13.7		
Sample Containers	A	4.4.1				
Preservation and Holding Times	A	4.4.2	A	5.13.6		
Documentation	A	5.0 / 5.3	A	3.3		
Sample Identification	A	5.3.2	A	3.2.1	A*	3.1.3.8
Packing and Transportation	A	4.4.3.2				
FIELD QUALITY ASSURANCE/QUALITY CONTROL						
Field Calibration	A	7.5				
Field Equipment Decontamination		4.1.3			A*	3.1.3.3.5
Quality Control Samples	A	9.1			A*	3.2.3
Control Limits	A	7.5			A*	3.1.3.9
Corrective Action	A	11			A*	3.1.3.10
INVESTIGATION-DERIVED WASTE						
Investigation Waste Disposal	A	4.4.5			A*	3.1.3.11, 6.0
Nonhazardous Waste			A	5.15 / 5.15.1		
Hazardous Waste			A	5.15 / 5.15.2		
RECORDKEEPING						
Field Logbooks and Forms			A	3.5	A*	3.1.3.12
Manufacturer's Specifications					A*	3.1.3.13
Chain-of-Custody Forms	A	5.3				
Field Calibration Records	A	7.8				
SURVEYING						
GPS Surveys					A*	3.1.3.14
NGVD Surveys					A*	3.1.3.14

(a) Annotations found in this reference table indicate the following:

A – Standard Operating Procedure (SOP) that is fully adopted.

A* – Standard Operating Procedure (SOP) previously addopted, presently under review.

M – Modification of existing Florida Department of Environmental Protection (FDEP) or U.S. Environmental Protection Agency (EPA) SOP documented in project-specific SOP.

(b) Denotes FDEP SOPs adopted by Tetra Tech NUS, Inc., source:
FDEP Comprehensive Quality Assurance Plan #980038, August 1998.
Number shown indicates the chapter and section in the FDEP SOPs.

(c) Denotes EPA Region 4 Environmental Investigations SOPs and Quality Assurance Manual, May 1996. Number shown indicates the section in the EPA SOPs.

(d) Denotes project-specific SOPs adopted by or prepared by Tetra Tech NUS, Inc. for the conduct of work at Outlying Landing Field Bronson.
Number shown indicates the text section in which the SOP may be found.

GPS – Global Postioning System

NGVD – Natural Geodetic Vertical Datum

VOC – volatile organic compound

The DPT sampler is attached to the leading end of the pushing rods and driven in a closed and sealed position into the subsurface soil using a hydraulic and/or percussion driver. At the top of the desired sampling interval, the pushing is temporarily stopped and an internal release mechanism in the sampler is triggered using extension rods inserted down the inside of the push rods. After the release is activated, the sampler is again driven forward, collecting soil in the sample tube as a piston retracts. The probe assembly is then retrieved and the soil sample is removed for examination.

After removal from the sampler barrel, the sample is extracted and placed on a fresh, clean surface. If a liner is used, it is separated into 6-inch-long sections (along perforations in the brass liners), and the exposed soil is screened with a flame ionization detector (FID). Samples selected for laboratory analyses will be immediately placed into laboratory-supplied containers. If liners are used, the open ends will be covered with clean, Teflon™ tape, capped, and sealed with exterior tape. The samples will be labeled, preserved on ice, and transported to the laboratory. All portions of the probe assembly that are inserted into the ground will be decontaminated before each use using standard decontamination procedures (see Table 3-1). Equipment rinsate blanks will be collected from the decontaminated sampler at the prescribed frequency.

3.1.3.2 Monitoring Well Installation

<u>Shallow Well Installation</u>

All monitoring wells will be constructed of Schedule 40 polyvinyl chloride (PVC) casing and screen manufactured for environmental applications (i.e., no inked markings, shipped clean in individual sealed wrappings) and meeting the requirements of the American Society for Testing and Materials (ASTM) F 480 and D 1785. Each section of casing and screen shall be National Sanitation Foundation (NFS) approved. This variance from the USEPA Region 4 SOPs' requirement for stainless steel casing and screen materials is based on previous investigation results show that background groundwater quality (e.g., pH) and dissolved contaminants in groundwater (e.g., petroleum hydrocarbons) are not present at concentrations detrimental to the use of PVC. If conditions are encountered for which PVC is inappropriate, then stainless steel or another suitable material shall be selected and presented to USEPA, FDEP, and Navy personnel for approval before being used.

Monitoring wells will be constructed with 1¼-inch inside diameter (ID) PVC casing with 10 feet of 0.010-inch PVC slotted screen. Each screen section will be pre-packed with 20/30 silica sand filter pack. This filter pack will extend a minimum of 2 feet above the screened section. A fine sand seal will be placed above the filter pack and the remaining borehole annulus will be grouted to the surface.

Well Surface Completion

The surface completion of the monitoring wells will be constructed by aboveground completion methods. The wells will have steel protector casing with a diameter at least 6-inches greater than the diameter of the well riser. Each aboveground completion will have a 3-foot x 3-foot x 5-inch concrete pad sloping at 0.25 inch/foot away from the steel casing. The bottom of the pad will be 2 inches bls. The steel protective casing will be painted with exterior white enamel. Well identification will be permanently marked on the well lid and protective casing.

General Drilling Requirements

The only drilling fluid used will be potable water. In addition, lubricants used on the rig will not introduce or mask chemicals of concern (COCs) at the site being investigated. All trash, waste, grout, cuttings, and drilling fluids associated with the drilling activities will be disposed of by the drilling subcontractor in accordance with the NAS Pensacola IDW Management Plan included in Appendix D.

The items listed below will also be part of the SOP for drilling.

- All data related to well construction will be documented on a monitoring well sheet field form included in Appendix E.
- A driller and drilling company certified by the State of Florida will construct each well.
- Well locations will be approved by the Base POC before installation.
- Glue will not be used to join screen or casing.
- At each well location, lithologic soil samples will be taken continuously by using a DPT coring tool.
- The top of the casing will be cut using an inside diameter pipe cutter.
- A notch will be cut into the top of the casing to be used as a reference point for the elevation survey and for measuring water levels.

Well Development

Monitoring wells will be developed to remove fine-grained sediments and to break down the filter cake or smearing along the borehole well. The wells will be developed by pumping. All development equipment will be decontaminated before being placed in the well. Throughout the development procedure, discharge water color and volume shall be documented. Wells will be developed until the following criteria are achieved:

- Turbidity remains within a 10 Nephelometric Turbidity Unit (NTU) range for 2 consecutive readings,

- Stabilization of the following parameters occurs:
  - temperature plus or minus 1°C,
  - pH plus or minus 1 unit, and
  - electrical conductivity plus or minus 5 percent of scale; and

- Accumulated sediment is removed from the well.

Monitoring well development will begin no sooner than 24 hours after well installation. No detergents, bleaches, soaps, or other such items will be used to develop the wells.

After development, water levels in the wells will allow to stabilize for a period of at least 24 hours prior to static water levels being measured and recorded. All data related to well development, including alternate development methodologies and their justification, will be written on the well development sheet provided in Appendix E, or in the field logbook.

3.1.3.3 Decontamination Procedures

The decontamination of major equipment (e.g., direct push rig, dump trucks, backhoes) and sampling equipment is necessary to minimize the spread of contamination to clean zones, to reduce exposure to personnel, and to reduce cross-contamination of samples when equipment is used at more than one sampling location.

Major equipment will be decontaminated at a location suitable for an equipment decontamination area, as identified by the OLF Bronson POC. Sampling equipment will be decontaminated in tubs or drainage pans to allow the decontamination rinse water to be collected for disposal. The sampling equipment will then be wrapped in aluminum foil and stored in a clean area until use. Clean sampling equipment will not be allowed to come into contact with the ground or any potentially contaminated surfaces before use at the sampling location. Equipment specific decontamination procedures are outlined in the following sections.

Soil Sampling Equipment

All stainless steel spoons, bowls, and other soil-sampling equipment will be decontaminated after each use. The decontamination procedure outlined below will be used.

- Wash and scrub the equipment with a solution of Liquinox (or equivalent) and potable water.
- Rinse with potable water.
- Rinse non-steel equipment with 10 to 15 percent reagent-grade nitric acid ($HN0^3$) when sampling for trace metals.
- Rinse with analyte-free water.
- Rinse twice with isopropanol.
- Rinse thoroughly with analyte-free water.
- Air dry (if possible).
- Wrap in oil-free aluminum foil (if appropriate).

Water Sampling Equipment

Peristaltic and/or submersible pumps will be used to purge and collect water samples. Purging and sampling performed with pumps will use dedicated tubing for each sampling location. Submersible pumps will be cleaned inside and outside between uses at each sampling location. Peristaltic pumps will be cleaned outside between uses at each sampling location and tubing will be replaced with new tubing.

Pump decontamination procedures are as follows:

- Wash with Liquinox and potable water;
- Rinse with potable water; and
- Rinse with analyte-free water.

Equipment will be decontaminated in the manner outlined below.

- Wash and scrub equipment with a solution of Liquinox (or equivalent) and potable water.
- Rinse with potable water.
- Rinse non-steel equipment with 10 to 15 percent reagent-grade $HN0^3$ when sampling for trace metals.
- Rinse with analyte-free water.
- Rinse twice with isopropanol.

- Rinse thoroughly with analyte-free water.
- Air dry (if possible).
- Wrap in oil-free aluminum foil.

Any additional equipment used in sampling will be decontaminated by following the procedure outlined above.

Major Equipment

All downhole drilling equipment used in the construction and sampling of monitoring wells, including downhole drill and sampling tools shall be steam cleaned. Equipment shall be cleaned prior to beginning work, between boreholes, any time the drill rig leaves the drill site before completing a boring, and at the conclusion of the drill program.

These decontamination operations will consist of washing equipment using high-pressure steam wash from a potable water supply and Alconox. The equipment will be rinsed with tap water. All decontamination activities will take place at a predetermined location.

3.1.3.4 Groundwater/Surface Water Interface Sampling

Site 102 is expected to be a wetlands and/or underwater resulting in not being able to install a site specific monitoring well. A representative groundwater sample from the groundwater/surface water interface may be collected in the following manner. A four inch diameter, 3 to 4 foot long piece of PVC well casing will be pushed into the sediment. Surface water parameters (including but not limited to temperature, pH, conductivity) will be recorded and the casing will be evacuated. Water quality parameters will be monitored to determine when the surface water has been evacuated and groundwater has begun to enter the casing. Upon determining that a change in water quality parameters has consistently occurred a sample will be collected for laboratory analysis.

3.1.3.5 Trace Metals Sampling in Groundwater

Groundwater samples to be analyzed for trace levels of inorganics shall be collected in a manner consistent with the procedure developed USEPA Region IV SOP guidance. The monitoring wells will be purged and sampled using low-flow/low-stress techniques. Efforts will be made to reduce the groundwater turbidity below 10 NTUs. Filtered groundwater samples will not be collected. Monitoring well purge water records will be recorded in the field logbook or on monitoring well purge record forms included in Appendix E.

3.1.3.6 Groundwater Level Measurements

Measurement of the depth to water in monitoring wells will be performed according to the TtNUS's COMPQAP and USEPA Region 4 SOPs, with the exception that measuring devices will not be calibrated against an Invar steel surveyor's chain. All devices used during a given measuring event will, however, be calibrated against each other to ensure that accurate relative measurements are made during the data collection event. The results of the calibration will be recorded in the field logbook.

A minimum of one complete round of water level measurements will be obtained from site monitoring wells. All measurements will be collected within a 48-hour period of consistent weather conditions to minimize atmospheric/precipitation effects on groundwater conditions. Measurements will be collected at least 24 hours after well development using an electrical water level indicator. A permanent reference point on the top of each well casing will be used for determining the depth to water. Water level measurements will be recorded in the field logbook to the nearest 0.01-foot. Static water levels will be measured in each well before any fluid is withdrawn. If floating hydrocarbon is detected in the monitoring wells, the thickness of the free product will be measured with an electronic interface probe.

3.1.3.7 Sample Head Space Analysis

Soil vapor head space analyses will be performed according to the method prescribed in FDEP Rule 62-770.200(8) of the Florida Administrative Code (FAC). Soil samples will be analyzed for their total hydrocarbon content using an organic vapor analyzer (OVA) equipped with a FID. A photoionization detector (PID) may be used only after a determination of the instrument's equivalent response to a FID has been made. Charcoal filters will be used to differentiate between methane (a naturally occurring gas) and petroleum hydrocarbon vapors. The calibration of the FID will be checked before the analyses. The following steps will be used to prepare soil samples for head space analysis:

- Each soil sample to be analyzed will be equally split and placed into 2 clean, 16-ounce glass jars;
- Each sample jar will be filled to approximately one-half of its volume, if sufficient sample volume is available;
- Aluminum foil covers will be sealed over the open end of the glass jar using a threaded, metal ring;

- The sample jars will be allowed to equilibrate under a temperature range of 20–30°C for approximately 5 minutes;
- The head space will be measured by piercing the aluminum foil with the FID probe and recording the highest sustained reading; and
- If FID readings above background are detected in the first jar, the second sample jar will be measured using an in-line charcoal filter to determine the portion of the total reading attributable to methane gas.

All soil vapor reading measurements will be recorded in the field logbook or on a boring log. Boring log field forms are provided in Appendix E.

3.1.3.8 Residual Free Product Detection in Soils

Residual free product field detection techniques using ultraviolet (UV) light or red dye will be used for soil borings and monitoring wells installed near suspected DNAPL source areas. UV light or red dye field tests will be performed on soil samples collected from the top of significant clay layers (greater than 4 feet thick) and other suspected locations based on field observations (i.e., elevated FID readings, odors, staining). Some petroleum-based, light nonaqueous-phase liquid (NAPLs) and some solvent-based DNALPs will fluoresce when exposed to UV light. Other NAPLs that may not fluoresce may be detected by mixing the soil sample with a colored, hydrophobic dye and watching for the presence of colored NAPL.

When a UV light is used to detect NAPLs, the suspect soil sample will be placed in a light-tight box containing a UV light. The box will be equipped with a shaded viewing port to eliminate ambient light, and the sample reaction will be directly observed for the presence of fluorescence. Alternatively, a darkened, well-ventilated room equipped with a UV light may be used if conveniently located near the sample collection site.

When samples are to be dye-tested, a portion of the suspect soil (e.g., 8-ounces volume, if available) will be placed into a clear, 1-liter jar. A volume of potable water and Red Oil (commercially available low-toxicity dye) sufficient to create a separate liquid phase following mixing (i.e., approximately 16 ounces) will be added to the sample, and the mixture will be agitated for a sufficient time to desegregate the majority of the soil sample. Following mixing the jar will be allowed to sit and will be observed for the presence of a colored NAPL fraction. Because of their natural cohesiveness, clay-rich samples may not readily desegregate, and mechanical breakage of the sample before mixing may be necessary.

3.1.3.9 Laboratory Sample Identification

The sample identification system to be used in the field to identify each sample collected during the preliminary site characterization will be in accordance with Navy Standards, contained in Appendix B. The coding system provides a tracking record to allow the retrieval of information about a particular sample and to ensure that each sample is uniquely identified.

Each sample is assigned a series of codes indicating the site (e.g., 100), sample type, sample location, and sample round (i.e., sequential order or date). The sample nomenclature system has been designed to maintain consistency between field, laboratory, and database sample numbers. In addition, the system facilitates cost-effective data evaluation because data can be easily sorted by matrix and/or depth or by other such parameters.

3.1.3.10 Field Instrument Control Limits

QA/QC specifications for field measurements are summarized in Table 3-2. This table shows the control parameters to be assessed, control limits, and corrective actions to be implemented.

The TtNUS representative on site will confirm measurements of total depth of each boring, dimensions and placement of well screens and casings, and volume and placement of filter pack and grout materials by independent observation or measurement. The FOL will review field forms and field logbook entries for indications of measurement data outside of the control range.

3.1.3.11 Corrective Actions

Comprehensive QA activities will be conducted by TtNUS to ensure that the data obtained from the sampling program as well as the resultant work products are technically valid. Any staff member engaged in project work who discovers or suspects a nonconformance is responsible for identifying and segregating (if applicable) the nonconforming item as well for forwarding a report to the Task Order Manager and QA Manager for investigation and corrective action. The QA Manager has the responsibility for assuring the overall adequacy of corrective actions and summarizing this information in a status report to TtNUS management.

Before its use in the field, each instrument will be calibrated to ensure that it is capable of producing usable data indicative of site conditions. While in the field, QC data, such as duplicate field measurements or QC check standards, will be collected for field instruments and used to evaluate the continued acceptable performance of each instrument. Table 3-2 lists corrective actions to be implemented whenever field instruments fail to meet the established control limit criteria.

Field data will be reviewed by the site geologist while in the field. Extreme readings (i.e., readings that appear significantly different from other readings at the same site) will be accepted only after the instrument has been checked for malfunction and the readings have been verified by retesting (with an alternate instrument, if possible).

QC data obtained from field duplicates, field blanks, trip blanks, or equipment blanks will be collected while in the field and assessed by the QA Manager or the cognitive Task Order Manager to evaluate the overall quality of the sample collected. Whenever the results of the field QC samples fail to meet the acceptance criteria, as identified in Table 3-2, corrective actions will be initiated.

Potential corrective actions will be dependent upon the final use of the data; however, appropriate corrective actions may include the following, as determined by the Task Order Manager in conjunction with the QA Manager:

- Evaluation of the suspect QC data by comparison to other QC samples taken at the same site or on the same date or analyzed by the same equipment/technician for similar contamination;
- Reanalysis of the QC sample in question (if possible);
- Qualification of the results; and
- Resampling.

Non–TtNUS parties involved in identified nonconformances will be notified initially by telephone with a follow-up formal correspondence explaining the deficiency. The responsible outside parties will be

TABLE 3-2

FIELD QA/QC SPECIFICATIONS
PRELIMIINARY SITE CHARACTERIZATION
SITES 100 AND 102
OLF BRONSON
PENSACOLA, FLORIDA

Analysis	Control Parameter	Control Limit	Corrective Action
Air monitoring using an organic vapor analyzer (FID)	Daily check of calibration of FID	Calibration to manufacturer's specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH = 7.0 ± 0.1	Recalibrate. If unable to calibrate, replace electrode.
Specific conductance of water	Continuing calibration check of standard solution	± 1% of standard	Recalibrate.
Temperature of water	Check against NIST precision thermometer	± 0.1°C at two different temperatures	Reset thermistors in accordance with manufacturer's specifications; dispose of inaccurate thermometer.

FID – flame ionization detector
NIST – National Institute of Standards and Technology

required to investigate the nonconformance and offer an appropriate corrective action. Notification, tracking, and ultimate closure of reported nonconformances and the review/approval of submitted corrective actions would be the responsibility of the TtNUS QA Manager.

3.1.3.12 Investigation-Derived Waste

All IDW generated during the preliminary assessment activities will be handled and disposed of in accordance with Section 5.0 of this document.

3.1.3.13 Field Logbooks and Forms

Field logbooks and standard data collection forms will be completed for field investigation, sample description, and data collection activities. These will include sample log sheets (for soil and groundwater samples), a daily record of drilling activities and equipment calibration logs. An example of these forms can be found in Appendix D.

Each sampling event leader shall maintain a bound, weatherproof field logbook. The FOL or designee will record all information related to sampling or field activities. This information may include sampling time, weather conditions, unusual events (e.g., well tampering), field measurements, descriptions of photographs, or other such details.

A site logbook shall be maintained by the FOL. The requirements of the site logbook are outlined in SOPs included in Appendix B. This book will contain a summary of the day's activities and will reference the field logbooks when applicable.

Each field team member who is supervising a drilling subcontractor must complete a daily record of drilling activity. This form documents the stage, hours, methods, materials, and supplies used during daily drilling activities. The information contained on this form is used for billing verification and progress reports. The driller's signature is required at the end of each working day to verify work accomplished, hour's worked, standby time, and material used. An example of this form is provided in Appendix E.

At the completion of field activities, the FOL will submit to the Task Order Manager all field records, data, field logbooks, site logbooks, chain-of-custody receipts, sample log sheets, drilling logs, daily logs, and other such forms.

3.1.3.14 Manufacturers' Specifications

The FOL shall collect a copy of the available manufacturers' specifications for all supplies and equipment that are used in the collection of environmental samples. This shall apply to, but not be limited to, the following:

- Calibration gases;
- Sample containers;
- Decontamination solvents and detergents;
- Laboratory-grade/analyte-free water;
- Reagents;
- Drilling additives;
- Bentonite and cement;
- Filter pack materials;
- Well casing and screen; and
- Disposable bailers, filters, tubing.

A Certificate of Conformance form, as required by Navy Southern Division, will be completed for materials used in the construction of the monitoring wells. The Certificate of Conformance form is included in Appendix E. The manufacturers' specifications will be included in the project files at the end of the field mobilization.

3.1.3.15 Surveying

Global Positioning Survey Locations

The locations of sample points, soil borings, and wells may initially be determined during the field investigation using a portable Global Positioning Survey (GPS) instrument with sub-meter accuracy. This information may be helpful in plotting results and analyzing the data coverage in real-time to make data acquisition decisions during the preliminary site characterization. The GPS instrument will be used in accordance with the manufacturer's instructions, and the results will be recorded in the field records. Monitoring wells and other selected points, however, will be permanently located using a NGVD survey at the close of the field mobilization.

National Geodetic Vertical Datum Survey Locations

A certified Florida licensed land surveyor will measure the locations of monitoring wells installed during the preliminary site characterization. Each point will be measured from a reference location that is tied to the

Florida State Plane Coordinate System. The surveys shall be third-order according to the methods prescribed in the *Civil Engineering Handbook* (Urquhart 1962). An X–Y coordinate system shall be used to identify locations. The X coordinate will be the east–west axis; the Y coordinate will be the north–south axis. The reference location will be the origin.

All surveyed locations will be reported using the Florida State Plane Coordinate System. Existing installation benchmarks will serve as the horizontal and vertical datum for the survey. Elevations and horizontal locations will be recorded to the nearest hundredth of a foot. The elevations of all monitoring wells will be surveyed at the water level measuring reference point on the top of the well casing and on the undisturbed ground surface adjacent to the well pad.

3.2 SITE SPECIFIC FIELD SAMPLING ACTIVITIES

The technical approaches to all of the individual tasks constituting the field investigation are described in the following sections.

3.2.1 Proposed Investigation Site 100

Field sampling activities will be conducted in the vicinity of the former fire fighting training area to evaluate contaminant levels in the soil and groundwater in accordance with FDEP and EPA regulations. The investigation activities will include the collection of soil and groundwater samples. Analytical results from the sampling will be used to assess site contaminant levels in the soil and groundwater in accordance with EPA and FDEP regulations. If soil contaminant levels are above the FDEP Soil Cleanup Target Levels (SCTLs) as defined in Chapter 62-785 FAC, leachability samples will be collected from soils to assess the potential for the leaching of contaminants into the subsurface. Groundwater analytical results will be screened against both the Florida primary and secondary standards defined in Chapter 62-550 FAC and the Groundwater Cleanup Target Levels (GCTLs) defined in Chapter 62-785 FAC. The proposed sampling activities at Site 100 are described in the following sections.

<u>Source Area of Concern</u>

The fire fighting training pit is the only source area of concern for Site 100.

Soil Investigation Scope

The preliminary site characterization for Site 100 will consist of four soil borings. The location of the proposed boring locations are shown on Figure 3-1. Four subsurface soil samples and four surface soil samples will be collected for laboratory analysis during boring advancement. The soil analytical results will be used to assess if soil at the former fire fighting training area is contaminated and to characterize the contamination in accordance with FDSP and US EPA regulations. The supporting rationale for these borings is presented in the box below.

Preliminary Site Characterization Rationale for Soil Sampling at Site 100	
Soil Sample Identification	**Rationale**
Subsurface Soil Samples 100-SU-01, 100-SU-02 100-SU-03, 100-SU-04	Soil investigation recommended in the 1992 Preliminary Site Assessment and the 1997 Phase I ESA based on observed surface staining and petroleum like odors.
Surface Soil Samples 100-SS-01, 100-SS-02, 100-SS-03, 100-SS-04	Soil investigation recommended in the 1992 Preliminary Site Assessment and the 1997 Phase I ESA based on observed surface staining and petroleum like odors.
Sediment Samples **(Optional, in place of Surface Soil Samples)** 100-SD-01, 100-SD-02, 100-SD-03, 100-SD-04	If surface water is present at the site, up to four sediment samples may be collected, at the discretion of the field operations leader in place of surface soil samples.

Soil Sampling Criteria

Soil samples shall be collected with a DPT rig using either two- or four-foot samplers with plastic liners or by hand auger for surface soils. These soil samples will be screened by Tetra Tech NUS using a Flame Ionization Detector (FID). One subsurface soil sample will be collected from above the water table at each soil boring located within the fire fighting training area.

During boring advancement, soil samples will be collected continuously until boring completion. Soil borings will be advanced to a maximum depth of 20 feet bls or to the water table, whichever occurs first. The water table at the site is expected to be relatively high (within 2 to 3 feet of the surface). If a shallow water table is encountered (less than 4 feet bls, the surficial subsurface soil samples will be collected using a stainless steel bucket hand auger. Each vadose zone soil sample will be screened for organic

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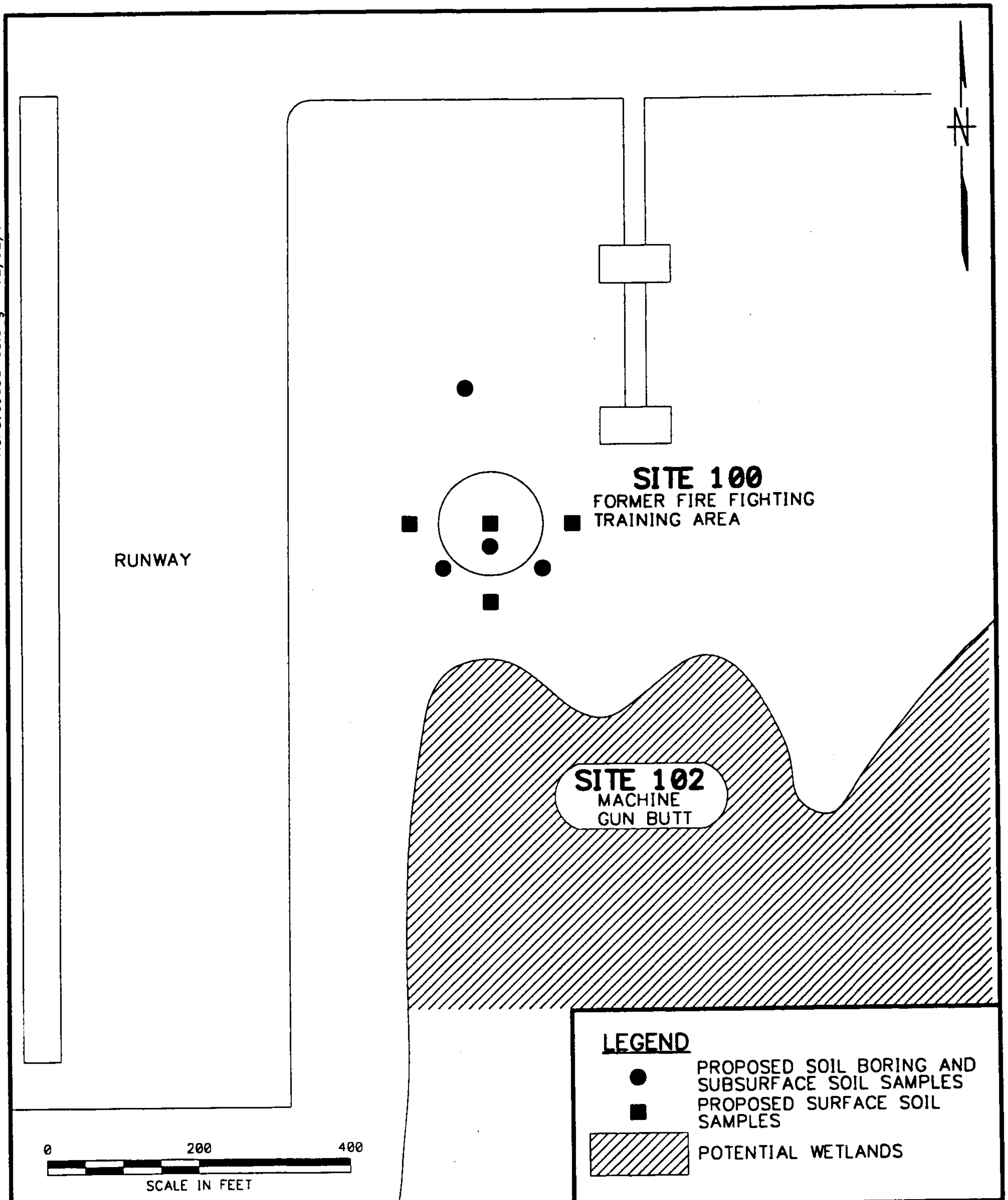

DRAWN BY MF / DATE 2/12/99	DEPARTMENT OF THE NAVY · SOUTHERN DIV FACILITIES ENGINEERING COMD	PROPOSED SOIL SAMPLE LOCATIONS SITE 100 OLF BRONSON NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0105
CHECKED BY / DATE			APPROVED BY / DATE
COST/SCHED-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 / REV. 0

FORM CADD NO. SDIV_AV.DVG - REV 0 - 1/20/98 vapors following headspace analysis as prescribed in Chapter 62-770.200.F.A.C. If OVA readings in the vadose are greater than 50 ppm, then the boring will be continued to a depth 5 feet below the depth when OVA readings decrease to < 50 ppm or to the water table, whichever occurs first. Soil samples will not be collected below the water table. Soil samples will be selected for laboratory analysis from unpaved areas at the discretion of the site geologist based on field observations. A surface soil sample will not be collected from borings in paved areas. Soil samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals.

Groundwater Investigation Scope

The preliminary site characterization for Site 100 will include up to four groundwater monitoring wells, with one source area monitoring well, one upgradient monitoring well, and two side gradient monitoring wells. Groundwater laboratory analysis from samples collected from the wells will be used to assess groundwater quality and potential source for groundwater contamination, if present. The supporting rationale for these wells is presented below. Figure 3-2 shows the approximate locations of the proposed monitoring wells.

Preliminary Site Characterization Rationale for Monitoring Wells at Site 100	
Monitoring Well Location	**Rationale**
BRO-100-1S, BRO-100-2S, BRO-100-3S, BRO-100-4S Sample Identification 100-MW-001-01, 100-MW-002-01 100-MW-003-01, 100-MW-004-01	Investigate the availability of groundwater contamination at the site and characterize any existing contamination in the shallow aquifer zone at the source area; piezometric control points to determine the shallow groundwater flow direction.

Groundwater Sampling Criteria

Groundwater from the monitoring wells will be analyzed for TCL VOCs, TCL SVOCs, PCBs, pesticides, and TAL Metals and CN. The groundwater parameter analysis is summarized on Table 3-3.

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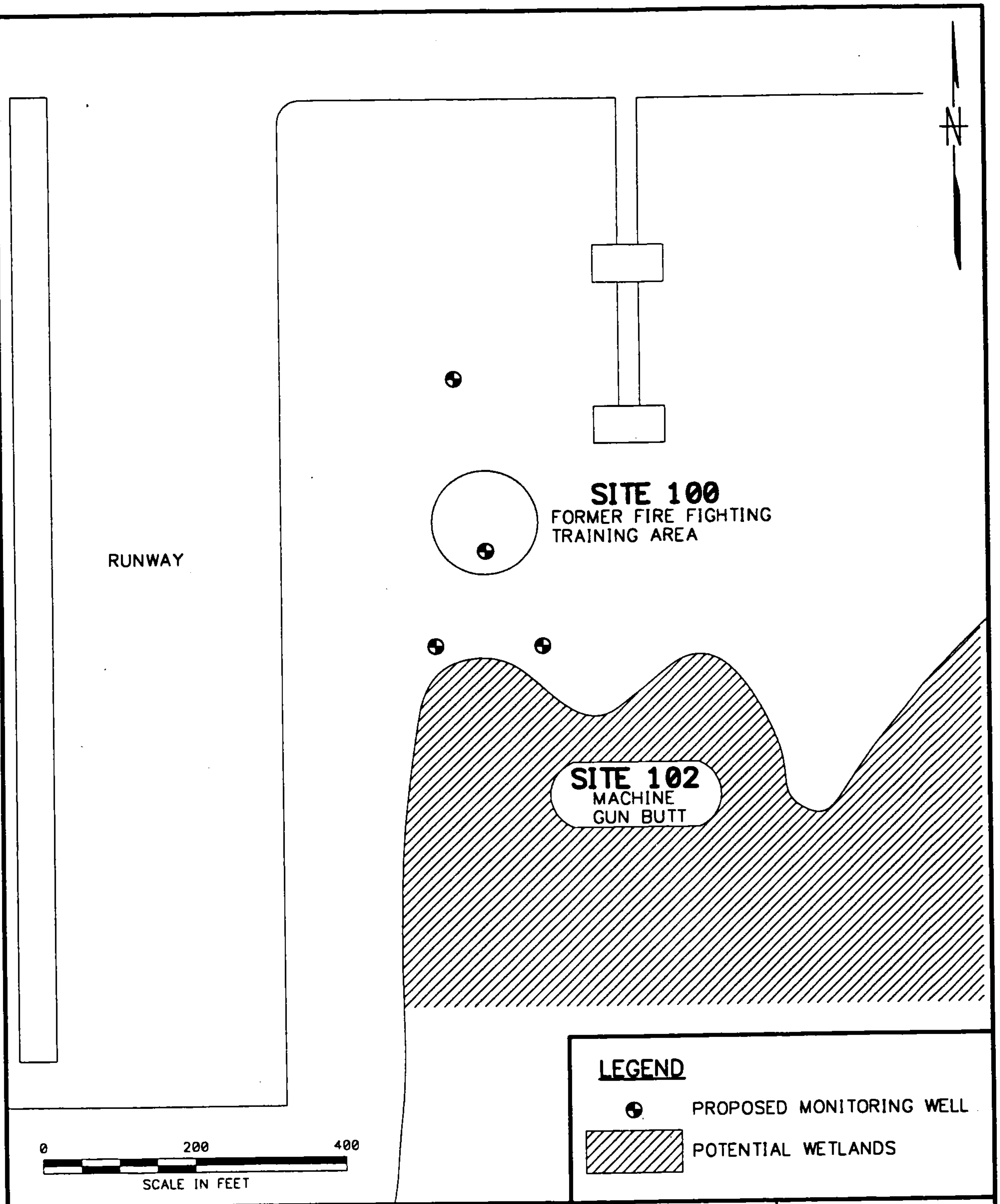

DRAWN BY MF DATE 2/12/99		PROPOSED MONITORING WELL LOCATION SITE 100 OLF BRONSON NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0105
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-2 REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

TABLE 3-3

**GROUNDWATER ANALYSES
PRELIMINARY ASSESSMENT
SITES 100 AND 102
OLF BRONSON
PENSACOLA, FLORIDA**

Site Number	Well Number	TCL–VOCs SW8260	TCL–SVOCs SW8270	TAL–Metals + CN	Pesticides/PCBs SW8081
100	BRO-100-1S	X	X	X	X
100	BRO-100-2S	X	X	X	X
100	BRO-100-3S	X	X	X	X
100	BRO-100-4S	X	X	X	X
102	BRO-102-1S	**NS**	**NS**	**NS**	**NS**
102	BRO-102-2S	**NS**	**NS**	**NS**	**NS**

NS-not scoped in the site Plan of Action
PCB–polychlorinated biphenyl
SVOC–semivolatile organic compound
TAL–Target Analyte List
TCL–Target Compound List
VOC–volatile organic compound

3.2.2 Proposed Investigation Site 102

Field sampling activities will be conducted in the vicinity of the former machine gun butt training area to evaluate contaminant levels in the soil, groundwater, and surface water in accordance with FDEP and EPA regulations. If soil contaminant levels are above the FDEP Soil Cleanup Target Levels (SCTLs) as defined in Chapter 62-785 FAC, leachability samples will be collected from soils to assess the potential for the leaching of contaminants into the subsurface. Groundwater analytical results will be screened against both the Florida primary and secondary standards defined in Chapter 62-550 FAC and the Groundwater Cleanup Target Levels (GCTLs) defined in Chapter 62-785 FAC. Analytical results from the sampling will be used to assess site contaminant levels in the soil and groundwater in accordance with EPA and FDEP regulations.

The proposed sampling activities at Site 102 are described in the following sections.

Source Area of Concern

The machine gun butt is the only source area of concern.

Soil Investigation Scope

The preliminary site characterization will consist of three surface soil samples. The proposed sample locations are shown on Figure 3-3. If standing water is present at the site, sediment samples will be collected in place of surface soil samples..

The supporting rationale for the proposed borings is presented in the following table.

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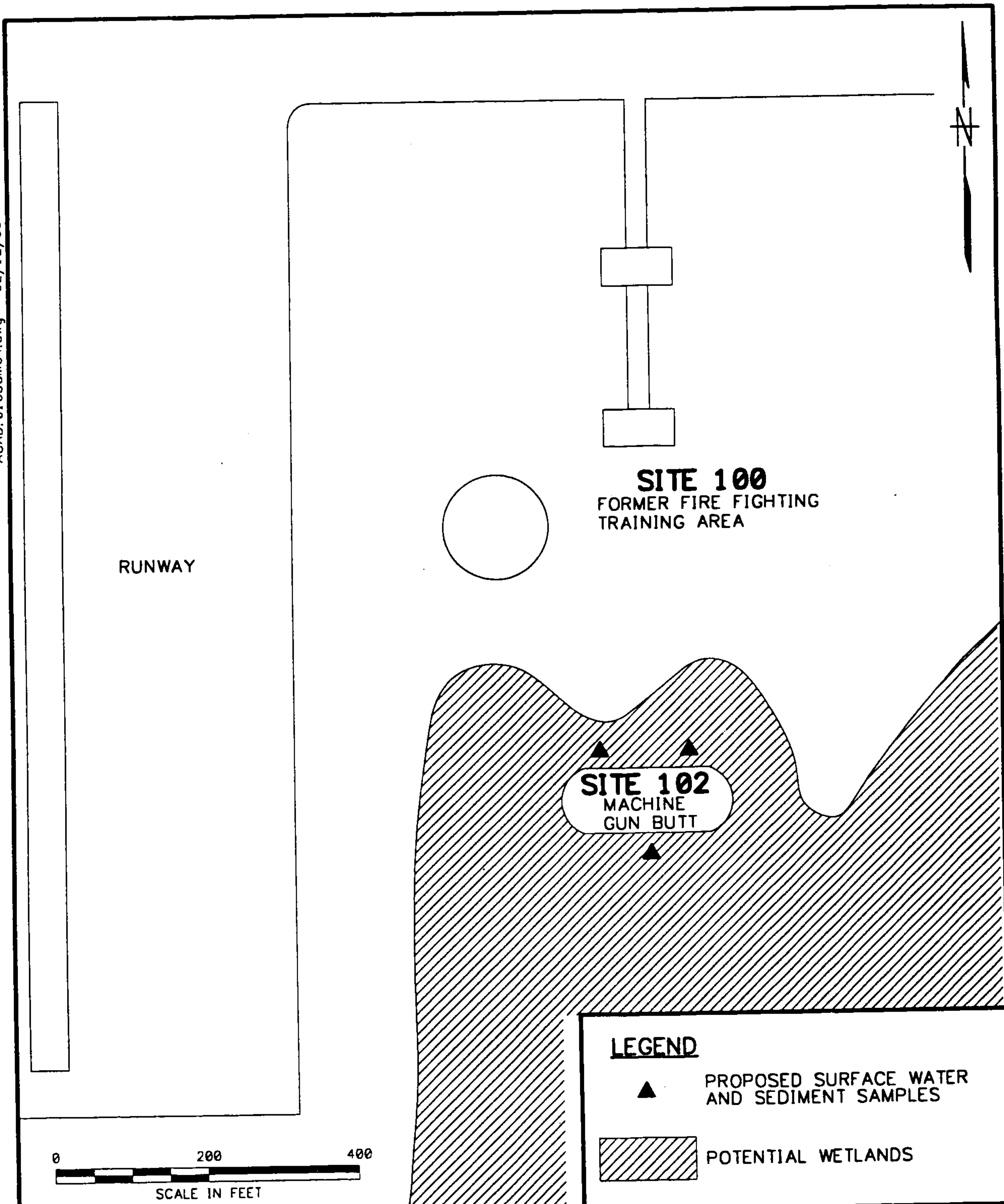

DRAWN BY MF DATE 2/12/99	DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMD ★	PROPOSED SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS, SITE 102 OLF BRONSON NAVAL AIR STATION PENSACOLA, FLORIDA	CONTRACT NO. 0105
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-3 REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

Preliminary Site Characterization Assessment Rationale for Soil Sampling at Site 102	
Soil Sample Identification	**Rationale**
Subsurface Soil Samples 102SU01, 102SU02 **(Costs not included in the POA)** **(Optional)**	Soil investigation recommended in the 1992 Preliminary Site Assessment and the 1997 Phase I ESA based on observed surface staining and petroleum like odors. I surface water is present at the site, sediment samples will be collected in place of surface soil samples. **These samples are not expected to be necessary at site 102 due to surface water. Collection of subsurface soil samples should be discussed with the project manager prior to collection.**
Surface Soil Samples 102SS01, 102SS02, 102SS03,	Soil investigation recommended in the 1992 Preliminary Site Assessment and the 1997 Phase I ESA based on observed surface staining and petroleum like odors. If surface water is present at the site, sediment samples will be collected in place of surface soil samples.
Sediment Samples **(Optional)** 102SD01, 102SD02, 102SD03	If surface water is present at the site, up to three sediment samples may be collected in place of surface soil samples, at the discretion of the field operations leader.
Soil Leachability Samples **(Optional)**	Leachability samples may be collected from the mound of the soil that is the machine gun butt. These samples may be included as surface soil samples and will follow the same naming convention.

Soil Sampling Criteria

Soil samples shall be collected using a DPT rig using either two-or four-foot samplers with plastic liners. A stainless steel hand auger may be used for collecting surface soil samples if groundwater is encountered within four feet bls. One subsurface soil sample will be collected from above the water table at each location.

During boring advancement, soil samples will be collected continuously until boring completion. Soil borings will be advanced to a maximum depth of 20 feet bls or to the water table, whichever occurs first. The water table at the site is expected to be relatively high (within 2 to 3 feet of the surface). Each vadose zone soil sample will be screened for organic vapors following headspace analysis as prescribed in Chapter 62-770.200.F.A.C. If OVA readings in the vadose are greater than 50 ppm, then the boring will be continued to a depth 5 feet below the depth when OVA readings decrease to < 50 ppm or to the water table, whichever occurs first. Soil samples will not be collected below the water table. Soil samples will be selected for laboratory analysis from unpaved areas at the discretion of the site geologist based on field observations. A surface soil sample will not be collected from borings in paved areas. Soil samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. Soil samples will not be collected below the water table. A surface soil sample will not be collected from paved areas. Soil samples will be analyzed for TCL VOCs, TCL SVOCs, pesticides, PCBs, and TAL metals.

Groundwater and Surface Water Investigation Scope

The area around the former machine gun butt is continually covered with surface water. If surface water is present at Site 102, groundwater monitoring wells will not be installed and surface water sampling will be performed at the locations where sediment samples were collected. Additionally, a groundwater/surface water interface sample will be collected for groundwater characterization. If surface water is not present, the preliminary site characterization will include two groundwater monitoring wells. Laboratory analysis of groundwater samples collected from the wells will be used to characterize the nature of groundwater contamination, if present. The rationale for the installation of the monitoring wells is shown below.

Preliminary Site Assessment Rationale for Monitoring Wells or Surface Water Samples at Site 102

Monitoring Well Location	Rationale
Surface Water Sample Locations 102-SW-01, 102-SW-02	Investigate the availability of groundwater contamination at the site and characterize any existing contamination in the surface water at the source area.
Groundwater Monitoring Wells **(Not included in POA)** **(Optional)** BRO-102-1S, BRO-102-2S Sample Identification 102-MW-001-01, 102-MW-002-01	Investigate the availability of groundwater contamination at the site and characterize any existing contamination in the shallow aquifer zone at the source area; piezometric control points to determine the shallow groundwater flow direction. **These wells are not expected to be necessary at site 102 due to surface water. Installation of these wells should be discussed with the project manager prior to installation.**

Groundwater and Surface Water Sampling Criteria

Groundwater and surface water samples shall be analyzed for TCL VOCs, TCL SVOCs, PCBs, pesticides, and TAL Metals and CN. Water quality parameters are summarized on Table 3-3.

3.3 Quality Assurance/Quality Control Samples

All environmental sampling will be performed in accordance with procedures outlined in the COMPQAP. QC samples including equipment blanks, trip blanks, and field duplicates will be collected as outlined in Section 9.1 of the COMPQAP. The frequency with which the QC samples are collected is summarized in the box below. At least one field blank will also be collected during each field sampling event.

Number of Samples	Precleaned Equipment Blank	Field-Cleaned Equipment Blank	Trip Blank (VOCs)	Duplicate
10+	minimum of one, then 5%	Minimum of one, then 5%	one per cooler	minimum of one, then 10%
5-9	one*	One*	not required	One
<5	one*	One*	not required	not required

*Note: For nine or fewer samples, a precleaned equipment blank and/or field-cleaned equipment blank is required. A field-cleaned equipment blank must be collected if equipment is cleaned in the field.

3.4 Investigative Derived Waste Sampling

Investigative derived waste (IDW) from the soil sampling will be returned to the location where it was generated. IDW from groundwater well development will be characterized by groundwater samples collected from those wells following development. IDW from decontamination fluids will be sampled separately for any contaminants discovered in the groundwater.

Investigation-derived water will be containerized and segregated in the following categories:

- Decontamination fluids;
- Development; and
- Purge water from wells.

A summary of the preliminary site characterization sampling and analysis program and QC analysis are presented in Tables 3-4 and 3-5.

TABLE 3-4

ANALYTICAL PROGRAM SUMMARY
PRELIMINARY SITE CHARACTERIZATION
FORSITES 100 AND 102
OLF BRONSON
PENSACOLA FLORIDA

Sample Identification Analysis Method	Estimated Quantity	CLP/TCL VOCs SW-846 8260	CLP/TCL SVOCs SW-846 8270	CLP/TAL Metals and CN (A)	CLP/TCL Pesticides/ PCBs SW-846 8081	TCLP
SURFACE SOIL						
Site 100	4	4	4	4	4	0
Site 102	3**	3**	3**	3**	3**	2*
SUBSURFACE SOIL						
Site 100	4	4	4	4	4	0
Site 102	0	0	0	0	0	2*
SEDIMENT SAMPLE						
Site 100	4**	4**	4**	4**	4**	0
Site 102	3	3	3	3	3	0
GROUNDWATER SAMPLES						
Site 100	4	4	4	4	4	0
Site 102	0	0	0	0	0	0
SURFACE WATER SAMPLES						
Site 100	0	0	0	0	0	0
Site 102	3	3	3	3	3	0
TOTAL SOIL SAMPLES	18	18	18	18	18	4*

(A)CLP/TAL Inorganics analyses by Methods SW6010, SW7471 or SW7470, SW9010, and SW9065.
*Sample will be collected if required.
**Sediment samples may be substituted for surface soil samples if standing water covers the site.
Notes:
- TCL – Target compound list
- CLP – Contract Laboratory Program
- TCLP – Toxicity Characteristic Leaching Procedure
- PCB – Polychlorinated biphenyls
- TPH – Total petroleum hydrocarbons
- QC – Quality control
- USEPA – U.S. Environmental Protection Agency
- SVOC – Semivolatile organic compound
- VOCs – Volatile organic compound
- TAL – Target analyte list

TABLE 3-5

ANALYTICAL QC PROGRAM SUMMARY
PRELIMINARY SITE CHARACTERIZATION FOR
SITES 100 AND 102
OLF BRONSON
PENSACOLA , FLORIDA

Sample Identification	Surface Soil Samples	Subsurface Soil Samples	Sediment Samples	Groundwater Samples	Surface Water Samples
QC SAMPLES					
Duplicate	1	1	1	1	1
Matrix Spike	0	0	0	0	0
Matrix Spike Duplicate	0	0	0	0	0
Trip Blanks	1	1	1	1	1
Equipment Blanks	1	0	1	1	1
Field Banks	0	0	0	1	0
TOTAL SOIL SAMPLES	3	2	3	4	3

Notes:
QC – Quality control

4.0 SAMPLE ANALYSES AND VALIDATION

4.1 DATA VALIDATION

The approach to providing reliable data that meet QA/QC requirements for each type of analytical data generated during the field investigation. The QA/QC efforts for laboratory analyses will include collection and submittal of QC samples and the assessment and validation of data from the subcontract laboratories. Analytical data will be subjected to independent data validation in accordance with the following guidelines:

- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA 1994d);
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA 1994e); and
- *Navy Installation Restoration Laboratory Quality Assurance Guide* (NFESC 1996).

The number of samples (including QA/QC samples) and analyses planned for preliminary site characterization for OLF Bronson are summarized in Section 3.0.

