

COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION  
FINAL **SAMPLING AND ANALYSIS PLAN**  
FOR SITE 9  
NAVY YARD DISPOSAL AREA  
NAVAL AIR STATION  
PENSACOLA, FLORIDA

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PENSACOLA, FLORIDA



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19. Abstract

This Sampling and Analysis Plan (SAP) is written for Site 9, the **Navy Yard Disposal Area**. **The purpose** of this investigation is to delineate nature, **extent** and magnitude of **contaminated soil** and groundwater. In addition, a **aediment sample** will be collected to **assess potential** impact to Wetland 6.

Investigative work will be completed through a **three-phased** approach **consisting of soil** borings, temporary monitoring wells, permanent monitoring wells, and collection of soil, groundwater, and sediment sampler for Target **Analyte List/Target Compound List (TAL/TCL)** using Contract Laboratory Program (CLP) protocol. Except for the omission of a bentonite seal and neat cement grout, temporary monitoring wells will be constructed, **developed**, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells **should be** evaluated on a site by site basis by the Navy, U.S. Environmental Protection Agency (USEPA) and Florida Department of Environmental Protection (FDEP).

Phase I activities will identify the presence or absence of contaminants at **the site**. Preliminary remedial **goals (PRGs)** will be established following evaluation of Phase I data for identified contaminants. Further **assessment** activities will **depend** on whether soil and groundwater samples exceed the applicable **PRGs**. A technical memorandum summarizing the findings of the first phase of the investigation presenting PRGs and outlining additional work will be prepared following receipt and evaluation of the analytical data.

Phase II of the investigation will be implemented for **plume/soil** contamination **delineation** (contaminants above the **PRGs**) through installation of additional temporary monitoring **wells/soil** borings. A technical memorandum will summarize the findings of the Phase II plume delineation and recommend locations for **permanent** monitoring wells. **Phase III** permanent monitoring wells (and soil borings, if required) will replace strategically located temporary monitoring wells and be **used** to confirm contamination delineation and risk **assessment**.

This SAP, in conjunction with the Comprehensive Sampling and Analysis Plan, will provide guidelines for sampling and analytical techniques to be used during the investigation and outline proper documentation procedures for the **investigation**.

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## List of Acronyms

The following list contains many of the acronyms, **initials**, abbreviations, and units of **measure** used in this report.

bls	<b>below</b> land surface
BNAs	base-neutral/acid extractable organic compounds
<b>CLEAN</b>	Comprehensive Long-Term Environmental Action <b>Navy</b>
CLP	Contract <b>Laboratory Program</b>
<b>CSAP</b>	Comprehensive Sampling and Analysis Plan
<b>DQO</b>	Data Quality Objective
<b>E/A&amp;H</b>	EnSafe/Allen & Hoshall
<b>E&amp;E</b>	Ecology & Environment, Inc.
<b>FDEP</b>	Florida Department of Environmental Protection
<b>FS</b>	Feasibility Study
FSA	<b>Full Scan</b> of Analysis
G&M	Geraghty and Miller, Inc.
GPS	Global Positioning System
GS	<b>Grain Size</b>
HEX	Hexavalent Chromium Analysis
<b>IAS</b>	<b>Initial</b> Assessment Study
IDR	Interim Data <b>Report</b>
<b>IWTP</b>	Industrial Wastewater Treatment Plant
msl	<b>Mean Sea</b> Level
NAS Pensacola	Naval <b>Air</b> Station Pensacola
<b>NEESA</b>	Naval Energy and <b>Environmental Support</b> Activity
OU	Operable Unit
PAHs	polynuclear aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
PPS	Physical Parameters, <b>Soil</b>
PPW	Physical Parameters, <b>Water</b>
PRGs	<b>preliminary</b> Remedial Goals
PVC	Polyvinyl Chloride
QA	Quality <b>Assurance</b>
QC	<b>Quality</b> Control
<b>RI</b>	<b>Remedial</b> Investigation
<b>SAP</b>	Sampling and Analysis <b>Plan</b>
<b>SOP/QAM</b>	<b>Standard</b> Operating <b>procedures</b> and <b>Quality</b> Assurance <b>Manual</b>
<b>SOUTHNAVFACENGCOM</b>	Southern Division, <b>U.S.</b> Navy, Naval Facilities <b>Engineering Command</b>
<b>ST</b>	Shelby <b>Tube</b>
TAL	Target Analyte List