Data quality indicators include the precision, accuracy, representativeness, comparability, and completeness parameters. These parameters will be used within the data validation process to evaluate data quality. The achievable limits for these parameters vary with the DQO level of the data. The limits used for laboratory analytical data in this program will be those set by the CLP for Level D DQOs.

4.2 DATA EVALUATION

Data evaluation will be performed to assess the usability of validated data results based upon data. Results of the data evaluation will be documented in the Site Characterization Report (SCR). The following data evaluations and comparisons will be made:

- Evaluation of detection limits;

- Evaluation of counting errors;
- Evaluation of equilibrium data;
- Evaluation of qualified data;
- Comparison of laboratory and field blanks to sample results; and
- Comparison of laboratory and field duplicate results.

4.3 DATA MANAGEMENT

Data management will be performed to track and manage environmental and QC data collected during the field investigation from the time the data are obtained through data analysis and report evaluation. Coordination and management of environmental and QC sample analysis by the contracted laboratories is included as part of this task. Assessment activities generate data including sample locations, measurements of field parameters, and the results of laboratory analyses

Samples will be tracked from field collection activities to analytical laboratories following standard chain-of-custody procedures. Sample information recorded on the chain-of-custody forms will be transferred (electronically or manually) into the sample tracking portion of the database management system (DMS), thereby enabling the samples to be tracked through final disposition.

Analytical results, applicable QA/QC data, validation flags, chain-of-custody information, and any other applicable information will be incorporated into the DMS. All data will be verified after uploading to ensure completeness and accuracy.

5.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

IDW generated during the preliminary site characterization investigations will be managed in accordance with the procedures described in the NAS Pensacola *Investigation-Derived Waste Management Plan* (EnSafe 1996a). This document, which is included as Appendix D of this Work Plan, emphasizes management of all IDW in an environmentally responsible manner consistent with the CERCLA program, Resource Conservation and Recovery Act (RCRA) requirements, and the base's standard procedures. The objectives of the IDW management plan include:

- Management of IDW in a manner that prevents contamination of uncontaminated areas (by IDW) and is protective of human health and the environment;

- Minimization of IDW to reduce disposal costs and the potential for human or ecological exposure to contaminated materials; and

- Compliance with federal and state requirements for the transport and disposal of IDW material.

6.0 SITE CHARACTERIZATION REPORT

The draft SCR will include appropriate sections concerning site background, investigation activities, physical characteristics, nature of contamination, and aquifer characteristics. The suggested SCR format is presented in Table 6-1.

After internal review, the draft SCR will be issued to the SOUTHNAVFACENGCOM for review. The final SCR will be issued upon incorporation of review comments.

TABLE 6-1

**SITE CHARACTERIZATION REPORT FORMAT
PRELIMINARY SITE CHARACTERIZATION FOR
SITES 100, AND 102
OLF BRONSON
PENSACOLA, FLORIDA**

Executive Summary

1.0 Introduction
- 1.1 Purpose of Report
- 1.2 Site Physical Description
  - 1.2.1 Site Description
  - 1.2.2 Site History
  - 1.23 Previous Investigations
- 1.3 Report Organization

2.0 Site Background

3.0 Site Conditions
- 3.1 Physiography
- 3.2 Hydrogeology
  - 3.1.1 Regional
  - 3.1.2 Site Specific

4.0 Methodologies and Equipment
- 4.1 Soil Boring Advancement, Soil Sampling, and Organic Vapor Analyzer (OVA) Headspace Analysis
- 4.2 Monitoring Well Installation and Construction
- 4.3 Water Table Elevation Measurements
- 4.4 Groundwater Sampling and Analyses

5.0 Nature of Contamination
- 5.1 Chemical Components and Contaminants, in the Following Media.
  - 4.1.1 Soils and Vadose Zone
  - 4.1.2 Groundwater
  - 4.1.3 Surface Water and Sediments

6.0 Summary and Conclusions
- 6.1 Summary
- 6.2 Conclusions
- 6.3 Recommendations

7.0 Professional Review Certification

Appendices

A – Site Conditions
B – Lithologic Logs
C – Groundwater Sample Analytical Data

7.0 PROJECT SCHEDULE

The field investigation activities are proposed to being in June 1999. The Final Preliminary Site Characterization Report is scheduled for submittal to Navy and regulatory personnel in July 1999. The estimated start and finish dates as well as the duration of each task, in working days, are shown on the project schedule included in Appendix F.

8.0 REFERENCES

American Society for Testing and Materials (ASTM) F 480 and D 1785.

Chapter 62-770 Petroleum Contamination Site Cleanup Criteria, September 23, 1997.

Ensafe/Allen & Hoshall, 1994, Comprehensive Long-Term Environmental Action Draft Investigative-Derived Waste Plan, Naval Air Station, Pensacola, Florida.

Law Engineering and Environmental Services, Inc., 1997, Report of Phase I Environmental Site Assessment, A Portion of Outlying Landing Field (OLF) Bronson, Approximately 430-Acre Site, Naval Air Station Pensacola, Florida.

Tetra Tech NUS, Inc., Comprehensive Qualitym Assurance Plan # 980038, 1998.

Tetra Tech NUS, Inc., Quality Assurance Program Manual, 1998.

USEPA (U.S. Environmental Protection Agency) 1996b. Environmental Investigations Standard Operating Procedures Quality Assurance Manual (EISOPQAM), Environmental Compliance Branch, Region 4, Science and Ecosystems Support Division, Athens, Georgia.

U.S. Geological Survey, Lillian Florida – Alabama Quadrangle, photo revised 1987. 7.5 minute series, Topographic Quadrangle Maps of Florida: scale 1:24,000.

APPENDIX A

REPORT OF PHASE I ENVIRONMENTAL SITE ASSESSMENT: A Portion of Outlying Landing Field (OLF Bronson)

LAW

ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

October 20, 1997

Mr. Larry Law
The School District of Escambia County
Facilities Planning Department
J.E. Hall Center - Room 158
30 East Texar Drive
Pensacola, Florida

Subject: **Draft Report of Phase I Environmental Site Assessment**
A Portion of Outlying Landing Field (OLF) Bronson
Approximately 430-Acre Site
Naval Air Station Pensacola, Florida
LAW Project 50227-7-0052.01

Dear Mr. Law:

Law Engineering and Environmental Services, Inc. (LAW) is pleased to submit this report of our Phase I Environmental Site Assessment for the subject site. The purpose of our Phase I Environmental Site Assessment was to identify obvious actual and potential recognized environmental conditions in relation to the subject site.

This report is intended for the use of the School District of Escambia County. Reliance on this document by any other party without the expressed written consent of LAW constitutes that party's acceptance of LAW's Agreement for Secondary Client. Use of this report for purposes beyond those reasonably intended by the School District of Escambia County and LAW will be at the sole risk of the user.

The conclusions and recommendations contained herein are based upon data which were reviewed and documented in this report along with our experience on similar projects. The discovery of any additional information concerning environmental conditions at the subject site should be reported to us for our review so that we can reassess potential environmental impacts and modify our recommendations, if necessary.

We appreciate the opportunity to be of service to you. Please call us if you have any questions or if we may be of further service.

Sincerely,
LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

Richard J. Brown, E.I.
Project Engineer

Michael J. Paulson

Michael J. Paulson, P.E.
Principal

BY WITH PERMISSION

G:eng\projects\7-0052\phase I\phase I.doc

3355 MCLEMORE DRIVE • PENSACOLA, FL 32514
(904) 857-0606 • FAX (904) 969-6169

SOW 105

BUREAU OF WASTE CLEANUP

FEB 16 1998 to JWM

TECHNICAL REVIEW SECTION

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

REPORT OF
PHASE I ENVIRONMENTAL SITE ASSESSMENT

A Portion of Outlying Landing Field (OLF) Bronson
Approximately 430-Acre Site
Naval Air Station Pensacola, Florida

Prepared For:

The School District of Escambia County Florida
Facilities Planning Department
30 East Texar Drive
Pensacola, Florida

Prepared By:

Law Engineering and Environmental Services, Inc.
3355 McLemore Drive
Pensacola, Florida 32514

October 20, 1997
LAW Project 50227-7-0052.01

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EXECUTIVE SUMMARY

A Portion of Outlying Landing Field (OLF) Bronson
Approximately 430-Acre Site
Naval Air Station Pensacola, Florida

Law Engineering and Environmental Services, Inc. (LAW) has performed a Phase I Environmental Site Assessment (ESA) of the subject site located at approximately 5.0 miles west of Pensacola City limits in Escambia County, Florida. The subject site consists of approximately 430 acres generally consisting of approximately 220 acres of wetlands, approximately 140 acres of asphalt-paved former aircraft landing strips, and approximately 70 acres of upland wooded areas. The subject site consists of the eastern portion of the former Outlying Landing Field (OLF) Bronson which was utilized as a training air base by Naval Air Station, Pensacola from 1942 to approximately 1958.

The following sections summarize the recognized environmental conditions identified by LAW during the Phase I ESA activities as well as present general recommendations for the noted environmental issues.

ON-SITE CONCERNS

- LAW obtained information that evidenced a former small arms firing range located on the southwestern portion of the subject site. Our experience with firing ranges indicates that soil and ground water in firing range areas are susceptible to contamination from lead and other heavy metals. The former small arms firing range is considered a recognized environmental condition.

- A "Machine Gun Butt" exists on the south-central portion of the subject site. Bullets from aircraft guns were aimed at the Machine Gun Butt to test and align aircraft gun sites during the active period of OLF Bronson. LAW's experience with firing ranges indicates that potential for soil and ground-water contamination due to the presence of lead and other heavy metals exists at firing ranges. The Machine Gun Butt is considered a recognized environmental condition.

- The 1992 Preliminary Assessment Report indicated that a fire-fighting training area was located on the south-central portion of the subject site. Typically, material burned during training exercises in this area would consist of readily available flammable products such as waste aviation gasoline. Other flammable liquids such as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gas may have been burned. We identified the former fire-fighting training area during our site reconnaissance and observed obvious petroleum surface staining and petroleum odors. The former fire-fighting training area is considered a recognized environmental condition.

To evaluate whether the soil and ground water in the vicinity of the three on-site concerns has been impacted, we recommend that soil and ground-water samples be collected in the area of each of the three on-site concerns and appropriate laboratory analyses be conducted on the samples.

OFF- SITE CONCERNS

- An aircraft parts storage area was observed adjacent to the eastern portion of the northern border of the subject site. The current owner of this adjacent parcel reported that the property and the buildings on the property were utilized as storage for airplane parts and accessories, and some airplane dismantling activities. Due to the nature of the activities which have been conducted at the adjacent parcel, there is potential for waste petroleum products from aircraft as well as solvents utilize for parts cleaning to have been utilized/generated at the adjacent parcel since the 1950's. The adjacent property to the north is considered upgradient to the subject site. If a release of potential contaminants were to occur from this adjacent parcel, the subject site could be impacted. The adjacent storage area to the north is considered a recognized environmental condition to the subject site.

- The Preliminary Assessment Report indicated that during its time of active operation between 1942 and 1952, OLF Bronson used two large aircraft fuel distribution systems consisting of underground storage tanks (USTs) and aviation fuel product lines. The USTs were reportedly removed in 1992. No assessment activities were conducted at the time of the tank closures and all product lines were capped and left in the ground. One of these aircraft fuel distribution systems was located just west of the subject site and serviced a former aircraft flight line. LAW's experience with petroleum product UST systems similar to that associated with the aircraft flight line indicates that releases of petroleum products, particularly from product lines, is common. The former aircraft flight line is considered to be upgradient to the southwestern portion of the subject site and is in relatively close proximity (approximately 800 feet) to the western border of the subject site. If a release of a potential contaminant has occurred along the former aircraft flight line, the subject site could be impacted. The former aircraft flight line is considered a recognized environmental condition to the subject site.

- Between 1942 and 1957, numerous types of solvents, oils, and fuels were used and stored in hangers at OLF Bronson to support the air operations. The hangers nearest the subject site were located approximately 1,300 feet west of the western border of the subject site and approximately 1,900 feet north of the southwestern portion of the subject site. This former hanger area is potentially upgradient from the southwestern portion of the subject site. If a significant release of hazardous materials had been released at the hanger area closest to the subject site, the southwestern portion of the subject site could be impacted by the release. Due to the former handling of hazardous materials and wastes at the former hanger area and its gradient position relative to the subject site, the former aircraft hanger area closest to the subject site is considered a recognized environmental condition to the subject site.

To evaluate whether the soil and ground water at the subject site has been impacted by the off-site activities of concern. we recommend that soil and ground-water samples be collected in areas that are in closest proximity to the areas of concern and appropriate laboratory analyses be conducted on the samples.

1.0 INTRODUCTION

Law Engineering and Environmental Services. Inc. (LAW) has performed a Phase I Environmental Site Assessment (ESA) of the subject site located approximately 5.0 miles west of Pensacola City limits in Escambia County, Florida. The subject site consists of approximately 430 acres generally consisting of approximately 220 acres of wetlands. approximately 140 acres of asphalt-paved former aircraft landing strips, and approximately 70 acres of upland wooded areas. The subject site consists of the eastern portion of the former Outlying Landing Field (OLF) Bronson which was utilized as a training air base by Naval Air Station, Pensacola from 1942 to approximately 1958.

This report is intended for the use of the School District of Escambia County. Reliance on this document by any other party without the expressed written consent of LAW constitutes that party's acceptance of LAW's Agreement for Secondary Client. Use of this report for purposes beyond those reasonably intended by the School District of Escambia County and LAW will be at the sole risk of the user.

This assessment was performed substantially as outlined in LAW's Proposal PNS-97109A dated July 23, 1997, and authorized by Mr. Larry Law, Director of Facilities Planning for the School District of Escambia County.

2.0 PURPOSE, SCOPE AND REPORT FORMAT

The following sections describe the purpose and scope of the Phase I ESA. and outline the report format.

2.1 PURPOSE

The purpose of our Phase I ESA is to generally characterize the subject site and adjacent properties to identify obvious actual and potential recognized environmental conditions. A recognized environmental condition is defined by ASTM E 1527-97 as "the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property, or into the ground, ground water, or surface water of the property." It was not the purpose of this assessment to determine the actual presence, degree, or extent of contamination, if any, on the subject site. Additional exploratory work including sampling and laboratory analyses was not a part of this assessment.

2.2 SCOPE OF SERVICES

The Phase I ESA is a general characterization of recognized environmental conditions based on readily available information and site observations. The assessment was performed using procedures as specified in the American Society for Testing and Materials (ASTM) specification ASTM E 1527-97. The following services were provided for the assessment:

1. A review of the subject site's location, present use and improvements, topography, soils, geology, and hydrogeology information.
2. A review of the subject site's historical information, including aerial photographs, maps, interviews, and other readily available site development data.
3. A review of select available regulatory information published by state and federal agencies, health, and/or other environmental agencies.
4. A review of readily available U.S. Navy Files associated with environmental-related studies and activities that have been conducted at OLF Bronson.

5. A site reconnaissance and environmental review, including a site survey, interviews with knowledgeable on-site personnel, and observation for chemicals and raw materials, polychlorinated biphenyls (PCBs), wells, hazardous and solid wastes, on-site landfills, pits and sumps, storage tanks, surface staining and stressed vegetation, munitions, oil and gas activity, waste-water discharge procedures, and utilities.

6. A neighboring site reconnaissance, including a review of adjacent property uses as well as significant surrounding property uses.

7. The preparation of this report containing our observations, findings, conclusions and recommendations.

Collection and testing of soil and/or ground-water samples were beyond the scope of the Phase I Environmental Site Assessment. Similarly, the evaluation of air quality, noise impacts, and the identification or delineation of geological or geotechnical hazards, wetland areas, storm-water features as they relate to National Pollution Discharge Elimination System (NPDES) regulations, and regulatory aspects related to the American Disabilities Act of 1990, endangered or protected plant and animal species, or historical and archaeological sites were beyond the scope of this assessment. The scope of this assessment also did not include detection of the presence of radon gas, lead-based paint, urea formaldehyde, asbestos-containing materials, or other potentially hazardous substances in construction materials on site, if any, except as otherwise provided herein.

2.3 REPORT FORMAT

Our report format has five major assessment sections:

- Hydrogeology
- Site History
- Regulatory Review
- Site Reconnaissance and Environmental Review
- Neighboring Site Reconnaissance

Recommendations based on the five sections are included in an evaluation section:

- Conclusions and Recommendations

A statement of interpretive limitations follows the recommendations.

3.0 HYDROGEOLOGY

A consideration of surface and subsurface drainage and geology is of interest since it provides an indication of the direction that contaminants, if present, could be transported.

LAW reviewed the following information in regards to the hydrogeology of the subject site and surrounding area:

- Special Publication No. 32, Florida's Groundwater Quality Monitoring Program, Hydrogeological Framework, Florida Geological Survey (FGS), 1991.

- Soil Survey of Escambia County, U.S. Department of Agriculture publication, dated 1960.

- Lillian Alabama-Florida Quadrangle, 7.5-Minute Series Topographic Map, U.S. Department of the Interior Geologic Survey (USGS), 1970, photorevised 1987.

- Water Resources of Escambia and Santa Rosa Counties, Florida, Report of Investigations No. 40, In Cooperation with the FGS, Escambia County, Santa Rosa County, and the City of Pensacola, USGS Publication, 1965.

- Multiple School Masterplan, OLF Bronson N.A.S., William F. Parks III, Architect, October 1996.

3.1 GEOLOGY

The subject site is located in the Coastal Plain Province which is a major physiographic division of the United States primarily consisting of unconsolidated sands, silts, and clays. The region in the vicinity of the subject site lies within the topographic subdivision of the Coastal Lowlands which consists of nearly level plains lying less than 100 feet above sea level. The geologic formation underlying the subject site can be as much as 1,000 feet thick and consists of alternating layers of sand, gravel, and clay.

3.2 SOIL CONDITIONS

The United States Department of Agriculture (USDA) publication that was issued in 1960 which reflects soil conditions in 1955, did not show the mapped soils on the subject site. The publication showed soils in the vicinity of the subject site to be poorly drained due to a high water table and containing organics with rapid permeability of the subsoil. A Preliminary Assessment for OLF Bronson dated 1992 described the surface soils as sand and muck.

3.3 SURFACE DRAINAGE

Surface drainage on the majority of the subject site is to the south and southwest, toward Perdido Bay. A northeasterly component of surface drainage exists near the northeast corner of the subject site. A westerly component of surface drainage exists on the extreme southern portion of the subject site. The topographic map (Figure 1) indicates that the surface elevation of the subject site ranges from approximately 25 feet above mean sea level (msl) on the northwest portion of the site to approximately 10 feet above msl on the southwest portion of the site.

The subject site is generally flat lying with surface drainage flowing by way of sheet flow towards several on-site drainage features. The predominant drainage feature on the site is a large wetland area located on the southern and eastern portions of the subject site (see Figure 2). Our aerial photograph reviews indicate that until approximately 1980, a designed drainage ditch located along the eastern portion of the subject site and extending along the southern border of the subject site was the predominant drainage feature on the property. This drainage ditch drained the majority of the site by directing surface drainage to Perdido Bay west of the subject site. Reports from individuals associated with OLF Bronson indicate that beavers dammed this drainage ditch in the mid 1980s resulting in the permanent flooding of the southern portion of the property. The wetland area on the southern portion of the subject site drains through the original drainage ditch on the extreme southwestern corner of the site. This drainage is eventually intercepted by Perdido Bay approximately 0.6 mile west of the subject site. Another obvious wetland area exists on the northeastern corner of the site. This wetland area drains off site to the northeast and is eventually intercepted by Perdido Bay approximately 0.6 mile north of the subject site.

The referenced Multiple School Masterplan prepared for the School District of Escambia County included the preliminary identification of on-site wetlands. This preliminary identification process identified approximately 200 acres of wetlands on the subject site. Figure 2 shows the general location of these potential on-site wetlands. Delineation of on-site wetlands was not included in the scope of this report, although based on our observations the referenced areas did appear to bear wetlands-type characteristics.

Based on the topography of the area surrounding the subject site, the area within approximately 1,000 feet north of the subject site is considered to be upgradient relative to the subject site. The area located greater than 1,000 feet north of the subject site is located in a separate drainage basin. The areas east, west, and south of the subject site are considered to be downgradient to crossgradient relative to the subject site.

3.4 GROUND WATER

According to a USGS publication pertaining to water resources in Escambia County, ground water is the principal source of water for domestic, agricultural, and industrial use. The Sand and Gravel Aquifer is the primary aquifer in Escambia County and the majority of the wells in the county draw water from this aquifer.

The Sand and Gravel Aquifer is generally comprised of quartz sand and contains numerous lenses and layers of clay and gravel. This aquifer extends from the water table down to various depths ranging from approximately 200 to 1000 feet. The depth to the top of the water table in the vicinity of the subject site is estimated to be approximately 5 to 30 feet below land surface. This estimation is based on recently published ground-water measurements obtained from ground-water monitoring wells on the central and western portion of OLF Bronson. No direct observation or measurements of ground-water conditions were made as part of this assessment.

The dip of geologic strata in the near surface water-table aquifer is anticipated to be so slight that ground-water flow is likely controlled principally by differences in topographic features. Therefore, it is anticipated that shallow ground water on and in the vicinity of the subject site will exhibit a gradient generally resembling the land surface topography which slopes to the south and southwest over the majority of the subject site. A westerly surface gradient exists on the extreme southern portion of the subject site and a north-easterly gradient exists on the northeastern corner of the subject site. On this basis, the area within approximately 1,000 feet north of the subject site is considered to be upgradient relative to the subject site. The area greater than 1,000 feet north of the subject site is located in a separate drainage basin from the subject site and is considered to be downgradient to the subject site. The areas west of the subject site is considered to be crossgradient to downgradient relative to the subject site. This estimate of ground-water gradient west of the subject site is further evidenced by published ground-water flow direction measurements on the central and western portions of OLF Bronson. The areas south and east of the subject site are also considered to be crossgradient to downgradient relative to the subject site.

4.0 SITE HISTORY

LAW reviewed the following information in order to ascertain the historical uses of the subject site and immediately adjacent properties to evaluate the presence of activity of potential environmental concern:

- Aerial photographs for the years 1994, 1980, 1976, 1968, 1958, 1951, and 1940.
- Lillian Alabama-Florida Quadrangle, 7.5-Minute Series Topographic Map, U.S. Department of the Interior Geologic Survey (USGS), 1970, photorevised 1987.
- Preliminary Assessment Report, OLF, Bronson, U.S. Navy, February, 1992.
- Compressed Air, Butane, Gasoline, and Oils Service Drawing, OLF Bronson, N.A.S. Drawing Number 23032, dated June 24, 1944.
- Tarklin Field Elevations and Boundings, N.A.S. Drawing No. 9128, dated January 10, 1942.
- Interview with Mr. Dean Spencer and Mr. Ron Joiner, N.A.S. Environmental Department.
- Interview with Mr. Frank Fritz, former N.A.S. Director of Engineering 1985-1995.
- Interview with Mr. Woodrow Lynn, Former N.A.S. Director of Facilities, 1950-1975.
- Interview with Mr. Greg Cambell and Ms. Debbie Vincent of the N.A.S. Public Works Center (PWC) Engineering Department.
- Interview with Mr. Richard Hon, Blue Angel Recreation Area.
- Interview with Mr. Samuel Goldman, property owner of adjacent aircraft parts storage yard.

Sanborn Fire Insurance Map coverage and historical city directories were not available for the subject site and vicinity. Chain-of-title information for the subject site was not provided to LAW for review.

4.1 PAST SITE USES

Based on our aerial photograph review, interviews, and historical information provided in the referenced previously prepared report, a history of the subject site was compiled.

Mr. Woodrow Lynn reported that in the 1930's the area containing the subject site was developed as a landing area for aircraft and was called Tarklin Field. Tarklin Field was utilized for touch-and-go landings of military training aircraft on sod airstrips.

The 1940 aerial photograph showed the majority of subject site to be undeveloped and apparently not vegetated or covered with light vegetation. An approximately 500-foot-diameter circular, apparently paved, area was shown on the west-central portion of the subject site. There were several unpaved roads or possibly unpaved airstrips shown transversing the subject site leading to the paved circular area. The Tarklin Field Elevation and Boundings Map showed the circular area. The map had the circular area labeled as "Sand Asphalt (Oil Treated) Landing Mat". Mr. Lynn reported that typically in the early stages of development of an airfield, the runway construction started with a central "core" and as construction funds became available, runways were constructed out from the central core. Mr. Lynn reported that the circular paved area on the 1940 aerial photograph was most likely a central core for the runway planned at the airfield.

In 1942, the entire 950-acre OLF Bronson was reportedly constructed. The original name of the airfield, Tarklin Field, was changed to OLF Bronson at this time. The base was used as a training base for Naval aviators during World War II and the Korean War. The western portion of OLF Bronson was also used to maintain sea planes and train sea plane pilots. OLF Bronson was closed as an active airfield in late 1950, but the runways were still used for touch-and-go landing for helicopter training. After 1950, base dismantling activities were conducted. By 1968, all buildings located at OLF Bronson were raised.

Based on available information, it appears that only one structure has ever existed on the subject site. Located on the southwest portion of the subject site, this building was identified by N.A.S. Drawing No. 23032 as the "Range House". It is assumed that this building was constructed at the time of the original site development. Based on our aerial photograph review, the "Range House" was razed between 1958 and 1968. LAW was unable to determine the specific use of the "Range

House". The 1944 drawing of OLF Bronson indicates that the "Range House" was located in the vicinity of a large earthen berm identified on the map as a "butt". This earthen berm was visible in the 1951 (see Figure 3) and 1958 aerial photographs reviewed. This earthen berm could not be identified in the 1968, 1976, 1980, or 1994 aerial photographs reviewed. LAW personnel could not locate the earthen berm during our site reconnaissance. Mr. Frank Fritz, the former N.A.S. Director of Engineering, indicated that it was very common for former training bases in the World War II era to have small arms firing ranges. These firing ranges typically consisted of an earthen mound that acted as a backstop for fired ammunition and a small arms and ammunition storage building. Mr. Fritz could not confirm that the "Range House" and earthen mound on the southwestern portion of the subject site was utilized as a small arms firing range. Based on the evidence presented in the aerial photographs and N.A.S. Drawing No. 23032, it appears that the area on the southwest portion of the subject site was utilized as a small arms firing range during the time OLF Bronson was active. LAW's experience with firing ranges indicates that soil and ground water in firing range areas are susceptible to contamination from lead and other heavy metals. Based on our position that this area on the southwestern portion of the subject site was utilized as a firing range and our experience with environmental concerns associated with firing ranges, the former small arms firing range is considered a recognized environmental condition.

The 1944 N.A.S. Drawing No. 23032 showed a "Machine Gun Butt" on the south-central portion of the subject site (see Figure 2). The presence of the Machine Gun Butt was observed in all the aerial photographs reviewed, and during our site reconnaissance. The Machine Gun Butt measures approximately 100 feet by 40 feet by 30 feet high. The 1992 Preliminary Assessment Report indicated that aircraft mechanics used the southeast section of OLF Bronson (south-central portion of the subject site) to calibrate 30-and-50 caliber aircraft machine guns. Bullets from aircraft guns were aimed at the Machine Gun Butt to test and align aircraft gun sites. We observed remnants of bullets embedded in the Machine Gun Butt during our reconnaissance. LAW's experience with firing ranges indicates that potential for soil and ground-water contamination due to the presence of lead and other heavy metals exists at firing ranges. Based on the presence of the former aircraft machine gun firing range, and the potential for contamination related to the former activities at the firing range, the former Machine Gun Butt is considered a recognized environmental condition.

The 1992 Preliminary Assessment Report indicated that a fire-fighting training area was located on the south-central portion of the subject site (see Figure 2). The fire-fighting training area was believed to be utilized during the time that OLF Bronson was active (1942-1958). The OLF Bronson Fire Department reportedly conducted practice burns at the training area. Details of the fire-fighting drills were not indicated in the report. The report did indicate that a typical fire-fighting drill consisted of filling a shallow pit with water then pouring flammable material on top of the water and igniting it. Typically, material burned during the training exercises would consist of readily available flammable products such as waste aviation gasoline. Other flammable liquids such as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gas may have been burned. Due to the reported use of potential contaminants at the fire-fighting training area and their potential to come into direct contact with the ground surface, the former fire-fighting training area is considered a recognized environmental condition.

Based on our document reviews and interviews with individuals associated with the subject site, no aircraft fueling or maintenance activities were conducted on the subject site during the time OLF Bronson was active. No evidence of landfilling activities was obtained by our historical review.

After OLF Bronson was closed in approximately 1952, the former landing fields located on the subject site were reportedly utilized during helicopter training activities by Combat Support Squadron 16. In recent years, the former air strips on the subject site have been used by model airplane enthusiasts.

4.2 PAST IMMEDIATELY SURROUNDING LAND USES

Our review of the 1940 aerial photograph indicated that the subject site was surrounded by generally undeveloped wooded properties. The 1951 aerial photograph showed the areas south, east, and north of the subject site to remain undeveloped with the exception of some residential properties along U.S. Highway 98 and Perdido Bay approximately 0.5 miles north of the subject site. The 1951 aerial photograph (see Figure 3) showed the development of the hangars, barracks, and other support facilities of OLF Bronson west of the subject site.

The 1958 through 1994 aerial photographs showed some development on a parcel adjacent to the northeastern corner of the subject site along Bronson Road (see Figure 2). The development included several buildings. There also appeared to be a lot of debris on the adjacent parcel in each photograph reviewed. Mr. Samuel Goldman, the current owner of the adjacent parcel located just north of the subject site, was contacted by LAW personnel. Mr. Goldman indicated that he purchased the adjacent parcel in the 1950s from the U.S. Navy. At that time, Mr. Goldman operated Transamerican Aviation, purchasing airplanes from the U.S. Navy to scrap and utilize the spare parts for resale. Mr. Goldman indicated that the buildings located on the parcel were moved to his property from OLF Bronson during OLF Bronson dismantling activities in the 1950s. Mr. Goldman reported that the property and the buildings were utilized as storage for airplane parts and accessories, with some airplane dismantling activities. Mr. Goldman reported that no manufacturing or aircraft maintenance had been conducted on his property. Mr. Goldman currently owns and operates Chesapeake Airways located in Maryland which continues to utilize the adjacent parcel for aircraft part storage. Due to the nature of the activities which have been conducted at the adjacent parcel, there is potential for waste petroleum products from aircraft as well as solvents utilize for parts cleaning to have been utilized/generated at the adjacent parcel since the 1950's. The adjacent property to the north is considered upgradient to the subject site. If a release of potential contaminants were to occur from this adjacent parcel, the subject site could be impacted. Based on the type of activities conducted at the adjacent parcel and its gradient position relative to the subject site the adjacent storage area to the north is considered a recognized environmental condition.

The Preliminary Assessment Report indicated that during its time of active operation between 1942 and 1952, OLF Bronson used two large aircraft fuel distribution systems. One of these systems consisted of four 25,000-gallon underground storage tanks (USTs) and one 15,000-gallon UST. These USTs were located approximately 1,400 feet west of the northwest corner of the subject site (see Figure 2). The tanks were constructed of steel and contained aviation fuel. The tanks were used to supply fuel for approximately 7,200 feet of aviation fuel product line. These product lines transported aviation fuel to 56 aircraft service pits. The concrete in-ground service pits were located in three rows along the aircraft flight line located adjacent to the airfield (see Figure 2). Each aircraft service pit contained compressed air hoses, aviation fuel control valves, and lubricating oil service equipment. At least twenty four of the aircraft service pits utilized an adjacent 500-gallon steel lubrication oil tank. The flight line containing the aircraft service pits. lube oil USTs, and aviation fuel product lines consisted of three 2,400-foot rows located approximately 800 feet from and parallel to the western border of the subject site (see Figure 2). Mr. Dean Spencer and Mr. Ron Joiner of the N.A.S. Environmental Department indicated that the four 25,000-gallon USTs and one 15,000-gallon UST associated with the aircraft flight line were removed in 1992. The 500-gallon lube oil USTs associated with the aircraft service pits were also reportedly removed in 1992. The N.A.S. Environmental Department and Public Works Center (PWC) Engineering Department could not provide documentation of the tank closures or assessment activities associated with the closures. Mr. Joiner reported that no assessment activities were conducted at the time of the tank closures and all product lines associated with the aviation fuel and lube oil USTs were capped and left in the ground. LAW's experience with petroleum product UST systems similar to that associated with the aircraft flight line indicates that releases of petroleum products, particularly from product lines, is common. LAW obtained no evidence indicating that a release has occurred along the former aircraft flight line; however, no assessment activities have reportedly been conducted along the former aircraft flight line. The former aircraft flight line is considered to be upgradient to the southwestern portion of the subject site and is in relatively close proximity (approximately 800 feet) to the western border of the subject site. If a release of a potential contaminant has occurred along the former aircraft flight line, the subject site could be impacted. Based on the potential of a past release, the gradient direction, and relative close proximity of the former aircraft flight line to the subject site, the former aircraft flight line is considered a recognized environmental condition.

The other aviation fuel system formerly located at OLF Bronson, as reported in the Preliminary Assessment Report, consisted of six 25,000-gallon USTs. These USTs were located approximately 0.70 miles west of the subject site. These six USTs supplied aviation fuel through approximately 5,500 feet of underground steel product lines to twenty aircraft service pits. These aircraft service pits were located along an aircraft flight line along the shore of Perdido Bay on the extreme western end of OLF Bronson. This extreme western end of OLF Bronson was utilized for sea plane flight training. Mr. Spencer and Mr. Joiner of the N.A.S. Environmental Department reported that the six 25,000-gallon USTs associated with the seaplane flight line on the western portion of OLF Bronson had been removed in approximately 1992. The N.A.S. Environmental Department and Public Works Center (PWC) Engineering Department could not provide documentation of the tank closures or assessment activities associated with the closures. Product lines associated with the aviation fuel and lube oil USTs associated with the seaplane flight line were reportedly left in the ground at the time of the UST closures. LAW has reviewed ground-water flow data from the western portion of OLF Bronson. The data indicates that ground-water flow in the area of the seaplane flight line and related USTs is in a west/southwest direction. Based on the ground-water flow direction, if a release of potential contaminants were to occur from the UST system associated with the former seaplane flight line, the subject site should not be impacted. Therefore, the UST system associated with the former sea plane flight line is not considered a recognized environmental condition to the subject site.

Documentation provided by the N.A.S. Environmental Department indicated that ninety-eight individual USTs had been located at OLF Bronson. None of these USTs were reportedly located on the subject site. These USTs ranged in capacity from 50 gallons to 25,000 gallons. The tanks were used to store the following materials: kerosene, new oil, waste oil, leaded gasoline, unleaded gasoline, and heating oil. The contents of approximately 20 of the USTs were not identified. Forty-seven of the USTs at OLF Bronson were removed in 1992. LAW was unable to obtain documentation of the 1992 UST closures or related assessments from the N.A.S. Environmental Department or from the PWC Engineering Department. The remaining 51 USTs were scheduled for removal in 1994. Documentation from the PWC Engineering Department indicates that 15 of the remaining 51 USTs scheduled for removal in 1994 were not located. The 36 USTs which were located in 1994 were removed. To date, the N.A.S. Environmental Department and PWC Engineering Department has indicated that no USTs (not including product piping) remain in place at OLF Bronson. More details of these UST closures are presented in Section 4.3 of this report. Based on the reports of knowledge personnel and our review of limited UST closure and assessment documentation as well as the documented ground-water flow direction (southwest, away from the subject site), the former UST systems located at OLF Bronson, other than the UST system which supplied the flight line adjacent to the subject site, should not impact the subject site and are not considered recognized environmental conditions to the subject site.

The 1992 Preliminary Assessment Report indicated that between 1942 and 1952 numerous types of solvents, oils and fuels were used at OLF Bronson to support the air operations. By volume, more high-octane aviation fuel was utilized at the facility than any other hazardous material.

Toluene, carbon tetrachloride, and trichloroethane were reportedly used by maintenance personnel at the hanger areas on the former base. The usage rate of the solvents, oils, and fuels was not reported. It was reported that all maintenance of aircraft based at OLF Bronson was conducted in the base hangers. Waste oil and waste solvents generated at the hangers were reportedly stored in USTs at the hangers. When the waste tanks were full, the waste liquids were reportedly pumped out of the USTs and transported off of the base for disposal or burned by the base fire department during fire-fighting training drills. The hangers nearest the subject site (see Figure 2) were located approximately 1,300 feet west of the western border of the subject site and approximately 1,900 feet north of the southwestern portion of the subject site. This former hanger area is potentially upgradient to the southwestern portion of the subject site. If a significant release of hazardous materials had been released at the hanger area closest to the subject site, the southwestern portion of the subject site could be impacted by the release. LAW personnel did not review documentation of a release having occurred at the former hanger areas; however, UST closure information for the USTs formerly located at the hanger area was not presented to LAW for review. Due to the former handling of hazardous materials and wastes at the former hanger area and its gradient position relative to the subject site, the former aircraft hanger area closest to the subject site is considered a recognized environmental condition to the subject site. The former hangers which serviced the seaplane landing area on the extreme western portion of OLF Bronson is considered to be downgradient to the subject site. If a significant release of potential contaminants had occurred at the former hangers on the extreme western portion of OLF Bronson, the subject site should not be impacted by the release. The former hangers located on the extreme western portion of OLF Bronson are not considered recognized environmental conditions to the subject site.

4.3 SUMMARY OF PREVIOUS REPORTS

The following reports pertaining to the subject site and nearby properties were reviewed by LAW personnel:

- Preliminary Assessment Report OLF Bronson; prepared by the Navy Energy and Environmental Support Authority (NEESA); dated February 1992.

- Contamination Assessment Report, OLF Bronson, Site 1162; prepared by Navy Public Works Center; dated December 1996.

- Contamination Assessment Report, OLF Bronson, Site 1101; prepared by Navy Public Works Center; dated January 1997.

- Contamination Assessment Report, OLF Bronson, Site 1116; prepared by Navy Public Works Center; dated March 1997.

- Contamination Assessment Report, OLF Bronson, Site 1140-NW; prepared by Navy Public Works Center; dated June 1997.

- Contamination Assessment Report, OLF Bronson, Site 1170; prepared by Navy Public Works Center; dated June 1997.

- Contamination Assessment Report, OLF Bronson, Site 1140-NE; prepared by Navy Public Works Center; dated August 1997.

The following sections generally summarize the reports which were reviewed:

4.3.1 PRELIMINARY ASSESSMENT REPORT, OLF BRONSON

OLF Bronson is (was) apparently listed on the Federal Facilities Hazardous Waste Compliance Docket. As a result, the Naval Facilities Engineering Command tasked the Naval Energy and Environmental Support Activity (NEESA) to conduct a preliminary assessment on OLF Bronson as required by Superfund Amendments and Reauthorization Act (SARA) Part 120. The preliminary assessment included the investigation and review of available records at NEESA and the Naval Facilities Engineering Command. After the records search, the NEESA team visited the subject site to complete documentation of past and present operations and disposal practices. With the assistance of Pensacola N.A.S. representatives, the NEESA team toured the subject site and interviewed long term employees at the site. If a potential threat to human health or the environment was identified, further action was recommended.

The NEESA/NAVY preliminary assessment identified three areas of potential environmental concern to the subject site. A summary of these three areas is presented in the following sub-sections.

4.3.1.1 Maintenance Areas Around The Hangars

OLF Bronson had four aircraft hangars. Hangars 1140 and 1121 were located near the sea plane ramps and hangars 1140 and 1121 located just west of the aircraft flight line near the main landing pad. Numerous solvents, fuels, oils, and aircraft cleaners were used at and around the four hangars. Maintenance shops and waste oil tanks were located at the hangars. It was reported that aircraft parts were degreased with solvents inside and outside the hangars. The report concluded that liquid materials spilled or placed on the concrete near the hangars may have been washed into the grassy areas adjacent to the aircraft hangars during periods of precipitation or when the concrete was washed down. It was concluded that the maintenance areas around the former hangars should not be a threat to nearby surface waters or local air quality; however, soil and ground water could be impacted by the potential contaminants. The assessment report recommended that soil samples be collected in the areas adjacent to the aircraft hangars for lead and semi-volatile organic compounds. LAW is not aware that this recommended soil sampling activity adjacent to the former hangers has been conducted.

4.3.1.2 Fire Fighting Training Area

The preliminary assessment identified a fire-fighting training area as a potential environmental concern. The fire-fighting training area was used during the active period of OLF Bronson. The area is located on the south-central portion of the subject site (see Figure 2). Flammable liquids burned in the pit most likely consisted of waste aviation fuel as well as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gasoline. The report also indicated that polychlorinated biphynels (PCBs) originating from hydraulic fluids may also have been burned in the area. It was concluded that the fire-fighting training area should not pose a threat to local air quality; however, nearby surface waters and ground water could potentially be impacted by the potential contaminants. The assessment report recommended that soil samples be collected in the vicinity of the former fire-fighting training area to evaluate if soils have been impacted by potential contaminants. LAW is not aware that this recommended soil sampling activity at the fire-fighting training area has been conducted.

4.3.1.3 Machine Gun Butt

The assessment report identified the "Machine Gun Butt" on the south-central portion of the subject site as a potential environmental concern (see Figure 2). The Machine Gun Butt had been utilize during the active period of OLF Bronson as a backstop for aircraft machine gun targets. The report concluded that the metals which were fired into the Machine Gun Butt could have potential to impact local surface waters and a minimal impact on ground water. The assessment report recommended that soil sampling be conducted in the area of the Machine Gun Butt to evaluate whether potential metal contaminants are migrating from the earthen mound. LAW is not aware that this recommended soil sampling activity at the former Machine Gun Butt has been conducted.

4.3.2 CONTAMINATION ASSESSMENT REPORTS

The six Contamination Assessment Reports (CARs) reviewed were conducted in response to petroleum contamination discovered during UST closures at various sites on OLF Bronson in 1994. UST closures conducted in 1994 that did not identify contaminated releases did not require CARs. The purpose of the CARs was to determine the vertical and horizontal extents of soil and ground-water contamination at the various sites where releases were detected and to develop remediation plans to be presented to the Florida Department of Environmental Protection (FDEP).

All of the CARs reviewed indicated the presence of petroleum impacted soil and ground water to varying degrees. The following are maximum concentrations of ground-water contaminants as indicated in the six CARs reviewed: Napthalene-1,060 parts per billion (ppb), Volatile Organic Analytes (VOAs)-12.0 ppb, Ethylene Dibromide (EDB)-0.12 ppb, Total Petroleum Hydrocarbons (TPH)-110,000 parts per million (ppm), and Total Benzene, Toluene, Ethyl-benzene, and Xylenes (BTEX)-62.0 ppb. No free phase petroleum hydrocarbons were detected in monitoring wells at the six CAR sites reviewed.

Of the six CARs reviewed, five recommended no further remedial action on the soils of the study sites and one recommended additional soil excavation and disposal of contaminated soils (Site 1107). Of the six CARs, five recommended monitoring only for ground water and one recommended no further action for ground water.

All of the CARs reviewed had ground-water depth and flow direction information for the specific sites. The ground-water depths at the six study sites ranged from 6.0 feet to 21 feet below the ground surface. The ground-water flow direction at the six study sites was consistently in a west/southwest direction.

5.0 REGULATORY REVIEW

5.1 LOCAL

Since the subject site is currently owned by the U.S. Navy, the Navy's emergency response and environmental compliance teams are the primary local contacts for regulatory issues at the subject site. Representatives of the N.A.S. Pensacola environmental department as well as the engineering department were contacted regarding potential environmental conditions on the subject site and in the near vicinity. Information provided by these representatives has been thoroughly discussed in other sections of this report.

5.2 STATE AND FEDERAL

LAW reviewed excerpts of federal and state environmental regulatory agency lists to assess whether the subject site or nearby properties within specified search criteria radii were listed as having a past or present record of actual or potential environmental impact or are under investigation for an environmental impact. The excerpts were prepared by Environmental Data Resources, Inc. (EDR) issued on August 11, 1997.

Please note that regulatory listings are limited and include only those sites that are known to the regulatory agencies at the time of publication to be contaminated or in the process of evaluation or subject to monitoring for potential contamination.

5.2.1 U.S. ENVIRONMENTAL PROTECTION AGENCY (USEPA) LISTS

5.2.1.1 National Priorities List

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) established the NPL (Nation Priority List) of federal "Superfund" sites. These are contaminated sites that have been assigned a high ranking, in terms of their potential public health effects, by the EPA.

- The subject site does not appear on the NPL.

- No NPL sites are located within one mile of the subject site.

5.2.1.2 Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) List

The CERCLIS List identifies suspected contamination sites throughout the nation: however. a facility or site on this list does not necessarily have environmental problems.

- The subject site does not appear on the CERCLIS List.
- No CERCLIS listed facilities are listed within a one-half-mile radius of the subject site.

5.2.1.3 Emergency Response Notification System (ERNS) List

The USEPA Emergency Response Notification System is a national database used to collect information on reported releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center, and the Department of Transportation.

- The subject site does not appear on the ERNS List.

5.2.1.4 RCRA Administrative Action Tracking System (RAATS) List

The USEPA RAATS list identifies facilities that are currently or at one time were subject to USEPA enforcement for activities related to their handling of hazardous wastes and summarizes the results of any action taken by the USEPA.

- The subject site does not appear on the RAATS List.

5.2.1.5 Facilities Index Report (FINDS) List

The USEPA FINDS Report is a computerized inventory of all facilities and/or locations that are regulated or monitored by the USEPA. This report indicates the responsible USEPA Program Office, such as Air, Water, of Hazardous Waste that is responsible for the facility. Presence of a facility on the FINDS Report does not necessarily mean that the site poses a threat to the environment or public health.

- The subject site does not appear on the FINDS report.

5.2.1.6 Toxic Release Inventory System (TRIS) List

The USEPA TRIS list identifies facilities subject to reporting inventories of specified chemicals per requirements of the Superfund Amendments and Re-authorization Act (SARA) of 1986. These facilities may not have an environmental problem but may have the potential to impact the environment due to activities related to the handling of hazardous substances.

- The subject site does not appear on the TRIS List.

5.2.1.7 USEPA Resource Conservation & Recovery Information System (RCRIS)

RCRIS, or RCRA Notifies list, is the EPA database of facilities that generate, transport, treat, store, or dispose of hazardous waste.

- The subject site does not appear on any of the RCRIS lists.
- There is one facility listed on the RCRIS-SQG (small quantity generator) list within one-quarter mile of the subject site. There are no RCRIS-LQG (large quantity generator) facilities located within one-quarter mile of the subject site. There are no RCRIS-TSD (treatment, storage, disposal) facilities located within one mile of the subject site.

The Blue Angel Recreation Area located approximately one-half mile west of the subject site is listed as a small quantity generator of hazardous waste. This facility is considered to be down gradient to the subject site. Based on its gradient direction, if a release of potential contaminants were to occur from this facility the subject site should not be impacted by the release. The Blue Angel Recreation Area is not considered a recognized environmental condition to the subject site.

5.2.2 FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) LISTS

5.2.2.1 SITES List (SITES)

The FDEP SITES list identifies facilities that have been identified by the FDEP as having known or suspected environmental contamination.

- The subject site does not appear on the SITES List.
- There are no facilities on the SITES list within a one-mile radius of the subject site.

5.2.2.2 Solid Waste Facilities (SLDWST) List

The FDEP SLDWST list identifies locations that have been permitted to conduct solid waste landfilling activities or other related waste handling activities, such as management of biohazardous wastes. The appearance of a site on this list does not necessarily indicate that an environmental concern exists at the site.

- The subject site does not appear on the SLDWST List.
- There are no facilities identified on the SLDWST List within a one-half-mile radius of the subject site.

5.2.2.3 Petroleum Contamination Tracking System (PCTS) Report

The FDEP PCTS identifies facilities and/or locations that have notified the FDEP of a possible release of contaminants from petroleum storage systems.

- The subject site does not appear on the PCTS report.
- There are no facilities identified within a one-half-mile radius of the subject site listed on the PCTS report.

5.2.2.4 Stationary Tank Inventory (TANKS) List

The FDEP TANKS List identifies facilities that have registered aboveground and underground petroleum fuel tanks. The appearance of a site on this list does not necessarily indicate environmental problems at the site.

- The subject site does not appear on the TANKS List.
- There are no facilities identified within a one-quarter-mile radius of the subject site listed on the TANKS list.

6.0 SITE RECONNAISSANCE AND ENVIRONMENTAL REVIEW

Mr. Richard J. Brown, a LAW professional experienced in environmental site assessments, along with other LAW personnel, visited the subject site on several occasions between August 22 and September 17, 1997 to view accessible areas of the subject site. The site reconnaissance was conducted on foot.

6.1 GENERAL SITE EVALUATION

The subject site consists of approximately 430 acres generally consisting of approximately 220 acres of wetlands, approximately 140 acres of asphalt-paved former landing strips, and approximately 70 acres of upland wooded areas. The subject site consists of the eastern portion of the former OLF Bronson which was utilized as a training air base by Naval Air Station, Pensacola from 1942 to approximately 1958. The site location is shown on a topographic map presented as Figure 1 and a generalized site plan is presented as Figure 2.

6.2 INTERVIEWS

Interviews were conducted with the following individuals concerning conditions at the subject site:

• Mr. Woodrow Lynn	Former N.A.S. Director of Facilities
• Mr. Frank Fritz	Former N.A.S. Director of Engineering
• Mr. Ron Joiner	N.A.S. Environmental Department
• Mr. Dean Spencer	N.A.S. Environmental Department
• Mr. Greg Cambell	PWC Engineering Department
• Ms. Debbie Vincent	PWC Engineering Department
• Mr. Richard Hon	Blue Angel Recreation Area
• Dr. Joe A Edmisten	Joe Edmisten and Associates, Ecological Consultants

The results of the interviews conducted are included in this site evaluation.

6.3 ENVIRONMENTAL PERMITS

No environmental permits regarding current on-site activities appear to be warranted at the subject site.

6.4 CHEMICALS AND RAW MATERIALS

No current on-site activities were identified which utilize chemicals or raw materials.

6.5 PCB ELECTRICAL TRANSFORMERS

Electrical transformers are a potential source of environmental concern due to the possible presence of PCB-containing cooling oils used in some units. There were no electrical transformers observed on the subject site.

6.6 WATER WELLS

No active drinking-water wells were observed on the subject site. It was reported that no drinking water wells had been located on the site in the past. No ground-water monitoring wells were observed or reported to be located on the subject site.

6.7 HAZARDOUS AND SOLID WASTES

Three potential areas of soil contamination located on the subject site may contain impacted soils considered to be hazardous wastes. These three areas include the former small arms firing range on the southwestern portion of the subject site, the Machine Gun Butt on the south-central portion of the subject site and the former fire-fighting training area on the south-central portion of the subject site (see Figure 2). No other potentially hazardous wastes were observed to be generated or stored on the subject site. No potential hazardous wastes were reportedly generated or stored at the subject site in the past. These three areas of potential soil contamination are considered recognized environmental conditions.

No solid waste was observed, generated or stored on the subject site. No solid waste was reportedly stored on the subject site in the past.

6.8 ON-SITE LANDFILLS

From our review of aerial photographs, historical maps, interviews, and observations during our site reconnaissance, evidence of on-site landfills was not observed. There was miscellaneous debris observed in limited areas throughout the site. This miscellanies debris included concrete and metal. The presence of this miscellaneous debris is not considered a recognized environmental condition.

6.9 PITS AND SUMPS

No pits or sumps were observed on the subject site.

6.10 STORAGE TANKS

Based upon our site reconnaissance and reports from individuals associated with the subject site, there are no underground storage tanks (USTs) or aboveground storage tanks (ASTs) located on the subject site. It was reported that no USTs or ASTs had been located on the subject site in the past.

6.11 SURFACE STAINING AND STRESSED VEGETATION

The former fire-fighting training area which was identified in our historical review was observed during our site reconnaissance. This area located on the south-central portion of the subject site contained limited vegetation and obvious petroleum surface staining and petroleum odors. The area of stressed vegetation and surface staining was approximately 75 feet in diameter. Based on our historical reviews and our site observations of the former fire-fighting training area, the former fire-fighting training area is considered a recognized environmental condition.

An approximately 4.0 acre area adjacent to the southwestern landing strip was observed to lack vegetation. There was no evidence of soil staining in this area. No grasses, shrubs, or trees were observed in this area. Only bare dry sandy soil was visible. The Multiple School Masterplan report reviewed showed this area to be a potential wetland that contained standing water at the time of the wetland study (August 1996). LAW contacted Dr. Joe A Edmisten, the author of the original wetland study, regarding the barren soil area. Dr. Edmisten reported that it is not uncommon for an area that undergoes repeated saturation and drying cycles to be barren of vegetation. Dr. Edmisten also reported that when he visited the subject site in August 1996, the barren soil area had obviously been disturbed by numerous off-road vehicles that had apparently utilized the area for recreational purposes. These type of vehicular activities would not be conducive to vegetation growth. Based on the information provided by Dr. Edmisten and our site observations, the barren soil area adjacent to the southwestern landing strip appears to be a natural occurrence aggravated by vehicular traffic. This area is not considered a recognized environmental condition.

6.12 MUNITIONS

The former Machine Gun Butt which was identified in our historical review was observed during our site reconnaissance. The Machine Gun Butt consisted of a large earthen mound approximately 30 feet high, 40 feet wide, and 100 feet in length. We observed remnants of bullets embedded in the Machine Gun Butt. The mound was vegetated with grasses, shrubs and small pine trees. Based on the historical usage of the Machine Gun Butt as a backstop for aircraft bullets, it is our opinion that there is potential for soil and ground-water contamination on and around the Machine Gun Butt related to lead and other heavy metals. Based on the historical uses of the Machine Gun Butt and the potential for soil and ground-water contamination, the Machine Gun Butt is considered a recognized environmental condition.

LAW reviewed historical evidence of a small arms firing range on the southwestern portion of the subject site. The presence of the small arms firing range was not confirmed through our interviews and document review process. Based on the evidence of the firing range presented in the aerial photographs and N.A.S. Drawing No. 23032, LAW assumes that the area on the southwestern portion of the subject site was utilized as a small arms firing range during the time OLF Bronson was active. During our site reconnaissance, we did not observe the earthen mound that was viewed on the 1951 and 1958 aerial photographs. Our observations in the area of the former earthen mound were hampered by thick vegetation and swampy conditions. Based on our assumption that this area was utilized as a firing range and our experience with environmental concerns associated with firing ranges, the former small arms firing range on the southwestern portion of the subject site is considered a recognized environmental condition.

Based on our historical reviews and site observations there are no areas at the subject site other than the former Machine Gun Pit and former small arms firing range which utilized, stored, or maintained munitions activities.

6.13 OIL AND GAS ACTIVITY

No oil and gas exploration or pipeline activities were identified on the subject site or in the vicinity of the subject site.

6.14 WASTEWATER STREAMS AND UTILITIES

Water, sewer, electric and gas utilities are not currently supplied to the subject site.

7.0 NEIGHBORING SITE RECONNAISSANCE

The neighboring site reconnaissance was performed on several occasions between August 22 and September 17, 1997 by LAW professional Mr. Richard J. Brown to assist in evaluating whether adjacent land uses have or could have potential to contaminate the subject site. The neighboring site reconnaissance was conducted by touring the area by foot and by automobile, viewing particular businesses from public rights-of-way, and by making actual observations at selected businesses or properties.

The properties surrounding the subject site are generally undeveloped with some residential development. The findings of our neighboring site reconnaissance are discussed below according to the geographic relation to the subject site: north, east, south, and west.

7.1 NORTH

The western portion of the northern border of the subject site is bordered by Bronson Road with undeveloped wooded properties farther north. The eastern portion of the northern border of the subject site is bordered by a parcel utilized for aircraft parts storage and by an undeveloped wooded parcel. As discussed in Section 4.2, the adjacent parcel to the north utilized for aircraft parts storage has been used for similar activities since the 1950s. Due to the nature of the activities which have been conducted at this adjacent parcel, there is potential for hazardous materials to have been located on and impacted the parcel. Based on surface topography, it appears that the adjacent parcel to the north is upgradient to the subject site. Based on the type of activities conducted at the adjacent parcel and based on its upgradient position relative to the subject site, the adjacent storage area to the north is considered a recognized environmental condition to the subject site. There were no other facilities observed north of the subject site which are considered recognized environmental conditions to the subject site.

7.2 EAST

The subject site is bounded to the east by Bauer Road and undeveloped properties. Farther east of the subject site are undeveloped properties and residential areas which have been developed in the past 10 years. The area east of the subject site is considered to be crossgradient to downgradient relative to the subject site. No facilities considered to be recognized environmental conditions relative to the subject site were identified east of the subject site.

7.3 SOUTH

The subject site is bordered to the south by undeveloped wooded properties. Farther south are additional undeveloped wooded properties. The area south of the subject site is considered to be crossgradient to downgradient to the subject site. No facilities considered recognized environmental conditions relative to the subject site were identified south of the subject site.

7.4 WEST

The northern and central portions of the western border of the subject site are bounded by the landing mat and associated runways of OLF Bronson. The southern portion of the western border of the subject site is border by undeveloped woodlands which are also part of OLF Bronson. Approximately 800 feet west of the northern and central portion of the western border of the subject site is the former aircraft flight line for OLF Bronson. Approximately 500 feet beyond the former aircraft flight line is an area which formerly contained aircraft hangers. As further explained in Section 4.2 of this report, large quantities of potential contaminants were utilized along the former aircraft flight line and the former aircraft hangers west of the subject site during the active period of OLF Bronson. No environmental assessments have reportedly been conducted in these two areas. Both of these areas are considered to be upgradient to the southwestern portion of the subject site. Based on this gradient direction, if significant releases of potential contaminants have occurred from the former aircraft flight line and the former aircraft hangers in the past, the subject site could be impacted by the releases. The former aircraft flight line and the former aircraft hanger areas located 1,300 feet west of the subject site are considered recognized environmental conditions to the subject site.

Farther west of the subject site are wooded areas located where support facilities for OLF Bronson had formerly been located. Blue Angel Recreation Area which consists of a general store, boat ramp, and campsites is located farther west of the subject site along Perdido Bay.

Two public water supply wells were identified west of the subject site during the area reconnaissance. The public water supply wells are maintained by the Escambia County Utilities Authority (ECUA). The two wells are located on OLF Bronson, approximately 1,800 feet and 2,800 feet west of the northern portion of the western border of the subject site. The wells were reportedly constructed in the early 1940s and extend to depths of approximately 250 feet below the ground surface. The east well is not currently in service and the west well is active. No contaminant concentrations above FDEP Groundwater Guidance Concentrations have been reported in either of the two wells as of December 1996.

Other than the former hanger area and the former aircraft flight line, no other facilities considered recognized environmental conditions to the subject site were identifies west of the subject site.

8.0 CONCLUSIONS AND RECOMMENDATIONS

LAW has reviewed environmental regulatory lists, related historical and geological information, as well as information obtained during our site and surrounding area reconnaissance. The following sections summarize the recognized environmental conditions identified by LAW during the Phase I ESA activities as well as present general recommendations for the noted environmental issues.

ON-SITE CONCERNS

- LAW obtained information that evidenced a former small arms firing range located on the southwestern portion of the subject site. Physical evidence of the small arms firing range was not observed during our site reconnaissance. Our observations in the suspected location of the small arms firing range was hampered by thick vegetation and swampy conditions. Our experience with firing ranges indicates that soil and ground water in firing range areas are susceptible to contamination from lead and other heavy metals. Based on our position that the area on the southwestern portion of the subject site was utilized as a firing range and our experience with environmental concerns associated with firing ranges, the former small arms firing range is considered a recognized environmental condition.

  To evaluate whether the soil and ground water in the vicinity of the small arms firing range have been impacted by heavy metals, we recommend that soil and ground-water samples be collected in the area of the former small arms firing range and appropriate laboratory analyses be conducted on the samples. Further assessment and/or remediation of the impacted soil and ground water, if any, may be required based on the results of the initial assessment.

- The 1944 N.A.S. Drawing No. 23032 showed a "Machine Gun Butt" on the south-central portion of the subject site. The 1992 Preliminary Assessment Report indicated that aircraft mechanics used the southeast section of OLF Bronson (south-central portion of the subject site) to calibrate 30-and-50 caliber aircraft machine guns. Bullets from aircraft guns were aimed at the Machine Gun Butt to test and align aircraft gun sites during the active period of OLF Bronson. LAW's experience with firing ranges indicates that potential for soil and ground-water contamination due to the presence of lead and other heavy metals exists at firing ranges. Based on the presence of the former aircraft machine gun firing range, and the potential for contamination related to the former activities at the firing range, the Machine Gun Butt is considered a recognized environmental condition.

  To evaluate whether the soil and ground water in the vicinity of the former Machine Gun Butt have been impacted by heavy metals, we recommend that soil and ground-water samples be collected in the area of the former Machine Gun Butt and appropriate laboratory analyses be conducted on the samples. Further assessment and/or remediation of the impacted soil and ground water, if any, may be required based on the results of the initial assessment.

- The 1992 Preliminary Assessment Report indicated that a fire-fighting training area was located on the south-central portion of the subject site. The fire-fighting training area was utilized during the time that OLF Bronson was active. The OLF Bronson Fire Department reportedly conducted practice burns at the training area. Typically, material burned during the training exercises would consist of readily available flammable products such as waste aviation gasoline. Other flammable liquids such as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gas may have been burned. We identified the former fire-fighting training area during our site reconnaissance and observed obvious petroleum surface staining and petroleum odors. Based on our historical reviews and site observations, the former fire-fighting training area is considered a recognized environmental condition.

  To evaluate whether the soil and ground water in the vicinity of the former fire-fighting training area has been impacted by petroleum products, chlorinated solvents, volatile organic compounds, or PCBs, we recommend that soil and ground-water samples be collected in the area of the former fire-fighting training area and appropriate laboratory analyses be conducted on the samples. Further assessment and/or remediation of the impacted soil and ground water, if any, may be required based on the results of the initial assessment.

OFF-SITE CONCERNS

- An aircraft parts storage area was observed adjacent to the eastern portion of the northern border of the subject site. The current owner of this adjacent parcel reported that the property and the buildings on the property were utilized as storage for airplane parts and accessories, and some airplane dismantling activities. It was reported that no manufacturing or aircraft maintenance had been conducted on this property. Due to the nature of the activities which have been conducted at the adjacent parcel, there is potential for waste petroleum products from aircraft as well as solvents utilize for parts cleaning to have been utilized/generated at the adjacent parcel since the 1950s. The adjacent property to the north is considered upgradient to the subject site. If a release of potential contaminants were to occur from this adjacent parcel, the subject site could be impacted. Based on the nature of activities conducted at the adjacent parcel and its gradient position relative to the subject site, the adjacent storage area to the north is considered a recognized environmental condition to the subject site.

  To evaluate whether the soil and ground water on the northeastern portion of the subject site have been impacted by petroleum products, chlorinated solvents, or volatile organic compounds related to the off-site activities conducted north of the subject site, we recommend that soil and ground-water samples be collected along the northern border of the subject site in the vicinity of the adjacent storage area and appropriate laboratory analyses be conducted on the samples.

- The Preliminary Assessment Report indicated that during its time of active operation between 1942 and 1952, OLF Bronson used two large aircraft fuel distribution systems. One of these systems consisted of four 25,000-gallon underground storage tanks (USTs) and one 15,000-gallon UST. These USTs were located approximately 1,400 feet west of the northwest corner of the subject site. The tanks were used to supply fuel for approximately 7,200 feet of aviation fuel product line, which transported aviation fuel to 56 aircraft service pits. The four 25,000-gallon USTs and one 15,000-gallon UST associated with the aircraft flight line were reportedly removed in 1992. Approximately twenty-six 500-gallon lube oil USTs associated with the aircraft service pits were also reportedly removed in 1992. No assessment activities were conducted at the time of the tank closures and all product lines associated with the aviation fuel and lube oil USTs were capped and left in the ground. LAW's experience with petroleum product UST systems similar to that associated with the aircraft flight line indicates that releases of petroleum products, particularly from product lines, is common. We obtained no evidence indicating that a release has occurred along the former aircraft flight line; however, no assessment activities have reportedly been conducted along the former aircraft flight line. The former aircraft flight line is considered to be upgradient to the southwestern portion of the subject site and is in relatively close proximity (approximately 800 feet) to the eastern border of the subject site. If a release of a potential contaminant has occurred along the former aircraft flight line, the subject site could be impacted. Based on the potential of a past release, the gradient direction, and relative close proximity of the former aircraft flight line to the subject site, the former aircraft flight line is considered a recognized environmental condition to the subject site.

  To evaluate whether the soil and ground water on the southwestern and western portions of the subject site have been impacted by petroleum products related to the off-site activities conducted at the former aircraft flight line, we recommend that soil and ground-water samples be collected along the western border and the southwestern portion of the subject site in areas that are in closest proximity to the former aircraft flight line and appropriate laboratory analyses be conducted on the samples.

- The 1992 Preliminary Assessment Report indicated that between 1942 and 1957 numerous types of solvents, oils, and fuels were used at OLF Bronson to support the air operations. It was reported that all maintenance of aircraft based at OLF Bronson was conducted in the base hangers. Waste oil and waste solvents generated at the hangers were reportedly stored in USTs at the hangers. The hangers nearest the subject site were located approximately 1,300 feet west of the western border of the subject site and approximately 1,900 feet north of the southwestern portion of the subject site. This former hanger area is potentially upgradient to the southwestern portion of the subject site. If a significant release of hazardous materials had been released at the hanger area closest to the subject site, the southwestern portion of the subject site could be impacted by the release. LAW personnel did not review documentation of a release having occurred at the former hanger areas; however, UST closure information for the USTs formerly located at the hanger area was not presented to LAW for review. Due to the former handling of hazardous materials and wastes at the former hanger area and its gradient position relative to the subject site, the former aircraft hanger area closest to the subject site is considered a recognized environmental condition to the subject site.

To evaluate whether the soil and ground water on the southwestern portion of the subject site has been impacted by petroleum products, chlorinated solvents, or volatile organic compounds related to the off-site activities conducted at the former aircraft hangar area closest to the subject site, we recommend that soil and ground-water samples be collected on the southwestern portion of the subject site in areas that are in closest proximity to the former aircraft hangar areas and appropriate laboratory analyses be conducted on the samples.

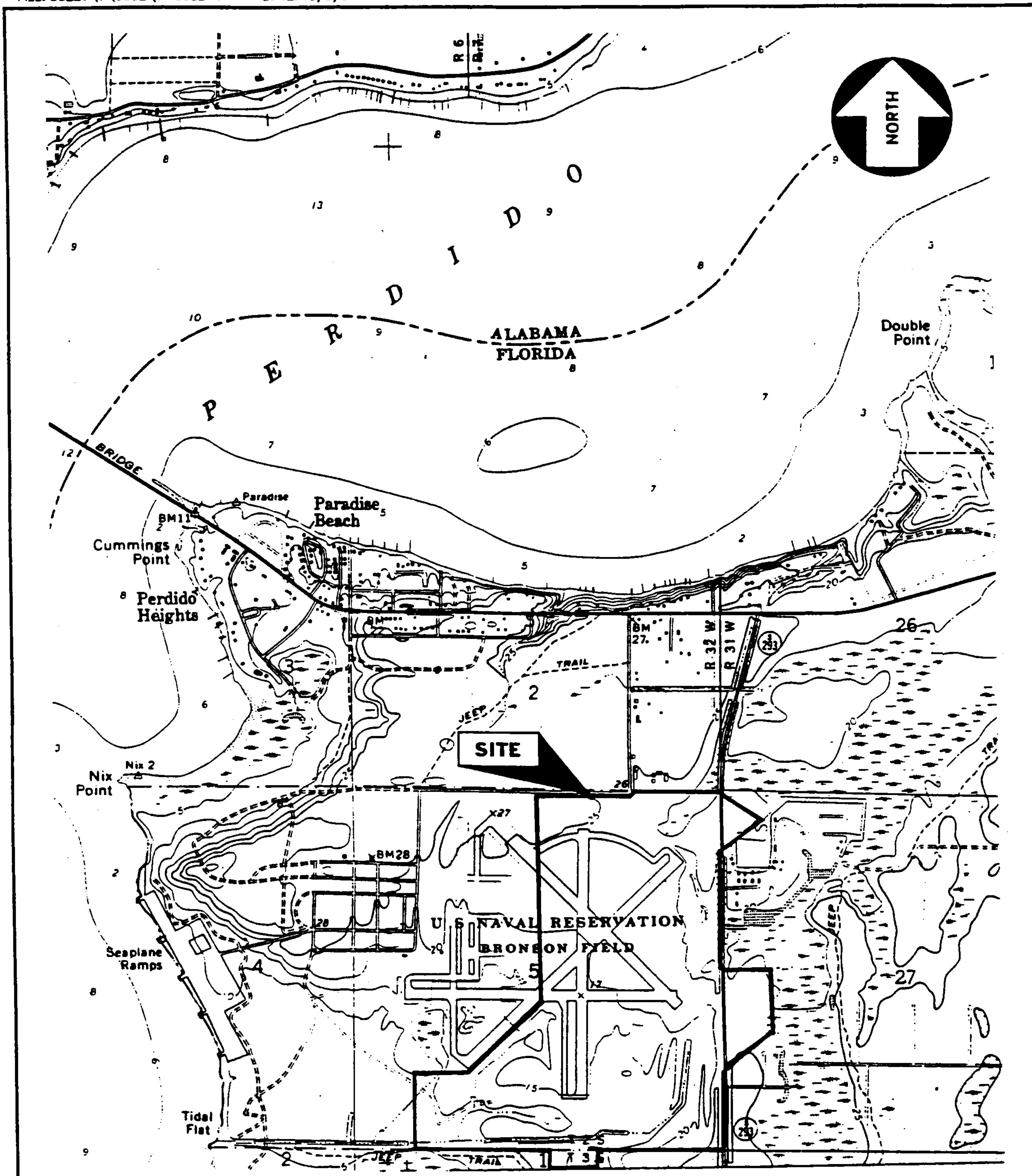
9.0 LIMITATIONS

The findings and opinions are relevant to the dates of our site visit and should not be relied on to represent conditions at substantially later dates. The opinions included herein are based on information obtained during the study and our experience under similar circumstances. If additional information becomes available which might impact our environmental conclusions. we request the opportunity to review the information, reassess the potential concerns, and modify our opinion, if warranted. If this assessment included a review of reports prepared by others, it must be recognized that LAW has no responsibility for the accuracy of information contained therein.

Although this assessment has attempted to identify the potential for contamination of the subject property, potential sources of contamination may have escaped detection due to : (1) the limited scope of this assessment, (2) the inaccuracy of public records. and (3) the presence of undetected and unreported environmental accidents.

FIGURES

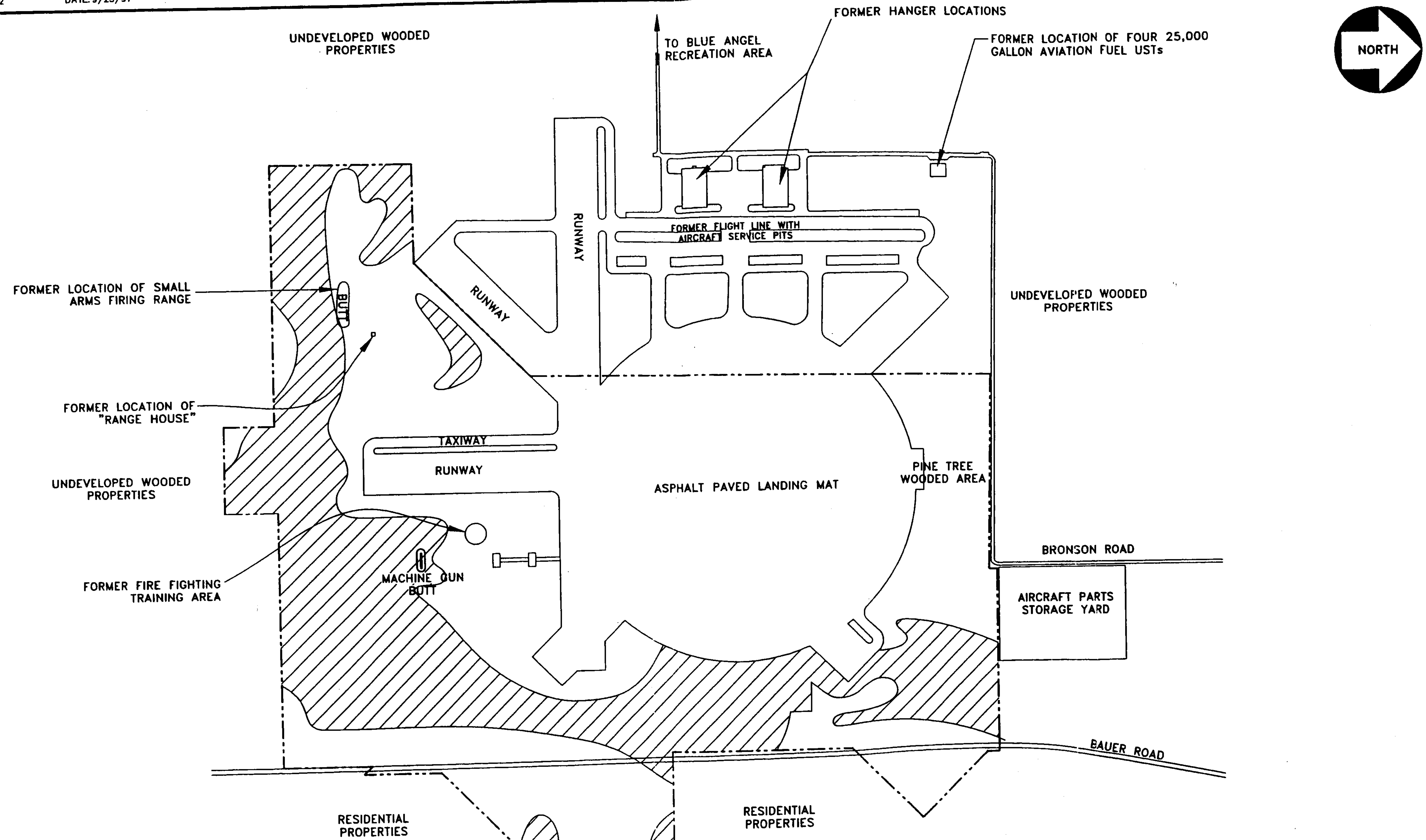
FILE: 50227\7\0052\7-0052-1 DATE: 10/3/97



SOURCE: U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE LILIAN, FLORIDA-ALABAMA DATED 1970, PHOTOREVISED 1976.

AREA TOPOGRAPHIC MAP PHASE I ENVIRONMENTAL ASSESSMENT OLS BRONSON N.A.S. PENSACOLA, FLORIDA	LAW ENGINEERING AND ENVIRONMENTAL SERVICES 3355 McLEMORE DRIVE PENSACOLA, FLORIDA 32514	Project No. 50227-7-0052 Drawing No. FIGURE 1 Drawn: BAW Checked: LJB Approved: MLP Date: 10-1-97	SCALE: V: H: 1"=2000'

FILE: 50227\7\0052\7-0052-2 DATE: 9/25/97



SOURCES: COMPRESSED AIR, BUTANE, GASOLINE AND OIL SERVICE DRAWING N.A.S. NO. 23032, DATED JUNE, 1944.
EXISTING WETLANDS MAP, BRONSON FIELD N.A.S., MULTIPLE SCHOOL MASTER PLAN
WILLIAM F. PARKS III, ARCHITECT, DATED SEPTEMBER 1996.

LEGEND:

POTENTIAL WETLANDS

APPROXIMATE SITE BOUNDARY

GENERALIZED SITE PLAN WITH SURROUNDED PROPERTIES NOTED PHASE I ENVIRONMENTAL SITE ASSESSMENT OLS BRONSON N.A.S. PENSACOLA, FLORIDA	LAW ENGINEERING AND ENVIRONMENTAL SERVICES 3355 McLEMORE DRIVE PENSACOLA, FLORIDA 32514	Project No. 50227-7-0052 Drawing No. FIGURE 2 Drawn: BAW Checked: Approved: Date:	SCALE: V: H: 1"=700'

APPENDIX B

TETRA TECH NUS, INC., STANDARD OPERATING PROCEDURES

BROWN & ROOT ENVIRONMENTAL	STANDARD OPERATING PROCEDURES	Number: CT-04	Page: 1 of 6
		Effective Date: 03/01/96	Revision: 0
		Applicability: B&R Environmental, NE	
		Prepared: Risk Assessment Department	
Subject: SAMPLE NOMENCLATURE		Approved: D. Senovich	

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1.0 PURPOSE

The purpose of this document is to specify a consistent sample nomenclature system that will facilitate subsequent data management in a cost-effective manner. The sample nomenclature system has been devised such that the following objectives can be attained:

- Sorting of data by matrix.
- Sorting of data by depth.
- Maintenance of consistency (field, laboratory, and data base sample numbers).
- Accommodation of all project-specific requirements on a global basis.
- Accommodation of laboratory sample number length constraints (10 characters).

2.0 SCOPE

The methods described in this procedure shall be used consistently for all projects requiring electronic data handling managed by personnel located in the Northeast Region of Brown & Root Environmental (Pittsburgh, Wayne, Holt, and Wilmington) and for any large contracts managed by the Northeast Region (e.g., NORTHDIV CLEAN, SOUTHDIV CLEAN, ARCS I, ARCS III, etc.). Smaller projects (as determined by Project Manager) are outside the scope of this SOP.

3.0 GLOSSARY

None.

4.0 RESPONSIBILITIES

Program Manager - It shall be the responsibility of the Program Manager (or designee) to inform contract-specific Project Managers of the existence and requirements of this Standard Operating Procedure.

Project Manager - It shall be the responsibility of the Project Manager to determine the applicability of this Standard Operating Procedure based on: (1) program-specific requirements, and (2) project size and objectives. It shall be the responsibility of the Project Manager (or designee) to ensure that the sample nomenclature is thoroughly specified in the relevant project planning document (e.g., sampling and analysis plan) and is consistent with this Standard Operating Procedure if relevant. It shall be the responsibility of the project manager to ensure that the Field Operations Leader is familiar with the sample nomenclature system.

Field Operations Leader - It shall be the responsibility of the Field Operations Leader to ensure that all field technicians or sampling personnel are thoroughly familiar with this Standard Operating Procedure and the project-specific sample nomenclature system. It shall be the responsibility of the Field Operations Leader to ensure that the sample nomenclature system is used during all project-specific sampling efforts.

5.0 PROCEDURES

5.1 Introduction

The sample numbering system consists of 12 distinct alpha-numeric characters, only 10 of which will be provided to the laboratory on the sample labels and chain-of-custody forms. The sample number provided to the lab shall be as follows where "A" indicates "alpha," "N" indicates "numeric," and "E" indicates "either"):

$$\overline{E}\ \overline{E}\ \overline{E}\ \overline{A}\ \overline{A}\ \overline{E}\ \overline{E}\ \overline{E}\ \overline{N}\ \overline{N}$$

Once the analytical results are received from the laboratory the sample number will be revised by a subroutine such that the sample number is more user friendly (i.e., dashes will be inserted). The sample number will then appear as follows:

$$\overline{E}\ \overline{E}\ \overline{E}\ -\ \overline{A}\ \overline{A}\ -\ \overline{E}\ \overline{E}\ \overline{E}\ -\ \overline{N}\ \overline{N}$$

If multiple sampling events occur (or are planned) for a given matrix, a subroutine within the database will be used to append two additional characters such that the sample number will appear as follows:

$$\underbrace{\overline{E}\ \overline{E}\ \overline{E}}_{\text{Site}}\ -\ \underbrace{\overline{A}\ \overline{A}}_{\text{Type}}\ -\ \underbrace{\overline{E}\ \overline{E}\ \overline{E}}_{\text{Location}}\ -\ \underbrace{\overline{N}\ \overline{N}}_{\text{Depth}}\ -\ \underbrace{\overline{N}\ \overline{N}}_{\text{Round}}$$

5.2 Sample Number Field Requirements

The various fields in the sample number will include the following:

- Site Identifier
- Sample Type
- Sample Location
- Sample Depth Indicator
- Sampling Round

The site identifier must be a three-character field (numeric characters, alpha characters, or a mixture of alpha and numeric characters may be used). A site number is necessary since many facilities/sites have multiple individual sites, SWMUs, operable units, etc.

The sample type must be a two-character alpha field. Suggested codes are provided in Section 5.3 of this SOP.

The sample location must be a three-character field (alpha, numeric, or a mixture).

The depth field must be provided for all samples, regardless if it is strictly applicable (as discussed in Section 5.3).

The sampling round is optional, but, if provided, must be two numeric characters.

5.3 Example Sample Field Designations

Examples of each of the fields are as follows:

Site Number - Examples of site numbers/designations are as follows:

A01 - Area of Concern Number 1
125 - Solid Waste Management Unit Number 125
000 - Base or Facility Wide Sample (e.g., upgradient well)
BBG - Base Background

The examples cited are only suggestions. Each Project Manager (or designee) must designate appropriate (and consistent) site designations for their individual project.

Sample Type - Examples of sample types are as follows:

AS - Air Sample
BS - Biota Sample (See Note)
CP - Composite Sample
CS - Chip Sample
DS - Drum Sample
DU - Dust Sample
FP - Free Product
ID - Investigation Derived Waste Sample
LT - Leachate Sample
MW - Monitoring Well
OF - Outfall Sample
RW - Residential Well Sample
SB - Soil Boring Sample
SD - Sediment Sample
SC - Scrape Sample
SG - Soil Gas Sample
SP - Seep Sample
SS - Surface Soil Sample
SU - Subsurface Soil Sample
SW - Surface Water Sample
TP - Test Pit Sample
TW - Temporary Well Sample
WC - Well Construction Material Sample
WI - Wipe Sample
WP - Well Point Sample
WS - Waste/Sludge Sample

Note: The biota sample designation may be contingent upon the type of biota sampled (e.g., BL - Lobster; BF - Finfish; BC - Clam; BO - Oyster). Numerous other examples can be cited but will be site-specific.

This field will also be used to designate field Quality Control Samples, as follows:

TB - Trip Blank
FB - Field Blank
RB - Rinsate Blank (Equipment Blank)
BB - Bottle Blank
AB - Ambient Condition Blank

Field quality control samples should be numbered sequentially (e.g., RB-001; FB-010, etc.).

Filtered/unfiltered surface water or groundwater samples shall be handled in an separate manner, as subsequently discussed.

Location - Examples of the location field are as follows:

A01 - Grid node A1
001 - Monitoring Well 1

It is important that consistency be maintained with respect to the use of the characters "0" and O. Data base subroutines will not sort correctly if a mixture are used (e.g, AO1 and A02).

Depth - Formerly, depth specifications were indicated with a four digit field (e.g., 0002 - 0 to 2 feet). While this is effective for depth sorting, it is difficult to include this level of detail in a 10-character lab number (FormMaster limitations). In addition, this approach will not accommodate non-integer depths (e.g., 2.5 feet to 4.5 feet).

Based on such potential problems, the following approach shall be used: Sample depths will simply represent the horizon from which the sample was obtained: For example, if ten split-spoon samples are collected from a boring, they will be numbered 01 through 10. The sample log sheet will be used to record the specific depth of the sample, and this information will be entered in a separator field in the data base.

Similar nomenclature will be used for depth-specific surface water and sediment samples, etc. If no depth information is required (e.g., groundwater samples), the field must still be filled (e.g., Ø, Ø).

This field will also be used for the designation of filtered and unfiltered samples. An unfiltered groundwater sample shall be designated as U0, if and only if, a corresponding filtered sample is collected. Such as sample shall be designated as F0.

Sampling Round - The sampling round field is straightforward. It can range from 01 to 99.

5.4 Example Sample Numbers

Examples of complete sample numbers (field/data base versus laboratory) are as follows:

Field/Data Base ID	Lab ID	Description
101-SB-A01-01	101SBA0101	The first sample (e.g., 0 to 2 feet) from soil boring A01 (grid) at Site 101.
101-SB-A01-02	101SBA0102	The second sample from boring A01 (could be the next depth interval or a duplicate of 101-SB-A01-01).
125-MW-001-01-01	125MW00101	A groundwater sample from monitoring well MW001 (first sampling round)
125-MW-001-02-01	125MW00102	A duplicate groundwater sample from monitoring well MW001 (first sampling round)
130-MW-003-U1-01	130MW003U1	An unfiltered groundwater sample from monitoring well MW003 (first sampling round)
130-MW-003-F1-01	130MW003F1	A filtered groundwater sample from monitoring well MW003 (first sampling round)
137-RB-001-00-01	137RB00100	The first rinsate blank collected at site 137.
137-TB-004-00-02	137TB00400	The fourth trip blank collected during the second sampling event at Site 137.
155-SW-003-01-01	155SW00301	A surface water sample collected from the surface of a pond at Site 155.
155-SW-003-02-01	155SW00302	A surface water sample collected from the bottom of the water column in a pond at Site 155.

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SECTION **PAGE**

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to identify and designate the field data record forms, logs and reports generally initiated and maintained for documenting Brown & Root Environmental field activities.

2.0 SCOPE

Documents presented within this procedure (or equivalents) shall be used for all Brown & Root Environmental field activities, as applicable. Other or additional documents may be required by specific client contracts.

3.0 GLOSSARY

None

4.0 RESPONSIBILITIES

Project Manager - The Project Manager is responsible for obtaining hardbound, controlled-distribution logbooks (from the appropriate source), as needed. In addition, the Project Manager is responsible for placing all forms used in site activities (i.e., records, field reports, and upon the completion of field work, the site logbook) in the project's central file.

Field Operations Leader (FOL) - The Field Operations Leader is responsible for ensuring that the site logbook, notebooks, and all appropriate forms and field reports illustrated in this guideline (and any additional forms required by the contract) are correctly used, accurately filled out, and completed in the required time-frame.

5.0 PROCEDURES

5.1 Site Logbook

5.1.1 General

The site logbook is a hard-bound, paginated controlled-distribution record book in which all major onsite activities are documented. At a minimum, the following activities/events shall be recorded (daily) in the site logbook:

- All field personnel present
- Arrival/departure of site visitors
- Arrival/departure of equipment
- Start or completion of borehole/trench/monitoring well installation or sampling activities
- Daily onsite activities performed each day
- Sample pickup information
- Health and Safety issues (level of protection observed, etc.)
- Weather conditions

A site logbook shall be maintained for each project. The site logbook shall be initiated at the start of the first onsite activity (e.g., site visit or initial reconnaissance survey). Entries are to be made for every day that onsite activities take place which involve Brown & Root Environmental or subcontractor personnel. Upon completion of the fieldwork, the site logbook must become part of the project's central file.

The following information must be recorded on the cover of each site logbook:

- Project name
- Brown & Root Environmental project number
- Sequential book number
- Start date
- End date

Information recorded daily in the site logbook need not be duplicated in other field notebooks (see Section 5.2), but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). An example of a typical site logbook entry is shown in Attachment A.

If measurements are made at any location, the measurements and equipment used must either be recorded in the site logbook or reference must be made to the site notebook in which the measurements are recorded (see Attachment A).

All logbook, notebook, and log sheet entries shall be made in indelible ink (black pen is preferred). No erasures are permitted. If an incorrect entry is made, the data shall be crossed out with a single strike mark, and initialed and dated. At the completion of entries by any individual, the logbook pages used must be signed and dated. The site logbook must also be signed by the Field Operations Leader at the end of each day.

5.1.2 Photographs

When movies, slides, or photographs are taken of a site or any monitoring location, they must be numbered sequentially to correspond to logbook entries. The name of the photographer, date, time, site location, site description, and weather conditions must be entered in the logbook as the photographs are taken. A series entry may be used for rapid-sequence photographs. The photographer is not required to record the aperture settings and shutter speeds for photographs taken within the normal automatic exposure range. However, special lenses, films, filters, and other image-enhancement techniques must be noted in the logbook. If possible, such techniques shall be avoided, since they can adversely affect the admissibility of photographs as evidence. Chain-of-custody procedures depend upon the subject matter, type of film, and the processing it requires. Film used for aerial photography, confidential information, or criminal investigation require chain-of-custody procedures. Adequate logbook notation and receipts must be compiled to account for routine film processing. Once processed, the slides of photographic prints shall be consecutively numbered and labeled according to the logbook descriptions. The site photographs and associated negatives must be docketed into the project's central file.

5.2 Site Notebooks

Key field team personnel may maintain a separate dedicated notebook to document the pertinent field activities conducted directly under their supervision. For example, on large projects with multiple investigative sites and varying operating conditions, the Health and Safety Officer may elect to maintain a separate site notebook. Where several drill rigs are in operation simultaneously, each site geologist assigned to oversee a rig must maintain a site notebook.

5.3 Sample Forms

A summary of the forms illustrated in this procedure is shown as the listing of Attachments in the Table of Contents for this SOP. Forms may be altered or revised for project-specific needs contingent upon client approval. Care must be taken to ensure that all essential information can be documented. Guidelines for completing these forms can be found in the related sampling SOP.

5.3.1 Sample Collection, Labeling, Shipment and Request for Analysis

5.3.1.1 Sample Log Sheet

Sample Log Sheets are used to record specified types of data while sampling. Attachments B-1 to B-4 are examples of Sample Log Sheets. The data recorded on these sheets are useful in describing the waste source and sample as well as pointing out any problems encountered during sampling. A log sheet must be completed for each sample obtained, including field quality control (QC) samples.

5.3.1.2 Sample Label

A typical sample label is illustrated in Attachment B-5. Adhesive labels must be completed and applied to every sample container. Sample labels can usually be obtained from the appropriate Program source or are supplied from the laboratory subcontractor.

5.3.1.3 Chain-of-Custody Record Form

The Chain-of-Custody (COC) Record is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as they are transferred from person to person. This form must be used for any samples collected for chemical or geotechnical analysis whether the analyses are performed on site or off site. One part of the completed COC form is retained by the field crew while the other two or three portions are sent to the laboratory. The original (top, signed copy) and extra carbonless copies of the COC form shall be placed inside a large Ziploc-type bag and taped inside the lid of the shipping cooler. If multiple coolers are sent but are included on one COC form, the COC form should be sent with the first cooler. The COC form should then state how many coolers are included with that shipment. An example of a Chain-of-Custody Record form is provided as Attachment B-6. A supply of these forms are purchased and stocked by the field department of the various Brown & Root Environmental offices. Alternately, COC forms supplied by the laboratory may be used. Once the samples are received at the laboratory, the sample cooler and contents are checked and any problems are noted on the enclosed COC form (any discrepancies between the sample labels and COC form and any other problems that are noted are resolved through communication between the laboratory point-of-contact and the Brown & Root Environmental Project Manager). The COC form is signed and one of the remaining two parts are retained by the laboratory while the last part becomes part of the samples' corresponding analytical data package. Internal laboratory chain-of-custody procedures are documented in the Laboratory Quality Assurance Plan (LQAP).

5.3.1.4 Chain-of-Custody Seal

Attachment B-7 is an example of a custody seal. The Custody seal is also an adhesive-backed label. It is part of a chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transit to the laboratory. The COC seals are signed and dated by the samplers and affixed across the opening edges of each cooler containing environmental samples. COC seals may be available from the laboratory; these seals may also be purchased from a supplier.

5.3.2 Geohydrological and Geotechnical Forms

5.3.2.1 Groundwater Level Measurement Sheet

A groundwater level measurement sheet, shown in Attachment C-1 must be filled out for each round of water level measurements made at a site.

5.3.2.2 Data Sheet for Pumping Test

During the performance of a pumping test (or an in-situ hydraulic conductivity test), a large amount of data must be recorded, often within a short time period. The pumping test data sheet (Attachment C-2) facilitates this task by standardizing the data collection format, and allowing the time interval for collection to be laid out in advance.

5.3.2.3 Packer Test Report Form

A packer test report form shown in Attachment C-3 must be completed for each well upon which a packer test is conducted following well installation.

5.3.2.4 Summary Log of Boring

During the progress of each boring, a log of the materials encountered, operation and driving of casing, and location of samples must be kept. The Summary Log of Boring (Attachment C-4) is used for this purpose and must be completed for each soil boring performed. In addition, if volatile organics are monitored on cores, samples or cuttings from the borehole (using HNU or OVA detectors), these results must be entered on the boring log (under the "Remarks" column) at the appropriate depth. The "Remarks" column can also be used to subsequently enter the laboratory sample number and the concentration of a few key analytical results. This feature allows direct comparison of contaminant concentrations with soil characteristics.

5.3.2.5 Monitoring Well Construction Details Form

A Monitoring Well Construction Details Form must be completed for every monitoring well piezometer or temporary well point installed. This form contains specific information on length and type of well riser pipe and screen, backfill, filter pack, annular seal and grout characteristics, and surface seal characteristics. This information is important in evaluating the performance of the monitoring well, particularly in areas where water levels show temporal variation, or where there are multiple (immiscible) phases of contaminants. Depending on the type of monitoring well (in overburden or bedrock), different forms are used (see Attachments C-5 through C-9). Similar forms are used for flush-mount well completions. The Monitoring Well Construction Details Form is not a controlled document.

5.3.2.6 Test Pit Log

When a test pit or trench is constructed for investigative or sampling purposes, a Test Pit Log (Attachment C-10) must be filled out by the responsible field geologist or sampling technician.

5.3.3 Equipment Calibration and Maintenance Form

The calibration or standardization of monitoring, measuring or test equipment is necessary to assure the proper operation and response of the equipment, to document the accuracy, precision or sensitivity of the measurement, and determine if correction should be applied to the readings. Some items of equipment require frequent calibration, others infrequent. Some are calibrated by the manufacturer, others by the user.

Each instrument requiring calibration has its own Equipment Calibration Log (Attachment D) which documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device. An Equipment Calibration Log must be maintained for each electronic measuring device used in the field; entries must be made for each day the equipment is used.

5.4 Field Reports

The primary means of recording onsite activities is the site logbook. Other field notebooks may also be maintained. These logbooks and notebooks (and supporting forms) contain detailed information required for data interpretation or documentation, but are not easily useful for tracking and reporting of progress. Furthermore, the field logbook/notebooks remain onsite for extended periods of time and are thus not accessible for timely review by project management.

5.4.1 Weekly Status Reports

To facilitate timely review by project management, Xeroxed copies of logbook/notebook entries may be made for internal use. To provide timely oversight of onsite contractors, Daily Activities Reports are completed and submitted as described below.

It should be noted that in addition to the summaries described herein, other summary reports may also be contractually required.

5.4.2 Daily Activities Report

5.4.2.1 Description

The Daily Activities Report (DAR) documents the activities and progress for each day's field work. This report must be filled out on a daily basis whenever there are drilling, test pitting, well construction, or other related activities occurring which involve subcontractor personnel. These sheets summarize the work performed and form the basis of payment to subcontractors (Attachment E is an example of a Daily Activities Report).

5.4.2.2 Responsibilities

It is the responsibility of the rig geologist to complete the DAR and obtain the driller's signature acknowledging that the times and quantities of material entered are correct.

5.4.2.3 Submittal and Approval

At the end of the shift, the rig geologist must submit the Daily Activities Report to the Field Operations Leader (FOL) for review and filing. The Daily Activities Report is not a formal report and thus requires no further approval. The DAR reports are retained by the FOL for use in preparing the site logbook and in preparing weekly status reports for submission to the Project Manager.

6.0 ATTACHMENTS

Attachment A	TYPICAL SITE LOGBOOK ENTRY
Attachment B-1	EXAMPLE GROUNDWATER SAMPLE LOG SHEET
Attachment B-2	EXAMPLE SURFACE WATER SAMPLE LOG SHEET
Attachment B-3	EXAMPLE SOIL/SEDIMENT SAMPLE LOG SHEET
Attachment B-4	CONTAINER SAMPLE LOG SHEET FORM
Attachment B-5	SAMPLE LABEL
Attachment B-6	CHAIN-OF-CUSTODY RECORD FORM
Attachment B-7	CHAIN-OF-CUSTODY SEAL
Attachment C-1	EXAMPLE GROUNDWATER LEVEL MEASUREMENT SHEET
Attachment C-2	EXAMPLE PUMPING TEST DATA SHEET
Attachment C-3	PACKER TEST REPORT FORM
Attachment C-4	EXAMPLE BORING LOG
Attachment C-5	EXAMPLE OVERBURDEN MONITORING WELL SHEET
Attachment C-5A	EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)
Attachment C-6	EXAMPLE CONFINING LAYER MONITORING WELL SHEET
Attachment C-7	EXAMPLE BEDROCK MONITORING WELL SHEET - OPEN HOLE WELL
Attachment C-8	EXAMPLE BEDROCK MONITORING WELL SHEET - WELL INSTALLED IN BEDROCK
Attachment C-8A	EXAMPLE BEDROCK MONITORING WELL SHEET - WELL INSTALLED IN BEDROCK (FLUSHMOUNT)
Attachment C-9	EXAMPLE TEST PIT LOG
Attachment D	EXAMPLE EQUIPMENT CALIBRATION LOG
Attachment E	EXAMPLE DAILY ACTIVITIES RECORD
Attachment F	FIELD TRIP SUMMARY REPORT

ATTACHMENT A
TYPICAL SITE LOGBOOK ENTRY

START TIME: ____________________ DATE: ____________________

SITE LEADER: ______________________________
PERSONNEL:

BROWN & ROOT ENV.	DRILLER	EPA
__________	__________	__________
__________	__________	__________
__________	__________	__________

WEATHER: Clear, 68°F, 2-5 mph wind from SE

ACTIVITIES:

1. Steam jenney and fire hoses were set up.
2. Drilling activities at well ____ resumes. Rig geologist was ______________. See Geologist's Notebook, No. 1, page 29-30, for details of drilling activity. Sample No. 123-21-S4 collected; see sample logbook, page 42. Drilling activities completed at 11:50 and a 4-inch stainless steel well installed. See Geologist's Notebook, No. 1, page 31, and well construction details for well ______.
3. Drilling rig No. 2 steam-cleaned at decontamination pit. Then set up at location of well _______.
4. Well ______ drilled. Rig geologist was __________________. See Geologist's Notebook, No. 2, page ____ for details of drilling activities. Sample numbers 123-22-S1, 123-22-S2, and 123-22-S3 collected; see sample logbook, pages 43, 44, and 45.
5. Well _____ was developed. Seven 55-gallon drums were filled in the flushing stage. The well was then pumped using the pitcher pump for 1 hour. At the end of the hour, water pumped from well was "sand free."
6. EPA remedial project manger arrives on site at 14:25 hours.
7. Large dump truck arrives at 14:45 and is steam-cleaned. Backhoe and dump truck set up over test pit _________.
8. Test pit _______ dug with cuttings placed in dump truck. Rig geologist was ______________. See Geologist's Notebook, No. 1, page 32, for details of test pit activities. Test pit subsequently filled. No samples taken for chemical analysis. Due to shallow groundwater table, filling in of test pit ___ resulted in a very soft and wet area. A mound was developed and the area roped off.
9. Express carrier picked up samples (see Sample Logbook, pages 42 through 45) at 17:50 hours. Site activities terminated at 18:22 hours. All personnel off site, gate locked.