TCL  
TKN  
TOC  
TRPHs  
USEPA  
v o c s

~~Target~~ Compound List  
Total Kjeldahl Nitrogen  
Top of Casing  
Total Recoverable Petroleum Hydrocarbons  
~~United~~ States Environmental Protection Agency  
Volatile Organic Compounds

## EXECUTIVE SUMMARY

This Sampling and Analysis Plan (*SAP*) is written for Site 9, the Navy Yard Disposal Area. The purpose of this investigation is to delineate **nature**, extent and magnitude of contaminated **soil** and groundwater. In addition, a sediment sample will be **collected** to **assess** potential impact to Wetland 6.

Investigative work will be completed through a three-phased **approach** consisting of soil **borings**, temporary monitoring wells, permanent monitoring wells, **and** collection of soil, groundwater and sediment Samples for Target Analyte List/Target Compound List (TAL/TCL) using Contract Laboratory **Program** (CLP) protocol. Except for the omission of a bentonite **seal** and neat cement grout, temporary monitoring wells will be constructed, developed, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells should be evaluated on a site by site basis by the Navy, **U.S.** Environmental Protection Agency (USEPA) and **Florida** Department of Environmental Protection (FDEP).

Phase I activities will identify the presence or absence of contaminants at the site. Preliminary remedial goals (PRGs) will be established following evaluation of Phase I **data** for identified contaminants. Further assessment activities will depend on whether **soil** and groundwater samples exceed the applicable PRGs. A **technical** memorandum summarizing the **findings** of the first phase of the investigation presenting PRGs and outlining additional work will be prepared following receipt and evaluation of the **analytical data**.

Phase II of the investigation will be implemented for plume/soil contamination delineation (contaminants above the PRGs) through installation of additional temporary monitoring wells/soil borings. A technical memorandum will **summarize** the **findings** of the Phase II plume delineation and recommend locations for permanent monitoring wells. Phase III permanent monitoring wells (and soil borings, if **required**) will **replace** strategically located temporary monitoring wells and be used to **confirm** contamination delineation and **risk** assessment.

This *SAP*, in conjunction with the Comprehensive Sampling and Analysis Plan, will provide guidelines for sampling and analytical techniques to be used during the investigation and outline proper documentation procedures for the investigation.

## 1.0 INTRODUCTION

As part of the U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, a Remedial Investigation/Feasibility Study (RI/FS) will be completed by EnSafe/Allen & Hoshall (E/A&H) at Site 9 — the Navy Yard Disposal Area, located at the Naval Air Station Pensacola (NAS Pensacola), Pensacola, Florida. This Sampling and Analysis Plan (SAP) has been developed by E/A&H for this investigation, as tasked by the Southern Division, U.S. Navy, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) under Contract No. N62467-89-D-0318/070.

Primary references for this SAP include the *Comprehensive Sampling and Analysis Plan for Naval Air Station Pensacola* (CSAP) (E/A&H 1993), the United States Environmental Protection Agency (USEPA) Region IV Standard Operating Procedures and Quality Assurance Manual (SOP/QAM), and the *Contamination Assessment/Remedial Activities Investigation Work Plan — Group F* completed by Ecology & Environment, Inc. (E&E 1992). References to these documents are made throughout this plan. The investigation of Site 9 will be completed to fulfill requirements set forth in the E&E site work plan (1992) and this site-specific SAP. This investigation will be conducted in accordance with the SOP/QAM and CSAP.