____
Field Operations Leader

ATTACHMENT B-1
EXAMPLE GROUNDWATER SAMPLE LOG SHEET

GROUNDWATER

SAMPLE LOG SHEET

Page ____ of ____

Project Site Name: ______________________

Project No.: ______________________

☐ Domestic Well Data
☐ Monitoring Well Data
☐ Other Well Type: ______________________
☐ QA Sample Type: ______________________

Sample ID No.: ______________________

Sample Location: ______________________

Sampled By: ______________________

C.O.C. No.: ______________________

Sampling Data

	pH	S.C.	Temp. (°C)	Turbidity	Color	TBD	TBD	TBD
Date: ________ Time: ________ Method: ________								

Purge Data

	Volume	pH	S.C.	Temp. (°C)	Turbidity	Color	TBD	TBD
Date: ________ Method: ________	Initial							
Monitor Reading (ppm):	1							
Well Casing Dia. & Material Type:	2							
	3							
Total Well Depth (TD):	4							
Static Water Level (WL):	5							
TD-WL (ft.) =								
One Casing Volume: (gal/L)								
Start Purge (hrs.):								
End Purge (hrs.):								
Total Purge Time (min):								
Total Amount Purged (gal/L):								

Analysis	Preservative	Container Requirements	Collected (✓)

Observations/Notes:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No:	

TBD: To Be Determined

ATTACHMENT B-2
EXAMPLE SURFACE WATER SAMPLING LOG SHEET

SURFACE WATER SAMPLING LOG SHEET

Page ___ of ___

Project Site Name: ____________________ Sample ID No.: ____________________

Project No.: ____________________ Sample Location: ____________________

☐ Spring ☐ Pond Sampled By: ____________________
☐ Stream ☐ Lake
☐ Other ____________________
☐ QA Sample Type: ____________________ C.O.C. No.: ____________________

Sample Data		
Date and Time	Method	Depth

pH	S.C.	Temp. (°C)	Turbidity	Color	TBD	TBD	TBD

Analysis	Preservative	Container Requirements	Collected (✓)

Observations/Notes:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

TBD: To Be Determined

ATTACHMENT B-3
EXAMPLE SOIL/SEDIMENT SINGLE SAMPLE LOG SHEET

SOIL/SEDIMENT
SINGLE SAMPLE LOG SHEET

Page ___ of ___

Project Site Name: ________________ Sample ID No.: ________________

Project No.: ________________ Sample Location: ________________

Sampled By: ________________

C.O.C. No.: ________________

- ☐ Surface Soil
- ☐ Subsurface Soil
- ☐ Sediment
- ☐ Other ________
- ☐ QA Sample Type: ________

	Composite Sample Data		
Sample Method:	Sample	Time	Color/Description
Depth Sampled:			
Sample Date and Time:			
Type of Sample ☐ Grab ☐ Composite ☐ Grab-Composite ☐ High Concentration ☐ Low Concentration			
	Grab Sample Data		
	Color	Description: (Sand, Clay, Dry, Moist, Wet, etc.)	

Analysis	Container Requirements	Collected (✓)	Map:

Observations/Notes:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No:	

ATTACHMENT B-4
CONTAINER SAMPLE LOG SHEET FORM

Brown & Root Environmental

Page ___ of _

☐ Container Data

Case #: _______

By: ______________________________

Project Site Name: ______________________ Project Site No. ______________________

Brown & Root Env. Source No. ______________ Source Location: ______________________

Container Source	Container Description
☐ Drum ☐ Bung Top ☐ Lever Lock ☐ Bolted Ring ☐ Other ________ ________ ☐ Bag/Sack ☐ Tank ☐ Other ________	Color: ________ Condition: ________ Markings: ________ Vol. of Contents: ________ Other: ________
Disposition of Sample ☐ Container Sampled ☐ Container opened but not sampled. Reason: ________ ☐ Container not opened. Reason: ________	Sample Description

	Layer 1	Layer 2	Layer 3
Phase	☐Sol. ☐Liq.	☐Sol. ☐Liq.	☐Sol. ☐Liq.
Color	________	________	________
Viscosity	☐L ☐M ☐H	☐L ☐M ☐H	☐L ☐M ☐H
% of Total Volume	________	________	________
Other ________	________	________	________

Monitor Reading:	Type of Sample
Sample Method:	☐ Low Concentration ☐ High Concentration ☐ Grab ☐ Composite ☐ Grab-composite

		Organic	Inorganic
Sample Date & Time:	Sample Identification		
Sampled by:			
Signature(s):			
	Date Shipped		
Analysis:	Time Shipped		
	Lab		
	Volume		

ATTACHMENT B-5

SAMPLE LABEL

Brown & Root Environmental PROJECT:____________________

STATION LOCATION: ____________________

DATE: ____/____/____ TIME: ______ hrs.

MEDIA: WATER ☐ SOIL ☐ SEDIMENT ☐ ________ ☐

CONCENTRATION: LOW ☐ MEDIUM ☐ HIGH ☐

TYPE: GRAB ☐ COMPOSITE ☐

ANALYSIS	PRESERVATION
VOA ☐ BNAs ☐	Cool to 4°C ☐
PCBs ☐ PESTICIDES ☐	HNO_3 to pH < 2 ☐
METALS: TOTAL ☐ DISSOLVED ☐	NaOH to pH > 12 ☐
CYANIDE ☐	____________ ☐
____________ ☐	

Sampled by:____________________

Remarks:

ATTACHMENT B-6

CHAIN-OF-CUSTODY RECORD FORM
(Original is 8.5 x 11")

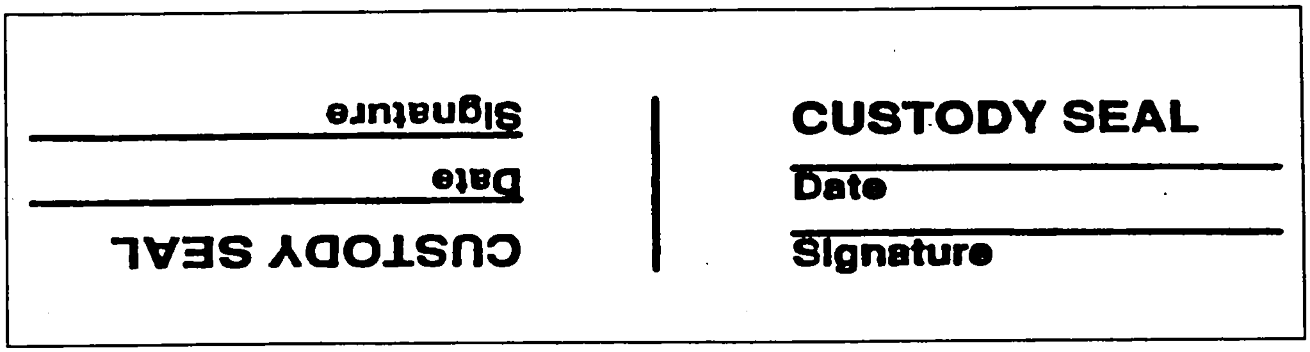
PROJECT NO.	PROJECT NAME
SAMPLERS: *(Signature)*	

STA NO.	DATE	TIME			STATION LOCATION	NO. OF CONTAINERS							REMARKS

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks:	

ATTACHMENT B-7

CHAIN-OF-CUSTODY SEAL



ATTACHMENT C-1
EXAMPLE GROUNDWATER LEVEL MEASUREMENT SHEET

GROUNDWATER LEVEL MEASUREMENT SHEET

Page ___ of ___

PROJECT NAME: ____________________ LOCATION: ____________________
PROJECT NUMBER: ____________________ MEASURING DEVICE: ____________________
PERSONNEL: ____________________ ADJUSTMENT FACTOR: ____________________
DATE: ____________________ REMARKS: ____________________
WEATHER CONDITIONS: ____________________

Well or Piezometer Number	Time	Elevation of Reference Point (Feet)*	Water Level Indicator Reading (Feet)*	Groundwater Elevation (Feet)*	Comments

*Measurements to nearest 0.01 foot.

Signature(s): ____________________

ATTACHMENT C-2
EXAMPLE PUMPING TEST DATA SHEET

PUMPING TEST DATA SHEET

Page ___ of ___

PROJECT NAME: ______________________
PROJECT NUMBER: ______________________
PUMPING TEST: [ ]
TEST NUMBER: ______________________
METHOD OF MEASUREMENT: ______________
DATE(s): ______________________
STATIC H_2O LEVEL (ft) (SO) ____________
PUMPING WELL NUMBER: ______________
MEASURED WELL NUMBER: ______________
STEP DRAW DOWN TEST [ ]
MONITORING POINT: ______________
DEPTH CORRECTION (ft) ______________
PUMP SETTING (Ft. below monitoring point): ______
DISTANCE FROM PUMPING WELL (ft) (r): ________
PUMPING TEST PERFORMED BY: ______________________________
REMARKS: ____

MILITARY TIME	ELAPSED TIME SINCE PUMP START OR STOP (Min.)	WATER LEVEL (Ft.)	CORRECTION (Ft.)	DRAW DOWN OR RECOVERY (Ft.)	FLOW METER READING (Gals.)	PUMPING RATE (GPM)	REMARKS

SIGNATURE(s): ____

ATTACHMENT C-3

PACKER TEST REPORT FORM

PROJECT: ____________ PROJECT NO.: ____________ TEST NO: ____________ PAGE ____ OF ____

BORING NO.: ____________ CASING DEPTH: ____________ CONTRACTOR: ____________ STATIC WATER LEVEL ____________

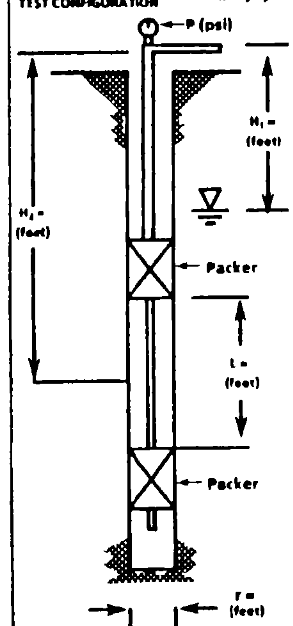
TEST INTERVAL: ____________ BY: ____________ CHECKED: ____________ PACKER PRESSURE ____________

Flow Test					Calculated Results							
Pressure, p (psi)	Elapsed Time (min)	Flow Reading	Δ Flow, ΔQ (ft^3)	Δ Flow, ΔQ (gal)	Flow Rate Q (gal/min)	H_1* (ft)	Hp(Ft) = 2.31 (psi)	H_2* (ft)	H = Hp + (H1 or H2)	Cp	K (ft/yr) = Cp·Q/H	K (cm/sec) = 9.67 x 10^{-7} · K (ft/yr)

CP = (1/(2 π L)) ln(L/r) (70,315 5)
7.48 Gallons = 1 Ft^3
1 psi = 2.31 ft head
Remarks: ____________

* H_1 is used when the test length is below the water table.
H_2 is used when the test length is above the water table.

TEST CONFIGURATION



Length of Test Section in feet, l	Cp Drilling Bit Size			
	EX (1.5")	AX (1.875")	BX (2.3/8")	NX (3")
1	31,000	28,500	25,000	23,900
2	19,400	18,100	16,000	15,100
5	9,800	9,300	8,800	8,200
8	6,800	6,500	6,100	5,800
10	5,700	5,400	5,100	4,900
15	4,100	3,800	3,700	3,600
20	3,200	3,100	3,000	2,800

ATTACHMENT C-4
EXAMPLE BORING LOG

BORING LOG

Page___ of___

PROJECT NAME: ____________________ BORING NUMBER: ____________________
PROJECT NUMBER: ____________________ DATE: ____________________
DRILLING COMPANY: ____________________ GEOLOGIST: ____________________
WATER LEVEL DATA: ____________________

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows/ 6" or RQD (%)	Sample Recovery/ Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION			* USCS	Remarks	PID or FID Reading (ppm)
					Soil Density/ Consistency or Rock Hardness	Color	Material Classification			

* When rock coring enter rock brokeness.

CONVERTED TO WELL : ___ Yes ___ No; WELL I.D.#: ____________________
REMARKS: ____________________

Signature(s): ____________________

LEGEND

SOIL TERMS

UNIFIED SOIL CLASSIFICATION (USCS)

COARSE-GRAINED SOILS
More Than Half of Material is LARGER Than No. 200 Sieve Size

FIELD IDENTIFICATION PROCEDURES (Excluding Particles Larger Than 3 Inches and Basing Fractions on Estimated Weights)			GROUP SYMBOL	TYPICAL NAMES
GRAVELS (50%(+)>1/4"Ø	CLEAN GRAVELS (Low % Fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	GW	Well graded gravels, gravel-sand mixtures, little or no fines.
		Predominantly one size or a range of sizes with some intermediate sizes missing.	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines.
	GRAVELS W/FINES (High % Fines)	Non-plastic fines (for identification procedures, see ML)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		Plastic fines (for identification procedures, see CL)	GC	Clayey gravels, poorly graded gravel-sand-clay mixtures.
SANDS 50%(+)<1/4"Ø	CLEAN SANDS (Low % Fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.	SW	Well graded sand, gravelly sands, little or no fines.
		Predominantly one size or a range of sizes with some intermediate sizes missing.	SP	Poorly graded sands, gravelly sands, little or no fines.
	SANDS W/FINES (High % Fines)	Non-plastic fines (for identification procedures, see MCL)	SM	Silty sands, poorly graded sand-silt mixtures.
		Plastic fines (for identification procedures, see CL)	SC	Clayey sands, poorly graded sand-clay mixtures.

FINE-GRAINED SOILS
More Than Half of Material is SMALLER Than No. 200 Sieve Size

FIELD IDENTIFICATION PROCEDURES (Excluding Particles Larger Than 3 Inches and Basing Fractions on Estimated Weights)				GROUP SYMBOL	TYPICAL NAMES
	Identification Procedures on Fraction Smaller than No. 40 Sieve Size				
	DAY STRENGTH (Crushing Characteristics)	DILATANCY (Reaction to Shaking)	TOUGHNESS (Consistency Near Plastic Limit)		
SILTS AND CLAYS Liquid Limit <50	None to Slight	Quick to Slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity.
	Medium to High	None to Very Slow	Medium	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	Slight to Medium	Slow	Slight	OL	Organic silts and organic silt-clays of low plasticity.
SILTS AND CLAYS Liquid Limit >50	Slight to Medium	Slow to None	Slight to Medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	High to Very High	None	High	CH	Inorganic clays of high plasticity, fat clays.
	Medium to High	None to Very Slow	Slight to Medium	OH	Organic clays of medium to high plasticity.
HIGHLY ORGANIC SOILS	Readily identified by color, odor, spongy feel and frequently by fibrous texture.			Pt	Peat and other organic soils

Boundary classifications: Soils possessing characteristics of two groups are designated by combining group symbols. For example, GW-GC, well graded gravel-sand mixture with clay binder.
All sieve sizes on this chart are U.S. Standard.

DENSITY OF GRANULAR SOILS

DESIGNATION	STANDARD PENETRATION RESISTANCE-BLOWS/FOOT
Very Loose	0-4
Loose	5-10
Medium Loose	11-30
Dense	31-50
Very Dense	Over 50

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	UNC COMPRESSIVE STRENGTH (TONS/SQ. FT.)	STANDARD PENETRATION RESISTANCE-BLOWS/FOOT	FIELD IDENTIFICATION METHODS
Very Soft	Less than 0.25	0 to 2	Easily pentrated several inches by fist
Soft	0.25 to 0.50	2 to 4	Easily penetrated several inches by thumb.
Medium Stiff	0.50 to 1.0	4 to 8	Can be penetrated several inches by thumb.
Stiff	1.0 to 2.0	8 to 15	Readily indented by thumb.
Very Stiff	2.0 to 4.0	15 to 30	Readily indented by thumbnail.
Hard	More than 4.0	Over 30	Indented with difficulty by thumbnail.

ROCK TERMS

ROCK HARDNESS (FROM CORE SAMPLES)

Descriptive Terms	Screwdriver or Knife Effects	Hammer Effects
Soft	Easily Gouged	Crushes when pressed with hammer
Medium Soft	Can be Gouged	Breaks (one blow); crumbly edges
Medium Hard	Can be scratched	Breaks (one blow); sharp edges
Hard	Cannot be scratched	Breaks conchoidally (several blows); sharp edges

ROCK BROKENESS

Descriptive Terms	Abbreviation	Spacing
Very Broken	(V. Br.)	0-2"
Broken	(Br.)	2"-1'
Blocky	(Bl.)	1'-3'
Massive	(M.)	3'-10'

LEGEND:

SOIL SAMPLES - TYPES

S-2" Split-Barrel Sample
ST-3" O.D. Undisturbed Sample
O - Other Samples, Specify in Remarks

ROCK SAMPLES - TYPES

X-NX (Conventional) Core (-2-1/8" O.D.)
Q-NQ (Wireline) Core (-1-7/8" O.D.)
Z - Other Core Sizes, Specify in Remarks

WATER LEVELS

12/18 ▼ 12.6' Initial Level w/Date & Depth
12/18 ▼ 12.6' Stabilized Level w/Date & Depth

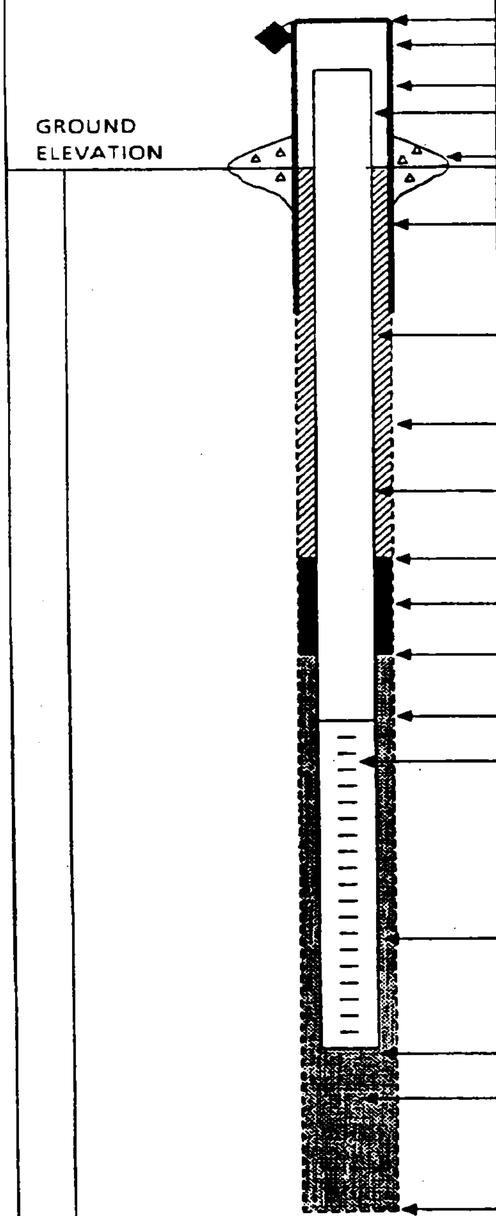
ATTACHMENT C-5
EXAMPLE OVERBURDEN MONITORING WELL SHEET

BORING NO.: ______________

OVERBURDEN MONITORING WELL SHEET

PROJECT ______________________ LOCATION ______________________
PROJECT NO. ______________________ BORING ______________________
ELEVATION ______________________ DATE ______________________
FIELD GEOLOGIST ______________________

DRILLER ______________________
DRILLING METHOD ______________________
DEVELOPMENT METHOD ______________________



ELEVATION OF TOP OF SURFACE CASING : ______________
ELEVATION OF TOP OF RISER PIPE: ______________
STICK - UP TOP OF SURFACE CASING: ______________
STICK - UP RISER PIPE : ______________
TYPE OF SURFACE SEAL: ______________________
I.D. OF SURFACE CASING: ______________________
TYPE OF SURFACE CASING: ______________________
RISER PIPE I.D. ______________________
TYPE OF RISER PIPE: ______________________
BOREHOLE DIAMETER: ______________________
TYPE OF BACKFILL: ______________________
ELEVATION / DEPTH TOP OF SEAL: ______ / ______
TYPE OF SEAL: ______________________
DEPTH TOP OF SAND PACK: ______________
ELEVATION / DEPTH TOP OF SCREEN: ______ / ______
TYPE OF SCREEN: ______________________
SLOT SIZE x LENGTH: ______________________
I.D. OF SCREEN: ______________________
TYPE OF SAND PACK: ______________________
ELEVATION / DEPTH BOTTOM OF SCREEN: ______ / ______
ELEVATION / DEPTH BOTTOM OF SAND PACK: ______ / ______
TYPE OF BACKFILL BELOW OBSERVATION WELL: ______________________
ELEVATION / DEPTH OF HOLE: ______ / ______

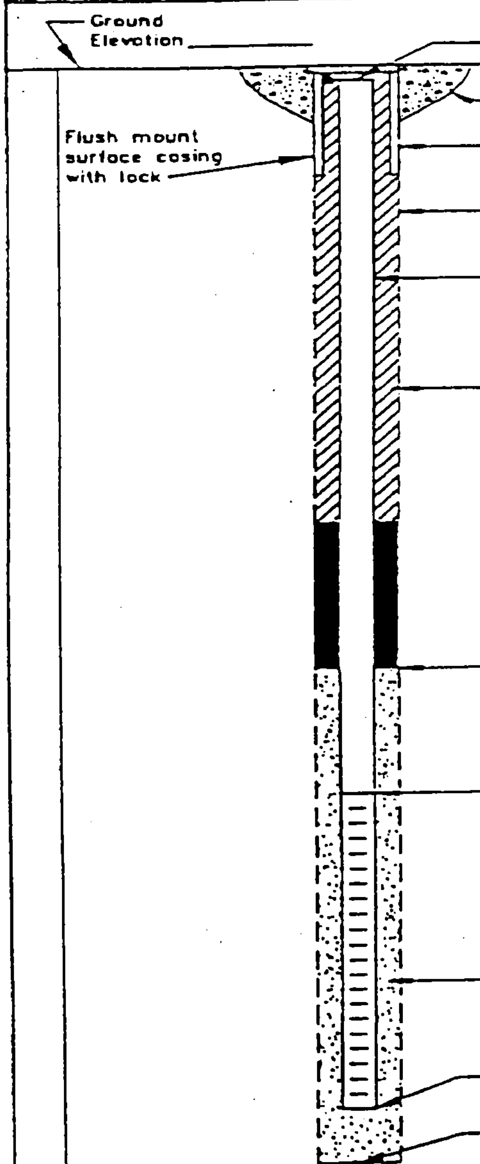
ATTACHMENT C-5A
EXAMPLE OVERBURDEN MONITORING WELL SHEET (FLUSHMOUNT)

BORING NO.: ______

MONITORING WELL SHEET

PROJECT ______ LOCATION ______
PROJECT NO. ______ BORING ______
ELEVATION ______ DATE ______
FIELD GEOLOGIST ______

DRILLER ______
DRILLING METHOD ______
DEVELOPMENT METHOD ______



ELEVATION TOP OF RISER: ______

TYPE OF SURFACE SEAL: ______

TYPE OF PROTECTIVE CASING: ______

I.D. OF PROTECTIVE CASING: ______

DIAMETER OF HOLE: ______

TYPE OF RISER PIPE: ______

RISER PIPE I.D.: ______

TYPE OF BACKFILL/SEAL: ______

______

DEPTH/ELEVATION TOP OF SAND: ______/______

DEPTH/ELEVATION TOP OF SCREEN: ______/______

TYPE OF SCREEN: ______

SLOT SIZE x LENGTH: ______

TYPE OF SAND PACK: ______

DIAMETER OF HOLE IN BEDROCK: ______

DEPTH/ELEVATION BOTTOM OF SCREEN: ______/______

DEPTH/ELEVATION BOTTOM OF SAND: ______/______

DEPTH/ELEVATION BOTTOM OF HOLE: ______/______

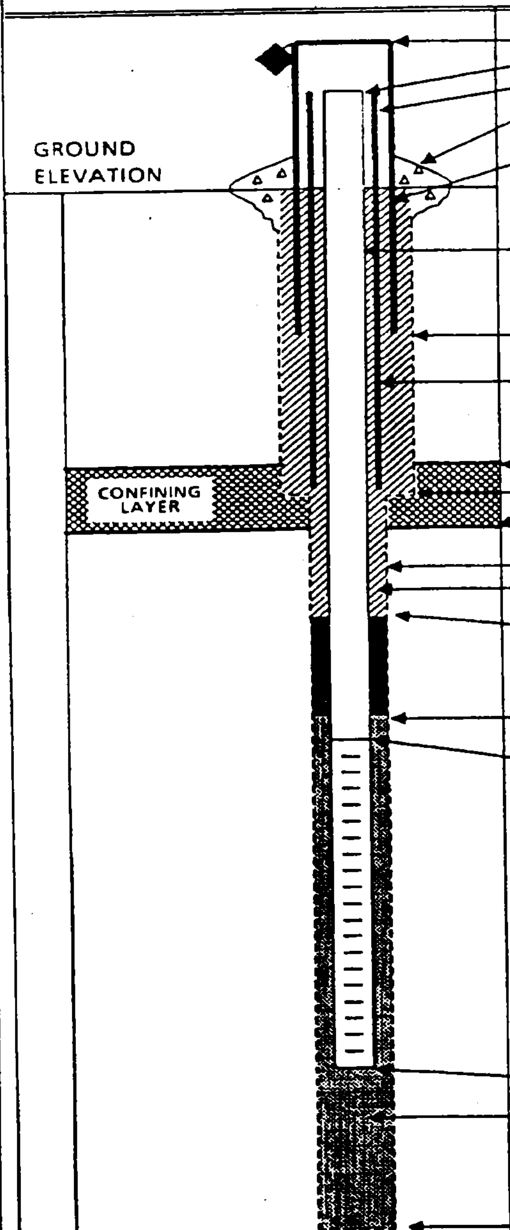
BACKFILL MATERIAL BELOW SAND: ______

ATTACHMENT C-6
EXAMPLE CONFINING LAYER MONITORING WELL SHEET

BORING NO.: ____________

CONFINING LAYER
MONITORING WELL SHEET

PROJECT ____________ LOCATION ____________ DRILLER ____________
PROJECT NO. ____________ BORING ____________ DRILLING
ELEVATION ____________ DATE ____________ METHOD ____________
FIELD GEOLOGIST ____________ DEVELOPMENT
METHOD ____________



ELEVATION OF TOP OF SURFACE CASING : ____________
ELEVATION OF TOP OF RISER PIPE: ____________
ELEVATION TOP OF PERM. CASING: ____________
TYPE OF SURFACE SEAL: ____________

I.D. OF SURFACE CASING: ____________
TYPE OF SURFACE CASING: ____________

RISER PIPE I.D. ____________
TYPE OF RISER PIPE: ____________

BOREHOLE DIAMETER: ____________

PERM. CASING I.D. ____________
TYPE OF CASING & BACKFILL: ____________

ELEVATION / DEPTH TOP CONFINING LAYER: ____________
ELEVATION / DEPTH BOTTOM OF CASING: ____________
ELEVATION / DEPTH BOT. CONFINING LAYER: ____________

BOREHOLE DIA. BELOW CASING: ____________
TYPE OF BACKFILL: ____________

ELEVATION / DEPTH TOP OF SEAL: ____________
TYPE OF SEAL: ____________

DEPTH TOP OF SAND PACK: ____________

ELEVATION/DEPTH TOP OF SCREEN: ____________
TYPE OF SCREEN: ____________

TYPE OF SAND PACK: ____________

ELEVATION / DEPTH BOTTOM OF SCREEN: ____________

ELEVATION / DEPTH BOTTOM OF SAND PACK: ____________
TYPE OF BACKFILL BELOW OBSERVATION WELL: ____________

ELEVATION / DEPTH OF HOLE: ____________

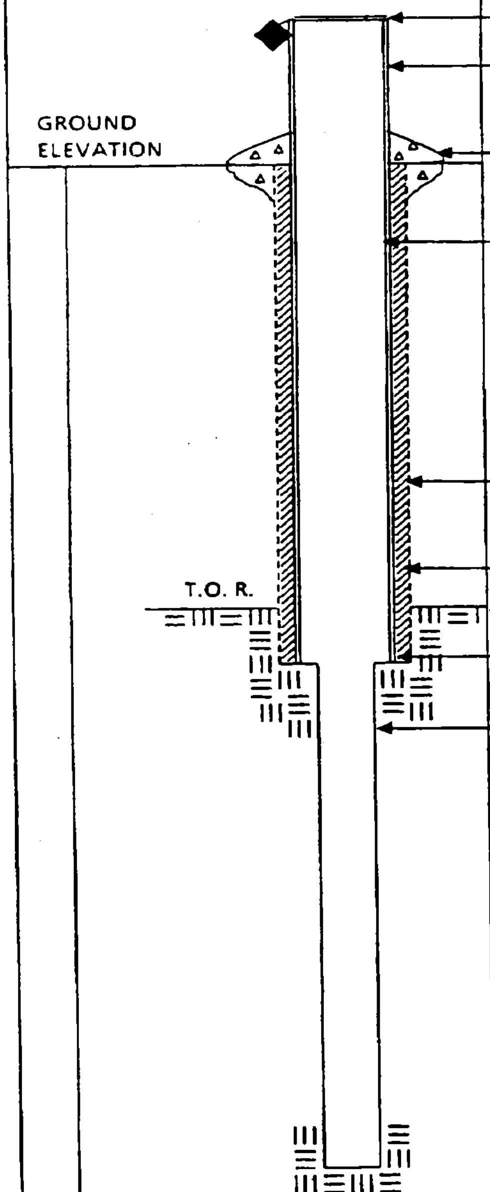
ATTACHMENT C-7
EXAMPLE BEDROCK MONITORING WELL SHEET - OPEN HOLE WELL

BORING NO.: ____________

BEDROCK
MONITORING WELL SHEET
OPEN HOLE WELL

PROJECT ____________ LOCATION ____________
PROJECT NO. ____________ BORING ____________
ELEVATION ____________ DATE ____________
FIELD GEOLOGIST ____________

DRILLER ____________
DRILLING METHOD ____________
DEVELOPMENT METHOD ____________



ELEVATION OF TOP OF CASING: ____________

STICK UP OF CASING ABOVE GROUND SURFACE: ____________

TYPE OF SURFACE SEAL: ____________
____

I.D. OF CASING: ____________
TYPE OF CASING: ____________

TEMP. / PERM.: ____________

DIAMETER OF HOLE: ____________

TYPE OF CASING SEAL: ____________

DEPTH TO TOP OF ROCK: ____________

DEPTH TO BOTTOM CASING: ____________

DIAMETER OF HOLE IN BEDROCK: ____________

DESCRIBE IF CORE / REAMED WITH BIT:
____
____
____

DESCRIBE JOINTS IN BEDROCK AND DEPTH:
____
____
____

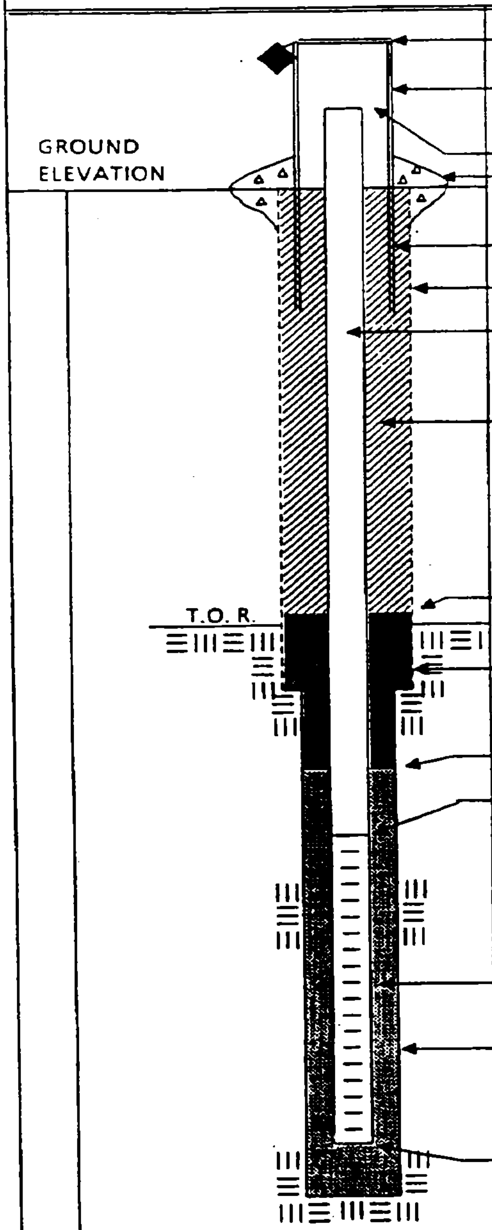
ELEVATION / DEPTH OF HOLE: ______ / ______

ATTACHMENT C-8
EXAMPLE BEDROCK MONITORING WELL SHEET - WELL INSTALLED IN BEDROCK

BORING NO.: ____________

BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT ____________ LOCATION ____________ DRILLER ____________
PROJECT NO. ____________ BORING ____________ DRILLING METHOD ____________
ELEVATION ____________ DATE ____________ DEVELOPMENT METHOD ____________
FIELD GEOLOGIST ____________



ELEVATION OF TOP OF SURFACE CASING: ____________

STICK UP OF CASING ABOVE GROUND SURFACE: ____________

ELEVATION TOP OF RISER: ____________

TYPE OF SURFACE SEAL: ____________

I.D. OF SURFACE CASING: ____________

DIAMETER OF HOLE: ____________

RISER PIPE I.D.: ____________

TYPE OF RISER PIPE: ____________

TYPE OF BACKFILL: ____________

ELEVATION / DEPTH TOP OF SEAL: ______/______

ELEVATION / DEPTH TOP OF BEDROCK: ______/______

TYPE OF SEAL: ____________

ELEVATION / DEPTH TOP OF SAND: ______/______

ELEVATION / DEPTH TOP OF SCREEN: ______/______

TYPE OF SCREEN: ____________

SLOT SIZE x LENGTH: ____________

I.D. SCREEN: ____________

TYPE OF SAND PACK: ____________

DIAMETER OF HOLE IN BEDROCK:

CORE / REAM: ____________

ELEVATION / DEPTH BOTTOM SCREEN: ______/______

ELEVATION / DEPTH BOTTOM OF HOLE: ______/______

ATTACHMENT C-8A
EXAMPLE BEDROCK MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK (FLUSHMOUNT)

BORING NO.: ________

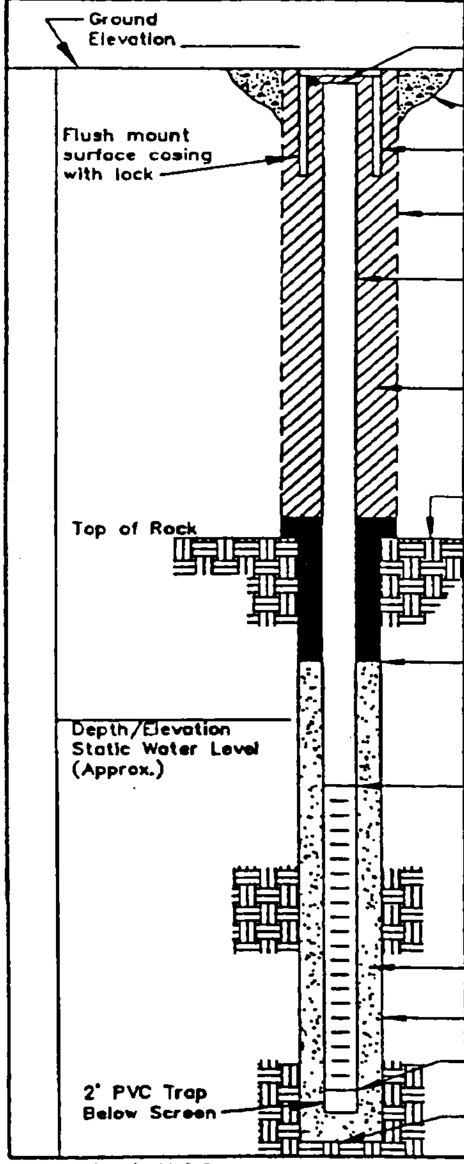
BEDROCK
MONITORING WELL SHEET
WELL INSTALLED IN BEDROCK

PROJECT: ________ LOCATION: ________ DRILLER: ________

PROJECT NO.: ________ BORING: ________ DRILLING METHOD: ________

ELEVATION: ________ DATE: ________ DEVELOPMENT METHOD: ________

FIELD GEOLOGIST: ________



ELEVATION TOP OF RISER: ________

TYPE OF SURFACE SEAL: ________

TYPE OF PROTECTIVE CASING: ________

I.D. OF PROTECTIVE CASING: ________

DIAMETER OF HOLE: ________

TYPE OF RISER PIPE: ________

RISER PIPE I.D.: ________

TYPE OF BACKFILL/SEAL: ________

DEPTH/ELEVATION TOP OF BEDROCK: ____/____

DEPTH/ELEVATION TOP OF SAND: ____/____

DEPTH/ELEVATION TOP OF SCREEN: ____/____

TYPE OF SCREEN: ________

SLOT SIZE x LENGTH: ________

TYPE OF SAND PACK: ________

DIAMETER OF HOLE IN BEDROCK: ________

DEPTH/ELEVATION BOTTOM OF SCREEN: ____/____

DEPTH/ELEVATION BOTTOM OF SAND: ____/____

DEPTH/ELEVATION BOTTOM OF HOLE: ____/____

BACKFILL MATERIAL BELOW SAND: ________

ACFILE: L670\GEOL\BEDRK.DWG

ATTACHMENT C-9
EXAMPLE TEST PIT LOG

TEST PIT LOG

Brown & Root Environmental

PROJECT: ______________________ TEST PIT NO.:

PROJECT NO ______________ DATE: ______________

LOCATION: ______________________

FIELD GEOLOGIST: ______________________

DEPTH (ft.)	LITHOLOGY CHANGE (Depth,ft.)	MATERIAL DESCRIPTION (Soil Density / Consistency, Color)	USCS	REMARKS

Test Pit Cross Section and / or Plan View

REMARKS ______________________

PHOTO LOG ______________________

TEST PIT ________

PAGE ____ OF ____

ATTACHMENT D
EXAMPLE EQUIPMENT CALIBRATION LOG

Brown & Root Environmental

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME / MODEL : ____________

MANUFACTURER : ____________

JOB NAME : ____________

JOB NUMBER : ____________

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS

ATTACHMENT E
EXAMPLE DAILY ACTIVITIES RECORD

Brown & Root Environmental

DAILY ACTIVITIES RECORD

PROJECT ______________ LOCATION ______________

CLIENT ______________ ARRIVAL TIME ______ JOB NO. ______

DATE ______________ DEPARTURE TIME ______________

CONTRACTOR ______________ DRILLER ______________

BORING NO. ______________ HNUS REPRESENTATIVE ______________

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE

COMMENTS: ____

APPROVED BY:

______________ HNUS FIELD REPRESENTATIVE

______________ DRILLER OR REPRESENTATIVE

ATTACHMENT F
FIELD TRIP SUMMARY REPORT
PAGE 1 OF 2

SUNDAY

Date: ______________________ Personnel: ______________________
Weather: ______________________ Onsite: ______________________

Site Activities: ____
____
____
____

MONDAY

Date: ______________________ Personnel: ______________________
Weather: ______________________ Onsite: ______________________

Site Activities: ____
____
____
____

TUESDAY

Date: ______________________ Personnel: ______________________
Weather: ______________________ Onsite: ______________________

Site Activities: ____
____
____
____

WEDNESDAY

Date: ______________________ Personnel: ______________________
Weather: ______________________ Onsite: ______________________

Site Activities: ____
____
____
____

ATTACHMENT F
PAGE 2 OF 2
FIELD TRIP SUMMARY REPORT

THURSDAY

Date: ______________________ Personnel: ______________________

Weather: ______________________ Onsite: ______________________

Site Activities: ____

____

____

____

FRIDAY

Date: ______________________ Personnel: ______________________

Weather: ______________________ Onsite: ______________________

Site Activities: ____

____

____

____

SATURDAY

Date: ______________________ Personnel: ______________________

Weather: ______________________ Onsite: ______________________

Site Activities: ____

____

____

____

APPENDIX C

HEALTH AND SAFETY PLAN

Draft Health and Safety Plan
for
Preliminary Assessment

Outlying Landing Field Bronson
Pensacola, Florida

Southern Division
Naval Facilities Engineering Command
Contract No. N62467-94-D-0888
Contract Task Order 0086

February 1999

DRAFT HEALTH AND SAFETY PLAN
FOR
PRELIMINARY ASSESSMENT

OUTLYING LANDING FIELD BRONSON
PENSACOLA, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION-NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, Pennsylvania 15222

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0086

FEBRUARY 1999

SUBMITTED BY:	APPROVED BY:
________________________	________________________
TERRY HANSEN	MATTHEW M. SOLTIS, CIH, CSP
TASK ORDER MANAGER	CLEAN HEALTH & SAFETY MANAGER
TETRA TECH NUS, INC.	TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA	PITTSBURGH, PENNSYLVANIA

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been written to encompass site activities that are to be conducted at properties associated with the Outlying Landing Field (OLF) Bronson, located west of Pensacola, Florida as part of Contract Task Order (CTO) 0086. Specifically, this HASP addresses the Preliminary Assessment (PA) activities to be conducted to identify whether soil and groundwater contamination exists at the sites. This HASP is being prepared for NAS Pensacola as part of an overall effort conducted under Comprehensive Long-Term Environmental Action Navy (CLEAN III) administered through the U.S. Navy Southern Division Naval Facilities Engineering Command (NAVFAC), as defined under Contract Number N62467-94-D-0888. In addition to the HASP, a copy of the Tetra Tech NUS, Inc. (TtNUS) Environmental Health and Safety Guidance Manual must be present at the site during the performance of site activities. The Guidance Manual provides detailed information pertaining to the HASP, as well as TtNUS Standard Operating Procedures (SOP's). Both documents must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.120.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site. The HASP will be modified, if new information becomes available. All changes to the HASP will be made by the Project Health & Safety Officer (PHSO) and approved by the TtNUS Health and Safety Manager (HSM) and the Task Order Manager (TOM). The TOM will notify affected personnel of all changes.

The elements of this HASP are in compliance with the requirements established by OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER), and sections of 29 CFR 1926, "Safety and Health Regulations for Construction". The information contained in this plan, as well as policies on conducting onsite operations, have been obtained from the TtNUS Health and Safety Program and NAS policies and procedures.

1.1 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in onsite activities. Personnel assigned to these positions shall exercise the primary responsibility for all onsite health and safety. These persons will be the primary point-of-contact for any questions regarding safety and health procedures and the selected control measures.

- The TtNUS TOM is responsible for the overall direction and implementation of health and safety for this project.

- The TtNUS Field Operations Leader (FOL) is responsible for implementation of this HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

- The SSO supports site activities by advising the FOL and PHSO on all aspects of health and safety on site. These duties may include the following:

  - Coordinates all health and safety activities with the FOL.
  - Selects, inspects, implements, and maintains personal protective equipment.
  - Establishes work zones and control points.
  - Directs and assists in the development of decontamination areas and procedures.
  - Implements air-monitoring program for onsite activities.
  - Verifies training and medical status of onsite personnel status in relation to site activities.
  - Implements hazard communication, respiratory protection, and other associated safety and health programs as necessary.
  - Coordinates emergency services.
  - Provides site-specific training for all onsite personnel.

- The TtNUS Project Health and Safety Officer (PHSO) is responsible for the preparation and maintenance of this Health and Safety Plan, including making any necessary amendments or modifications based on information that becomes available during the course of field activities. The PHSO also serves as the primary contact for technical health and safety support for this project.

- Compliance with these requirements is monitored by the SSO and the PHSO, under the direction of the CLEAN Health and Safety Manager (HSM).

1.2 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: OLF Bronson

Address: Pensacola, Florida

Remedial Project Manager: B.K. Moring
(US Navy)

Phone Number: (843) 820-5514

Navy On-Site Representative: Ron Joyner

Phone Number: (850) 452-4611

Purpose of Site Visit: This activity is divided into a multi-task operation (see Section 4.0), including soil boring (drilling), multi-media sampling, and other related activities.

Proposed Dates of Work: March – April 1999

Project Team:

TtNUS Personnel:	**Discipline/Tasks Assigned:**
Terry Hansen	Task Order Manager (TOM)
Jerry Goode	Field Operations Leader (FOL)
Matthew M. Soltis, CIH, CSP	CLEAN Health and Safety Manager (HSM)
Delwyn E. Kubeldis, CIH, CSP	Project Health and Safety Officer (PHSO)
TBD	Site Safety Officer (SSO)

Non-TtNUS Personnel	**Affiliation/Discipline/Tasks Assigned**
TBD	Drilling Subcontractor(s)
TBD	Surveying Subcontractor

Prepared By: Delwyn E. Kubeldis, CIH, CSP

TBD - To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a preplanning effort to direct and guide field personnel in the event of an emergency. In the event of onsite emergencies that cannot be handled by onsite personnel, they will be evacuated to a safe place of refuge, and the appropriate emergency response agencies will be notified. Because a majority of potential emergency situations will require assistance from outside emergency responders, TtNUS and subcontractor personnel will not provide emergency response support for significant emergency events beyond our capabilities. The emergency response agencies listed in this plan are capable of providing the most effective response and are designated as the primary responders. These agencies are located within a reasonable distance from the area of operations, a factor which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(l)(1)(ii).

TtNUS will, through necessary services, include initial response measures for incidents such as:

- Incipient fire-fighting support and prevention
- Incipient spill control and containment measures and prevention
- Removal of personnel from emergency situations
- Provision of initial medical support for injury/illness requiring only first-aid level support
- Provision of site control and security measures as necessary

2.2 PRE-EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, injury or illness resulting from exposure to chemical or physical hazards or fire are the most probable emergencies that can be encountered during site activities. To minimize and eliminate these potential emergency situations, pre-emergency planning activities associated with this project include the following. The SSO and/or the FOL are responsible for:

- Coordinating response actions with NAS Pensacola Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.

- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information includes the following:
  - Chemical Inventory (for substances used onsite), with Material Safety Data Sheets.
  - Onsite personnel medical records (medical data sheets).
  - A logbook identifying personnel onsite each day.
  - Emergency notification phone numbers in all site vehicles
- Identifying a chain or command for emergency action.
- Educating site workers to the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible.

It is the responsibility of the TtNUS FOL to ensure that this information is available and present at the site.

2.3 EMERGENCY RECOGNITION AND PREVENTION

2.3.1 Recognition

Foreseeable emergency situations that may be encountered during site activities will generally be recognizable by visual observation. Visual observation will be the principal method of identifying physical hazards that may be associated with the proposed scope of work. Visual observation will also play a role in detecting some chemical overexposures. A clear knowledge of the signs and symptoms of overexposure to contaminates of concern may alert personnel of the potential hazards concerning themselves or their fellow workers. These potential hazards, the activities with which they have been associated, and the recommended control methods are discussed in detail in sections 5.0 and 6.0 of this document. Additionally, early recognition will be supported by periodic site surveys to eliminate any conditions that may predispose site personnel or properties to an emergency. The FOL and the SSO will constitute the site evaluation committee responsible for these periodic surveys. Site surveys will be conducted at least once a week during the initiation of this effort.

The above actions will provide early recognition for potential emergency situations. Should an incident take place, TtNUS will take defensive and offensive measures to control these situations. However, if the FOL and/or the SSO determine that an incident has progressed to a serious emergency situation, TtNUS will withdraw, and notify the appropriate response agencies.

2.3.2 Prevention

TtNUS and subcontractor personnel will minimize the potential for emergencies by ensuring compliance with the HASP, the Health and Safety Guidance Manual, applicable OSHA regulations, and through periodic site surveys of work areas.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

In the event that the site must be evacuated, all personnel will immediately stop activities and report to the FOL at the place of safe refuge. Safe places of refuge will be determined prior to commencement of site activities and will be conveyed to personnel as part of the daily safety meeting conducted each morning. Upon reporting to the refuge location, personnel will remain there until directed otherwise by the TtNUS FOL. The FOL or the SSO will take a head count at this location to confirm the location of all site personnel. The site logbook will be used to take the head count. Places of refuge will ideally be selected which offer a point for communication purposes should this be required.

2.5 EVACUATION ROUTES AND PROCEDURES

Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the FOL. The use of these locations as assembly points provides communication and a direction point for emergency services, should they be needed.

Evacuation procedures will be discussed prior to the initiation of any work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) will influence the designation of evacuation routes. As a result, assembly points at NAS will be selected, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Since TtNUS personnel will not always be working in the proximity of each other, hand signals, voice commands, air horns, and two-way radios (approved by NAS personnel) will comprise the mechanisms to alert site personnel of an emergency.

If an incident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures (if needed) verbally, by air horn, or using two-way radios.
- Evacuate non-essential personnel.
- Initiate incipient response procedures.
- Describe to the FOL (who will serve as the Incident Commander) what has occurred in as much detail as possible.

In the event that site personnel cannot control the incident through offensive and/or defensive measures, the FOL and/or the SSO will enact emergency notification procedure to secure additional outside assistance in the following manner:

- Call 911 for outside emergency service and report the emergency to the NAS Emergency Dispatch (See Table 2-1)
- Give the emergency operator the location of the emergency and a brief description of what has occurred.
- Stay on the phone follow the instructions given by the operator
- The appropriate agency will be notified and dispatched

If an incident occurs at NAS outside of our designated operating areas impacting field personnel, the following procedures are to be initiated:

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns, or two-way radio.
- Call Navy On-Site Representative
- Proceed to the assembly points as directed by NAS personnel.

2.7 EMERGENCY CONTACTS

Prior to performing work at the site, all personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. A mobile phone shall be available on site. Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table must be posted on site where it is readily available to all site personnel.

TABLE 2-1
EMERGENCY REFERENCE
NAS PENSACOLA (OLF BRONSON)

AGENCY	TELEPHONE
EMERGENCY (outside services) (Police, Fire, and Ambulance Services)	911
NAS Pensacola - Emergency Dispatch	(850) 452-3333
Navy Engineer-in-Charge B. K. Moring	(843) 820-5514
Navy Environmental Coordinator Ron Joyner	(850) 452-4611
Navy Hospital	(850) 505-6600
TtNUS Tallahassee Office and Task Order Manager (Terry Hansen)	(850) 656-5458
CLEAN Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Delwyn E. Kubeldis, CIH, CSP	(412) 921-8529
Continuum Healthcare	(800) 229-3674

2.8 EMERGENCY ROUTE TO HOSPITAL

For the purpose of this project, one hospital has been chosen as the primary resource for medical attention.

Navy Hospital
Highway 98
Pensacola, Florida
(850) 505-6600

Directions to the Navy Hospital from OLF Bronson are as follows:

> Proceed out of OLF Bronson turning right onto Highway 98. Proceed east on Highway 98 approximately 4 miles. Hospital will be on the left (Building 2268).

A map indicating the travel route from the site to the Navy Hospital will be inserted as Figure 2-1.

2.9 DECONTAMINATION PROCEDURES/EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will not be performed if the incident warrants immediate evacuation. However, it is unlikely that an evacuation would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

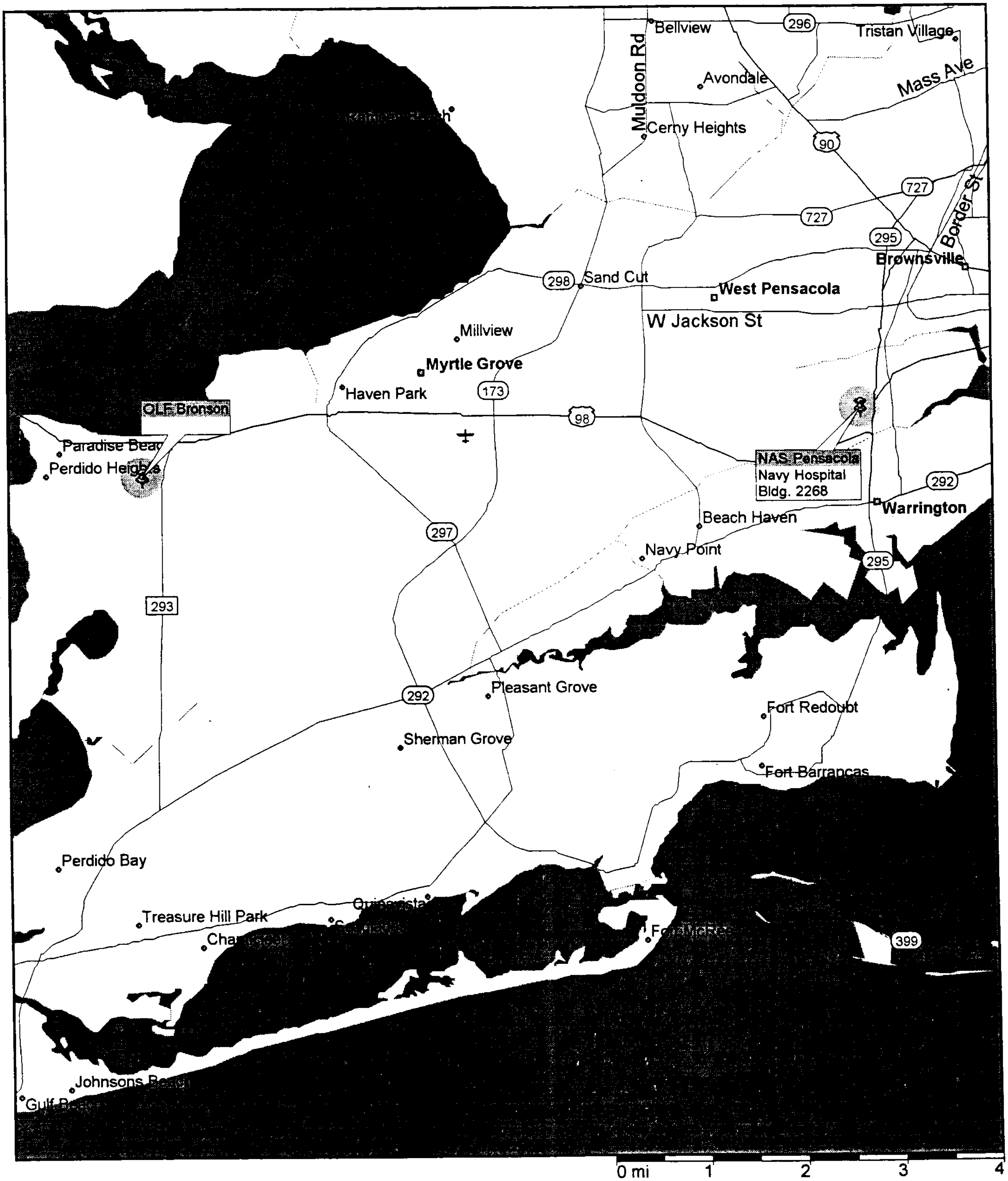
TtNUS personnel will perform removal of personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only first-aid level support. Medical attention above that level will require assistance and support from the designated emergency response agencies. **If the emergency involves personnel exposures to chemicals, follow the steps provided in Figure 2-2.**

2.10 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment II) must be followed. Following this procedure is necessary for documenting all of the information obtained at the time of the incident.

OLF Bronson

Hospital Route



Streets98

FIGURE 2-2
EMERGENCY RESPONSE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of exposure situations. In the event of a personnel exposure to a hazardous substance or agent:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events)
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the exposed person is a Tetra Tech NUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the Continuum Healthcare physician. Continuum Healthcare will contact the medical facility and request specific testing which may be appropriate. The care of the involved worker will be monitored by Continuum Healthcare physicians. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call Continuum Healthcare at 1-800-229-3674, being prepared to provide:
  - Any known information about the nature of the exposure.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the exposed Tetra Tech NUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate MSDS to Continuum Healthcare at (770) 457-1429.
- Contact Corporate Health and Safety Department (Matt Soltis) at 1-800-245-2730.

As environmental data is gathered and the exposure scenario becomes more clearly defined, this information should be forwarded to the Continuum Healthcare Medical Director or Assistant Medical Director.

Continuum Healthcare will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each involved worker's medical file in addition to being distributed to appropriately designated company officials. Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. This generalized summary will be accompanied by a personalized letter describing the findings/results. A copy of the personal letter will be filed in the continuing medical file maintained by Continuum Healthcare.

FIGURE 2-2 (continued)
POTENTIAL EXPOSURE REPORT

Name: ______________________ Date of Exposure: ____________

Social Security No.: ____________ Age: ________ Sex: ________

Client Contact: ______________________ Phone No.: ____________

Company Name: ______________________

I. Exposing Agent

Name of Product or Chemicals (if known): ______________________

____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing? ______________________

How long did individual work in area before signs/symptoms developed? ____________

Was protective gear being used? If yes, what was the PPE? ____________

Was there skin contact? ______________________

Was the exposing agent inhaled? ______________________

Were other persons exposed? If yes, did they experience symptoms? ____________

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: ________ Worsened: ________ Remained Unchanged: ________

V. Treatment of Symptoms (check off appropriate response)

None: _ Self-Medicated: ________ Physician Treated: ________

3.0 SITE BACKGROUND

OLF Bronson is located in Escambia County, in Florida's northwest coastal area, approximately 5 miles west of the Pensacola City limits. The 950-acre installation was constructed in the early 1940s. Prior to construction, the site was undeveloped and sparsely vegetated. Several unpaved roads or airstrips were visible at the site leading to the paved circular area. The original name of the airfield, Tarklin Field, was changed to OLF Bronson during the installation construction activities. The base was used a training base for Naval aviators during World War II and the Korean War. The western portion of OLF Bronson was also used to maintain sea planes and train sea plane pilots. OLF Bronson was closed as an active airfield in 1950, but the runways were still used for touch-and-go landing for helicopter training. After 1950, base dismantling activities were conducted. By 1968, all buildings located at OLF Bronson were razed. Aerial photographs identify areas to the south, east, and north of the facility as undeveloped with the exception of some residential properties along U.S. Highway 98, and Perdido Bay (0.5 miles north of the facility).

3.1 SITE DESCRIPTIONS

This HASP encompasses field work being performed at two properties associated with OLF Bronson.

3.1.1 Site 100 – Former Fire-Fighting Training Area

Site 100 is located in the south-central portion of the facility. The fire-fighting training area was believed to be utilized during the time that OLF Bronson was active (1942 – 1958). The OLF Bronson Fire Department reportedly conducted practice burns at the training area. Typically, material burned during the training exercises would consist of readily available flammable products such as waste aviation gasoline. Other flammable liquids such as kerosene, chlorinated solvents, diesel fuel, hydraulic fluid, and automobile gas may have been burned.

3.1.2 Site 102 – Machine Gun Butt

Site 102 is a former machine gun butt located on the south-central portion of the facility. The machine gun butt measures approximately 100 feet by 40 feet by 30 feet high. The machine gun butt had been utilized during the active period of OLF Bronson as a backstop for aircraft machine gun targets. The mound was used by aircraft mechanics to calibrate 30- and 50-caliber aircraft machine guns. Bullets from aircraft guns were aimed at the machine gun butt to test and align aircraft gun sites. Remnants of bullets were discovered embedded in the machine gun butt. It was concluded that various metals, which were fired into the machine gun butt, could have potential to impact local surface waters and minimal impact on the groundwater.

4.0 SCOPE OF WORK

The following is a list of activities that are covered in this HASP for the CTO 0086 assessment:

- Mobilization/demobilization
- Soil boring activities (Direct Push Technology [DPT] and hollow-stem auger drilling)
- Monitoring well installation and development
- Multi-media sampling, including:
  - Soils (surface and subsurface)
  - Groundwater and surface water
  - Sediment
  - Investigative-Derived Waste (IDW)
- Site surveying
- Decontamination of sampling and heavy equipment
- IDW management

The above listing represents a summarization of the tasks as they may apply to the scope and application of this HASP. For more detailed description of the associated tasks, refer to the Sampling and Analysis Plan (SAP). Any tasks to be conducted outside of the elements listed here will be considered a change in scope requiring modification of this document. The TOM or a designated representative will submit all requested modifications to this document to the HSM.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES SUMMARIZATION

Table 5-1 of this section serves as the primary portion of the site-specific HASP which identifies the tasks that are to be performed as part of the scope of work. This table will be modified and incorporated into this document as new or additional tasks are performed at the site. The anticipated hazards, recommended control measures, air monitoring recommendations, required Personal Protective Equipment (PPE), and decontamination measures for each site task are discussed in detail. This table and the associated control measures shall be changed, if the scope of work, contaminants of concern, or other conditions change.

Through using the table, site personnel can determine which hazards are associated with each task and at each site, and what associated control measures are necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which PPE and decontamination procedures to use based on proper air monitoring techniques and site-specific conditions.

A Health and Safety Guidance Manual accompanies this table and HASP. The manual is designed to further explain supporting programs and elements for other site-specific aspects as required by 29 CFR 1910.120. The Guidance Manual should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of Tetra Tech NUS' SOPs are also provided in this Guidance Manual.

Safe Work Permits issued for all exclusion zone activities (See Section 9.4 and Attachment IV) will use elements defined in Table 5-1 as it's primary reference. The FOL and/or the SSO completing the Safe Work Permit will add additional site-specific information. In situations where the Safe Work Permit is more conservative than the direction provided in Table 5-1 due to the incorporation of site-specific elements, the Safe Work Permit will be followed.

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TABLE 5-1

TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR OUTLYING LANDING FIELD – BRONSON, PENSACOLA, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
Soil boring activities (using hollow-stem auger and DPT drilling techniques). This task also includes monitoring well installation.	*Chemical Hazards* 1) Chemical hazards vary depending on which site is being investigated. <u>Site 100 – Former Fire-Fighting Training Area</u> Potential contaminants are fuels used in fire-fighting exercises, including VOCs (jet/aviation fuel [represented as JP-5], gasoline, and chlorinated solvents [represented as trichloroethylene]) and TPHs (represented as Diesel Range Organics [DRO]). <u>Site 102 – Machine Gun Butt</u> Potential contaminants are metals associated with bullet remnants, including lead, copper, and zinc. Further information on these contaminants and other potential contaminants is presented in Table 6-1. 2) Transfer of contamination into clean areas or onto persons *Physical hazards* 3) Heavy equipment/machinery hazards (rotating equipment, struck by hazards, etc.) 4) Noise in excess of 85 decibels (dBA) 5) Energized systems (contact with underground or overhead utilities) 6) Strain from heavy lifting 7) Slip, trips, and falls 8) Vehicular (highway) and equipment traffic 9) Ambient temperature extremes (heat stress) 10) Inclement weather *Natural Hazards* 11) Insect/animal bites and stings, poisonous plants, etc.	1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (e.g. air, water, soils, etc.). Generation of dusts should be minimized to the greatest extent possible. Airborne dust clouds should be avoided or area wetting methods used. If area wetting methods are not feasible, termination of activities will be used to minimize exposure to excessive airborne dusts. 2) Decontaminate all equipment and supplies between boreholes and prior to leaving the site. 3) All equipment to be used will be - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600,.601,.602), and manufacturers design and documented as such using Equipment Inspection Checklist (See Attachment III of this HASP). - Operated by knowledgeable operators and ground crew. - Only manufacturer approved equipment may be used in conjunction with equipment repair procedures. In addition to the equipment considerations, the following SOPs will be employed: - All personnel not directly supporting the drilling operation will remain at least 25 feet from the point of operation. - All loose clothing/protective equipment will be secured to avoid possible entanglement. - Hand signals will be established prior to the commencement of drilling activities. - A remote sampling device must be used to sample drill cuttings near rotating tools. - Work areas will be kept clear of clutter. - All personnel will be instructed in the location and operations of the emergency shut off device(s). This device will be tested initially (and then periodically) to insure its operational status. - Areas will be inspected prior to the movement of direct push rigs and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. 4) Hearing protection will be used during all subsurface activities. 5) All utility clearances shall be obtained prior to subsurface activities. Prior to any subsurface investigations, the locations of all underground utilities will be identified and marked. Obtain written permit clearance prior to all subsurface investigations. 6) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 7) Preview work locations for unstable/uneven terrain. 8) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Personnel must wear reflective vests in traffic areas. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the Base requirements. 9) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP. 10) Suspend or terminate operations until directed otherwise by SSO 11) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison ivy, poison oak, etc.). Report potential hazards to the SSO. When feasible and necessary, use commercially available insect repellents. Refer to Attachment I of this HASP or the Health and Safety Guidance Manual for additional information on natural hazards.	**It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard.** A Photoionization Detector w/ 10.6 eV UV lamp source or Flameionization Detector will be used to screen for VOCs. The following guidance applies: Source (e.g., borehole) monitoring will be conducted at regular intervals determined by the SSO. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations. Some site contaminants are metals and are not detectable with the PID or FID. Also, site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to the greatest extent possible to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts or by avoiding dust plumes. Where the utility clearance cannot be obtained in a reasonable period, or not located, drilling shall proceed with extreme caution using a magnetometer for periodic downhole surveys every 2 feet to a depth of at least 6 feet.	All subsurface operations are to be initiated in Level D protection. Level D protection constitutes the following minimum protection - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Safety glasses - Hardhat - *Reflective vest for traffic areas* - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire.* - *Nitrile gloves or leather gloves with surgical style inner gloves* - *Hearing protection during drilling or for other high noise areas as directed by the SSO.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** - Will consist of a soap/water wash and rinse for reusable protective equipment (e.g., gloves). This function will take place at an area adjacent to the drilling operations bordering the support zone. This decontamination procedure for Level D protection will consist of - Equipment drop - Soap/water wash and rinse of reusable outer gloves, as applicable - Outer coveralls, boot covers, and/or outer glove removal - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Wash hands and face, leave contamination reduction zone.

TABLE 5-1

TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR OUTLYING LANDING FIELD – BRONSON, PENSACOLA, FLORIDA PAGE 2 OF 4

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
Multi-media sampling, including groundwater, surface water, sediment, and soil (surface and subsurface) This task also includes sampling for IDW	*Chemical Hazards* 1) Chemical hazards vary depending on which site is being investigated. Site 100 – Former Fire-Fighting Training Area Potential contaminants are fuels used in fire-fighting exercises, including VOCs (jet/aviation fuel [represented as JP-5], gasoline, and chlorinated solvents [represented as trichloroethylene]) and TPHs (represented as Diesel Range Organics [DRO]). Site 102 – Machine Gun Butt Potential contaminants are metals associated with bullet remnants, including lead, copper, and zinc. Further information on these contaminants and other potential contaminants is presented in Table 6-1. 2) Transfer of contamination into clean areas *Physical hazards* 3) Noise in excess of 85 decibels (dBA) 4) Strain from heavy lifting 5) Heavy equipment/machinery hazards (rotating equipment, struck by hazards, etc.) 6) Slip, trips, and falls 7) Vehicular (highway) and equipment traffic 8) Ambient temperature extremes (heat stress) 9) Inclement weather *Natural Hazards* 10) Insect/animal bites and stings, poisonous plants, etc.	1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media (e.g. air, water, soils). Generation of dusts should be minimized to the greatest extent possible. Airborne dust clouds should be avoided or area wetting methods used. If area wetting methods are not feasible, termination of activities will be used to minimize exposure to observed airborne dusts. 2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. 3) When sampling at the drilling locations use hearing protection. The use of hearing protection outside of 25 feet from the drilling locations should be incorporated under the following condition: If you have to raise your voice to talk to someone who is within 2 feet of your location, hearing protection must be worn. 4) Use machinery or multiple personnel for heavy lifts. Use proper lifting tchniques. 5) Avoid contact moving equipment and keep hands from the point of operation. A remote sampling device must be used to sample drill cuttings near rotating tools. The equipment operator shall shutdown machinery if the sampler is near moving machinery parts. 6) Preview work locations for unstable/uneven terrain. 7) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Personnel must wear reflective vests in traffic areas. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with Base requirements. 8) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP. 9) Suspend or terminate operations until directed otherwise by SSO 10) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison ivy, poison oak, etc.). Report potential hazards to the SSO. When feasible and necessary, use commercially available insect repellents. Refer to Attachment I of this HASP or the Health and Safety Guidance Manual for additional information on natural hazards.	**It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard.** A Photoionization Detector w/ 10.6 eV UV lamp source or Flameionization Detector will be used to screen for VOCs. The following guidance applies: Source (e.g., borehole) monitoring will be conducted at regular intervals determined by the SSO. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations. Some site contaminants are metals and are not detectable with the PID or FID. Also, site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to the greatest extent possible to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be qualitative by observing work conditions for visible dust clouds or accumulations. Potential exposure to contaminants attached to dust particles will be controlled by using water to suppress dusts or by avoiding dust plumes.	Level D protection will be utilized for the initiation of all sampling activities. Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (steel toe/shank) - Safety glasses - Surgical style gloves (double-layered if necessary) - *Reflective vest for high traffic areas* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)* **Note:** The Safe Work Permit(s) for this task (see Attachment IV) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a removal and disposal of non-reusable PPE (gloves, coveralls, etc., as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of: - Equipment drop - Outer coveralls, boot covers, and/or outer glove removal (as applicable) - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Soap/water wash and rinse of reusable PPE (e.g., hardhat) if potentially contaminated - Wash hands and face, leave contamination reduction zone.

TABLE 5-1

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TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
OUTLYING LANDING FIELD – BRONSON, PENSACOLA, FLORIDA

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
Mobilization/ Demobilization	*Physical Hazards* 1) Lifting (muscle strains and pulls) 2) Pinches and compressions 3) Slip, trips, and falls 4) Heavy equipment/machinery hazards (rotating equipment, struck by hazards, etc.) 5) Vehicular (highway) and equipment traffic 6) Ambient temperature extremes (heat stress)	1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 2) Keep any machine guarding in place. Avoid moving parts. Secure loose clothing, jewelry, or long hair that could become entangled. 3) Preview work locations for unstable/uneven terrain. 4) All equipment will be -Inspected in accordance with OSHA, and manufacturers design. -Operated by knowledgeable operators, and knowledgeable ground crew. 5) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Personnel must wear reflective vests in traffic areas. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with Base requirements. 6) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP.	Not required	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - *Safety glasses* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas, or as directed on an operation by operation scenario.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)*	Not required
Decontamination of Sampling and Heavy Equipment	*Chemical Hazards* 1) Chemical hazards vary depending on which site is being investigated. <u>Site 100 – Former Fire-Fighting Training Area</u> Potential contaminants are fuels used in fire-fighting exercises, including VOCs (jet/aviation fuel [represented as JP-5], gasoline, and chlorinated solvents [represented as trichloroethylene]) and TPHs (represented as Diesel Range Organics [DRO]). <u>Site 102 – Machine Gun Butt</u> Potential contaminants are metals associated with bullet remnants, including lead, copper, and zinc. Further information on these contaminants and other potential contaminants is presented in Table 6-1. 2) Decontamination fluids - Liquinox (detergent), acetone or isopropanol *Physical Hazards* 3) Strains from heavy lifting 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Vehicular (highway) and equipment traffic 7) Ambient temperature extremes (heat stress) 8) Slips, trips, and falls	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Obtain manufacturer's MSDS for any decontamination solvents used onsite. Use appropriate PPE as identified on MSDS. All chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication section of the Health and Safety Guidance Manual (Section 5). 3) Use multiple persons where necessary for lifting and handling sampling equipment for decontamination purposes. 4) Wear hearing protection when operating pressure washer. 5) Use eye and face protective equipment when operating pressure washer. All other personnel must be restricted from the area. 6) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Personnel must wear reflective vests in traffic areas. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with Base requirements. 7) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP. 8) Preview work locations for unstable/uneven terrain.	Use visual observation, and real-time monitoring instrumentation to ensure all equipment has been properly cleaned of contamination and dried. After decon is completed, screen equipment with a PID/FID. If any elevated readings (i.e., above background) are observed, perform decon again and rescreen. Repeat until no elevated PID/FID readings are noted.	*For Heavy Equipment* This applies to high pressure soap/water, steam cleaning wash and rinse procedures. Level D Minimum requirements - - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Chemical resistant boot covers - Nitrile outer gloves - PVC Rainsuits or PE or PVC coated Tyvek - Safety glasses underneath a splash shield - Hearing protection (plugs or muffs) if operating pressure washer for more than 15 minutes *For sampling equipment*, the following PPE is required Level D Minimum requirements - - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Nitrile outer gloves - Safety glasses *In the event of overspray of chemical decontamination fluids use PVC Rainsuits or PE or PVC coated Tyvek as necessary.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)*	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of: - Equipment drop - Soap/water wash and rinse of outer boots and gloves, as applicable - Soap/water wash and rinse of the outer splash suit, as applicable - Disposable PPE will be removed and bagged. **Equipment Decontamination** - All heavy equipment decontamination will take place at a centralized decontamination pad utilizing steam or pressure washers. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. All site vehicles will be restricted access to exclusion zones, or also have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the onsite activity. **Sampling Equipment Decontamination** Sampling equipment will be decontaminated as per the requirements in the Sampling and Analysis Plan and/or Work Plan. MSDS for any decon solutions (Alconox, isopropanol, etc.) will be obtained and used to determine proper handling / disposal methods and protective measures (PPE, first-aid, etc.). All equipment used in the exclusion zone will require a complete decontamination between locations and prior to removal from the site. The FOL or the SSO will be responsible for evaluating equipment arriving onsite and that which is to leave the site. No equipment will be authorized access or exit without this evaluation.

TABLE 5-1

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TASKS/HAZARDS/CONTROL MEASURES COMPENDIUM FOR
OUTLYING LANDING FIELD – BRONSON, PENSACOLA, FLORIDA
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Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment	Decontamination Procedures
IDW management (including moving IDW drums to storage areas)	*Chemical Hazards* 1) Chemical hazards vary depending on which site is being investigated. <u>Site 100 – Former Fire-Fighting Training Area</u> Potential contaminants are fuels used in fire-fighting exercises, including VOCs (jet/aviation fuel [represented as JP-5], gasoline, and chlorinated solvents [represented as trichloroethylene]) and TPHs (represented as Diesel Range Organics [DRO]). <u>Site 102 – Machine Gun Butt</u> Potential contaminants are metals associated with bullet remnants, including lead, copper, and zinc. Further information on these contaminants and other potential contaminants is presented in Table 6-1. 2) Transfer of contamination into clean areas *Physical hazards* 3) Noise in excess of 85 dBA 4) Strains from heavy lifting 5) Pinches and compressions 6) Slip, trips, and falls 7) Natural hazards (Insect/animal bites and stings) 8) Vehicular (highway) traffic 9) Ambient temperature extremes (heat stress)	1) Employ real-time monitoring instrumentation, action levels, and identify PPE to control exposures to potentially contaminated media (e.g. air, water, soils). 2) Decontaminate all equipment and supplies, if they become contaminated, between locations and prior to leaving the site. 3) When working near heavy equipment, use hearing protection. 4) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 5) Keep any machine guarding in place. Avoid moving parts. Secure loose clothing, jewelry, or long hair that could become entangled. 6) Preview work locations for unstable/uneven terrain. 7) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 3 feet). - Personnel must wear reflective vests in traffic areas. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with Base requirements. 8) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Attachment V of this HASP.	**It is anticipated that potential contaminant concentrations at outdoor sample locations will not present an inhalation hazard.** A Photoionization Detector w/ 10.6 eV UV lamp source or Flameionization Detector will be used to screen for VOCs. The following guidance applies: Source monitoring will be conducted at regular intervals determined by the SSO. The SSO will also monitor the breathing zone (BZ) of all potentially affected employees. Workers must evacuate to a safe area if sustained BZ concentrations exceed background concentrations.	Level D protection will be utilized for the initiation of all IDW activities. Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Safety shoes (Steel toe/shank) - Safety glasses - Hardhat - *Reflective vest for traffic areas* - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential exists for soiling work attire.* - *Nitrile gloves or leather gloves with surgical style inner gloves* - *Hearing protection if near drilling operations or for other high noise areas as directed by the SSO.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)*	**Personnel Decontamination** - Will consist of a soap/water wash and rinse for reusable protective equipment (e.g., gloves). This function will take place at an area adjacent to the operations bordering the support zone. This decontamination procedure for Level D protection will consist of - Equipment drop - Soap/water wash and rinse of reusable outer gloves, as applicable - Outer coveralls, boot covers, and/or outer glove removal - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Wash hands and face, leave contamination reduction zone.
Surveying	*Chemical hazards:* Exposure to site contaminants during this activity is anticipated to be unlikely given the limited contact with potentially contaminated media. *Physical hazards:* 2) Slip, trips, and falls 3) Inclement weather *Natural Hazards:* 4) Insect/animal bites or stings, poisonous plants, etc.	2) Preview work locations and site lines for uneven and unstable terrain. Clear necessary vegetation, establish temporary means for traversing hazardous terrain(i.e., rope ladders, etc.) 3) Suspend or terminate operations until directed otherwise by SSO 4) Wear appropriate clothing and PPE. Avoid potential nesting areas and suspicious vegetation (poison ivy, poison oak, etc.). Report potential hazards to the SSO. When feasible and necessary, use commercially available insect repellents. Refer to Attachment I of this HASP or the Health and Safety Guidance Manual for additional information on natural hazards.	No air monitoring is needed given the unlikelihood that volatile contaminants are present. The potential for exposure to site contaminants during this activity is considered minimal. Minimize the generation of airborne dusts since many site contaminants are in the form of a particulate or may be bound to particulates.	Surveying activities shall be performed in Level D protection Level D Protection consists of the following: - Standard field dress including sleeved shirt and long pants - Steel-toe work boots or shoes - Safety glasses, hard hats (if working near machinery) - Snake chaps for heavily wooded area where encounters are likely. - Tyvek coveralls may be worn to provide additional *protection against poisonous plants and insects, particularly ticks. Work gloves may be worn if desired.* *(Items in italics are deemed optional as conditions or the FOL or SSO dictate.)*	**Personnel Decontamination** - A structured decontamination is not required as the likelihood of encountering contaminated media is considered remote. However, survey parties should inspect themselves and one another for the presence of ticks when exiting wooded areas, grassy fields, etc. This action will be employed to stop the transfer of these insects into vehicles, homes, and offices.

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6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical, physical, and natural hazards associated with the sites to be investigated and the activities that are to be conducted as part of the scope of work. Table 6-1, which is included as part of this HASP, provides various information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data. Section 6.1 provides general information regarding all contaminants that may be present at the sites.

6.1 CHEMICAL HAZARDS

The investigation sites have two distinct sets of contaminants of concern. At Site 100 (Former Fire-Fighting Training Area), given the nature of past activities and practices, the following potential contaminants of concern are anticipated:

- Volatile Organic Compounds (VOCs), such as jet/aviation fuel (represented as JP-5), gasoline, and chlorinated solvents (represented as trichloroethylene),

- Total Petroleum Hydrocarbons (specifically Diesel Range Organics [DRO]).

At Site 102 (Machine Gun Butt), the following potential contaminants of concern are anticipated:

- Metals, such as lead, copper, and zinc.

Information on the toxicological, chemical, and physical properties of these substances are addressed in Table 6-1 of this HASP. It is anticipated that the greatest potential for exposure to site contaminants is during intrusive activities (soil borings and multi-media sampling). Exposure to these compounds is most likely to occur through inhalation of airborne particulate matter or through ingestion of contaminated soil or water through hand-to-mouth contact during soil disturbance activities.

6.2 PHYSICAL HAZARDS

In addition to the chemical hazards discussed above, the following physical hazards may be present during the performance of the site activities.

- Heavy equipment/machinery hazards (rotating equipment, struck by hazards, etc.)
- Slips, trips, and falls
- Energized systems (contact with underground or overhead utilities)
- Strain from heavy lifting

- Vehicular (highway) and equipment traffic
- Pinch/compression points
- Noise in excess of 85 decibels (dBA)
- Inclement weather
- Ambient temperature extremes (i.e., heat stress)
- Flying projectiles

These physical hazards are discussed in detail in Table 5-1 as applicable to each site task.

6.3 NATURAL HAZARDS

Natural hazards such as poisonous plants or bites from poisonous, disease-carrying, or otherwise dangerous animals or insects (snakes, ticks, etc.) are often prevalent at sites that are being investigated as part of hazardous waste site operations. During warm months (spring through early fall), tick-borne Lyme Disease may pose a potential health hazard. The longer a disease-carrying tick remains attached to the body, the greater the potential for contracting the disease. Wearing long -sleeved shirts and long pants (tucked into boots and taped) will prevent initial tick attachment, while performing frequent body checks will help prevent long term attachment. Site first aid kits should be equipped with medical forceps and rubbing alcohol to assist in tick removal. For information regarding tick removal procedures and symptoms of exposure, consult Section 4.0 of the Health and Safety Guidance Manual.

Contact with poisonous plants and bites or stings from poisonous insects are other potential natural hazards. Long sleeved shirts and long pants (tucked into boots), and avoiding potential nesting areas, will minimize the potential for exposure. Additionally, site personnel may use insect repellents. Personnel who are allergic to stinging insects (such as bees, wasps and hornets) must be particularly careful since severe illness and death may result from allergic reactions. As with any medical condition or allergy, information regarding the condition must be listed on the Medical Data Sheet (see Section 7 of the Health and Safety Guidance Manual), and the FOL or SSO notified.

Fire ants present a unique situation when working outdoors in Florida. Their aggressive behavior and their ability to sting repeatedly can pose a unique health threat. The sting injects a venom that causes an extreme burning sensation. Pustules from which can become infected if scratched. Allergic reactions of people sensitive to the venom include dizziness, swelling, shock and in extreme cases unconsciousness and death. People exhibiting such symptoms should see a physician.

Fire ants can be identified by their habitat. They build mounds in open sunny areas sometimes supported by a wall or shrub. The mound has no external opening. The size of the mound can range from a few inches across to some which are in excess of two feet or more in height and diameter. When disturbed they defend it by swarming out and over the mount even running up grass blades and sticks.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
OUTLYING LANDING FIELD – BRONSON, PENSACOLA, FLORIDA

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Diesel Range Organics(represented as Diesel Fuel)	Mixture	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either PID or FID.	Air sample using charcoal tube as a collection media; carbon disulfide desorption; GC/FID detection. Sampling and analytical protocol in accordance with NIOSH Method #1550.	OSHA/NIOSH/ACGIH: 5 mg/m^3 as mineral oil mist. In addition NIOSH and ACGIH establish 10 mg/m^3 as a STEL.	Kerosene odor **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** Nitrile	**Boiling Pt:** <170-400°F; 77-204°C **Melting Pt:** Not available **Solubility:** Negligible **Flash Pt:** 125°F; 52°C **LEL/LFL:** 0.6% **UEL/UFL:** 7.5% **Vapor Density:** >5 **Vapor Pressure:** <1 mmHg @ 70°F; 21°C **Specific Gravity:** 0.86 **Incompatibilities:** strong oxidizers, halogens, and hypochlorites **Appearance and odor:** Colorless to amber with a kerosene odor	Prolonged or repeated exposures to this product may cause skin and eye irritation. Due to the defatting capabilities this exposure may lead to a dermatitis condition. High vapor concentrations are irritating to the eyes and respiratory tract. Exposure to high airborne concentrations may result in narcotic effects including dizziness, headaches, and anesthetic to unconsciousness. High concentrations in a confined space may adequately displace oxygen thereby resulting in suffocation.
JP-5	N/A	Components of this substance will be detected readily however no documentation exists as to the relative response ratio of either the PID or FID.	Air sample using charcoal tube and carbon disulfide desorption; Sampling and analytical protocol shall proceed in accordance with NIOSH Method #1501.	USAF 8 hr - 200 ppm	Kerosene odor threshold ~ 800 ppm Rating - Poor to Adequate **Recommended Air Purifying cartridges:** Organic vapor **Recommended gloves:** Nitrile	**Boiling Pt:** <290-470°F; 143-243°C **Melting Pt:** Not available **Solubility:** Negligible **Flash Pt:**-10 to -50°F; -23 to -45°C **LEL/LFL:** <1% **UEL/UFL:** 8% **Vapor Density:** >1 **Vapor Pressure:** 75 mmHg; 70°F; 21°C **Specific Gravity:** 0.78 **Incompatibilities:** strong oxidizers **Appearance and odor:** Colorless to amber with a kerosene odor	Based on the constituents of jet fuels, it can be surmised that JP-5 is irritating to the eyes, skin, and respiratory tract. **Direct contact** may result in mild irritation with a possible drying and defatting of the skin **Ingestion** may result in gastrointestinal irritation, nausea, and vomiting and may be harmful or even fatal. **Inhalation** of vapors or mists of JP-5 may result in headache, nausea, confusion,narcotic effect, and drowsiness. Chronic inhalation of jet fuel vapors may produce symptoms such as fatigue, anxiety, mood changes, liver and kidney damage, and memory difficulties in exposed workers.
Gasoline	8006-61-9	Relative response ratios for the components of gasoline range from 100 - 200% for PID and FID detection.	See components for measurement considerations.	ACGIH & OSHA: 300 ppm 500 ppm STEL NIOSH: Reduce to lowest feasible concentration.	**Respiratory Protection:** Odor threshold 0.7 ppm, adequate air purifying respirator with organic vapor cartridges up to 100 ppm. **Recommended Gloves:** Nitrile >6.00 hrs; PV alcohol >6.00 hrs; Viton/neoprene >8.00 hrs	**Boiling Pt:** 102°F; 39°C **Melting Pt:** Not available **Solubility:** Negligible **Flash Pt:** -50°F; -45°C **LEL/LFL:** 1.4% **UEL/UFL:** 7.6% **Vapor Density:** ~5 **Vapor Pressure:** 38-300 mmHg (varies seasonally) **Specific Gravity:** 0.74 @ 20/20°C **Incompatibilities:** Strong oxidizers, peroxides, strong acids, and perchlorates **Appearance and Odor:** Colorless liquid with gasoline odor.	Overexposure to this substance may result in irritation to the eyes, skin, and mucous membranes. Systemically, headache, fatigue, blurred vision, dizziness, slurred speech, confusion, possible convulsion, and chemical pneumonia (aspiration). Prolonged or chronic exposures may result in possible liver or kidney damage. Components of this substance have been determined to be confirmed human carcinogens.

TABLE 6
CHEMIC. ?HYSICAL, AND TOXICOLOGICAL DATA
OUTLYING LANDING FIELD - BRONSON, PENSACOLA, FLORIDA
PAGE 2

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Trichloroethylene	79-01-6	PID: I.P. 9.45 eV, High response with PID and 10.2 eV lamp. FID: 70% Response with FID.	Air sample using charcoal tube; carbon disulfide desorption; Sampling and analytical protocol shall proceed in accordance with OSHA Method #07, or NIOSH Method #1022 or #1003.	OSHA: 50 ppm 200 ppm (Ceiling) ACGIH: 50 ppm 100 ppm STEL NIOSH: 25 ppm IDLH: 1000 ppm	Inadequate - Odor threshold 82 ppm. APRs with organic vapor/acid gas cartridges may be used for escape purposes. Exceedances over the exposure limits require the use of positive pressure-demand supplied air respirator. **Recommended gloves:** PV Alcohol unsupported >16.00 hrs; Silver shield >6.00 hrs; Teflon >24.00 hrs; or Viton >24.00 hrs; Nitrile (Useable time limit 0.5 hr, complete submersion for the nitrile selection)	**Boiling Pt:** 188°F; 86.7°C **Melting Pt:** -99°F; -73°C **Solubility:** 0.1% @ 77°F; 25°C **Flash Pt:** 90°F; 32°C **LEL/LFL:** 8% @ 77°F; 25°C **UEL/UFL:** 10.5 @ 77°F; 25°C **Vapor Density:** 4.53 **Vapor Pressure:** 100 mmHg @ 90°F; 32 °C **Specific Gravity:** 1.46 **Incompatibilities:** Strong caustics and alkalis, chemically active metals (barium, lithium, sodium, magnesium, titanium, and beryllium) **Appearance and Odor:** Colorless liquid with a chloroform type odor. Combustible liquid, however, burns with difficulty.	Central nervous system effects including euphoria, analgesia, anesthesia, paresthesia, headaches, tremors, vertigo, and somnolence. Damage to the liver, kidneys, heart, lungs, and skin have also been reported. Contact may result in irritation to the eyes, skin, and mucous membranes. Ingestion may result in GI disturbances including nausea, and vomiting NIOSH lists this substance a potential human carcinogen.
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	Air sample using a mixed cellulose ester filter; or HNO_3 or H_2O_2 desorption; or Atomic absorption detection. NIOSH Method #7082 or #7300.	OSHA: 0.05 mg/m^3 ACGIH: 0.05 mg/m^3 NIOSH: 0.10 mg/m^3 IDLH: 100 mg/m^3 as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m^3. **Recommended gloves:** This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	**Boiling Pt:** 3164°F; 1740°C **Melting Pt:** 621°F; 327°C **Solubility:** Insoluble **Flash Pt:** Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) **LEL/LFL:** Not applicable **UEL/UFL:** Not applicable **Vapor Density:** Not available **Vapor Pressure:** 0 mmHg **Specific Gravity:** 11.34 **Incompatibilities:** Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids **Appearance and Odor:** Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, Gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death. Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

TABLE 6-1
CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
OUTLYING LANDING FIELD - BRONSON, PENSACOLA, FLORIDA
PAGE 3

Substance	CAS No.	Air Monitoring/Sampling Information		Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Zinc	7440-66-6	Particulate form - This substance is not detectable using a PID or FID.	Air sample using a particulate filter; acid desorption; AAS detection. Sampling and analytical protocol will proceed in accordance with NIOSH Method #7300.	OSHA: 10 mg/m³ Total dust, 5 mg/m³ Respirable fraction NIOSH: 5 mg/m³, 15 mg/m³ (Ceiling) ACGIH: 10 mg/m³	No identifiable warning properties to indicate presence and thereby detection. **Recommended APR Cartridge:** Suitable for dust and fume. Organic vapor acid gases with HEPA filter. **Recommended gloves:** This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	**Boiling Pt:** 1666°F; 908°C **Melting Pt:** 788°F; 419.8°C **Solubility:** Insoluble **Flash Pt:** Not available (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) **LEL/LFL:** Not available **UEL/UFL:** Not available **Vapor Density:** Not available **Vapor Pressure:** 0 mmHg **Specific Gravity:** 7.14 **Incompatibilities:** Strong acids, halogens, catalytic metals, combustibles, oxidizers, nitryl fluoride **Appearance and odor:** Bluish-white, lustrous metal, odorless	Inhalation of fumes may result in metal fume fever. This condition is characterized by metallic taste, dryness of the throat, coughing with generalized aching and flu-like symptoms. Effects through ingestion may include coughing, difficulty in breathing, and sweating. A human skin irritant. Irritation to the eyes may result from mechanical action.
Copper	7440-50-8 (Cu) 1317-38-0 (CuO)	Substance is not volatile. Unable to be detected by PID or FID.	Air sample using a mixed cellulose ester filter; inductively coupled plasma/atomic emission spectroscopy. Sampling and analytical protocol shall proceed in accordance with NIOSH Method #7300.	NIOSH; OSHA: 0.10 mg/m³ ACGIH: 0.2 mg/m³	The use of an air-purifying full-face respirator with a high efficiency particulate air filter. **Recommended gloves:** This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	**Boiling Pt:** 4215°F; 2324°C **Melting Pt:** 1981°F; 1083°C **Solubility:** Insoluble **Flash Pt:** Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals) **LEL/LFL:** Not applicable **UEL/UFL:** Not applicable **Vapor Density:** Not available **Vapor Pressure:** 1 mmHg @ 2962°F 1628°C **Specific Gravity:** 8.94 **Incompatibilities:** Oxidizers, alkalis, sodium azide, acetylene, bromates, chlorates, iodates, and acids. **Appearance and Odor:** Metal: Reddish, lustrous malleable, odorless solid. Fume: Finely divided black particulate dispersed in air.	Irritation to the nose, throat, and respiratory tract. Metallic taste Discoloration of skin (potential dermatitis) and hair. Chronic exposure may result in dermatitis and damage to the liver and kidneys. Overexposure to fumes causes symptoms characteristic of the flu (headaches, chills, muscle aches, nausea, vomiting, diarrhea). Ingestion may cause burning in the mouth, throat, and stomach. Metallic taste with colicky abdominal pain. Individuals with Wilson's disease are at greater risk of chronic exposure as a result of the bodies tendency to absorb and retain copper.

7.0 AIR MONITORING

Direct reading instruments, such as the Photoionization Detector (PID) or Flame Ionization Detector (FID) will be used at the site to detect and evaluate the presence of site contaminants and other potentially hazardous conditions. As a result, specific air monitoring measures and requirements are established in Table 5-1 pertaining to the specific hazards and tasks of an identified operation. Additionally, the Health and Safety Guidance Manual, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments. Lead (potentially present at Site 102) is not detectable using either the PID or FID. Given the previously observed absence of significant amounts of bullet fragments, the nature of planned site activities, and the low inhalation hazard presented by lead, additional monitoring for lead exposure will not be conducted. If significant amounts of bullet fragments and/or lead are observed during the course of this project, the PHSO or HSM will be notified for further direction regarding appropriate monitoring for particulates.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector

In order to accurately monitor for any substances which may present an exposure potential to site personnel, a photoionization detector (PID) using a lamp energy of 10.6 eV or higher will be used. This instrument will be used to monitor potential source areas and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting the organic vapors of concern (**NOTE:** A flame ionization detector may be used as an alternative to the PID).

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels that will initiate the use of elevated levels of protection. The SSO may decide to increases these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager. Operational checks and field calibration will be performed on all instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the Health & Safety Guidance Manual which will be maintained on site for reference). All calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that all of the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: ______________________ PROJECT NO.:______________

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section is included to specify health and safety training and medical surveillance requirements for both TtNUS and subcontractor personnel participating in site activities.

8.1.1 Requirements for TtNUS Personnel

All TtNUS personnel must complete 40 hours of introductory hazardous waste site training prior to performing work at the OLF Bronson facility. Additionally, TtNUS personnel who have had introductory training more than 12 months prior to site work must have completed 8 hours of refresher training in the past 12 months before being cleared for site work. In addition, 8-hour supervisory training in accordance with 29 CFR 1910.120 (e)(4) will be required for site supervisory personnel.

Documentation of TtNUS introductory, supervisory, and refresher training as well as site-specific training will be maintained at the project. Copies of certificates or other official documentation will be used to fulfill this requirement.

8.1.2 Requirements for Subcontractors

All TtNUS subcontractor personnel must have completed introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120 (e). Additionally, personnel who have had the introductory training more than 12 months ago, are required to have 8 hours of refresher training meeting the requirements of 29 CFR 1910.120 (e)(8) prior to performing field work at the OLF Bronson facility if required. TtNUS subcontractors must certify that each employee has had such training by sending TtNUS a letter, on company letterhead, containing the information in the example letter provided as in Figure 8-1 and by providing copies of certificates for all subcontractor personnel participating in site activities.

FIGURE 8-1
TRAINING LETTER

The following statements must be typed on company letterhead and signed by an officer of the company and accompanied by copies of personnel training certificates:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Terry Hansen
Tetra Tech NUS, Inc.
Task Order Manager
Ellis Building, Suite 220
1311 Executive Center Drive
Tallahassee, Florida, 32301

Subject: HAZWOPER Training for OLF Bronson, Pensacola, Florida

Dear Mr. Hansen:

As an officer of XYZ Corporation, I hereby state that I am aware of the potential hazardous nature of the subject project. I also understand that it is our responsibility to comply with all applicable occupational safety and health regulations, including those stipulated in Title 29 of the Code of Federal Regulations (CFR), Parts 1900 through 1910 and Part 1926.

I also understand that Title 29 CFR 1910.120, entitled "Hazardous Waste Operations and Emergency Response," requires appropriate level of training for certain employees engaged in hazardous waste operations. In this regard, I hereby state that the following employees have had 40 hours of introductory hazardous waste site training or equivalent work experience as requested by 29 CFR 1910.120(e) and have had 8 hour of refresher training as applicable and as required by 29 CFR 1910.120(e)(8) and that site supervisory personnel have had training in accordance with 29 CFR 1910.120(e)(4).

LIST FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

Enclosed: Training Certificates

8.2 SITE-SPECIFIC TRAINING

TtNUS will provide site-specific training to all TtNUS employees and subcontractor personnel who will perform work on this project. Site-specific training will also be provided to all personnel (U.S. Department of Defense, EPA, etc.) who may enter the site to perform functions that may or may not be directly related to site operations. Site-Specific training will include:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets

Site-specific documentation will be established through the use of Figure 8-2. All site personnel and visitors must sign this document upon receiving site-specific training.

8.3 MEDICAL SURVEILLANCE

8.3.1 Medical Surveillance Requirements for TtNUS Personnel

All TtNUS personnel participating in project field activities will have had a physical examination meeting the requirements of TtNUS's medical surveillance program and will be medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained in the TtNUS Jacksonville office and made available, as necessary.

FIGURE 8-2

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing remedial investigation activities at OLF Bronson, Pensacola, Florida and that I have received site-specific training which included the elements presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site
- Use of personal protective equipment
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- Contents of the Health and Safety Plan
- Emergency response procedures (evacuation and assembly points)
- Incipient response procedures
- Review of the contents of relevant Material Safety Data Sheets

I further state that I have been given the opportunity to ask questions and that all of my questions have been answered to my satisfaction.

I further state, by presence of my signature below, that the date of my training (introductory, refresher, and supervisory, as applicable) and my medical surveillance requirements are accurate and correct to the best of my knowledge.

NAME	40-Hour General Site Worker Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Date of Medical Surveillance	SIGNATURE

8.3.2 Medical Surveillance Requirements for Subcontractors

Subcontractors are required to obtain a certificate of their ability to perform hazardous waste site work and to wear respiratory protection. The "Subcontractor Medical Approval Form" provided in Figure 8-3 shall be used to satisfy this requirement, providing it is properly completed and signed by a licensed physician.