The Site 9 RI will assess the nature of any potential contamination identified during past and proposed field investigations. The results of the previous Phase I investigation are outlined in the *Interim Data Report (IDR), Contamination Assessment/Remedial Investigation, Navy Yard Disposal Area (Site 9)* (E&E 1992). Before field activities begin, a well inventory, contaminant source survey, and habitat and biota survey will be conducted. Field activities to be performed during the RI include the completion of soil borings and [temporary/permanent] monitoring wells, the collection of soil, groundwater [, and sediment] samples, and a hydrologic and ecologic assessment. Chemical analyses will be completed by a laboratory approved by the

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Naval Energy and Environmental Support Activity (NEESA) using Contract Laboratory Program (CLP) protocol. Field sampling, analytical methods, and reporting will be conducted at USEPA Level IV protocol.

[Investigative work will be completed through a ~~three-phased~~ approach consisting of soil borings, temporary monitoring wells, permanent monitoring wells, and collection of soil, groundwater, and sediment samples for Target Analyte List/Target Compound List (TAL/TCL) using CLP protocol. Except for the omission of a bentonite seal and neat cement grout, temporary monitoring wells will be constructed, developed, and sampled in accordance with the procedures for permanent monitoring wells. Therefore, the necessity for installation of permanent monitoring wells should be evaluated on a site by site basis by the Navy, USEPA and Florida Department of Environmental Protection (FDEP).

Phase I activities will identify the presence or absence of contaminants at the site. Preliminary remedial goals (PRGs) will be established following evaluation of Phase I data for identified contaminants. Further assessment activities will depend on whether contaminant concentrations in soil and groundwater samples exceed the applicable PRGs. A technical memorandum summarizing the findings of the ~~first~~ phase of the investigation presenting PRGs and outlining additional work will be prepared following receipt and evaluation of the analytical data.

Phase II of the investigation will be implemented for plume/soil contamination delineation (contaminants above the PRGs) through installation of additional temporary monitoring wells/soil borings. A technical memorandum will summarize the findings of the Phase II plume delineation and recommend locations for permanent monitoring wells. Phase III permanent monitoring wells (and soil borings, if required) will replace strategically located

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temporary monitoring wells and be used to **confirm** contamination delineation and risk assessment.]

Upon completion of the investigative work and **laboratory analysis**, an RI report will be submitted to the Navy, USEPA, and **FDEP** summarizing the activities, results and conclusions of the investigation. The **report will** provide **supporting data** for the completion of a baseline **risk** assessment and Feasibility Study (FS) to be completed **at** Site 9.

This **SAP**, in conjunction with the CSAP, will provide guidelines for sampling and analytical techniques to be **used** during the RI and outline proper documentation **procedures** for the investigation.