Subcontractors who have a company medical surveillance program meeting the requirements of paragraph (f) of OSHA 29 CFR 1910.120 can substitute "Subcontractor Medical Approval Form" (See Figure 8-3) with a letter, on company letterhead, containing all of the information in the example letter presented in Figure 8-4 of this HASP.

8.3.3 Requirements for All Field Personnel

Each field team member (including subcontractors) and visitors entering the exclusion zone(s) shall be required to complete and submit a copy of Medical Data Sheet found in the TtNUS Health and Safety Guidance Manual. This shall be provided to the SSO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTIONS

Subcontractors who will not enter the exclusion zone during operation, and whose activities involve no potential for exposure to site contaminants, will not be required to meet the requirements for training/medical surveillance other than site-specific training as stipulated in Section 8.2. This exception may only be granted by the CLEAN Health and Safety Manager, Matt Soltis.

FIGURE 8-3

SUBCONTRACTOR MEDICAL APPROVAL FORM

For employees of ____
Company Name

Participant Name: ____________________________ Date of Exam: ________________

Part A

The above-named individual has:

1. Undergone a physical examination in accordance with OSHA Standard 29 CFR 1910.120, paragraph (f) and found to be medically -

   ( ) qualified to perform work at the OLF Bronson, work site
   ( ) not qualified to perform work at the OLF Bronson, work site

and,

2. Undergone a physical examination as per OSHA 29 CFR 1910.134(b)(10) and found to be medically -

   ( ) qualified to wear respiratory protection
   ( ) not qualified to wear respiratory protection

My evaluation has been based on the following information, as provided to me by the employer.

( ) A copy of OSHA Standard 29 CFR 1910.120 and appendices.
( ) A description of the employee's duties as they relate to the employee's exposures.
( ) A list of known/suspected contaminants and their concentrations (if known).
( ) A description of any personal protective equipment used or to be used.
( ) Information from previous medical examinations of the employee which is not readily available to the examining physician.

Part B

I, ____________________________, have examined ____________________________
Physician's Name (print) Participant's Name (print)
and have determined the following information:

FIGURE 8-3
SUBCONTRACTOR MEDICAL APPROVAL FORM
PAGE TWO

1. Results of the medical examination and tests (excluding finding or diagnoses unrelated to occupational exposure):

   ____
   ____
   ____

2. Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health:

   ____
   ____
   ____

3. Recommended limitations upon the employee's assigned work:

   ____
   ____
   ____

I have informed this participant of the results of this medical examination and any medical conditions which require further examination of treatment.

Based on the information provided to me, and in view of the activities and hazard potentials involved at the OLF Bronson work site, this participant

( ) may
( ) may not

perform his/her assigned task.

Physician's Signature ______________________

Address ______________________

Phone Number ______________________

NOTE: Copies of test results are maintained and available at:

____
Address

FIGURE 8-4

MEDICAL SURVEILLANCE LETTER

The following statements must be typed on company letterhead and signed by an officer of the company:

LOGO
XYZ CORPORATION
555 E. 5th Street
Nowheresville, Kansas 55555

Month, day, year

Mr. Terry Hansen
Tetra Tech NUS, Inc.
Task Order Manager
Ellis Building, Suite 220
1311 Executive Center Drive
Tallahassee, Florida, 32301

Subject: HAZWOPER Training for OLF Bronson, Pensacola, Florida

Dear Mr. Hansen:

As an officer of XYZ Corporation, I hereby state that the persons listed below participate in a medical surveillance program meeting the requirements contained in paragraph (f) of Title 29 of the Code of Federal Regulations (CFR) Part 1910.120, entitled "Hazardous Waste Operations and Emergency Response. I further state that the persons listed below have had physical examinations under this program within the past 12 months and that they have been cleared, by a license physician, to perform hazardous waste site work and to wear positive- and negative-pressure respiratory protection. I also state that, to my knowledge, no person listed below has any medical restriction that would preclude him/her from working at the OLF Bronson facility.

LIST OF FULL NAMES OF EMPLOYEES AND THEIR SOCIAL SECURITY NUMBERS HERE.

Should you have any questions, please contact me at (555) 555-5555

Sincerely,

(Name and Title of Company Officer)

9.0 SITE CONTROL

This section outlines the means by which TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site: exclusion zone, contamination reduction zone, and support zone. It is also anticipated that this control measure will be used to control access to site work areas. Use of such controls will restrict the general public, minimize potentials for the spread of contaminants and to protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The exclusion zone will be considered those areas of the site of known or suspected contamination. It is not anticipated that significant amounts of surface contamination are in the proposed work areas of this site. It is anticipated that this will remain so until/unless contaminants are brought to the surface by intrusive activities such as drilling. Furthermore, once such activities have been completed and surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the contamination reduction zone. Therefore, the exclusion zones for this project will be limited to those areas if the site where active work is being performed plus so many feet surrounding the point of operation (See Table 5-1 for specific operation). The exclusion zone for this activity will represent the areas where the soils are disturbed through soil gas surveying and sampling activities. All exclusion zones will be delineated using barrier tape, cones and /or drive poles, and postings to inform and direct facility personnel.

Further, the work area will be significantly impacted by traffic restrictions and requirements as indicated in the Florida Department of Transportation (FDOT) permit for conducting work along 103rd St.. The permit requirements will be followed in their entirety by TtNUS and subcontractor personnel.

9.1.1 Exclusion Zone Clearance

A pre-startup site visit will be conducted by members of the field team in an effort to identify proposed subsurface investigation locations, conduct utility clearances, and provide up-front notices concerning scheduled activities within the facility. In all cases, no subsurface activities will proceed without utility clearance. In the event that a utility is struck during a subsurface investigative activity, the emergency numbers provided in Section 2.7, Table 2-1, will be notified.

When base personnel are working within the proximity of this investigation, they will be moved or their operation temporarily discontinued to remove them from potential hazards associated with this operation.

9.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone (CRZ) will be a buffer area between the exclusion zone and any area of the site where contamination is not suspected. This area will also serve as a focal point in supporting exclusion zone activities. This area will be delineated using barrier tape, cones, and postings to inform and direct facility personnel. Decontamination will be conducted at a central location. All equipment potentially contaminated will be bagged and taken to that location for decontamination. Given this consideration, equipment required to complete this operation may include hand augers and stainless steel bowls and spatulas for each location. Traffic restrictions as indicated in the FDOT permit will be followed.

9.3 SUPPORT ZONE

The support zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. In all cases, the support zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies. Traffic restrictions as indicated in the FDOT permit will be followed.

9.4 SAFE WORK PERMITS

All exclusion zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is illustrated in Figure 9-1. Partially completed Permits for the work to be performed are included in Attachment I. The daily meetings conducted at the site will further support these work permits. This effort will ensure all site-specific considerations and changing conditions are incorporated into the planning effort. All permits will require the signature of the FOL and SSO.

Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

FIGURE 9-1
SAFE WORK PERMIT

Permit No. ______________ Date: __________________ Time: From ____________ to ____________

SECTION I: General Job Scope (To be filled in by person performing work)

I. Work limited to the following (description, area, equipment used): ______________________________

II. Names: ______________________________

III. Onsite Inspection conducted ☐ Yes ☐ No Initials of Inspector ____________ TtNUS ____________ OLF Bronson

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required

Level D ☐ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☐

Modifications/Exceptions: ______________________________

V. Chemicals of Concern	Action Level(s)	Response Measures

VI. Additional Safety Equipment/Procedures

Hardhat	☐ Yes ☐ No		Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes ☐ No		Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes ☐ No		Radio	☐ Yes	☐ No
Splash Shield	☐ Yes ☐ No		Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes ☐ No		Gloves (Type)	☐ Yes	☐ No
Steel toe/shank Workboots	☐ Yes ☐ No		Work/rest regimen	☐ Yes	☐ No

Modifications/Exceptions: ______________________________

VII. Procedure review with permit acceptors	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment inspected	☐	☐	Assembly points	☐	☐

VIII. Equipment Preparation	Yes	NA
Equipment drained/depressured	☐	☐
Equipment purged/cleaned	☐	☐
Isolation checklist completed	☐	☐
Electrical lockout required/field switch tested	☐	☐
Blinds/misalignments/blocks & bleeds in place	☐	☐
Hazardous materials on walls/behind liners considered	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☐ No
If yes, fill out appropriate section(s) on safety work permit addendum

X. Special instructions, precautions: ______________________________

Permit Issued by: ______________________ Permit Accepted by: ______________________
Job Completed by: ______________________ Date: ______________________

9.5 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel (DOD, FDOT, OSHA, etc.)
- Southern Division Navy Personnel
- Other authorized visitors

It is not anticipated that this operation will result in a large number of site visitors. However, as some visitors can reasonably be expected, the following requirements will be enforced:

- All site visitors will be routed to the FOL, who will sign them in to the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), who they represent, and purpose for the visit.

- All site visitors will be required to produce the necessary information supporting clearance onto the site. This includes information attesting to applicable training (40-hours of HAZWOPER training required for all Southern Division Navy personnel) and medical surveillance, as stipulated in Section 8 of this document. In addition, to enter the site's operational zones during planned activities, all visitors will be required to first go through site-specific training covering the topics stipulated in Section 8.2 of this document.

NOTE: All site visitors will be escorted at all times while at the site.

Following this, the site visitor will be permitted to enter the site and applicable operational areas. All visitors are required to observe the protective equipment and site restrictions in effect at the area of their visit. Any and all visitors not meeting the requirements as stipulated in this plan for site clearance will not be permitted to enter the site operational zones during planned activities. Any incidence of unauthorized site visitation will cause all onsite activities to be terminated until that visitor can be removed. Removal of unauthorized visitors will be accomplished with support from the Base Contact, if necessary. At a minimum, the Navy On-site Representative will be notified of any unauthorized visitors.

9.6 SITE SECURITY

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As this activity takes place at Navy facilities open to public access, and along public highways, the first line of security will take place using traffic permit restrictions, exclusion zone barriers, and any existing barriers at the sites to restrict the general public. The second line of security will take place at the work site referring interested parties to the FOL or designee. The FOL will serve as a focal point for all non-project interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. When possible, these maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on site activities will practice the "buddy system" to ensure the safety of all personnel involved in this operation.

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS and subcontractor personnel will provide MSDSs for all chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of all chemicals used on site will be developed using the Health and Safety Guidance Manual. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.10 COMMUNICATION

As personnel will be working in proximity to one another during field activities, a supported means of communication between field crews members will not be necessary. External communication will be accomplished by using the telephones at predetermined and approved locations. External communication will primarily be used for the purpose of resource and emergency resource communications. Prior to the commencement of activities, the FOL will determine and arrange for telephone communications.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that bulk hazardous materials (over 55-gallons) will be handled at any given time as part of this scope of work. It is also not anticipated that such spillage would constitute a danger to human health or the environment. However, as the job progresses, the potential may exist for accumulating Investigative Derived Wastes (IDW) such as decontamination fluids, soil cuttings, and purge and well development waters, in a central staging area. Once these fluids and other materials have been characterized, they can be removed from this area and properly disposed.

10.2 POTENTIAL SPILL AREAS

Potential spill areas will be periodically monitored in an ongoing attempt to prevent and control further potential contamination of the environment. Currently, limited areas are vulnerable to this hazard including:

- Resource deployment
- Waste transfer
- Central staging

It is anticipated that all IDW generated as a result of this scope of work will be containerized, labeled, and staged to await further analyses. The results of these analyses will determine the method of disposal.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by the personnel staging or disposing of drums or in the Resource Deployment area will be conducted during working hours to visually determine that storage vessels are not leaking. If a leak is detected, the contents will be transferred, using a hand pump, into a new vessel. The leak will be collected and contained using absorbents such as Oil-Dry, vermiculite, or sand, which are stored at the vulnerable areas in a conspicuously marked drum. This used material, too, will be containerized for disposal pending analysis. All inspections will be documented in the project logbook.

10.4 PERSONNEL TRAINING AND SPILL PREVENTION

All personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and the SSO will serve as the Spill Response Coordinators for this operation, should the need arise.

10.5 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents the minimum equipment that may be maintained (depending on anticipated need) at the staging areas at all times for the purpose of supporting this Spill Prevention/Containment Program.

- Sand, clean fill, vermiculite, or other non combustible absorbent (Oil-dry)
- Drums (55-gallon U.S. DOT 17-E or 17-H)
- Shovels, rakes, and brooms
- Container labels

10.6 SPILL CONTROL PLAN

This section describes the procedures the TtNUS field crew members will employ upon the detection of a spill or leak.

1. Notify the SSO or FOL immediately upon detection of a leak or spill. Activate emergency alerting procedures for that area to remove all non-essential personnel.

2. Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

3. Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

4. Recontainerize spills, including 2-inch of top cover impacted by the spill. Await test results for treatment or disposal options.

It is not anticipated that a spill will occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SSO in accordance with the procedures discussed in Section 2.0 of this HASP.

11.0 CONFINED-SPACE ENTRY

It is not anticipated, under the proposed scope of work, that confined space and permit-required confined space activities will be conducted. Therefore, personnel under the provisions of this HASP are not allowed, under any circumstances, to enter any confined spaces. A confined space is defined as an area which has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.

A Permit-Required Confined Space is one that:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space, consult the Health and Safety Guidance Manual or call the PHSO. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will have to be addressed.

12.0 MATERIALS AND DOCUMENTATION

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- Health and Safety Guidance Manual
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for all chemicals brought on site, including decon solution, fuels, sample preservations, calibration gases, etc.
- Follow-up Reports (to be completed by the FOL)
- A full size OSHA Job Safety and Health Poster
- Training/Medical Surveillance Documentation Form (blank)
- First-Aid Supply Usage Form
- Emergency Reference Form (Section 2.0, extra copy for posting)

12.1 MATERIALS TO BE POSTED AT THE SITE

The following documentation is to be posted at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing - This list represents all chemicals brought on site, including decontamination solutions, sample preservations, fuel, etc.. This list should be posted in a central area.

Material Safety Data Sheets (MSDS) - The MSDSs should also be in a central area accessible to all site personnel. These documents should match all the listings on the chemical inventory list for all substances employed on site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster - this poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaces, altered, or covered by other material.

Site Clearance Posting - This list is found within the training section of the HASP (See Figure 8-2). This list identifies all site personnel, dates of training (including site-specific training), and medical surveillance. The lists indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) - This list of numbers and directions will be maintained at all phone communications points and in each site vehicle.

Medical Data Sheets/Cards - Medical Data Sheets will be filled out by on site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. a copy of this sheet or a wallet card will be given to all personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) - this standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring - All results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using DOT placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose, as stated above, is to allow site personnel quick access to this information. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-term Environmental Action - Navy
CNS	Central Nervous System
CTO	Contract Task Order
CZR	Contamination Reduction Zone
DOD	United States Department of Defense
eV	electron Volts
FDOT	Florida Department of Transportation
FOL	Field Operations Leader
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IDLH	Immediate Dangerous to Life or Health
IDW	Investigative-Derived Wastes
LEL/LFL	Lower Explosive Limit / Lower Flammable Limit
MSDA	Material Safety Data Sheets
N/A	Not Available
NAS	Naval Air Station
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicity Program
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
SAP	Sampling and Analyses Plan
SOPs	Standard Operating Procedures
SSO	Site Safety Officer
TBD	To be determined
TLV	Threshold Limit Value
TOM	Task Order Manager
TWA	Time-Weighted Average
WP	Work Plan

ATTACHMENT I

TICK CONTROL
AND
LYME DISEASE

TICK CONTROL
AND
LYME DISEASE

The occurrence of Lyme disease has become a worldwide problem since its identification in 1976. This disease is characteristically recognized as being transmitted by ticks, which may be encountered by field personnel while working at this site. As a result, this discussion has been included with this Health and Safety Plan to provide for adequate recognition, evaluation, and control efforts to minimize the occurrence and effects of this potential hazard.

The discovery of Lyme disease is credited to Dr. Allen Steere of Yale University Medical School, and is named after the community where it was (reportedly) first encountered, Lyme, Connecticut. This disease can be transmitted to man through the bite of ticks that are infected with a cork screw-shaped microbe (spirochete). The spread of this disease has been so rapid that in 1984 it surpassed Rocky Mountain Spotted fever as the most common tick-borne disease in the United States. In this country, most of the incidents of this disease have been recorded in the Northeast, and the tick species most commonly attributed with its spread is the deer tick.

Recognition

This hazard potential exists primarily in the spring and summer months, as these are the seasons that tick populations and activity flourish. In fact, 90 percent of the reported cases have occurred from early June through September. Also, this concern exists primarily in heavily vegetated areas. Therefore, recognition of these factors can aid in the awareness and control of this threat.

To aid in the recognition and identification of these insects, an example illustration of the tick species common to the region where this site is located has been included with this discussion. This species (the American Dog tick) is common in the eastern half of the United States, and typically exists in areas covered with grass or underbrush. These insects will attach themselves to animals (including man) that pass through the area and rub against them. After finding a host, the tick inserts its mouthparts and sucks blood until it is fully engorged. This requires a time period of three to twelve days, then the tick will drop off. In addition to Lyme disease concerns, this tick has also been identified as a transmitter of Rocky Mountain Spotted Fever, and the organisms of tularemia and possibly relapsing fever. The wounds left by tick bites can be painful, and can also have a paralyzing effect commonly referred to as tick paralysis.

The earliest symptom of the onset of this disease is the occurrence of an unusual red skin rash. This is commonly the first indication since it has been evidenced that many persons who have contracted this disease were, in fact, unaware that they had been bitten. This rash can appear at the site of the bite anywhere from several days to a few weeks after the bite. It typically starts as a small red spot, and then expands as the spirochetes expand from the bite location. Rash sizes can vary, but have been most commonly associated in a 2 to 3 inch diameter size range. This rash will fade (with or without treatment) after a few weeks. Close inspection is necessary to detect this symptom as the rashes are easy to miss because they're often very faint. Body sites where rashes frequently occur include the thigh areas, groin, and armpits. Also, it is not uncommon for a rash to develop in more than one place.

Other early symptoms include profound fatigue, a stiff neck, and flu-like symptoms such as headache, chills, fever, and muscle aches. Recognition of the onset of any of these symptoms is important since tick bites do not always produce a rash. If left untreated, the disease will progress to its second stage within weeks or months after the infection. This stage involves affects to the heart and nervous system. A common second stage symptom is a paralysis on one or both sides of the face. Others include severe headache, encephalitis, or meningitis. The third and final stage involves the development of chronic inflammatory arthritis, which can occur up to a year or more after the bite.

Evaluation

Evaluation of this hazard potential principally involves field personnel performing close self-inspections for the presence of ticks each time they leave the site. This should involve careful examination, especially of the individuals' heads. Personnel should be aware that when a tick attaches itself to its host, it inserts its entire head under the surface of the skin.

Control

Control of this threat involves several components. First, field personnel must be aware of the climate and area conditions which are commonly associated with being conducive to tick infestation. Second, when working in or walking through potential infested areas, personnel must ensure that they do not have exposed body parts (i.e. at least long sleeved shirts and long pants, particularly when protective coveralls are not worn). In heavily vegetated areas where infestation is likely, Tyvek coveralls will be required to minimize this hazard potential. Also, several commercial products have been demonstrated as being effective in repelling ticks. Examples include Permanone, Off!, and Cutter. These types of repellents will be used at the direction and discretion of the Tetra Tech NUS Health and Safety Officer, and only in accordance and observation of manufacturer's recommendations. In most instances, however, such repellents are typically applied to the outside surfaces of clothing (and not directly onto the skin), and should be applied also to shoe tops, socks, pants cuffs, and other areas most susceptible to ticks.

Tick Removal

In the event that a tick is discovered to be attached to a member of the field team, timely removal of the insect is critical to reducing the potential for contracting the disease. According to available information and research, there is apparently a grace period of at least a few hours from the time of the bite before the tick transmits the microbe (the spirochetes are not present in the mouth parts of the tick). However, the incident of a tick bite is frequently unnoticed, and the discovery of the tick may not occur until after this suspected grace period has already elapsed. Therefore, timely removal is very important. The preferred method of tick removal is to pull it out using tweezers or small forceps. In this method, the tick should be grasped as close to the mouth as possible, and then pulled steadily upward. Care must be exercised so as not to pull in a jerking motion as this can result in the head becoming detached. After the tick has been removed, disinfect the bite with rubbing alcohol or povidone iodine (Betadine). The tick must not be handled as the microbes can enter the body through any breaks in intact skin. The bite should be checked occasionally for at least a two-week period to see if a rash forms. If it does, medical attention must be promptly sought.

In order to provide for proper and timely response to the occurrence of a tick bite, the SSO will ensure that the site First Aid kit is properly equipped with medical forceps and rubbing alcohol, in addition to the standard kit contents. Also, an adequate supply of commercial insect (tick) repellents will be maintained on-site, and all personnel will be trained in its proper application and will be required to use it, at the direction of FOL.

ATTACHMENT II

INJURY/ILLNESS PROCEDURE AND REPORT FORM

CASE NO. ________

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room.
- If incident involves a chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Diethorn at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours. You will be required to complete an Injury/Illness Report (attached). You may also be required to participate in a more detailed investigation from the Health Sciences Department.
- If further medical treatment is needed, The Hartford Network Referral Unit will furnish a list of network providers customized to the location of the injured employee. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work. Please call Marilyn Diethorn at (412) 921-8475 for the number of the Referral Unit.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local human resources representative, corporate health and safety coordinator, or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries (Tetra Tech or Company) pay premiums on behalf of their employees. The type of injuries or illnesses covered and the amount of benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits. All employees must follow the above injury/illness reporting procedures. Consultants, independent contractors, and employees of subcontractors are <u>not</u> covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported. Please note that if you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

CASE NO. ________

TETRA TECH NUS, INC.
INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

To: Corporate Health and Safety Manager
Human Resource Administrator

Project Name: ____________________

Project No. ____________________

Prepared by: ____________________

Position: ____________________

Office: ____________________

Telephone: ____________________

Information Regarding Injured or Ill Employee:	
Name: ____________________	Office: ____________________
Home address: ____________________	Gender: M ☐ F ☐ No. of dependents: ______
____________________	Marital status: ____________________
Home telephone: ____________________	Date of birth: ____________________
Occupation (regular job title): ____________________	Social Security No.: ____________________
Department: ____________________	
Date of Accident: ____________________	**Time of Accident:** ____________________
Location of Accident Was place of accident or exposure on employer's premises Yes ☐ No ☐	
Street address: ____________________	
City, state, and zip code: ____________________	
County: ____________________	
Narrative Description of How Accident Occurred: (Be specific. Explain what the employee was doing and how the accident occurred.)	

TETRA TECH, INC.
INJURY/ILLNESS REPORT

Did employee die? Yes ☐ No ☐
Was employee performing regular job duties? Yes ☐ No ☐
Was safety equipment provided? Yes ☐ No ☐
Was safety equipment used? Yes ☐ No ☐
Note: Attach any police reports or related diagrams to this accident report.

Witness(es):

Name:

Address:

Telephone:

Describe the Illness or Injury and Part of Body Affected:

Name the Object or Substance which Directly Injured the Employee:

Medical Treatment Required:	**Lost Work Days:**
☐ No ☐ Yes ☐ First Aid Only	☐ No. of Lost Work Days ______
Physician's Name: ______	Last Date Worked ______
Address: ______	Time Employee Left Work ______
Hospital or Office Name: ______	Date Employee Returned to Work ______
Address: ______	☐ No. of Restricted Work Days ______
______	☐ None
Telephone No.: ______	

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: ______________________

Date of Report: ______________________ Time of Report: ______________________

	Printed Name	Signature	Telephone No.	Date
Project or Office Manager				
Site Safety Coordinator				
Injured Employee				

To be completed by Human Resources:

Date of hire: Hire date in current job:

Wage information: $ __________ per __________ (hour, day, week, or month)

Position at time of hire:

Shift hours:

State in which employee was hired:

Status: ☐ Full-time ☐ Part-time Hours per week: __________ Days per week: __________

Temporary job end date:

To be completed during report to workers' compensation insurance carrier:

Date reported: Reported by:

TeleClaim phone number:

TeleClaim account number:

Location code:

Confirmation number:

Name of contact:

Field office of claims adjuster:

ATTACHMENT III

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION

COMPANY:______________________________ **UNIT NO.**______________

FREQUENCY: Inspect daily, document prior to use and as repairs are needed.

Inspection Date: ____/____/____ Time: _______ Equipment Type:____________________ (e.g., bulldozer)

	Good	Need Repair	N/A
Tires or tracks	❐	❐	❐
Hoses and belts	❐	❐	❐
Cab, mirrors, safety glass	❐	❐	❐
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	❐	❐	❐
- Is the equipment equipped with audible back-up alarms and back-up lights?	❐	❐	❐
Horn and gauges	❐	❐	❐
Brake condition (dynamic, park, etc.)	❐	❐	❐
Fire extinguisher (Type/Rating -__________)	❐	❐	❐
Fluid Levels:			
- Engine oil	❐	❐	❐
- Transmission fluid	❐	❐	❐
- Brake fluid	❐	❐	❐
- Cooling system fluid	❐	❐	❐
- Windshield wipers	❐	❐	❐
- Hydraulic oil	❐	❐	❐
Oil leak/lube	❐	❐	❐
Coupling devices and connectors	❐	❐	❐
Exhaust system	❐	❐	❐
Blade/boom/ripper condition	❐	❐	❐
Accessways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	❐	❐	❐
Power cable and/or hoist cable	❐	❐	❐
Steering (standard and emergency)	❐	❐	❐

Safety Guards:	**Yes**	**No**
– Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?____________________	❐	❐
– Hot pipes and surfaces exposed to accidental contact?____________________	❐	❐
– All emergency shut offs have been identified and communicated to the field crew?____________	❐	❐
– Have emergency shutoffs been field tested? ____________________	❐	❐
– Results?____________________	❐	❐
Are any structural members bent, rusted, or otherwise show signs of damage?____________	❐	❐
– Are fueling cans used with this equipment approved type safety cans?____________	❐	❐

- Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?__________ ❐ ❐

Portable Power Tools:

- Tools and Equipment in Safe Condition?__________ ❐ ❐
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)? ❐ ❐
- Portable electric tools properly grounded?__________ ❐ ❐
- Damage to electrical power cords?__________ ❐ ❐
- Blade guards in place?__________ ❐ ❐
- Components adjusted as per manufacturers recommendation?__________ ❐ ❐

Cleanliness:

- Overall condition (is the decontamination performed prior to arrival on-site considered acceptable)?__________
- Where was this equipment used prior to its arrival on site?__________
- Site Contaminants of concern at the previous site?__________
- Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls?__________

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)?__________
- Does the operator, understand the equipments operating instructions?__________
- Is the operator experienced with this equipment? __________
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner?__________
- Is the operator 21 years of age or more?__________

Identification:

- Is a tagging system available, for positive identification, for tools removed from service?___

Additional Inspection Required Prior to Use On-Site

	Yes	No
– Does equipment emit noise levels above 90 decibels?	❐	❐
– If so, has an 8-hour noise dosimetry test been performed?	❐	❐

- Results of noise dosimetry:__________
- Defects and repairs needed:__________
- General Safety Condition: __________
- Operator or mechanic signature:__________

Approved for Use: ❐ Yes ❐ No

____

Site Safety Officer Signature

ATTACHMENT IV

SAFE WORK PERMITS

SAFE WORK PERMIT FOR
MULTI-MEDIA SAMPLING

Permit No. ______________ Date: __________________ Time: From ____________ to ______________

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): **Multi-media sampling including groundwater, surface water, sediments, and soils (surface and subsurface). IDW sampling is also included in this task.**

II. Required Monitoring Instrument(s): PID or FID

III. Field Crew: ______________________________

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector __________ __________
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety shoes, surgical style gloves, and safety glasses. Hard hats and hearing protection will be worn when working near operating equipment or when required by the SSO.

V. Chemicals of Concern	Action Level(s)	Response Measures
Potential site contaminants include various VOCs, TPHs, and metals	Any sustained readings above background levels in worker breathing zones.	Suspend site activities and report to an unaffected area.

VI. Additional Safety Equipment/Procedures

	Yes	No		Yes	No
Hard-hat	☐	☒	Hearing Protection (Plugs/Muffs)	☐	☒
Safety Glasses	☐	☒	Safety belt/harness	☐	☒
Chemical/splash goggles	☐	☒	Radio	☐	☒
Splash Shield	☐	☒	Barricades	☐	☒
Splash suits/coveralls	☐	☒	Gloves (Type - Nitrile)	☒	☐
Steel toe Work shoes or boots	☒	☐	Work/rest regimen	☐	☒

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall if there is a potential for soiling work cloths

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment/PPE inspected	☐	☐	Assembly points	☐	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☐
Equipment purged/cleaned	☐	☐
Isolation checklist completed	☐	☐
Electrical lockout required/field switch tested	☐	☐
Blinds/misalignments/blocks & bleeds in place	☐	☐
Hazardous materials on walls/behind liners considered	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: ______________________________

Permit Issued by: ______________________ Permit Accepted by: ______________________

SAFE WORK PERMIT FOR SOIL BORINGS AND WELL INSTALLATION

Permit No. __________ Date: __________ Time: From __________ to __________

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): **Soil borings using hollow-stem augers and Direct Push Technology techniques. Monitoring well installation is included in this task.**

II. Required Monitoring Instruments: FID or PID

III. Field Crew: __________

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector __________ __________
TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

IV. Protective equipment required

Level D ☒ Level B ☐
Level C ☐ Level A ☐
Detailed on Reverse

Respiratory equipment required

Full face APR	☐	Escape Pack	☐
Half face APR	☐	SCBA	☐
SKA-PAC SAR	☐	Bottle Trailer	☐
Skid Rig	☐	None	☒

Modifications/Exceptions: Minimum requirement include sleeved shirt and long pants, safety shoes, safety glasses, hardhat, hearing protection, and nitrile gloves or leather gloves with surgical-style inner gloves.

V.

Chemicals of Concern	Action Level(s)	Response Measures
Potential site contaminants include various VOCs, TPHs, and metals.	Any sustained readings above background levels in worker breathing zones.	Suspend site activities and report to an unaffected area.

VI. Additional Safety Equipment/Procedures

	Yes	No		Yes	No
Hard-hat	☒	☐	Hearing Protection (Plugs/Muffs)	☒	☐
Safety Glasses	☒	☐	Safety belt/harness	☐	☒
Chemical/splash goggles	☐	☒	Radio	☐	☒
Splash Shield	☐	☒	Barricades	☐	☒
Splash suits/coveralls	☐	☒	Gloves (Type - Nitrile)	☒	☐
Steel toe Work shoes or boots	☒	☐	Work/rest regimen	☐	☒

Modifications/Exceptions: Reflective vests for high traffic areas. Tyvek coverall and impermeable boots if there is a potential for soiling work cloths.

VII. Procedure review with permit acceptors

	Yes	NA		Yes	NA
Safety shower/eyewash (Location & Use)	☐	☐	Emergency alarms	☐	☐
Procedure for safe job completion	☐	☐	Evacuation routes	☐	☐
Contractor tools/equipment/PPE inspected	☐	☐	Assembly points	☐	☐

VIII. Equipment Preparation

	Yes	NA
Equipment drained/depressurized	☐	☐
Equipment purged/cleaned	☐	☐
Isolation checklist completed	☐	☐
Electrical lockout required/field switch tested	☐	☐
Blinds/misalignments/blocks & bleeds in place	☐	☐
Hazardous materials on walls/behind liners considered	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.) ☐ Yes ☐ No
If yes, complete permit required or contact Health Sciences, Pittsburgh Office

X. Special instructions, precautions: Avoid generating any airborne dusts.

Permit Issued by: __________ Permit Accepted by: __________

ATTACHMENT V

HEAT STRESS

HEAT STRESS

Because some physically demanding field work is expected to take place during warmer months or periods, heat related disorders are a potential problem. Discussed below are the common heat-related disorders and the recommended actions to prevent heat stress.

<u>Heat Related Disorders</u>

Heat Rash

Also known as prickly heat, this condition affects the skin. It occurs in situations where the skin remains wet most of the time. The sweat ducts become plugged and a skin rash soon appears.

Signs and Symptoms

- Skin rash will appear on affected areas of the body.
- Tingling or prickling sensation will be felt on the affected areas.

Heat Cramps

Heat cramps are muscle pains, usually in the lower extremities, the abdomen, or both, that occur after profuse sweating with accompanying salt depletion. Heat cramps most often afflict people in good physical condition, who overwork in conditions of high temperature and humidity. Untreated, heat cramps may progress to heat exhaustion.

Signs and Symptoms

- Cramps in the extremities and abdomen that begin suddenly during vigorous activity. Heat cramps can be mild with only slight abdominal cramping and tingling in the extremities, but more commonly present intense and incapacitating pain in the abdomen and extremities.

- Respiration rate will increase, decreasing after the pain subsides.

- Pulse rate will increase

- Skin will be pale and moist.

- Body temperature will be normal

- Generalized weakness will be noted as the pain subsides.

- Loss of consciousness and airway maintenance are seldom problems with this condition.

Treatment for heat cramps is aimed at eliminating the exposure and restoring the loss of salt and water.

Heat Exhaustion

Heat exhaustion is a more severe response to salt and water loss, as well as an initial disturbance in the body's heat-regulations system. Like heat cramps, heat exhaustion tends to occur in people working in hot environments. Heat exhaustion may progress to heat stroke. Treatment for heat exhaustion is similar in principle to that for heat cramps.

Signs and Symptoms

- Heat exhaustion may be accompanied present by a headache, fatigue, dizziness, or nausea with occasional abdominal cramping. More severe cases of heat exhaustion may resulting partial or complete temporary loss of respiration nd circulation due to cerebral ischemia.

- Sweating will be profuse.

- Pulse rate will be rapid and weak.

- Respiration rate will be rapid and shallow.

- The skin will be pale and clammy

- The body temperature will be normal or decreased.

- The person could be irritable and restless.

Heat Stroke

Heat stroke is caused by a severe disturbance in the body's heat-regulating system and is a profound emergency: The mortality rate ranges from 25 to 50 percent. It is most common in men over 40, especially alcoholics. It can also occur to people of any age having too much exposure to the sun or prolonged confinement in a hot atmosphere. Heat stroke comes on suddenly. As the sweating mechanism fails, the body temperature begins to rise precipitously, reaching 106°F (41°C) or higher within 10 to 15 minutes. If the situation is not corrected rapidly, the body cells -- especially have very vulnerable cells to the brain--are literally cooked, and the central nervous system is irreversibly damaged. The treatment for heat stroke is aimed at maintaining vital functions and causing as rapid a decrease of body temperature as possible.

Signs and Symptoms

- The person's pulse will be strong and bounding.
- The skin will be hot, dry, and flushed.
- The worker may experience headache, dizziness, and dryness of mouth
- Seizures and coma can occur.
- Loss of consciousness and airway maintenance problems can occur.

These are only guidelines for heat related emergencies. Actual training in emergency medical care or basic first aid is recommended.

Controlling Heat Stress

The SSO shall visually monitor personnel to note for signs of heat stress. Field personnel will also be instructed to observe for symptoms of heat stress and methods on how to control it. One or more of the following control measures can be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids. Personnel must replace water and salt lost from sweating. Personnel must be encouraged to drink more than the amount required to satisfy thirst. Thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement.

- Replacement fluids can be commercial mixes such as Gatorade®.

- Establish a work regime that will provide adequate rest periods for cooling down. This may require additional shifts of workers.
- Cooling devices such as vortex tubes or cooling vests can be worn beneath protective garments.
- Breaks are to be taken in a cool rest area (77°F is best).
- Personnel shall remove impermeable protective garments during rest periods.
- Personnel shall not be assigned other tasks during rest periods.
- Personnel shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

The heat stress of personnel onsite may be monitored utilizing biological monitoring.

One of the following biological monitoring procedures may be utilized by the SSO to monitor heat stress concerns.

- Heart rate (HR) shall be measured by the pulse for 30 seconds as early as possible in the resting period. The HR at the <u>beginning of the rest period should not exceed 110 beats/minute.</u> If the HR is higher, the next work period should be shortened by 10 minutes (or 33 percent), while the length of rest period stays the same. If the pulse rate is 100 beats/minute at the beginning of the next rest period, the following work cycle should be shortened by 33 percent. The length of the initial work period will be determined by using the table below.

PERMISSIBLE HEAT EXPOSURE THRESHOLD LIMIT VALUES

	Work Load		
Work-Rest Regimen	Light	Moderate	Heavy
Continuous	80.0°F	80.0°F	77.0°F
75% Work - 25% Rest, Each Hour	87.0°F	82.4°F	78.6°F
50% Work - 50% Rest, Each Hour	88.5°F	85.0°F	82.2°F
25% Work - 75% Rest, Each Hour	90.0°F	88.0°F	86.0°F

- Body temperature shall be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the <u>beginning of the rest period should not exceed 99°F</u>. If it does, the next work period should be shortened by 10 minutes (or 33 percent), while the length of the rest period stays the same. However, if the oral temperature exceeds 99.7°F at the beginning of the next rest period, the following work cycle shall be further shortened by 33 percent. OT should be measured at the end of the <u>rest period to make sure that it has dropped below 99°F</u>. At no time shall work begin with the oral temperature above 99°F.

NOTE: External temperatures in excess of those stated above shall be regarded as inclement weather. Work continuation, termination, or alteration of the work schedule will be at the discretion of the FOL or SSO.

APPENDIX D

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION
DRAFT INVESTIGATION-DERIVED WASTE PLAN
NAVAL AIR FACILITY
PENSACOLA, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION
DRAFT INVESTIGATION-DERIVED WASTE PLAN
NAVAL AIR STATION
PENSACOLA, FLORIDA

SOUTHNAVFACENGCOM
CONTRACT NUMBER:
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Prepared for:

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN)
NAVAL SUPPORT ACTIVITY
NAVAL AIR STATION
PENSACOLA, FLORIDA

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Release of this document requires the prior notification of the Commanding Officer of the Naval Air Station, Pensacola, Florida.

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List of Abbreviations

The following lists contains many of the acronyms, initials, abbreviations, and units of measure used in this report.

AOC	area of contamination
ARARs	applicable or relevant and appropriate requirements
AWQC	ambient water quality criteria
CAA	Clean Air Act
CAMU	Corrective Action Management Unit
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COLIWASA	Composite Liquid Waste Samplers
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm	centimeters
CWA	Clean Water Act
DE	Disposable Equipment
DOT	Department of Transportation
E/A&H	EnSafe/Allen & Hoshall
FDEP	Florida Department of Environmental Protection
ft^3	Cubic Feet
gpm	gallons per minute
HSWA	Hazardous and Solid Waste Amendments
IDW	Investigation-Derived Waste
IR	Installation Restoration
IWTP	Industrial Wastewater Treatment Plant
JP	Jet Propulsion
LDR	Land Disposal Restrictions
MCL(s)	Maximum Contaminant Level(s)
MCLG	Maximum Contaminant Level Goals
ml	milliliter
MTRs	Minimum Technological Requirements
NAS	Naval Air Station
NCP	National Contingency Plan
NPL	National Priorities List
OD	Outside Diameter
PAHs	Polynuclear Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
POL	Petroleum Oils and Lubricants
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
ppm	Parts Per Million or milligrams per kilogram
PSC	Potential Source of Contamination

QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RT	Regulatory Threshold
SDWA	Safe Drinking Water Act
SMP	Site Management Plan
SOP/QAM	Standard Operating Procedures and Quality Assurance Manual
SVOCs	Semivolatile Organic Compounds
TBC	To-be-considered
TCLP	Toxicity Characteristic Leaching Procedure
TRPHs	Total Recoverable Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
TSD	Treatment, Storage, or Disposal
TU	Temporary Unit
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

The following discussion outlines the manner in which investigation-derived waste (IDW) will be managed to comply with all applicable or relevant and appropriate requirements (ARARs). IDW generated during the investigations will likely include soil produced during the advancement of hand auger borings and soil borings and the installation of monitoring wells; groundwater derived from developing and purging of monitoring wells; disposable personal protective equipment and sampling utensils; decontamination fluids generated from the cleaning of personal protective equipment, sampling equipment, and drilling equipment. As the generator of the IDW, the Navy will be responsible for the ultimate treatment, storage, or disposal of all IDW. E/A&H will provide technical assistance to the Navy during the management of all IDW.

2.0 IDENTIFICATION OF ARARS

The National Contingency Plan (NCP) requires IDW handled at National Priorities List (NPL) sites, including federal facilities to meet all ARARs to the extent practicable considering the situation's urgency. The NCP is codified at 40 Code of Federal Regulations (CFR) Part 300. Likewise, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(a)(4) requires investigation and remediation activities at non-NPL federal facilities to meet the substantive requirements of applicable state laws.

2.1 ARARs Defined

Applicable requirements are standards or criteria promulgated under federal law that specifically address a hazardous substance, pollutant contaminant, remedial action, location, or other circumstance at a project site (USEPA 1988a). Resource Conservation and Recovery Act (RCRA) requirements are applicable when a waste generated at a CERCLA site meets the definition of a solid hazardous waste.

Relevant and appropriate requirements are standards or criteria promulgated under federal or state laws that are suited to a particular site because they address site scenarios sufficiently similar to those on which the regulations are based. Identifying ARARs first dictates determining whether they are both relevant and appropriate. This evaluation compares a number of site-specific factors with those addressed in the statutory or regulatory requirements. Factors considered include the hazardous substances present at the site, physical site features, or the type of remedial action. A given requirement might be relevant, but not appropriate, for the project site. Therefore, such a requirement would not be an ARAR for the site. When a requirement is deemed both relevant and appropriate in a given case, this requirement must be complied with to the same degree as if it were applicable. An example of a relevant and appropriate requirement is the use of maximum contaminant levels (MCLs) as cleanup standards for water. The MCLs are not applicable, because the Navy is not using the contaminated water to supply drinking water. However, MCLs are relevant and appropriate because the water may be treated for potential use as drinking water in the future.

To-be-considered (TBC) criteria are federal- or state-issued guidance or non-promulgated advisories that are not legally binding and do not have the status of potential ARARs. In many circumstances, TBC criteria will be reviewed along with ARARs in determining an IDW level that sufficiently protects human health or the environment. This review will occur before selecting an IDW management option.

There are several types of ARARs, including chemical-specific, action-specific, and location-specific ARARs. Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies applied to site-specific conditions. These values establish an acceptable concentration of a chemical substance that may be found in or discharged to the ambient environment. MCLs are examples of chemical-specific ARARs. Action-specific ARARs are technology- or activity-based requirements or limitations on actions taken with respect to hazardous substances. An example of an action-specific ARAR is an emissions limit on a chemical constituent for incineration to treat contaminated soil. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in special locations. Location standards for RCRA facilities are location-specific ARARs when a new waste management unit is created to treat or dispose of waste at a CERCLA site.

Federal environmental laws and regulations that are potential ARARs for IDW at CERCLA sites include RCRA, including the Land Disposal Restrictions (LDR) and Corrective Action Program; the Toxic Substances Control Act (TSCA), the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and the Clean Air Act (CAA). State and local environmental laws and regulations also may serve as ARARs. State regulations may have a great impact on how IDW is managed, since states may promulgate more stringent requirements than the federal requirements for many programs, including the solid and hazardous waste program.

Although CERCLA exempts response actions conducted entirely onsite from permit requirements, the United States Environmental Protection Agency (USEPA) does require that the substantive issues are addressed if the containerized IDW is RCRA hazardous waste (USEPA 1988a). RCRA hazardous IDW containerized and stored onsite should be properly disposed of within a regulatory timeframe. However if the regulatory timeframe cannot be met, storage does not require a permit. Actions that take place offsite are subject to all permitting requirements.

2.2 Resource Conservation and Recovery Act

RCRA was passed by Congress in 1976 to meet three goals: (1) to protect human health and the environment, (2) to reduce waste and conserve energy and natural resources, and (3) to reduce or eliminate the generation of hazardous waste as expeditiously as possible. The Hazardous and Solid Waste Amendments (HSWA) of 1984 significantly expanded RCRA's scope by adding new corrective action requirements, LDRs, and minimum technological requirements (MTRs) (USEPA 1988b).

RCRA is the most important federal ARAR for managing IDW, because it specifically regulates solid waste disposal and all aspects of transportation, treatment, storage, and disposal of hazardous waste. RCRA is applicable to management of IDW at CERCLA sites if the IDW is stored or disposed of offsite. If IDW is stored onsite, then the IDW must be managed to comply with RCRA to the extent practical.

RCRA has 10 subtitles addressing specific waste management activities. Two of these subtitles and their implementing regulations may be ARARs for IDW handling: Subtitle C (Hazardous Waste Management) and Subtitle D (Solid Waste Management). The regulations are codified in 40 CFR Parts 260 through 272.

RCRA was developed first and foremost as a prevention-oriented program, with a primary objective to prevent new releases resulting in contaminated sites. Following this objective, stringent standards were developed to ensure human health and the environment were protected from such ongoing waste management. The Subtitle C regulations are specified as uniform, national standards with which all RCRA-regulated facilities must comply. These standards generally are very stringent because they must ensure an adequate level of protection nationally. The standards must prevent or minimize environmental releases over a wide range of hazardous waste types, environmental conditions, operational contingencies, and other factors. The HSWA amendments strengthened the RCRA prevention program by adding the LDRs and MTRs that have become central features of the RCRA prevention program. These features added incentives to generators to minimize the amounts of waste being created by providing technology-based standards for hazardous waste treatment, in the case of LDRs, and land-based disposal units design, in the case of MTRs.

Under RCRA Subtitle C, wastes are hazardous on the basis of their source or method of generation ("listed" wastes) or their chemical constituents or characteristics ("characteristic" wastes). The hazardous waste identification rules are codified in 40 CFR Part 261. For example, 1,1,1-trichloroethane is a listed waste when it is a spent solvent. Based on the "contained-in" interpretation, soil, groundwater, and other investigation wastes containing this listed waste also would be considered hazardous (USEPA 1986). Characteristic hazardous wastes include those wastes with one or more characteristics of ignitability, corrosivity, reactivity, and toxicity. Determining whether a waste is hazardous may be based on knowledge of the IDW and associated suspected or known contamination, rather than by direct testing (USEPA 1991). The IDW generator may choose to characterize the waste as hazardous or non-hazardous based on the site history and environmental data for the surrounding area, without actually collecting a sample of the waste and testing it for hazardous waste parameters.

2.2.1 Land Disposal Restrictions

With respect to managing IDW, the LDR program is one of the most significant provisions of RCRA. The LDR program, defined in RCRA Section 3004 and codified in 40 CFR Part 268, establishes technology-based standards that must be met before placing hazardous waste into land disposal units, which include landfills, surface impoundments, waste piles, and other land-based units. Hazardous waste generators must notify receiving hazardous waste facilities that a waste is restricted from land disposal. Certification is required for all restricted wastes that meet LDR treatment standards when the waste is land disposed.

For the purpose of managing IDW, land disposal occurs when any of the following activities take place:

- Wastes from different areas of contamination (AOC) are consolidated and disposed of in one AOC.

- Wastes are moved outside an AOC for storage or treatment and are returned to the same or a different AOC.

- Wastes are excavated from an AOC, removed to a separate unit such as a tank, surface impoundment or incinerator that is within the AOC, and then are redeposited into the AOC (USEPA 1991).

The concept of an AOC can be used to determine whether LDRs apply to a given situation; however, this concept applies only to contaminated soil or sediment from the site. Contaminated personal protective equipment (PPE), disposable equipment (DE), extracted ground water, or decontamination fluids that may be generated by investigation activities at the site are not exempted from LDRs if disposed of within an AOC. USEPA has not yet issued a regulatory definition of the term "AOC," but the preamble to the NCP (55 FR 8760) states "USEPA generally equates the CERCLA area of contamination with a single RCRA land-based unit, usually a landfill." It is further noted that "under RCRA the term 'landfill' could include a non-discrete land area on or in which there is generally dispersed contamination."

LDRs limit the constituent concentrations of wastes that may be disposed in land units (such as landfills and surface impoundments). An important consideration in evaluating the applicability or relevance and appropriateness of LDRs is whether land disposal of hazardous IDW will occur as a result of the proposed storage or disposal method. Based on the delineation of an AOC, LDRs are not ARARs when uncontained hazardous IDW (soil or sediment) is handled as follows:

- Capped in place
- Treated in situ
- Processed within the AOC to improve structural stability
- Left in place, moved, or stored within a single AOC unit

LDRs prohibit storing restricted hazardous waste beyond specified time limits, unless the purpose is to accumulate sufficient quantities to promote proper disposal, treatment, or recovery. However, under CERCLA there is no time limit for storing IDW in the AOC until a final disposal option is selected in the record of decision (ROD).

All LDRs must be followed to the extent practical if hazardous IDW cannot be held within the delineated AOC. For example, if leaving hazardous IDW within the AOC would significantly increase risk to human health and the environment through the potential of fire, explosion, toxicity, or other hazard, then the IDW should be managed at an offsite RCRA Subtitle C hazardous waste treatment, storage, or disposal (TSD) facility.