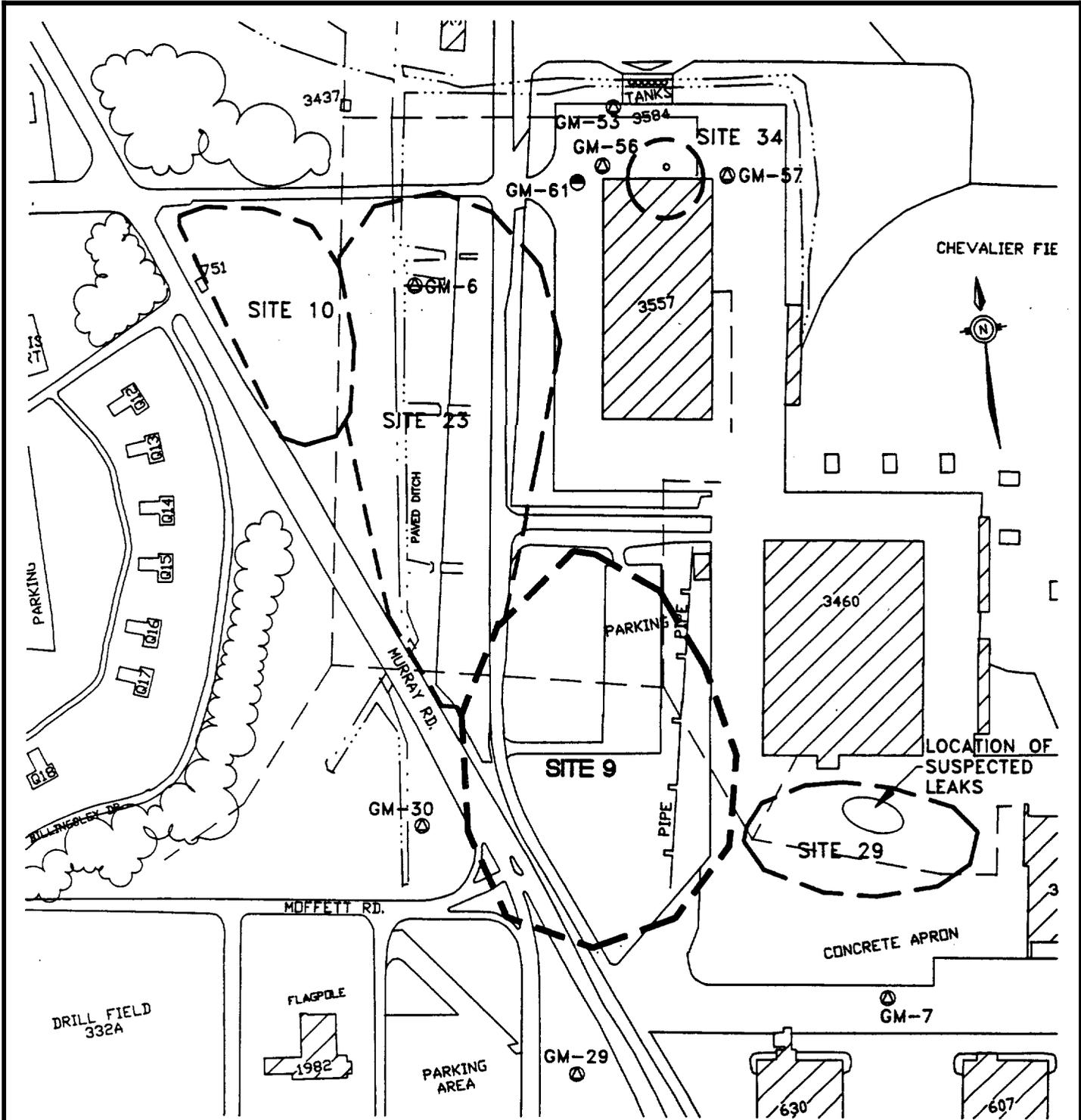
## **2.0 BACKGROUND INFORMATION**

### **2.1 Site Description**

Site 9 is at the southwestern corner of Chevalier Field (**see** Figure 2-1). The southwestern portion of the site includes **Murray Road**, **Industrial Road**, and the intersection of Murray and Moffet roads with Ellyson Avenue. These roads convey heavy through-traffic. The southeastern corner of the site contains a portion of **an** extensive concrete apron (Chevalier Field). The northcentral portion of the site is an asphalt-paved parking **area**. The remaining portion is covered with **grass**.

The land surface elevation at Site 9 is approximately **5** feet above **mean sea level**. The **terrain** is relatively flat, and the surficial **soil** is predominantly fine-grained sand. No groundwater monitoring wells **are** located within the actual boundary of Site 9; however, four **monitoring**

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SOURCE: ECOLOGY AND ENVIRONMENT, 1992

**LEGEND**

-  EXISTING SHALLOW MONITORING WELL
-  EXISTING DEEP MONITORING WELL
-  SITE BOUNDARY
-  BUILDING
-  INDUSTRIAL WASTE SEWER LINE



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FIGURE 2-1  
SITE MAP  
SITE 9

DWG DATE: 09/03/93 | DWG NAME: 70SITE9

wells were constructed in the site vicinity to characterize groundwater conditions for other sites in the southwest Chevalier Field area. Figure 2-1 shows the locations of the monitoring wells and neighboring sites. Well GM-29 is located approximately 200 feet from the southern perimeter of Site 9, well GM-30 is approximately 50 feet from the [western] perimeter, well GM-6 is approximately 750 feet [north-north west], and well GM-7 is approximately 400 feet southeast of Site 9. Monitoring well construction details are presented in Table 2-1.

<b>Table 2-1 Construction Details of Monitoring Wells Near Site 9</b>					
Well Designation	Surface Elevation (ft msl)	TOC Elevation (ft msl)	Total Depth Drilled (ft)	Screened Interval (ft)	Depth to Filter Pack (ft)
GM-6	6.0	6.40	12.0	9.7 - 12.2	5.7
GM-7	7.6	8.92	11.5	8.8 - 11.3	4.8
GM-29	7.0	7.91	11.5	9.2 - 11.7	5.2
GM-30	5.1	6.14	11.5	9.2 - 11.7	5.0

Source: Geraghty & Miller, Inc., 1984, 1986

Notes:

TOC = Top of Casing  
 msl = Mean sea level

## 2.2 Site History

Site 9 was used for the disposal of trash and refuse between 1917 and the early 1930s. The site is shown on several old maps as the Navy Yard Dump or the Warrington Village Dump (NEESA 1983). In the late 1960s, while trenching for an industrial wastewater treatment plant

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sewer system, part of Site 9 was excavated. Glass, **scrap metal**, and debris were unearthed; no unusual odor was reported.

Previous environmental studies of Site 9 were conducted under the Navy Assessment and Control of Installation Pollutants program. Former environmental investigations of the site consisted of an **Initial** Assessment Study (IAS) completed by NEESA (1983), a Verification Study completed by Geraghty and Miller, Inc. (G&M) (1984), and a **Phase I** Contamination Assessment completed by E&E (1992). The IAS report evaluated Site 9 based on information from historical records, field inspections, and NAS Pensacola personnel interviews. The IAS report concluded no further study of the site was necessary, and the site area did not constitute a threat to human health or the environment. These conclusions assumed **hazardous** materials were not disposed of onsite and dumping practices had **ceased**. No environmental sampling was performed onsite during the IAS to substantiate the recommendations.

[**According to**] the Verification Study, monitoring wells GM-6, GM-7, GM-29, and GM-30 were constructed in the vicinity of the southwest corner of Chevalier Field to determine shallow groundwater flow and further delineate contamination in the general area of Sites 9, 10, 23, and 29. Groundwater samples from the four wells were analyzed for volatile organic compounds (VOCs) using USEPA Method 601. No **VOCs** were detected in the four groundwater samples; consequently, Site 9 was not included in the Characterization Study.

E&E performed a Phase I investigation of Site 9 to identify **areas** and potential contaminants of concern. The investigation results are detailed in the E&E IDR (1992). **Soil** and groundwater samples were collected during the investigation and **submitted** for laboratory analysis. Metals (arsenic, chromium, **zinc**, lead, cadmium, nickel and copper), total recoverable petroleum hydrocarbons (TRPHs), and polynuclear aromatic hydrocarbons (PAHs) were detected in the **soil**

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and groundwater. Also detected in the groundwater samples were VOCs and one base-neutral/acid extractable organic compounds (BNAs). Site 9 has been impacted by extensive redistribution of site soils during construction and possibly impacted by the industrial waste sewer line. Additional assessment was recommended for Site 9.

### 23 Physical Setting

Climatology, biological resources, physiography, and hydrogeology for Site 9 and NAS Pensacola are detailed in Sections 4 through 7 of the E&E site work plan (1992).