2.2.2 Corrective Action Program

In addition to the prevention-oriented provisions of RCRA, the HSWA corrective action program created a very different mandate: cleaning up releases from solid waste management units at more than 4,000 RCRA TSD facilities. While implementing these requirements and through its experience with the Superfund program, USEPA found that Subtitle C requirements, when applied to remediation wastes, could be a disincentive to more protective remedies. These requirements also provided very limited flexibility in choosing the most practical remedy at a specific site. In response to this, USEPA created two types of waste management units, the Corrective Action Management Unit (CAMU) and the Temporary Unit (TU), as a mechanism for providing more regulatory flexibility at remediation sites conducted under the auspices of RCRA while maintaining a standard of environmental protection.

CAMUs

CAMUs are land-based units that can be used to manage wastes during site remediation. CAMUs provide two primary advantages:

- Placing remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes, so that LDR standards are not triggered.

- Consolidating or placing remediation wastes into or within a CAMU does not constitute creating a unit subject to MTRs.

Although CAMUs are permitted by the USEPA, they must comply with state and local regulations. Currently, there are no permitted CAMUs.

TUs

TUs are for short-term operation of tanks and container storage units used to treat or store remediation wastes for investigations conducted under RCRA. These units may only be used for remediation wastes, and they must be located at the facility where the remediation is occurring. TUs do not include incinerator, non-tank thermal treatment devices, or units regulated under 40 CFR Part 264 Subpart X (miscellaneous units). The corrective action regulations for temporary units allow an alternative design, operating, or closure standard to be applied rather than the standards that normally apply to permitted facilities. Wastes can be stored in a TU for up to one year, with extensions available on a case-by-case basis.

2.3 Toxic Substances Control Act

Congress passed TSCA in 1976 to establish requirements and authorities for identifying and controlling toxic chemical hazards to human health and the environment. While the majority of regulations promulgated under TSCA address chemical manufacturing, the law also covers managing and disposing wastes containing polychlorinated biphenyls (PCBs) in 40 CFR Part 761 and asbestos in 40 CFR Part 763. These regulations potentially affect IDW management in at least two ways:

- Non-hazardous IDW under RCRA that contains PCBs at concentrations greater than specified limits must be managed at facilities permitted under TSCA. Incineration is the most common option for wastes containing 50 parts per million (ppm) PCBs or greater.

- Non-hazardous IDW with PCB concentrations less than 50 ppm are generally not regulated under TSCA, although some states regulate these wastes as hazardous.

2.4 Clean Water Act

The CWA, developed in 1977, provides site-specific pollutant discharge limitations and performance standards for specific industries to protect surface water quality. During an investigation, the most likely situation where the CWA will be applicable involves indirectly discharging IDW water to a Navy owned treatment works (NOTW), publicly owned treatment works (POTW), or a wastewater treatment plant for treatment (USEPA 1991). A less likely situation may involve direct discharge, either onsite or offsite, to surface water. The CWA also regulates criteria for selecting POTWs and sets ambient water quality criteria (AWQC) to protect human health and aquatic life. Regulations under the CWA are codified in 40 CFR Parts 121 through 136.

2.5 Safe Drinking Water Act

The SDWA which was enacted in 1974 and most recently amended in 1986, mandates the USEPA establish regulations to protect human health from contaminants in drinking water. Regulations for the SDWA are codified in 40 CFR Parts 141 through 149. The legislation authorizes national drinking water standards and a joint federal-state system for assuring compliance with those standards.

USEPA has developed two sets of drinking water standards, referred to as primary and secondary standards, to protect human health and to ensure the aesthetic quality of drinking water, respectively (USEPA 1988b). Primary standards consist of contaminant-specific standards, known as maximum contaminant levels (MCLs). These are set as close as feasible to MCL goals (MCLGs), which are purely health-based. Secondary drinking water standards are guidelines regulating the aesthetic quality of water supplies, such as clarity and odor, and are not enforceable at the federal level. At a minimum, states must enforce the federal MCLs. In some cases, states establish and enforce secondary standards equal to or more stringent than USEPA's.

Under Section 1424(e) of SDWA, an aquifer identified as the sole or principal source of drinking water for any area may be designated as a "sole source aquifer". No commitment of federal financial assistance may be made for any project that may contaminate a sole source aquifer so as to create a significant public health hazard. No IDW disposal actions should occur that could affect a sole source aquifer without considering MCLs and the ARARs.

3.0 GENERATION OF INVESTIGATION-DERIVED WASTE

Activities that may generate IDW during operations at installation restoration (IR) sites include preliminary site investigations, removal actions, and remedial investigations. IDW may include drilling muds, soil cuttings, purged groundwater, decontamination fluids, DE, and PPE.

3.1 Sources of IDW

Table 3-1 summarizes all sites to be investigated and lists the known or suspected contaminants for each site.

Table 3-1
Summary of Investigation-Derived Waste Sources

Source (Site)	Site Name	Known or Suspected Contaminants
1	Sanitary Landfill	Metals, TRPHs, VOCs, PAHs, phenols
2	Waterfront Sediments	Metals, TRPHs, VOCs, PAHs
3	Crash Crew Training Area	Metals, TRPHs, VOCs, PAHs, phenols
4	Army Rubble Disposal Area	Unknown
5	Borrow Pit	Unknown
6	Fort Redoubt Rubble Disposal Area	Unknown
7	Firefighting School	POLs
8	Rifle Range Disposal	Solid waste, paper
9	Navy Yard Disposal Area	Metals, TRPHs, PAHs
10	Commodore's Pond	Metals, TRPHs, PAHs, phenols
11	North Chevalier Disposal Area	Metals, TRPHs, VOCs, PAHs, phenols
12	Scrap Bins	Metals, TRPHs, PAHs, phenols, PCBs
13	Magazine Point Rubble Disposal Area	TRPHs, VOCs, PAHs, phenols
14	Dredge Spoil Fill Area	Metals, TRPHs, VOCs, PAHs, phenols
15	Pesticide Rinsate Disposal Area	Metals, TRPHs, VOCs, PAHs, pesticides
16	Brush Disposal Area	Metals
17	Transformer Storage Yard	Metals, TRPHs, PAHs, VOCs, PCBs
18	PCB Spill Area	Metals, TRPHs, PAHs, VOCs, PCBs
22	Refueler Repair Shop	Aviation Gas, JP with lead

Table 3-1 (Continued)
Summary of Investigation-Derived Waste Sources

Source (Site)	Site Name	Known or Suspected Contaminants
24	DDT Mixing Area	DDT with diesel fuel
25	Radium Spill Site	Radioactive Waste
26	Supply Department Outside Storage	Industrial Waste, Oils
27	Radium Dial Shop	Radium, phosphors
28	Transformer Accident	Transformer Oil
29	Soil South of Building 3460	Metals, TRPHs, PAHs, VOCs
30 and formerly PSC 31	Buildings 649 and 755, Building 648	Metals, TRPHs, VOCs, PAHs, phenols
32, 33, 35	Industrial Wastewater Treatment Plant	Metals, VOCs, SVOCs
34	Solvent North of Building 3557	Metals, TRPHs, PAHs, phenols
36	Industrial Waste Sewer	Metals, TRPHs, PAHs, phenols
38	Building 71	Metals, VOCs, PCBs
39	Oak Grove Campground	Debris, POL, broken clay, coal, cleaning solutions
40	Bayou Grande	Unknown
41	NAS Pensacola Wetlands	Unknown
42	Pensacola Bay	Unknown

Key:

PSC	=	Potential Source of Contamination
TRPHs	=	Total Recoverable Petroleum Hydrocarbons
VOCs	=	Volatile Organic Compounds
PAHs	=	Polynuclear Aromatic Hydrocarbons
PCBs	=	Polychlorinated Biphenyls
SVOCs	=	Semivolatile Organic Compounds
POL	=	Petroleum, Oils and Lubricants
JP	=	Jet Propulsion

Source: U.S. Navy 1993

Field activities performed during the site investigations that may generate IDW typically include some or all of the following:

Activity	**Waste Type**
Monitoring Well Installation	Soil cuttings, decontamination fluids, drilling mud, PPE, DE
Monitoring Well Development	Development water, silt, decontamination fluids, PE, DE
Groundwater Sampling	Purge water, decontamination fluids, PPE, DE
Soil Boring	Soil cuttings, drilling mud, decontamination fluids, PPE, DE
Soil Excavation/Trenching	Soil cuttings, decontamination fluids, PPE, DE
Soil Sampling	Soil cuttings, decontamination fluids, PPE, DE
Sediment Sampling	Sediment, decontamination fluids, PPE, DE
Surface Water Sampling	Decontamination fluids, PPE, DE
Aquifer Testing	Development water, decontamination fluids, PPE, DE
Radiation Monitoring	PPE, DE

The wastes described above may be regulated as hazardous for the purposes of storage, treatment, or disposal. Section 4 describes how this determination will be made and how IDW will be characterized. Once the IDW is characterized, a decision may be made on properly managing the waste. In addition to the waste types listed above, general refuse may be created during field activities, including packaging materials, broken or cut-off well screen, and casing. Typically, this refuse is managed as non-hazardous material and disposed of accordingly.

3.2 IDW Volume Estimates

Various field activities conducted in an investigation may create IDW. Estimated typical volumes of IDW generated from field activities are shown below.

- **Screening:** Screening studies typically include soil-gas, soil-probe, geophysical surveys, and water level measurements. These activities may generate several 55-gallon drums of decontamination fluid, PPE, DE and groundwater during the course of the initial studies.

- **Drilling:** Drilling an 8-inch-outside-diameter (OD) soil boring will generate a minimum of 0.35 cubic feet (ft^3) or 2.6 gallons of soil cuttings per linear foot of borehole. A 25-foot soil boring therefore would generate approximately 9.0 ft^3, or 65 gallons, of soil cuttings (approximately 1.25 55-gallon drums). Table 3-2 shows the relationship between the diameter of the borehole and the potential volume of soil cuttings generated. Larger diameter soil borings will generate proportionately larger quantities of soil. Additional quantities of soil should be expected due to its expansion following removal from the borehole (known as bulking) and slough created during drilling, especially if poorly consolidated materials are encountered. The bulking is estimated to increase soil cutting volume by 30 percent. Soil cuttings from drilling typically will be placed into 55-gallon containers.

Table 3-2
Volume of Soil Cuttings Generated for Typical Diameter Boreholes

Hole Diameter (inches)	Undisturbed Volume of Soil per Linear Foot of Hole		Volume of Loose Soil per Lineal Foot of Hole	
	Gallons	Ft^3	Gallons	Ft^3
6.0	1.5	0.20	2.0	0.26
8.0	2.6	0.35	3.4	0.46
10.0	4.0	0.54	5.2	0.70
12.0	5.8	0.78	7.5	1.01

NOTES:
1 ft^3 = 7.5 gallons (approximately)
1 Gallon = 0.134 ft^3 (approximately)

- **Well Development or Purging and Groundwater Sampling:** The volume of groundwater from monitoring well development and groundwater sampling depends on a number of variables, including the turbidity of the groundwater, well diameter, length of screened interval, diameter of the saturated filter pack, and porosity of the material used as filter packing.

  Complete well development requires removing of well drilling relics to establish proper flow conditions and until field parameters have stabilized. Table 3-3 shows the estimated water volumes for various well screen diameters and borehole diameters, assuming a 30 percent porosity within the filter pack.

Table 3-3
Volume of Water Generated for a Typical Well Casing and Borehole Combination

Well Casing/Boring Diameter (inches)	Volume of Water Generated per Lineal Foot of Hole (gallons)
2/8	0.9
4/10	1.2
4/12	2.2

For example, a 4-inch well with a 10-inch borehole would contain approximately 1.2 gallons of fluid per foot of saturated zone. If no additional construction water was used and only three volumes of water were pumped for the development of 15 feet of saturated material, the well would produce approximately 54 gallons of fluid.

For hollow-stem drilling, additional water typically is used for flowing sand conditions. For normal well construction, minimal additional water would be used. Additional water would be generated during later purging and sampling and would be specific to the conditions for the well. The water generated during these activities typically will be placed in 55-gallon containers or in portable storage tanks.

- **Aquifer testing**: Aquifer tests which may be conducted at the Naval Air Station Pensacola may generate large quantities of groundwater, depending on the hydraulic properties of individual screened formations. A well installed in a formation with a high transmissivity will sustain a higher pumping rate and generate greater quantities of water. A typical test would be 1.5 to 2 times the expected withdrawal rate for the recovery system. It is anticipated withdrawal rates for NAS Pensacola will range from approximately 10 gallons per minute to 250 gallons per minute. With large volumes such as this, it will be necessary to use 20,000-gallon portable tanks to store water these tests generate. This water may undergo treatment at the onsite IWTP or be transported to an offsite facility. Slug tests typically will generate a small-to-moderate volume of decontamination fluid. In some instances, it may be possible to store fluids from several different aquifer tests in one container.

- **Trenching and Subsurface Exploration**: For trenching or other large-volume excavations, it will be necessary to store the wastes in large covered roll-off bins or on an appropriate liner material and to cover it. If possible, and when appropriate and approved by the regulatory agencies, the best option may be to return the materials to the excavation.

- **PPE, DE, and Decontamination Fluid**: The volume of IDW generated as PPE, DE, and decontamination fluids during each field activity depends on a number of site-specific factors and therefore will vary in quantity. Site-specific factors include the USEPA health and safety work level (Level D, Level C, or Level B), number and type of field activities per site, and total number of sites being investigated. PPE waste volumes typically will account for one-half of a 55-gallon container per day for a crew of four. Decontamination fluid will vary from a few gallons per day for decontaminating monitoring instruments to several hundred gallons per day for large equipment such as drilling rigs.

4.0 CHARACTERIZING INVESTIGATION-DERIVED WASTE

Identifying and characterizing IDW should begin in the planning stages of field activities. First, it must be determined if the IDW contains CERCLA hazardous substances, and whether these hazardous substances constitute either RCRA hazardous wastes or contaminants regulated under other statues. The origin of the waste must be determined as well as the chemical contaminants and their concentrations. Typically, sampling data obtained from site characterization or investigation activities provide an initial determination of whether a waste is hazardous. If necessary, IDW is sampled and submitted for TCLP analysis to provide additional information and to determine specific hazardous waste characteristics. Environmental samples relevant to IDW are soil samples (for soil cuttings and excavated soil) and groundwater samples (for purge water and development water).

The Navy as *"Generator"* of the waste retains all responsibility for characterizing the containerized waste as hazardous or non-hazardous according to 40 Code of Federal Regulations (CFR) 260. The Navy characterizes its waste in accordance with NAS Pensacola Instruction 5090.1B *Hazardous Waste Management Program* (NAS Pensacola 1994).

4.1 RCRA Hazardous Wastes and CERCLA Hazardous Substances

Some CERCLA hazardous substances are RCRA hazardous waste. PCBs also are considered CERCLA hazardous substances. Identification of RCRA hazardous waste and PCB-contaminated IDW is essential for making storage and disposal decisions. The presence of RCRA hazardous wastes invoke special considerations. The RCRA program recognizes two general classes of waste at the federal level: hazardous and non-hazardous. Solid wastes are defined by RCRA to be hazardous either by being a listed waste, determined by the wastes's origin or by its contaminant concentrations.

4.2 RCRA Listed Hazardous Waste

The E/A&H site manager is responsible for identifying any potential listed hazardous wastes that may be present at the site. The site manager establishes the site's history and use, and determines whether activities there generate, or have generated, listed hazardous wastes. Examples of activities that may generate listed wastes include use of solvents, rinsing and management of pesticide containers, electroplating, dry cleaning, and wood treatment. USEPA provides guidance in the level of effort required to establish whether listed waste activities are involved at investigation sites. USEPA states that "at many CERCLA sites no information exists on the source of the wastes nor are references available citing the date of disposal. The U.S. Navy should use available site information, manifests, storage records, and vouchers in an effort to ascertain the source of these contaminants. When this documentation is not available, the U.S. Navy may assume that the wastes are not listed RCRA hazardous wastes, unless further analysis or information becomes available which allows the lead agency to determine that the wastes are listed RCRA hazardous wastes" (USEPA 1990).

Once it has been determined that a listed waste is involved at a field activity site, the environmental analytical data should be reviewed to determine if the IDW contains any hazardous constituent found in the RCRA listed waste. USEPA's "contained-in" policy states that media such as soil and groundwater containing a listed hazardous waste must be managed as such until they no longer contain that waste. There is no established policy on how to determine when the media no longer contains the listed hazardous waste. Usually this determination is made on a case-by-case basis. Two aspects should be considered for managing IDW: whether the waste also may be hazardous for characteristics (as described in Section 4.3) and whether the cost of additional analytical work will offset the cost of managing the waste as a listed hazardous waste. In addition to identifying potential listed criteria, IDW also should be evaluated for characteristic hazardous waste criteria, as described in Section 4.3.

4.3 RCRA Characteristic Hazardous Waste

Characteristic hazardous wastes are based on general criteria. In order for a waste to be considered a characteristic hazardous waste, it must exhibit one or more of the following properties, as defined in 40 CFR §261.21 through §262.24:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity
  - Heavy Metals
  - Volatile Organic Compounds
  - Semivolatile Organic Compounds
  - Pesticides and Herbicides

IDW does not usually exhibit the characteristics of ignitability, corrosivity, or reactivity due to the waste's nature and matrix. Typically, IDW waste consists of low concentrations of contaminants in soil and water. The quantities of these contaminants typically are insufficient to cause the soil or water to exhibit any of the characteristics of ignitability, corrosivity, or reactivity.

The characteristic for toxicity is based on the waste's leaching characteristics. The Toxicity Characteristic Leaching Procedure (TCLP) simulates the effect of hazardous constituents leaching from a waste; USEPA bases regulatory limits to protect human health and the environment on the TCLP test. Reviewing environmental data to initially screen the IDW helps eliminate some or all of the toxicity characteristics. USEPA provides that if a total analysis demonstrates the individual constituents are not present in the waste, or they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run (40 CFR Part 261, Appendix II). IDW to be left onsite should not containerized or tested.

4.4 CERCLA Hazardous Substances

If the IDW does not contain RCRA "hazardous waste", it should be determined if the IDW contains other CERCLA hazardous substances. CERCLA hazardous substances include, in addition to RCRA hazardous wastes, substances, elements, compounds, solutions, or mixtures designated as hazardous under CERCLA or under the authority of another ARAR including TSCA, CWA, CAA, and SDWA. CERCLA hazardous substances are listed in 40 CFR Part 302.4, Table 302.4.

5.0 SAMPLING AND ANALYSIS

Sampling and analyzing IDW will be conducted when corresponding environmental sample data are not available or when details are needed about the waste. Sampling of soil or sediment IDW may occur as the waste is generated (i.e., as the boring is advanced) or may be collected from the containerized waste. All samples collected for waste analysis should be representative of the waste being sampled. Therefore, the samples should be composited. If the soil or sediment IDW is to be disposed of offsite, samples for TCLP analysis may be collected during advancement of the soil boring or from the containerized waste. If the IDW is to be disposed of within the AOC, sampling is not required. Guidelines for collecting representative samples are contained in Chapter 9 of *Test Methods for Evaluating Solid Waste* (USEPA 1986). Sampling methods are detailed in Appendix A.

5.1 Completing a Waste Profile

IDW is characterized through knowledge of the waste, review of environmental data correlating to the waste, or sampling and analyzing the waste itself. This characterization leads to a waste profile summarizing all the information available on the IDW. The waste profile is required for shipping any IDW to offsite facilities. It should be completed for all wastes generated in investigation activities as an accurate record of the waste identification, source, and characteristics. The profile also can describe wastes that are generated consistently and have similar or identical characteristics. For example, if a site investigation is conducted over many months and soil cuttings are generated consistently over that period, one waste profile may be completed to describe all the soil cuttings, even though they may be shipped offsite at different times throughout the investigation. Once that profile is approved, it may be used for subsequent shipments of the same waste without completing and approving a new profile. Appendix B includes the waste profile form.

Completing all 11 sections of the profile ensures all necessary information is obtained to properly manage the waste. Each blank on the profile form should be filled in, even if the appropriate response is "not applicable" or a zero value. The sections cover these subjects:

- Generator Information
- Waste Description
- Transportation Information
- Physical Properties
- Toxicity Characteristics
- Total Metals
- Other Solvent Constituents
- Chemical Composition
- Additional Information and Comments
- Technical Review
- Generator Certification

In most cases, environmental data gathered during the site investigation will be used to characterize the associated IDW. This process allows the IDW to be characterized more quickly and minimizes the sampling and analysis of IDW by providing an initial review of potential hazardous waste categories that may apply.

Once the waste profile has been completed, it will be signed by the Navy installation environmental coordinator. The waste profile then will be used for obtaining approval for treatment or disposal at offsite TSD facilities and for evaluating possible onsite treatment and disposal options.

5.2 Management of Disposable PPE and Equipment

Disposable PPE and DE will be managed according to the type of activity and concentration of contamination encountered with the equipment. In general, most PPE and DE will be managed as non-hazardous solid waste, particularly if little contact occurs with the sampling media and low concentrations of contaminants are involved. The IDW should be placed in plastic bags and transferred to an onsite industrial dumpster, whose contents is routinely disposed of in an municipal landfill. A second option is to transport the IDW to a suitable offsite municipal solid waste landfill.

Contaminated PPE and DE used in collection of samples from known highly contaminated areas will be placed in 55-gallon drums, accurately labeled as discussed in Section 5.6 and stored at a container storage area. PPE and DE will be stored until adequate characterization is complete for the site or for the containerized PPE and DE. The environmental sampling results from the sites where the IDW was generated will be reviewed when available. PPE and DE that is contaminated with listed hazardous waste will be managed as hazardous waste, and will be characterized in a manner consistent with the media being sampled.

5.3 Management of Empty Drums

Empty drums may be generated in rare cases, such as when IDW is consolidated onsite to minimize the number of containers shipped to offsite waste management facilities. Empty drums also may be generated when IDW is removed from containers for onsite treatment or disposal. Federal regulations require empty containers that held hazardous waste to be emptied to the maximum extent practicable before further management. In addition, if the container was used for an acutely hazardous waste, it must be decontaminated via triple rinsing before further management (40 CFR 261.7[3]).

Federal regulations exempt empty containers from regulation as hazardous waste. However, in order to retain the exemption, the empty container must be managed in one of the following ways:

- Dispose of it at an approved solid waste management facility, if 5-gallon capacity or less.
- Reclaim its scrap value onsite or ship the container to a reclaimer for its scrap value.
- Recondition or remanufacture the container onsite for subsequent reuse, or ship it to reconditioner or remanufacturer.
- Ship the container to a supplier or another intermediate collection location for accumulation before managing the container.

6.0 STORAGE

Specific IDW storage requirements depend on a number of factors, including the auspices under which the investigation is being conducted, location of the storage area, the length of storage, the type of storage unit, the type of waste, and the regulatory status of the storage unit. Storage of non-hazardous waste and designated waste in drums and portable tanks is not regulated by USEPA.

Storage of hazardous waste is regulated on the federal and state levels, with four options discussed further:

- Accumulation within the AOC
- Storage in a TU
- Accumulation for up to 90 days from the date of generation
- Storage in a unit that meets permitted facility standards

Selection of an applicable option may be dependent on:
- State laws and interpretations
- Applicable statutes under which the investigation is being conducted
- Site-specific issues

The location of IDW storage may be within the AOC or at another location of the installation. It is important to carefully consider the location chosen for IDW storage, since it may affect the applicability of some RCRA requirements such as LDRs and MTRs. IDW is generally stored in a manner meeting the requirements for hazardous waste storage until environmental data or other information prove otherwise. Typically, IDW is accumulated within the AOC or at a centralized storage area that complies with RCRA requirements for storing both solid and hazardous IDW.

6.1 Accumulation within the AOC

Accumulation of IDW within the AOC is appropriate for investigations conducted under CERCLA. In addition, if IDW is merely being moved within the AOC, land disposal is not considered to have occurred, therefore LDRs are not triggered. An evaluation of the IDW handling technique must be conducted to determine if the technique constitutes land disposal. Activities which constitute land disposal are detailed in Section 2.2.1 Land Disposal Restrictions. If IDW cannot be deposited within the AOC, IDW handling and disposal must comply with all LDRs to the extent practical.

6.2 Storage in a Temporary Unit

TUs are appropriate for investigations conducted under RCRA. Storing waste in a TU provides the greatest flexibility for design and operation of the storage unit. A temporary storage unit may be established for containers or tanks and may be placed either within or outside an AOC. A TU's major advantage is that IDW may be stored for up to one year, and waste may be removed from the TU and placed back into the AOC for treatment or disposal without triggering LDRs or MTRs. TUs must be administratively created with regulatory agency input. Design of a TU must consider:

- Length of time the unit will operate
- Type of unit
- Volumes of wastes to be managed
- Physical and chemical characteristics of the wastes to be managed there
- Potential for releases
- Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases
- Potential for exposure of humans and environmental receptors if releases were to occur

Specific design and operating requirements for accumulation storage areas and permitted storage units may be used as guidelines in developing temporary storage units. It is important to determine whether the TU will reside within an AOC, and the specific AOC should be identified in site-specific plans for the TU.

6.3 Accumulation of Containers for Less Than 90 Days

Generators may accumulate RCRA hazardous waste in container storage areas or storage tanks for up to 90 days before shipment to an offsite management facility. These storage areas and tanks are commonly called accumulation storage units. This storage option is somewhat flexible in terms of design due to the limited storage time involved. However, 90 days is not always sufficient to adequately characterize the waste before shipment offsite. This storage option is inappropriate for long-term storage of IDW.

Accumulation container storage areas must meet specific design and operational requirements outlined in 40 CFR §262.34(a) and R.61-79.262 Subpart C, which include the following:

- Containers must be in good condition and compatible with the waste placed inside them.
- Containers must be kept closed, except when waste is being added or removed from them, and they must be managed in such a way as to prevent rupture or leakage.
- Containers must be marked as hazardous waste and with the accumulation start date, composition and physical state of the waste, hazardous properties of the waste, and the name and address of the generator.
- Inspection of the accumulation storage unit must be conducted and recorded at least weekly.
- Personnel handling the containers must receive initial and annual training on operating and maintaining the accumulation storage unit.
- A contingency plan must be developed and emergency equipment provided for the accumulation storage unit.

- The accumulation storage unit must be closed to meet the RCRA closure performance standard.

In addition to these requirements. E/A&H recommends providing the following measures when possible:

- If the accumulation storage unit is not within the AOC, the unit should be constructed with a concrete or asphalt base, depending on the type and quantity of waste stored, and should have berms around the perimeter. Existing concrete and asphalt pads often are appropriate for storage.
- The accumulation storage unit should be covered, or adequate capacity should be provided to handle runon and precipitation.
- Liquids from runon, precipitation, or spills should be collected promptly from the accumulation storage unit and managed appropriately.

Accumulation storage units do not require administrative action to create; the generator simply must establish the storage area and maintain adequate documentation demonstrating compliance with the operating requirements.

6.4 Storage of Containers to Meet Permitted Facility Standards

The last storage option for IDW is to use an existing permitted storage facility or create a storage area meeting all the design specifications and operating requirements applicable to permitted facilities. The requirements for permitted facilities were developed to allow longer storage of a variety of wastes generated at industrial facilities, and these requirements are the most stringent under RCRA. Unless using an existing permitted storage facility, this option provides the least amount of flexibility because the requirements are extensive and very specific. However, this option also provides the greatest amount of storage time, with no pre-established limits on time a waste may be stored. While CERCLA allows onsite storage units of this type to be exempt from permitting standards, the substantive requirements still must be met. These requirements for container storage areas are summarized below:

- General Standards
  - Waste analysis plan for characterizing each hazardous waste stored at the facility
  - Facility security
  - Location standards for flood zones and seismically sensitive areas
  - Annual personnel training

- Emergency Preparedness
  - Develop a contingency plan for emergencies
  - Provide adequate communication and alarm systems for emergencies
  - Personnel training in emergency response
  - Procedures for managing ignitable, reactive, and incompatible wastes

- Design
  - Impermeable containment base free of cracks and gaps
  - Containment adequate for 10 percent of total waste capacity or largest container, whichever is greater
  - Additional containment adequate to contain a 25-year, 24-hour storm event, or a method to prevent runon and runoff of storm water and precipitation

- Operation
  - Weekly inspections
  - Removing accumulated liquids in the containment system within 24 hours
  - Separating incompatible wastes

- Closure
  - Develop closure plan subject to agency approval
  - Oversight by independent registered professional engineer
  - Certify to regulators the adequacy of closure

6.5 Inspections and Storage Inventory Log

All storage areas (TU, 90-day accumulation, and units meeting permitted facility standards) should be inspected at least weekly. A standard inspection form is included in Appendix C which shows the items to be inspected, discrepancies noted, and corrective actions taken. Container storage inspections should cover the following areas:

- Condition of containers
- Adequacy and completeness of labels
- Evidence of leaks and spills
- Adequate aisle space
- Loading and unloading areas
- Emergency equipment

In addition to completing weekly inspections, an inventory of containers should be maintained that reflects the following information:

- Number of containers currently in storage
- Date each container was generated
- Dates, manifest numbers, and destination facilities for IDW shipped to offsite management facilities
- Dates and disposition information for IDW disposed of onsite

Inventory information for small quantities of IDW may be maintained in the field logbook for the site. An inventory log may be used to track larger quantities of IDW from multiple sites. An inventory form is included as Appendix D. Inventory information should be updated at least weekly, and the inventory should be physically checked against the containers in storage at the time of inspection.

6.6 Container Labeling

Identifying marks and labels will be required on each waste container. The generating personnel must clearly mark each container with contrasting lettering. All empty drums will be marked as empty to avoid question of their contents. E/A&H has instituted the use of CERCLA IDW labels as shown in Figure 6-1. These labels will provide the base personnel with all the pertinent information they need to complete the inspection records state and federal regulations require. The labels will show the site location, date media was introduced in the drum, location designator, and type of media. Each location designator will be composed of five to six characters, the first two will represent the site identification number at NAS Pensacola (for example "30", represents site 30). The third character represents the waste origin (for example "S" for soil boring, "G" for monitoring well). If the monitoring well is temporary, the fourth digit will be used for the temporary designation of "R." The fourth digit may also designate the depth of the permanent monitoring well (i.e., "S" for shallow, "I" for intermediate, "D" for deep). The fourth and fifth characters may represent the matrix serial identification number, which is a unique location number assigned to the origin. For example a drum of purge water collected from Site 30, shallow monitoring well number 12 would have the location designator 30GS12. These labels will be filled out by the E/A&H personnel on the specific site and attached to the full and sealed drums. Drum labels will be placed on the side of the drum, not on the lid, to reduce weathering and to prevent the possibility of interchanging labels if lids are reused. If labels are not available, the following action will be accepted: The drums containing waste will be marked with a contrasting paint pen or grease pencil as CERCLA IDW, identifying the site location, date media was introduced in the drum, location designator, and type of media to allow the appropriate analysis to be traced to the correct drum of waste. All old markings on recycled drums shall be painted over with black spray paint to avoid confusion with the new labels or markings.

All labeling information for each drum will be entered into the field logbook. After the drum's contents are characterized, as described in Section 4, the labels will be updated to reflect the

Figure 6-1 Drum Label

NAVY CLEAN
ENSAFE/ALLEN
& HOSHALL

ENSAFE/ALLEN & HOSHALL
5720 SUMMER TREES DR. SUITE 8
MEMPHIS, TENNESSEE 38134
(901) 383-9115

SITE ______________________ DATE ______________________

LOCATION
DESIGNATOR ________________ MEDIUM ______________________

appropriate classification of wastes and the logbook will be updated. Drums containing hazardous IDW will be labeled using a paint pen or grease pencil "HAZARDOUS WASTE - Florida Law Prohibits Improper Storage or Disposal" in accordance with 40 CFR Part 172 and the applicable state regulations. Drums containing non-hazardous IDW will be labeled using a paint pen or grease pencil "NON HAZARDOUS WASTE".

6.7 Use of Portable Storage Tanks

Portable storage tanks often are used to accumulate and store liquid IDW such as groundwater or storm water runoff. USEPA regulates these portable tanks as containers for storage onsite. Storage tanks should be labeled in the same manner as for containers. However, the portable tanks must comply with federal Department of Transportation (DOT) specification and labeling if they will be used to transport liquids to offsite facilities.

6.8 Repackaging and Overpacking Containers

Repackaging or overpacking containers may become necessary if they become damaged or weathered and no longer are suitable for use. Repackaging involves transferring the waste from the damaged drum into a new container, whereas overpacking involves placing the damaged drum into a larger container. When repackaging or overpacking occurs, the new container must be labeled identically, and a note should be made in the field logbook or storage inventory log of the change in packaging or drum size.

7.0 TREATMENT AND/OR DISPOSAL OF IDW

The Navy as *"Generator"* of the waste retains all responsibility for disposal of the containerized waste. The Navy disposes of its hazardous waste in accordance with NAS Pensacola Instruction 5090.1B *Hazardous Waste Management Program* (NAS Pensacola 1994).

Once the IDW has been characterized, treatment and disposal options that appropriately manage the waste may be considered. The options available at a particular installation depend on:

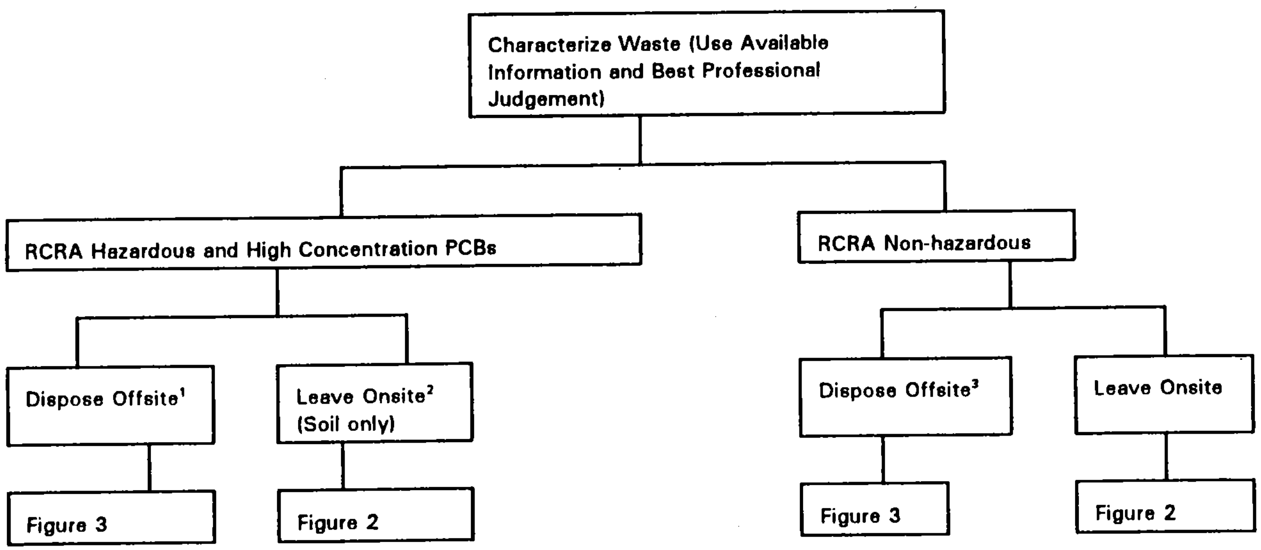
- Availability of onsite management facilities, such as industrial wastewater treatment plants, NOTWs, bioremediation facilities, and other treatment technologies that may have been developed for other cleanup sites.

- Availability of a POTW with the capability to treat wastewater from the installation.

- Site conditions and regulatory approval for disposal of non-hazardous soil back onto the site where generated.

A decision tree for selecting the best approach for IDW management is provided in Figure 7-1, 7-2, and 7-3. If the IDW is to remain onsite, then the onsite branch, Figure 7-2, shows the steps and choices for the different types of IDW. If the IDW is to leave the site, the offsite branch, Figure 7-3, shows the steps and choices for the different types of IDW. The waste management options addressed in this section include managing aqueous wastes at installation wastewater treatment plants, NOTWs, and at POTWs. Solid IDW may be disposed of at an offsite facilities or returned to the site from which it was generated. In addition, IDW may be used onsite in pilot-scale treatability studies.

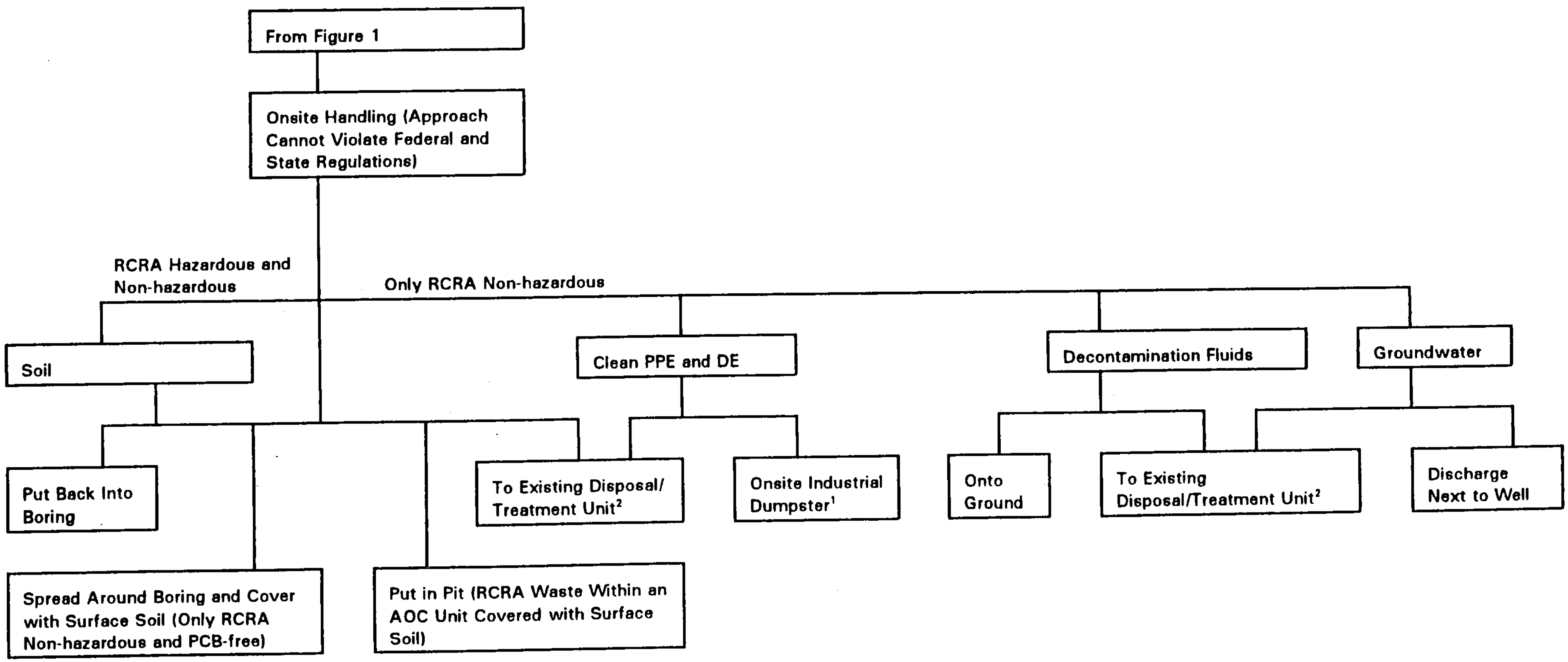
Figure 7-1
IDW Management Decision Tree



Source: Modified from USEPA 1991

Notes:
1 Soil cuttings, groundwater, and decontamination fluids creating increased hazards should be disposed of offsite.
2 If not prohibited by other legally enforceable requirements such as state ARARs
3 Justified only when a RCRA non-hazardous waste is a state hazardous waste and state requires waste removal, or if leaving the waste onsite would significantly affect human health and the environment

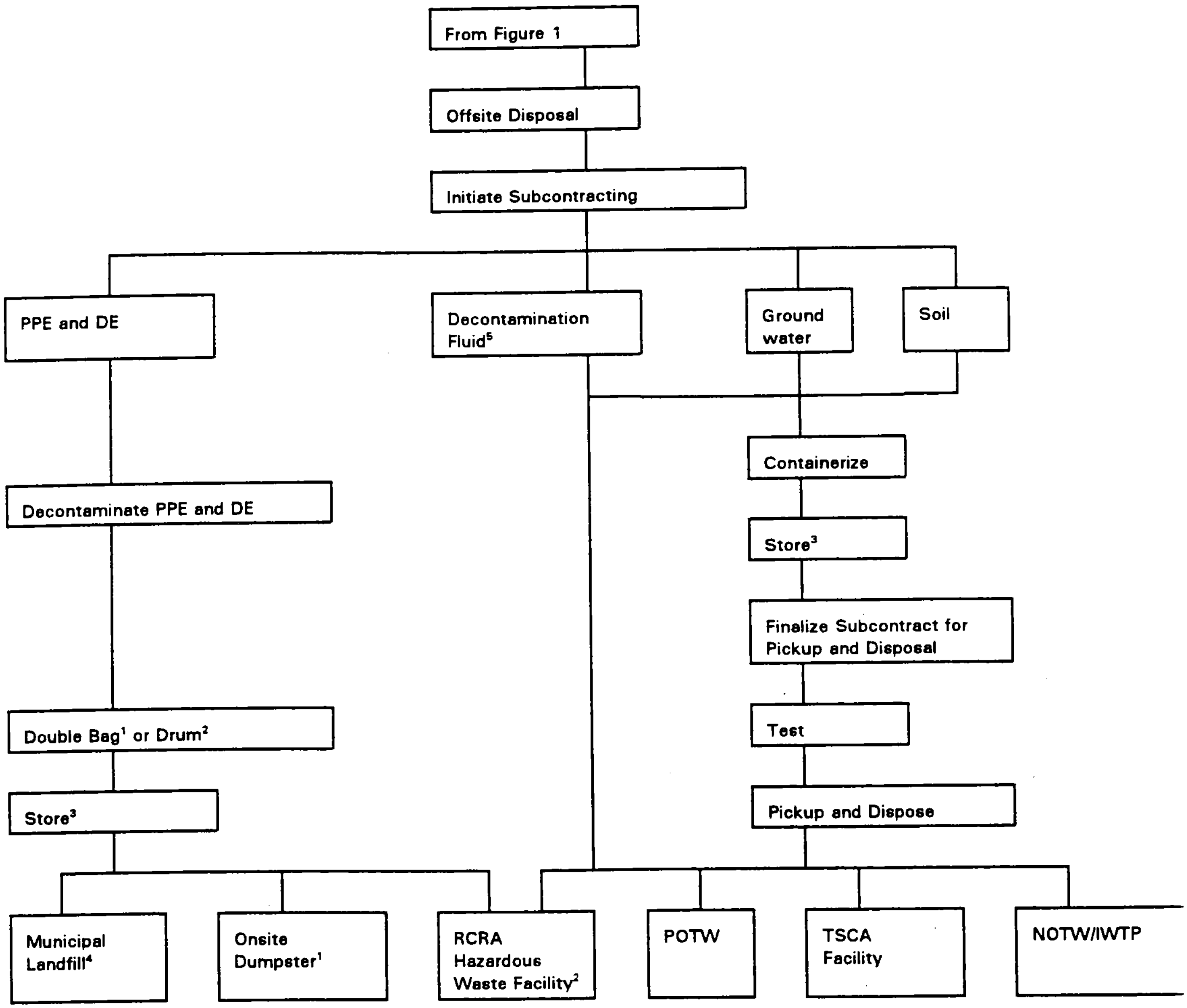
Figure 7-2
Onsite Handling of IDW



Source: Modified from USEPA 1991

Notes:
1 Clean PPE and DE may also go to the nearest landfill
2 If the receiving unit meets the offsite policy acceptability criteria

Figure 7-3
Offsite Handling of IDW



Source: Modified from USEPA 1991

Notes:

1 Only RCRA non-hazardous waste
2 Only RCRA hazardous waste generated in quantities greater than 100 kg/month when sent offsite
3 In accordance with accumulation requirements for RCRA hazardous wastes
4 Only if the conditionally exempt small quantity generator exception applies
5 If the conditionally exempt small quantity generator exception applies, offsite disposal of decontamination fluids may not require subcontracting

7.1 Offsite Handling

Offsite handling of IDW would involve using a subcontractor to haul and dispose of the IDW at an offsite facility which complies with the applicable regulations for the type of waste. Generally, this approach allows for the most technologically advanced disposal option. However, there are several disadvantages to offsite handling which include:

- increased costs
- loss of control over the fate of the IDW while retaining liability
- potential for spills during transportation
- finding a suitable disposal facility
- reluctance of states to accept waste generated out-of-state

7.1.1 Management of Aqueous Liquids at Installation Treatment Plants

Aqueous liquids such as well purge water, well development water, and decontamination liquids often can be treated at available installation wastewater treatment plants. Based on the completed waste profile, the IDW can be evaluated to determine if it meets the acceptance criteria under the wastewater treatment plant's discharge permit. This evaluation usually consists of comparing the waste contaminants to the chemical constituents the plant is permitted to manage. Accepting and discharging the IDW to the wastewater treatment plant typically is coordinated with the installation environmental coordinator and plant personnel. If the waste is restricted under the LDR program, a special notification must be completed and submitted to the wastewater treatment plant when the waste is transferred (40 CFR §268.7[1[[6]). A certificate of disposal or their receipt should be obtained from the wastewater treatment plant after the IDW has been accepted, and this document should be filed with the waste profile, along with a copy of the LDR notification.

In addition to IWTPs, NOTWs are permitted to accept wastewater for treatment. However, NOTWs may be subject to different regulations. If this option is selected for use, notification and coordination with Base environmental personnel will be required.

7.1.2 Management of Aqueous Liquids at POTWs

Many POTWs are permitted to accept wastewater for treatment under special discharge permits issued for occasional or one-time discharges. These permits may often be obtained with the data used to complete the waste profile. The process of obtaining a special discharge permit is more formal than obtaining approval; however, the turnaround time for approval is typically just two to four weeks. If the waste is restricted under the LDR program, a special notification must be completed and submitted to the POTW when the waste is shipped or transferred (40 CFR §268.7[a][6]). A certificate of disposal or other receipt should be obtained from the POTW after IDW has been accepted, and this document should be filed with the waste profile, along with copies of the LDR notification.

7.1.3 Use of Investigation-Derived Waste in Pilot-Scale Treatability Studies

IDW may often be used beneficially onsite in pilot-scale treatability studies. At the federal level, samples undergoing treatability studies at laboratories and testing facilities are exempt from hazardous waste regulation, as long as USEPA and the Florida Department of Environmental Protection (FDEP) are notified and certain record-keeping and management standards are met (40 CFR 261.4[e] and [f]).

Before conducting a treatment study, any IDW intended for such use should be stored in accordance with applicable regulation, in properly labeled and marked containers.

7.2 Onsite IDW Handling and Management Options

Onsite handling of IDW is a cost effective approach to handling IDW. If IDW is RCRA non-hazardous soil or water, it may be left onsite unless a state ARAR or community concerns, require offsite disposal. IDW to be left onsite should not be containerized or tested. The onsite handling options for RCRA non-hazardous IDW are listed below.

- Soil
  - — Spread around the well
  - — Return to boring
  - — Put the IDW into a pit within the AOC
  - — Dispose at the site's TDU

- Groundwater
  - — Pour onto ground next to well
  - — Dispose at the site's TDU

- Decontamination Fluids
  - — Pour onto ground
  - — Dispose at the site's TDU

- Decontaminated PPE and DE
  - — Double bag and dispose at the site, or in an municipal landfill
  - — Dispose at the site's TDU

If the IDW is RCRA hazardous soil that poses no immediate danger to human health and the environment, it may remain onsite within the delineated AOC. Proximity to residents and workers must be considered before using this disposal option. Onsite disposal of RCRA hazardous soil involves:

- Delineating the AOC
- Determining pit locations close to the borings within the AOC
- Covering hazardous IDW in the pits with the surficial soil

8.0 IDW MANAGEMENT ORGANIZATION

The Navy will have ultimate authority and responsibility for managing and disposing of the IDW E/A&H generates on its behalf. Interim status for hazardous waste container storage facilities on the military base has been granted under RCRA statues and regulations. This allows all wastes to be managed in accordance with subtitles C and D of RCRA and with the state solid waste regulations. The Navy, E/A&H, and subcontractor personnel will implement the IDW management plan. E/A&H and its subcontractor personnel will be responsible for properly containerizing and labeling the waste and collecting samples for laboratory analysis. The Navy will be responsible for managing the waste inventory at waste accumulation areas, laboratory analysis, characterizing the waste as hazardous or non-hazardous (after analytical information is returned from the laboratory), loading of waste for offsite transfer, and for the transporting the waste to a properly permitted waste management facility.

8.1 E/A&H Site Manager

The E/A&H site manager will be responsible for properly containerizing IDW including:

- Notifying the site IDW coordinator of any new waste.
- Properly labeling the containers per Section 6 of this plan when accumulation is initiated.
- Establishing IDW accumulation area(s) at each site.

8.2 E/A&H IDW Coordinator

The E/A&H IDW coordinator will be responsible for assisting the Navy in managing IDW accumulation areas and accumulation areas associated with the investigation, however the Navy will retain ultimate responsibility for the waste management system. His responsibilities include:

- Supervising daily waste management at all generating points.
- Ensuring hazardous waste containers are properly labeled and stored in an appropriate manner and incompatible waste are segregated.
- Maintaining drum inventory logs or forms.
- Ensuring overall compliance with this plan.

8.3 Navy Environmental Coordinator (IDW Manager)

The Navy manages the hazardous waste in accordance with NAS Pensacola Instruction 5090.1B *Hazardous Waste Management Program* (NAS Pensacola 1994). The Navy environmental coordinator (IDW manager) will be responsible for the entire IDW management system. He will be responsible for informing E/A&H IDW Coordinator of any changes in procedures or policy concerning the handling, storage, and disposal of IDW.

9.0 REFERENCES

Naval Air Station Pensacola. (1994). *NASP Instruction 5090.1B Hazardous Waste Management Program*. Naval Air Station Pensacola: Pensacola, Florida.

U.S. Environmental Protection Agency (1986). Test Methods for Evaluating Solid Waste, Third Edition SW-846. Prepared by the Office of Solid Waste and Emergency Response.

U.S. Environmental Protection Agency (1988a). *Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA, Interim Final.* Prepared by the Office of Emergency and Remedial Response.

U.S. Environmental Protection Agency (1988b). *CERCLA Compliance with Other Laws Manual, Draft Guidance.* Prepared by the Office of Emergency and Remedial Response.

U.S. Environmental Protection Agency. (1990). *National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule.* USEPA/540/1-89/002. December 1989. Federal Register V55:46 pg 8666-8865, March 8, 1990.

U.S. Environmental Protection Agency (1991). *Management of Investigation-Derived Wastes During Site Inspections.* Prepared by the Office of Emergency and Remedial Response, Publication 9345.3-02FS.

U.S. Navy. (1993). *1994 Site Management Plan (SMP) of the Installation Restoration Program for the Naval Air Station Pensacola*, Pensacola, Florida.

Appendix A
Sampling and Analysis Procedures

1.0 IDW SAMPLING METHODS

The basic objective of the IDW sampling program is to produce a set of samples representative of the IDW media under investigation and suitable for subsequent analysis. This attachment describes the methods and materials to be used for sampling IDW generated at Navy installations. Under many circumstances, the sampling and testing performed for the investigation will be sufficient to classify the IDW and no additional sampling will be necessary. When additional sampling is required to characterize the waste, it is important that quality control (QC) sampling is performed to assess the accuracy and precision of the sampling program. QC sampling methods should be the same as those stated in the approved work plan.

Sampling accuracy is usually achieved by using a random sampling technique. Sampling precision is achieved by collecting the appropriate number of samples and by maximizing the physical size of the samples.

A simple random sampling strategy will be employed for most solid waste cases where it is determined additional samples are required to characterize the IDW. The rationale for using this type of sampling method is that typically little or no information is known about the distribution of the chemical contaminants within the waste. For most solid IDW, distinct strata within the containers are not identified and various in composition or stratification may have occurred at unknown and random depths.

Simple random sampling is a type of probability sampling relying on mathematical and statistical theories. In simple random sampling all locations or portions of the IDW have an equal chance of being sampled. For simple random sampling, the appropriate number of samples to be collected is estimated by finding the regulatory threshold (RT) for the contaminants of concern and by estimating the sample mean (x) and variance (s).

Simple random sampling may be used for liquid IDW thought to be homogeneous. Stratified random sampling may be used for liquid IDW sampling where the contaminants of concern are thought to stratify due to their density relative to the other liquids. Stratified random sampling is different from simple random sampling in that the Xs are calculated for each stratum in the population and then integrated into the overall estimates of those statistics. Systematic random sampling may also be used for instances where there are recognized trends or cycles associated with the contaminants in the IDW. Cases where systematic random sampling may be used include drums with floating or sinking products.

It is also likely that if the waste is to be disposed of to a treatment, storage, or disposal unit (TSDF), the TSDF's operators will want to perform their own waste characterization. Therefore, it is important to contact the potential TSDF before performing sampling and laboratory analysis of the IDW to avoid duplication of efforts and costs. Potential TSDFs for the IDW should be contacted following environmental sampling. Their requirements regarding acceptable laboratory analyses change as do the wastes that they are accepting and the rates that they charge. Transportation requirements and costs should be determined before shipping.

The sampling method selected for each of the IDW media will, in part, depend on the potential contaminants of concern as shown by site history or analytical results of the field sampling program. The generation of additional decontamination fluids through IDW sampling should be minimized and should be a factor considered in the final choice of sampling technique. Care should be exercised to avoid using sampling devices plated with chrome or other materials that might contaminate the sample.

The description of sampling methods for containerized media is divided into three sections that address (1) soil and sludge, (2) containerized liquid, and (3) containerized PPE. If required, wipe sampling will be used to analyze the surface of drums, DE, and PPE.

1.1 Soil and Sludge Sampling

Available options for sampling devices suitable for soil and sludge (or sediment) sampling include scoops, thin-walled tube samplers, hand augers, and core samplers. The use of a scoop and a 100 centimeters (cm) long sampling trier is the recommended method for sampling containerized soil and sludge. However, site-specific conditions may necessitate a variety of sampling options, and therefore all of these sampling methods will be discussed. The presence of rocks, debris, or other sampling-specific considerations may complicate sampling and preclude the use of or require modification to some of these sampling devices.

When sampling a previously sealed vessel, the presence of a bottom sludge should be checked. This is easily accomplished by measuring the depth to apparent bottom and then comparing it to the known interior depth. Methods for sampling a bottom sludge are described in the following sections. Sludge developing in 55-gallon drums can also be collected by employing glass tubes used for the liquid portion of the sample.

1.1.1 Shovel, Spades, and Scoops

Collection of soil and sludge samples can be accomplished with tools such as spades, shovels, and scoops. The recommended and most direct method of collecting surface samples for subsequent analysis is with the use of a spade and scoop. This method is limited somewhat to sampling at the near surface. Samples from depths greater than 50 cm may become very labor-intensive. Samples collected for volatile organic compound (VOC) analysis will be placed directly into the analytical bottle. Samples collected for other analyses will be composited in a stainless steel bowl and then placed into the analytical bottles.

1.1.2 Thin-Walled Tube Sampler and Hand Corers

The thin-walled tube sampler is, as its name implies, a metal tube generally 2.5 to 7.5 cm in diameter and 30 to 60 cm long. The tube is forced into the soil or sludge and then extracted. Friction will usually hold the sample material in the tube during extraction. A variety of interchangeable cutting tips facilitates penetration with reduced sample disturbance. Thin-walled tube samplers are available in various types and construction materials and are suitable for moist, dry, sandy, or heavy-duty applications.

Sampling soil or sludge can also be accomplished with a hand corer. This device is essentially the same type of thin-walled tube sampler described above. It is modified by the addition of a handle to facilitate driving the corer and a check valve on top to prevent washout during retrieval through an overlying water layer. Hand auguring devices can be used in conjunction with a thin-walled tube sampler. In this manner, a thin-walled tube sampler can be used to sample both from the surface or to the bottom of a 55-gallon drum. However, the presence of rocks or the collapse of the auger hole generally prohibits sampling at depth.

1.2 Aqueous Liquid Sampling

Beakers, glass tubes, bailers, and extended bottle samplers and composite liquid waste samplers (COLIWASA) are potential devices used to sample containerized liquid media. Site-specific conditions may necessitate a variety of sampling options, and therefore all of these methods will be discussed. Samples from drums can also be readily collected by merely submerging a sample bottle.

1.2.1 Beakers

The use of a sampling device such as a beaker, either disposable or constructed or glass, Teflon, or stainless steel, is the recommended method for sampling containerized liquids. The device typically has a capacity of at least 500 milliliters (ml) to provide an adequate sample volume for analysis and to minimize the number of times the liquid will be distributed, thus reducing agitation of any sediment layer. Large sample volumes required for some analyses will require submerging the beaker several times to obtain the appropriate volume. A stainless steel beaker with pour spout and handle works well. It is easily cleaned and considerably less expensive than Teflon.

1.2.2 Bailers

Liquid samples from open containers, such as 55-gallon drums, may be collected. Bailers may also be used to collect liquid samples from containers such as drums or tanks. The major disadvantages to using bailers are splash hazards, and the need for decontamination of reusable bailers, and the generation of waste when using disposable bailers.

1.2.4 Composite Liquid Waste Samplers

The composite liquid waste samplers (COLIWASA) is designed to permit representative sampling of the complete water column from drums or other containerized liquid media. This type of sampler is used when contaminants of different densities such as oil and water are potentially present in the containerized liquid. It consists of a 152-cm long by 4-cm ID section of tubing with a neoprene stopper at one end. The stopper is attached to a rod running the length of the tube and terminating with a locking mechanism at the other end. Manipulation of the locking mechanism opens and closes the sampler by raising and lowering the neoprene stopper. The major drawbacks associated with using the COLIWASA include the difficulty of decontamination and cost. The sampler is difficult to decontaminate in the field and high in cost relative to alternative procedures such as glass tubes. The COLIWASA should only be used when multiphase wastes are suspected.

1.3 Wipe Sampling

Wipe samples are used to assess surface pesticide/PCB contamination and are applicable for the analysis of drums containing used PPE and DE. The terms "wipe sample," "swipe sample," and "smear sample" have all been used synonymously. For purposes of this section, the sample will be termed "wipe sample". Wipe samples will adhere to requirements for soil sample preservation and holding times. Wipe samples will be collected in accordance with the following procedures.

Before Sampling:

1. Don personal protective equipment as required in the site-specific HASP.
2. Mark the 10-cm sample site with a decontaminated template or a ruler.
3. Write a detailed description of the area to be sampled including a sketch of the sampling area in the field logbook.
4. Prepare all sampling equipment for the sampling event.

During Sampling:

5. Remove the cap from the sampling vial.

6. Remove the hexane- or deionized water-soaked gauze or swab from the sampling vial with stainless steel forceps or tongs.
7. Immediately begin wiping the sampling area twice, from left to right and then from top to bottom.
8. Return the gauze or swab to the sample vial. If using a gauze, fold the gauze so the side used in sampling is not exposed.
9. Cap the sample vial.

After Sampling:

10. Label the vial and record the sampling details on the sampling forms. Complete the chain-of-custody forms in accordance with Section 12 of the CSAP.

QA/QC samples will be collected at the frequency presented in Section 15 of the CSAP. In addition, a hexane- or deionized water-soaked gauze will be submitted as a QA sample.

Appendix B

Waste Profile Forms and Instruction

PROFILE NUMBER_______________
Completed by_______________
Date_______________
Reviewed by_______________

INVESTIGATION-DERIVED WASTE PROFILE

Complete one form for each waste stream generated at each site. See instructions attached for detailed information about this form.

GENERATOR INFORMATION

Facility Name _______________
Site Name _______________
Address _______________
____
City _______________ State ___ Zip _______________

USEPA ID Number_______________
Technical Contact _______________
Phone _______________
Fax _______________
CTO Number_______________

WASTE DESCRIPTION

Waste Description_______________
Source Code/Process _______________
Waste Form Code/Category of Waste _______________
Special Handling Instructions _______________
Is this waste regulated by USEPA or FDEP? _______________ Waste codes _______________ CLIN_______________

LDR Subcategory	____	____	____	____
Numerical Standard per §268.41?	____	____	____	____
Numerical Standard per §268.43?	____	____	____	____
Technology-Based Standard §268.42?	____	____	____	____

TRANSPORTATION INFORMATION

DOT Proper Shipping Name_______________
DOT Hazard Class_______________ UN/NA_______________ RQ_______________
Packaging Description _______________

PHYSICAL PROPERTIES

Color _______________
Odor _______________

Liquid Layering _______________
Physical State _______________

	Avg.	Min.	Max.
pH	____	____	____
Specific Gravity	____	____	____
Flash point	____	____	____
(Method):	____	____	____
BTU/lb	____	____	____

Viscosity _______________
Yard-Pound Factor _______________ % YD = LB
% Halogens _______________
% Liquid _______________
% Sludge _______________
% Solid _______________
% Water _______________

Acid Reactive	Y	N	Biological	Y	N	Corrosive	Y	N
Dioxin	Y	N	Explosive	Y	N	Flammable	Y	N
Oxidizer	Y	N	Pesticide	Y	N	Herbicide	Y	N
Poison	Y	N	Pumpable	Y	N	Pyrophoric	Y	N
Radioactive	Y	N	RCRA Reactive	Y	N	Shock Sensitive	Y	N
Wastewater	Y	N	Water Reactive	Y	N	Other _______________		

TOXICITY CHARACTERISTICS

USEPA Waste Code	Contaminant	Level (mg/L)	Federal Regulated Level
	Aldrin	______	
	Antimony	______	
D004	Arsenic	______	5.0
	Asbestos	______	
D005	Barium	______	100.0
D018	Benzene	______	0.5
	Beryllium	______	
D006	Cadmium	______	1.0
D019	Carbon Tetrachloride	______	0.5
D020	Chlordane	______	0.03
D021	Chlorobenzene	______	100.0
D022	Chloroform	______	6.0
D007	Chromium (Total)	______	
	Chromium (Trivalent	______	
	Chromium (Hexavalent)	______	
	Cobalt	______	
	Copper	______	
D023	o-Cresol	______	200.0
D024	m-Cresol	______	200.0
D025	p-Cresol	______	200.0
D016	2,4-D	______	10.0
	DDT, DDE, DDD	______	
D027	1,4-Dichlorobenzene	______	7.5
D028	1,2-Dichloroethane	______	0.5
D029	1,1-Dichloroethylene	______	0.7
	Dieldrin	______	
D030	2,4-Dinitrotoluene	______	0.13
	Dioxin (2,3,7,8, - TCDD)	______	
D012	Endrin	______	0.02
	Fluoride salts	______	
D031	Heptachlor (& its epoxide)	______	0.008
D032	Hexachlorobenzene	______	0.13
D033	Hexaclorobutadiene	______	0.5
D034	Hexachloroethane	______	3.0
	Ketone	______	
D008	Lead	______	5.0
	Lead components, organic	______	
D013	Lindane	______	0.4
D009	Mercury	______	0.2
D014	Methoxychlor	______	10.0
D035	Methyl ethyl ketone	______	200.0
	Mirex	______	
	Molybdenum	______	
	Nickel	______	
D036	Nitrobenzene	______	2.0
D037	Pentachlorophenol	______	100.0
D038	Pyridine	______	5.0
D010	Selenium	______	1.0
D011	Silver	______	5.0
D039	Tetrachloroethylene	______	0.7
	Thallium	______	
D015	Toxaphene	______	0.5
D017	2,4,5-TP (Silvex)	______	1.0
D040	Trichloroethylene	______	0.5
D041	2,4,5-Trichlorophenol	______	100.0
D042	2,4,6-Trichlorophenol	______	2.0
	Vanadium	______	
D043	Vinyl chloride	______	0.2
	Zinc	______	
	PCB	______	

TOTAL METALS

Metals (ppm)	Avg.	Min.	Max.	Metals (ppm)	Avg.	Min.	Max.
Aluminum	__	__	__	Iron	__	__	__
Antimony	__	__	__	Lead	__	__	__
Arsenic	__	__	__	Mercury	__	__	__
Barium	__	__	__	Molybdenum	__	__	__
Beryllium	__	__	__	Nickel	__	__	__
Cadmium	__	__	__	Selenium	__	__	__
Chromium VI	__	__	__	Silver	__	__	__
Chromium III	__	__	__	Thallium	__	__	__
Cobalt	__	__	__	Vanadium	__	__	__
Fluoride	__	__	__	Zinc	__	__	__

CHEMICAL COMPOSITION

Chemical Name	Avg.	Min.	Max.	Circle one:
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
______________	__	__	__	% PPM PPB
Water	__	__	__	% PPM PPB

ADDITIONAL INFORMATION AND COMMENTS

Attached documentation: ____

____

____

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Waste Profile No. ________

GENERATOR CERTIFICATION

I hereby certify, as an authorized representative of the generator named on Page w of this Waste Profile, that the information provided in this and all attached documents is true and correct; reveals any and all known or suspected hazards involving the handling, transportation, treatment, storage and disposal of this waste; and no willful misrepresentations or omissions have been made. I further certify and warrant that this identification is the result either of an analysis of a representative sample obtained and analyzed in accordance with the sampling and testing procedures specified by the U.S. Environmental Protection Agency or by applying knowledge of the process generating the specific waste being offered.

Generator's Signature ______________________________ Title ___________________________ Date ____________

Instructions for Completing the Investigation-Derived Waste Profile

1. *General Information*. The mailing address of the generator and the site where the waste will be picked up should be indicated. The USEPA Identification Number for the site must be provided, unless the generator is a conditionally-exempt small quantity generator.

2. *Waste Description*. This Section contains some general information about the waste, including how it was generated.

   USEPA hazardous waste codes are also included in this section. Waste codes are selected according to whether the waste contains any listed hazardous waste or whether the waste itself exhibits a characteristic of hazardous waste. There is a hierarchy for assigning waste codes which can be reviewed in detail in 40 CFR Part 261 of the federal hazardous waste regulation. Here's a simple explanation:

   a. If the remediation site is associated with a specific industrial process, first look under the K-code listing in 40 CFR §261.32 to determine if any of the generating processes match the activities previously conducted at the site. If so, the waste gets the K-code and go on to step "d" to assign characteristic codes. If the process is not described in the K-code list, go to step "b". There are very few specific industrial processes that would result in such IDW at Navy facilities.

   b. If the remediation site is associated with a non-specific industrial process that was not listed under the K-codes, look under the F-code listings in 40 CFR §261.31 to determine if any of the generating processes match the activity and contaminants at the site. If so, the waste gets the appropriate F-code, and then continue to step "d" to assign characteristic codes. If the process is not described in the F-code list, go to step "d". Some common F-code activities include use of solvents, wood treatment activities, and electroplating operations.

   c. If the remediation site is associated with the release of a commercial product, off-specification species or out-of-date product, look under the P-code and U-code listings in 40 CFR §261.33 for a match to the contaminants found at the site. P-code sates are acutely toxic, and U-code waste are listed for chronic toxicity, reactivity, or ignitability. A common activity which results in this type of waste is a pesticide storage area where containers were rinsed or where releases occurred. Don't forget to check the lists for common synonyms of the chemical. The CAS number may also be used to review the list of waste codes. If the waste does not match any of the chemicals in this list, go to step "J".

   d. If the waste doesn't fall into any of the categories listed above, you must consider the characteristic waste categories listed in 40 CFR Part 261. Subpart C. There are four categories of characteristics, known as D-code wastes: ignitable, corrosive, reactive and toxic. A waste may exhibit one or more of these characteristics. The only way to determine whether a waste is regulated as a characteristic waste is to take a sample and analyze it for the characteristic, or to use other analytical data to determine if it exhibits one or more characteristics. If the waste does not fall into any of the categories listed in steps "a" through "c" and does not exhibit a hazardous characteristic, it is not regulated as hazardous waste, although it may be regulated as designated waste.

      Characteristic waste codes regulated under federal regulations are assigned according to the type of characteristic exhibited.

3. *Transportation Information*. This section is for completing the proper U.S. Department of Transportation shipping name, hazard class and UN/NA number. In addition, the reportable quantity (RQ) for the waste is shown here. DOT information is available in 40 CFR Part 172, and RQ information is available in 40 CFR Part 302.

4. *Physical Properties*. Important physical characteristics are described in this section of the profile, including many of the characteristics to be used for verifying the waste identification when the waste is picked up by E/A&H's waste management contractor.

5. *Toxicity Characteristics*. This section of the profile contains a comprehensive listing of chemical constituents that are regulated by USEPA. Their corresponding D-codes are shown in the list, as is the regulated level for each chemical. This section of the form should be completed even if the waste is listed as a K-code, F-code, P-code or

U-code. It is usually based on an analytical report for the waste. If a sample will be collected for toxicity characteristic analysis, the constituents selected for analysis should be based on a review of available corresponding environmental data, known activities at the site, and possible management methods for the waste.

6. *Total Metals*. Information on total metals is usually required for waste streams requiring certain types of treatment. For example, an inorganic sludge that exhibits a toxicity characteristic for cadmium and lead (D006 and D008) may be chemically stabilized to meet LDR treatment standards before it is landfilled. Usually this type of treatment consists of "fixing" the waste in a concrete-like material. In order to ensure that the required USEPA treatment standards will be met, the treatment company needs information on the total quantity of cadmium and lead in the waste so that it can develop the proper "recipe" for the waste and stabilizer.

7. *Chemical Composition*. All the components of the waste are listed, along with a range of their concentration. It is important that the average concentrations add up to 100%, so that all the components are represented. A composition listing for a typical solvent/water waste stream is on the following page.

Chemical Name	Avg.	Min.	Max.	Conc.
Xylenol	3	2	4	%
Ethyl Acetate	5	4	6	%
Methanol	1	1	2	%
Ethanol	1	1	2	%
Hexone (Methyl Isobutyl Ketone)	1	1	2	%
Aliphatic Naphtha (carrier)	69	50	70	%
Water	20	10	55	%
Total Composition	100	N/A	N/A	%

8. *Additional Information and Comments*. This section is for explaining any special conditions or handling required for the waste. In addition, this section should list the supporting documentation attached to the profile to support the waste characterization.

9. *Generator Certification*. The generator certification should be signed by the environmental coordinator for the Navy installation where the waste is generated.

Appendix C
Sample Storage Area Inspection Form

ACCUMULATION STORAGE UNIT
GENERAL INSPECTION - WEEKLY

INSPECTED BY:________________________ ________________________ __/__/__ ______
Inspector' name (print) Signature Date Time

REVIEWED BY:________________________ ________________________ __/__/__ ______
Manager's name (print) Signature Date Time

EQUIPMENT/AREA	SAT	UNSAT	COMMENTS
FACILITY PROPER			
Evacuation Routes			
Access (Unobstructed)			
Emergency exits unlocked at start of day			
Pavement/curbing			
No evidence of leakage, spillage, or accumulated liquid .			
Access Road			
Access (Unobstructed)			
Condition (No holes, depressions, or debris)			
SECURITY DEVICES			
Fences			
Condition (No damage or corrosion).			
Gates			
Condition (No damage or corrosion)			
Operation (Swing or slide freely)			
Access (Unobstructed)			
Padlocks			
Present at each gate			
Operation			
Warning Signs			
Presence (Maximum 75 feet apart)			
Legibility (From a minimum 25 feet apart)			
SAFETY AND EMERGENCY EQUIPMENT			
Emergency Shower/Eye Wash Stations			
Adequate supply of eyewash solution			
Handle operation			
Water Pressure, volume, and flow			
Identification signs (Present, legible, and in satisfactory condition)			
Access (Unobstructed)			

Appendix D
Drum Inventory Form

EnSafe/Allen & Hoshall

Investigation Derived Waste: Drum Inventory

Project Name:			Project Number:		
Client:			Site No.:		
Survey Date:			Surveyor:		
	Boring/Well No.	Contents	Date Generated	# Drums	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

APPENDIX E

FIELD FORMS

Low Flow Purge Data Sheet

Well No.: ______________

PROJECT: ____________________ **DATE:** ____________________
PROJECT NUMBER: ____________________ **WEATHER:** ____________________
SITE: ____________________ **PERSONNEL:** ____________________

Well Screen Depth: ________ / ________ ft.
Initial Water Level: ________ @ ________ hrs.

Pump Type/Material: ____________
Pump Intake Depth: ____________

Tide Cycle: [ ] High @ ________
[ ] Low @ ________
[ ] Not Affected

Total Purge Volume=__________ **(gal / L)Drawdown + Tubing Volume=**__________ **(gal / L)**

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Temp °C	pH	p Con mS/cm	DO mg/L	Turbidity NTU	Salinity %	Eh mV	Comments

Remarks: ____
____

Low Flow Purge Data Sheet

Well No.: ______________

PROJECT: ______________________ **DATE:** ______________________
PROJECT NUMBER: ______________________ **WEATHER:** ______________________
SITE: ______________________ **PERSONNEL:** ______________________

Well Screen Depth: ________ / __________ ft.
Initial Water Level: __________ @ ________ hrs.

Pump Type/Material: ______________
Pump Intake Depth: ______________

Tide Cycle: [ ] High @ ________
[ ] Low @ ________
[ ] Not Affected

Total Purge Volume=____________ **(gal / L)Drawdown + Tubing Volume=**____________ **(gal / L)**

Time	Water Level feet below TOC	Volume mL	Flow Rate mL/min	Temp °C	pH	p Con mS/cm	DO mg/L	Turbidity NTU	Salinity %	Eh mV	Comments

Remarks: ____

____

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: ______________________

Location: ______________________

Weather Conditions: ______________________

Tidally Influenced: Yes ___ No ___

Project No.: ______________________

Personnel: ______________________

Measuring Device: ______________________

Remarks: ______________________

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Depth to Free Produc (feet)*	Depth to Water (feet)*	Thickness of Free Produc (feet)*	Groundwater Elevation (feet)*	Comments

* All measurements to the nearest 0.01 foot

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: ____________________
Project No.: ____________________

[ ] Domestic Well Data
[ ] Monitoring Well Data
[ ] Other Well Type: ____________________
[ ] QA Sample Type: ____________________

Sample ID No.: ____________________
Sample Location: ____________________
Sampled By: ____________________
C.O.C. No.: ____________________
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

	Color	pH	S.C. mS/cm	Temp. °C	Turbidity NTU	DO	Salinity	Eh mV
Date:								
Time:								
Method:								

PURGE DATA

Date:	Volume	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter:	2							
Well Casing Material:	3							
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

Project Site Name: ______________________
Project No.: ______________________

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: ______________________
[] QA Sample Type: ______________________

Sample ID No.: ______________
Sample Location: ______________
Sampled By: ______________
C.O.C. No.: ______________

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:			
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:				
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

MULTIPLE SAMPLE LOG SHEET

PAGE___ OF___

[] SURFACE SOIL [] SEDIMENT
[] SUBSURFACE SOIL [] LAGOON / POND
[] OTHER ________________

SIGNATURE(S): ____________________________

PROJECT NAME: ______________________
PROTECT NUMBER: ____________________

LOCATION: ____________________________
____

SAMPLE No.	SAMPLE METHOD	DEPTH (Ft.)	DATE	TIME	SAMPLED BY	CONCENTRATION (L)LOW (H)HIGH	(G) GRAB (C) COMPOSITE	TOTAL No. OF CONTAINERS	ANALYSES							SOIL DESCRIPTION

REMARKS:	LABORATORY:	COC No.:

WELL DEVELOPMENT SHEET

PROJECT SITE NAME: ____________________ SITE/LOCATION ____________

PROJECT NUMBER: ____________________ WELL ID.: ____________

WEATHER: ____________________ DATE: ____________

STATIC WATER LEVEL: ____________________ PERSONNEL: ____________

TOTAL WELL DEPTH: ____________________ WELL TYPE: [PVC], [S.S.], or OTHER ________

ONE CASING VOLUME: ____________________

START TIME: ____________________ MEASURING DEVICE: ____________

END TIME: ____________________ ADJUSTMENT FACTOR: ____________

[ ] DOMESTIC WELL, [ ] MONITORING WELL, [ ] OTHER ____________________

METHOD & REMARKS ____

Approximate Volume	Time	Color	pH (S.U.)	Cond. (mS/cm)	Turbidity (NTU)	DO (mg/L)	Temp. (Celcius)	Salinity (%)

NOTE: All measurements to nearest 0.01 foot measured from top of well riser pipe unless otherwise noted.

ADDITIONAL COMMENTS: ____

SIGNATURE(s): ____________________ PAGE___OF___

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: ______________________
Project No.: ______________________

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: ______________________
[] QA Sample Type: ______________________

Sample ID No.: ______________
Sample Location: ______________
Sampled By: ______________
C.O.C. No.: ______________

Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color Visual	pH Standard	S.C. mS/cm	Temp. Degrees C	Turbidity NTU	DO mg/l	Salinity %	Other NA
Date:								
Time:								
Depth:								
Method:								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

GROUNDWATER SAMPLE LOG SHEET

Page___ of ___

Project Site Name: ____________________
Project No.: ____________________

[] Domestic Well Data
[] Monitoring Well Data
[] Other Well Type: ____________________
[] QA Sample Type: ____________________

Sample ID No.: ____________________
Sample Location: ____________________
Sampled By: ____________________
C.O.C. No.: ____________________
Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

Date:	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Time:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Method:								

PURGE DATA:

Date:	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	Salinity	Other
Method:	Initial							
Monitor Reading (ppm):	1							
Well Casing Diameter & Material	2							
Type:	3							
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

Circle if Applicable:		Signature(s):
MS/MSD	Duplicate ID No.:	

MONITORING WELL DEVELOPMENT RECORD

Well:____________________
Site :____________________
Date Installed: ______________
Date Developed:_____________
Dev. Method:_______________
Pump Type:________________

Depth to Bottom (ft): ______________
Static Water Level Before(ft):__________
Static Water Level After (ft):__________
Screen Length (ft):_________________
Specific Capacity:__________________
Casing ID (in): __________________

Site Geologist: ____________________
Drilling Co.: _____________________
Project:_________________________
Project Number:___________________
Sheet No.______ of __________

Time	Estimated Sediment Thickness (ft)	Cumulative Water Volume or Pumping Rate (gallons/gpm)	Water Level Reading (ft. below TOC)	Temperature (units_____)	pH	Specific Conductance (microsiemens/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)

Form Title Petroleum or Petroleum Products Water Sampling Log
Effective Date September 23, 1997

Petroleum or Petroleum Products Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID:	DATE: / /
SITE NAME:	SITE LOCATION:		

PURGE DATA

WELL DIAMETER (in):	TOTAL WELL DEPTH (ft):	DEPTH TO WATER (ft):	WELL CAPACITY (gal/ft):

1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY =

= (-) x =

PURGE METHOD:	PURGING INITIATED AT:	PURGING ENDED AT:
	PURGE RATE (gpm):	TOTAL VOLUME PURGED (gal):

WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	COLOR	ODOR	APPEARANCE	OTHER

SAMPLING DATA

SAMPLED BY / AFFILIATION	SAMPLER(S) SIGNATURE(S)	
SAMPLING METHOD(S):	SAMPLING INITIATED AT:	SAMPLING ENDED AT:
FIELD DECONTAMINATION: Y N	FIELD-FILTERED: Y N	DUPLICATE: Y N

SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	

REMARKS:

MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)

WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

SOUTHERN DIVISION - NAVFACENGCOM
MONITORING WELL DEVELOPMENT RECORD

Well:________________________
Site :________________________
Date Installed: ________________
Date Developed:______________
Dev. Method:_________________
Pump Type:__________________

Depth to Bottom (ft): _______________________
Static Water Level Before(ft):_______________
Static Water Level After (ft):_______________
Screen Length (ft):_________________________
Specific Capacity:__________________________
Casing ID (in): ____________________________

Responsible Professional: ___________________
Drilling Co.: _________________________________
Project:______________________________________
Project Number:_______________________________
Sheet No.______ of ___________

Time	Estimated Sediment Thickness (ft)	Cumulative Water Volume (gallons)	Water Level Reading (ft. below TOC)	Temperature (units_____)	pH	Specific Conductance (microsiemens/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)

SOUTHERN DIVISION - NAVFACENGCOM
CERTIFICATE OF CONFORMANCE

Well Designation: ______________________

Site Name: ______________________

Date Installed: ______________________

Project Name: ______________________

Responsible Professional: ______________________

Drilling Company: ______________________

Driller: ______________________

Project Number: ______________________

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing			
Well Screen			
End Cap			
Drilling Fluid			
Drilling Fluid Additives			
Backfill Material			
Annular Filter Pack			
Bentonite Seal			
Annular Grout			
Surface Cement			
Protective Casing			
Paint			
Rod Lubricant			
Compressor Oil			

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Responsible Professional: ______________________

SOUTHNAVFAC — LOG OF BORING

Page of

ROJECT NO:	PROJECT NAME:
ROJECT LOCATION:	DATE DRILLED:
DRILLING COMPANY:	SURFACE ELEVATION: *Feet*
DRILLING METHOD:	BORING DIAMETER: *Inches*
DRILLING RIG:	GEOLOGIST:

DEPTH feet	SAMPLE NUMBER	BLOWS/FT.	PID (ppm)				GRAPHIC LOG	USCS/RQD	GEOLOGIC DESCRIPTION Density/Consistency, Hardness, Color	WELL DIAGRAM
			Sample	B. Zone	Borehole	Drill B. Z.				
5										
10										
20										
25										
30										
35										
4										

ICE NUMBER

SHEET ________ OF ______

PROJECT: | NO. | BORING NO.

DEPTH	TYPE	BLOWS	DRIVEN	REC'VD	MOISTURE	ODOR	UNFILTER	FILTERED	CORRECT	DEPTH		USCS OR ASTM CODE	LITHOLOGIC DESCRIPTION :
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			
										1			
										2			
										3			
										4			
										5			
										6			
										7			
										8			
										9			
										0			

SOUTHNAVFAC
WELL ABANDONMENT FORM

Facility Name:______________________________

Site Name:______________________________

Site Number:______________ Date(s) Abandoned:______________

Well Number:______________ Well Depth:______________

Well Diameter:______________ Screen Length:______________

Well Location:______________________________

Reason for Abandonment:______________________________

____

Abandonment Contractor:______________________________

Method of Abandonment[1]:

Grout in Place:______________ Pull and Grout:______________

Overdrill and Grout:______________ Other (Explain):______________

____

Type and Amount of Grout and Date(s):______________________________

____

Final Surface Conditions:______________________________

____

Additional Notes/Comments:______________________________

____

Inspected by (Contractor):______________________ Date:__________

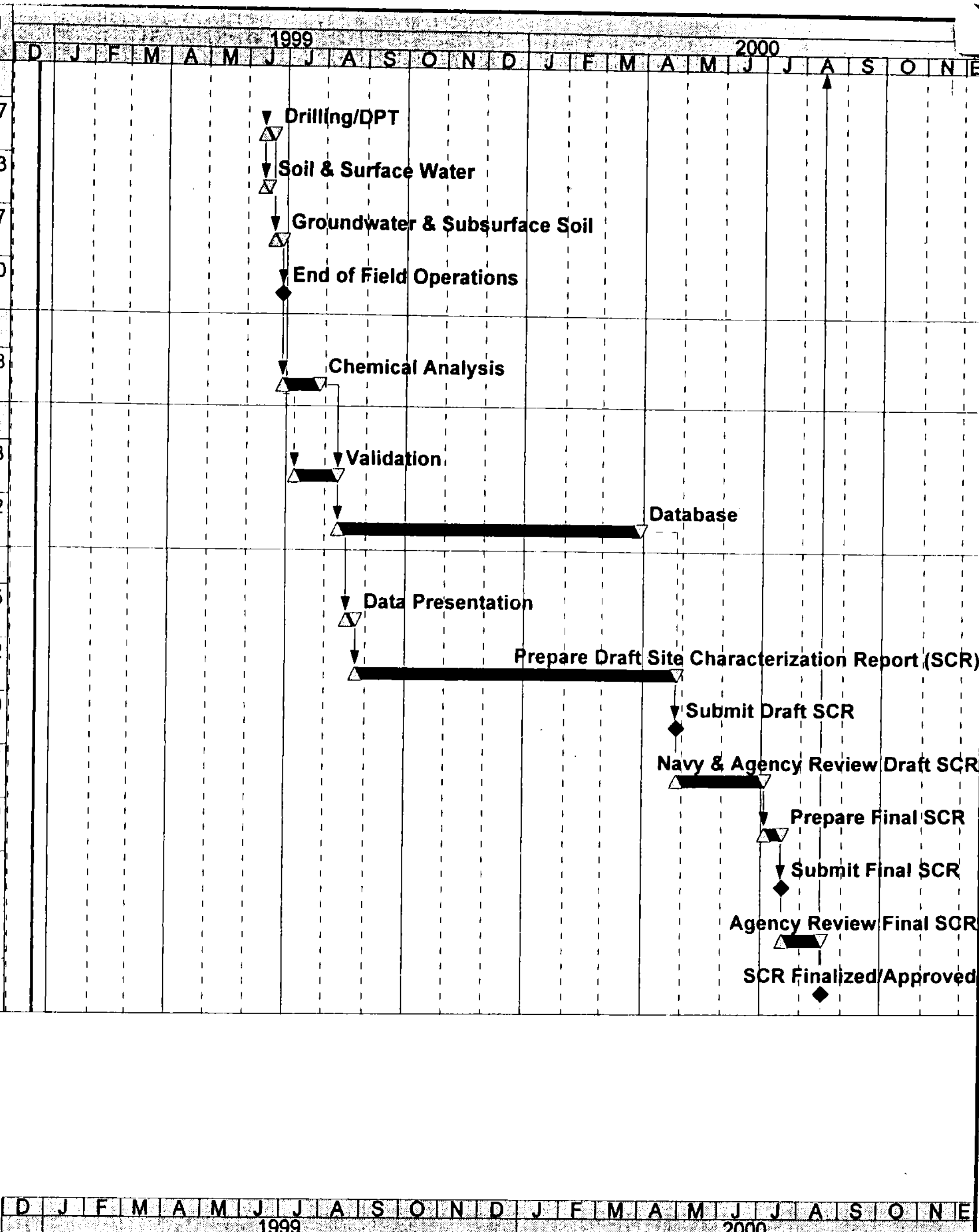
Approved by (Navy Representative:______________________ Date:__________

(1) Note that abandonment may be subject to state and local requirements in addition to federal requirements. These requirements should be incorporated into the abandonment process, and additional information provided in the Additional Notes/Comments section of this form.

APPENDIX F

PRELIMINARY SITE CHARACTERIZATION SCHEDULE

Activity ID	Activity Description	Cal ID	Early start	Early finish	Orig Dur
FIELD INVESTIGATIONS					
EJ0050123	Drilling/DPT	1	14JUN99	20JUN99	7
EJ0050125	Soil & Surface Water	1	14JUN99	16JUN99	3
EJ0050135	Groundwater & Subsurface Soil	1	21JUN99	27JUN99	7
EJ0050185	End of Field Operations	1		27JUN99	0
LABORATORY ANALYSIS					
EJ0060115	Chemical Analysis	1	28JUN99	26JUL99	28
DATA MANAGEMENT					
EJ0070115	Validation	2	08JUL99	09AUG99	23
EJ0070120	Database	2	10AUG99	29MAR00	162
DATA EVALUATION & REPORT					
EJ0090110	Data Presentation	2	17AUG99	23AUG99	5
EJ0090115	Prepare Draft Site Characterization Report (SCR)	2	24AUG99	26APR00	172
EJ0090120	Submit Draft SCR	2		26APR00	0
EJ0090125	Navy & Agency Review Draft SCR	1	27APR00	02JUL00	67
EJ0090135	Prepare Final SCR	2	03JUL00	17JUL00	10
EJ0090140	Submit Final SCR	2		17JUL00	0
EJ0090150	Agency Review Final SCR	1	18JUL00	16AUG00	30
EJ0090160	SCR Finalized/Approved	2		16AUG00	0



Project Start	21DEC98
Project Finish	17OCT00
Data Date	21DEC98
Run Date	0'

Early Bar
Progress Bar
Critical Activity

PORT:EJ01

Sheet 2 of 2

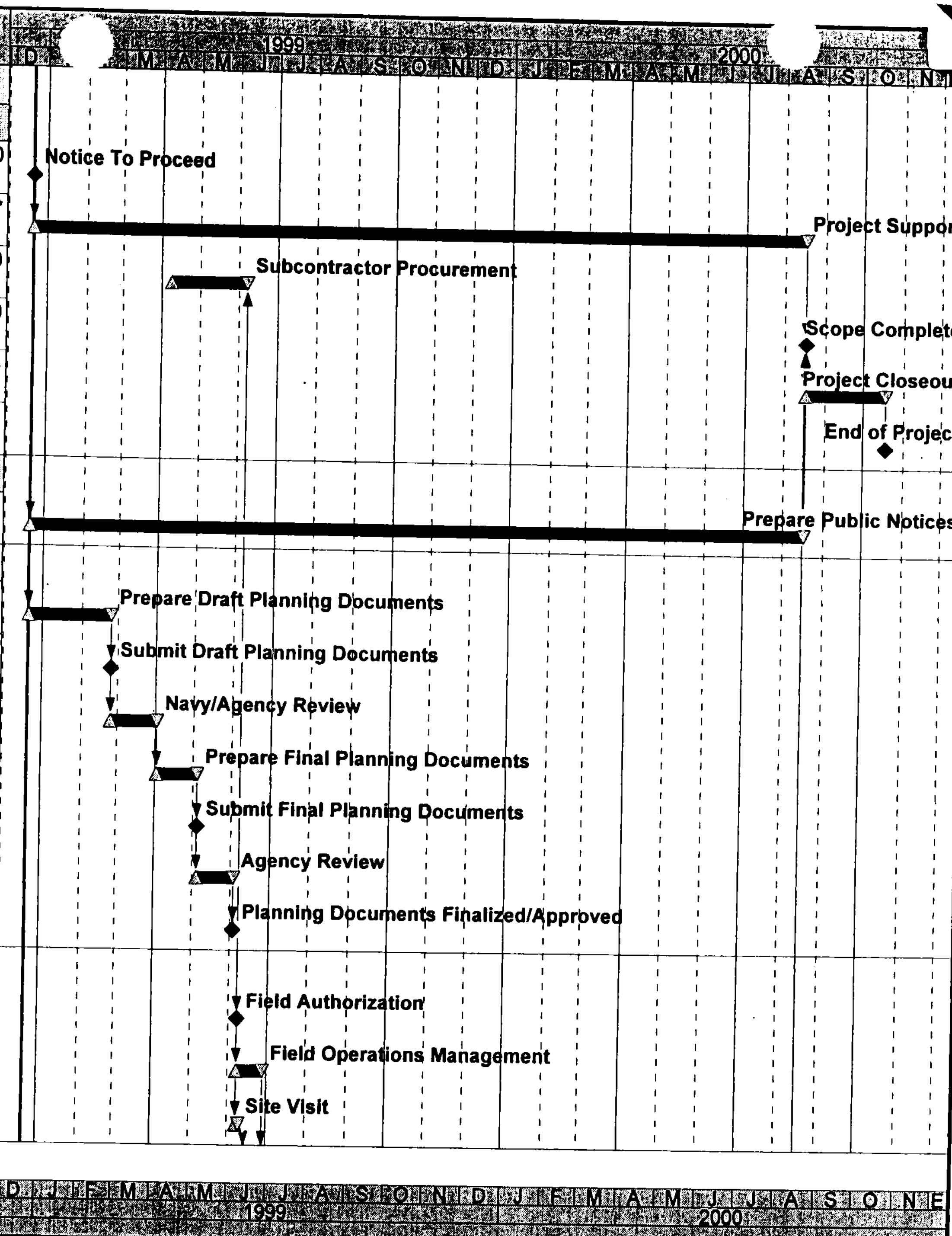
NAVY - CLEAN III (SDIV)

BASE SCHEDULE

Tetr ch NUS

SOW 10[illegible] NAS PENSACOLA BRONSON CHARA

Activity ID	Activity Description	Cal ID	Early start	Early finish	Orig Dur
PROJECT MANAGEMENT					
EJ0010105	Notice To Proceed	2	21DEC98*		0
EJ0010115	Project Support	1	21DEC98	16AUG00	601*
EJ0010130	Subcontractor Procurement	1	08APR99	06JUN99	60
EJ0010135	Scope Complete	2		16AUG00	0
EJ0010145	Project Closeout	2	17AUG00	17OCT00	44
EJ0010155	End of Project	2		17OCT00	0
COMMUNITY RELATIONS					
EJ0020115	Prepare Public Notices	2	21DEC98	16AUG00	422*
PLANNING DOCUMENTS					
EJ0040115	Prepare Draft Planning Documents	2	21DEC98	23FEB99	44
EJ0040117	Submit Draft Planning Documents	2		23FEB99	0
EJ0040120	Navy/Agency Review	1	24FEB99	01APR99	37
EJ0040125	Prepare Final Planning Documents	2	02APR99	03MAY99	22
EJ0040127	Submit Final Planning Documents	2		03MAY99	0
EJ0040130	Agency Review	1	04MAY99	02JUN99	30
EJ0040135	Planning Documents Finalized/Approved	2		02JUN99	0
FIELD INVESTIGATIONS					
EJ0050105	Field Authorization	1	07JUN99*		0
EJ0050115	Field Operations Management	1	07JUN99	27JUN99	21*
EJ0050120	Site Visit	1	07JUN99	08JUN99	2



Project Start	21DEC98
Project Finish	17OCT00
Data Date	21DEC98
Run Date	05JAN99

Early Bar
Progress Bar
Critical Activity

PORT:EJ01

NAVY - CLEAN III (SDIV)

BASELINE SCHEDULE

TetraTech NUS

APPENDIX G

PRELIMINARY SITE CHARACTERIZATION
RESPONSE TO COMMENTS

FLORIDA

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

RECEIVED
MAR 2 ...

March 19, 1999

Mr. B. K. Moring
Code 1855
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: Draft Sampling and Analysis Plan for Preliminary Site Characterization, Sites 100 and 102, Outlying Landing Field Bronson, Pensacola, Florida

Dear Mr. Moring:

I have completed the technical review of the above referenced document dated February 18, 1999 (received February 25, 1999). I have the following comments that should be addressed in the Final Sampling and Analysis Plan for these sites.

1. Section 3.1.3.5 Sample Head Space Analysis: The definition of excessively contaminated soil is located in Chapter 62-770.200(8) of the Florida Administrative Code (FAC) dated September 23, 1997.

2. Section 3.2.1 Proposed Investigation Site 100: Soils must be screened against the Soil Cleanup Target Levels (SCTLs) defined in Chapter 62-785 FAC. Groundwater should be screened against the Florida primary and secondary standards defined in Chapter 62-550 FAC and the Groundwater Cleanup Target Levels (GCTLs) defined in Chapter 62-875 FAC.

3. Section 3.2.5 Soil Investigation Site 102: Soils must be screened against the Soil Cleanup Target Levels (SCTLs) defined in Chapter 62-785 FAC.

4. Section 3.2.6 Groundwater and Surface Water Investigation Scope: A groundwater monitoring well is recommended for Site 102 to characterize the groundwater conditions at this site. The proposed

surface water sample will not be adequate to demonstrate whether or not groundwater has been impacted at the site.

5. Section 8.0 References: The correct date for Chapter 62-770 FAC is September 23, 1997.

If I can be of any further assistance with this matter, please contact me at (850) 921-9989.

Sincerely,

Joseph F. Fugitt

Joseph F. Fugitt, P.G.
Remedial Project Manager

cc: Ron Joyner, NAS Pensacola
Gena Townsend, USEPA Region IV
Terry Hansen, Tetra Tech NUS, Inc., Tallahassee
Tom Moody, FDEP Northwest District

TJB TB JJC JJC ESN ESN

RE: Draft Sampling and Analysis Plan for Preliminary Site Characterization, Sites 100 and 102, Outlying Landing Field Bronson, Pensacola, Florida

Dear Mr. Moring:

I have completed the technical review of the above referenced document dated February 18, 1999 (received February 25, 1999). I have the following comments that should be addressed in the Final Sampling and Analysis Plan for these sites.

1.. *Section 3.1.3.5 Sample Head Space Analysis: The definition of excessively contaminated soil is located in Chapter 62-770.200(8) of the Florida Administrative Code (FAC) dated September 23, 1997.*

RESPONSE: The text in Section 3.1.3.5 will be corrected.

2. *Section 3.2.1 Proposed Investigation Site 100: Soils must be screened against the Soil Cleanup Target Levels (SCTLs) defined in Chapter 62-785 FAC. Groundwater should be screened against the Florida primary and secondary standards defined in Chapter 62-550 FAC and the Groundwater Cleanup Target Levels (GCTLs) defined in Chapter 62-875 FAC.*

3. *Section 3.2.5 Soil Investigation Site 102: Soils must be screened against the Soil Cleanup Target Levels (SCTLs) defined in Chapter 62-785 FAC.*

RESPONSE: The text in Section 3.2.1 and 3.2.5 will be corrected to reference these SCTLs and GCTLs.

4. *Section 3.2.6 Groundwater and Surface Water Investigation Scope: A groundwater monitoring well is recommended for Site 102 to characterize the groundwater conditions at this site. The proposed surface water sample will not be adequate to demonstrate whether or not groundwater has been impacted at the site.*

RESPONSE: Site 102 is consistently a wetland area. Installation of a groundwater monitoring well has the potential to cause damage to the site. As the water table is expected to be encountered at or near the surface the collection of a site specific groundwater sample is proposed using a surface water to groundwater interface method successfully used previously at NAS Whiting Field, Milton, FL, and at NAS Cecil Field, Jacksonville, FL. The method will be described more completely in the text but may be summarized here as follows:

- Push a 2 to 3 foot piece of 4-inch diameter PVC pipe into the sediment
- Evacuate the water column inside the pipe while measuring typical groundwater parameters
- Once a consistent difference is noted over time of the measured parameters, groundwater is assumed to have been encountered
- Collect a water sample for laboratory analysis

Should Site 102 be accessible when the fieldwork is performed a DPT monitoring well will be installed and the surface water to groundwater sampling method described above will not be performed.

5. *Section 8.0 References: The correct date for Chapter 62-770 FAC is September 23, 1997.*

RESPONSE: The references will be corrected to reflect this date.