## 3.0 PHYSICAL SURVEY

Various physical surveys have been conducted at Site 9 as part of E&E's Phase I activities. These include aerial photograph analysis, site reconnaissance, surface/particulate air emissions surveys, and a radiation survey. Results of the physical surveys are presented in Section 3 of the IDR (E&E 1992). Relevant information has been considered during the planning of this RI and will not be duplicated. Three surveys will be conducted before field activities begin: a well inventory survey, a contaminant source survey, and a habitat and biota survey.

### Well Inventory

An inventory of existing monitoring wells will be completed in accordance with Section 3.1 of the CSAP.

### Contaminant Source Survey

A contaminant source survey will be conducted to determine any potential sources and any present or past waste streams at the site. The survey will include a review of previous investigative reports, interviews with present and former NAS Pensacola personnel, aerial photo analysis, and a utility survey.

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The survey will include the identification of the following:

- e Location of previous and current underground and overhead piping and utilities.
- e Past and present chemicals **used** at the **site**.
- e Locations of any known surface **spills**.
- e Locations of any known **historical** outfalls.
- Locations and **contents** of any known present or former underground storage **tanks**.

#### Habitat and Biota Survey

A Phase I habitat and biota survey will be performed **in accordance** with Section 8 of the **CSAP**. Data **obtained** during the Site 9 RI will **also be** used to help assess **ecological** risk to any onsite or surrounding terrestrial and aquatic habitats **potentially affected** by contaminant migration. The complete ecologic assessment of any adjacent wetland complex will be conducted **as part** of the RI of Site 41 (NAS Pensacola wetlands). **[If** ecological impacts to wetland areas adjacent to Site 9 are suspected based on Phase I data, **Phase II** sampling **will be** performed during the Site 41 RI and in accordance **with** the Final RI/FS **Work Plan for OU 41**. **If** other ecological impacts (terrestrial) are suspected at Site 9 after the **Phase I** survey, Phase II sampling **will** be implemented **as** outlined in Section 8 of the CSAP.]

#### 4.0 FIELD SAMPLING PLAN

The field sampling plan describes **the** sampling and field measurement procedures **to be used** during the RI. The field investigation includes [a phased approach consisting initially of] advancing **soil** borings, installing [temporary, and eventually permanent] groundwater monitoring wells, and collecting **soil, groundwater**[, and sediment] samples. **A** hydrologic **and** ecologic assessment will **also be** conducted for Site 9.

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#### 4.1 Sampling Objectives

The objectives of the field sampling effort are to:

##### [Phase I]

- e Identify potential sources of contamination.
- e Assess the nature of identified contaminants.
- [• **Establish PRGs for the identified contaminants.**
- e **Assess the potential impact to Wetland 6.]**

##### [Phase II]

- e Delineate the extent of **soil** and groundwater contamination.
- e Delineate migration pathways of the contaminants.
- e Identify potential **receptors** of the **contaminants**.

##### [Phase III]

- e **Establish permanent monitoring well locations to confirm extent delineation and monitor contaminant migration.]**

#### 4.2 Sampling and Analytical Requirements

The sampling and analytical requirements summarized in Table 4-1 [are] discussed below. The proposed number of **soil**, groundwater[, and sediment] samples is also provided in Table 4-1. The Navy, USEPA, and **FDEP** will be apprised of any changes in the number of samples collected.

Any additional sources or previously undetected contamination **will** be investigated by the collection of additional samples from **any** given **media**, sampling additional **media** not included in this site-specific **SAP**, installation of **additional monitoring wells** to delineate the extent and depth of contaminants, and **performance** of additional **aquifer response tests** to characterize

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subsurface hydrologic conditions. Before additional field activities begin, a field change request will be submitted to the Navy for approval with notification to the USEPA and FDEP.

<b>Table 4-1</b>			
<b>Site 9 Phase I RI Sampling and Analytical Requirements</b>			
Medium	No. of Samples <sup>a</sup>	Analytical Parameter	DQO <sup>b</sup> Level
Soil <sup>c</sup>	[27]	FSA	IV
Groundwater <sup>d</sup>	[11]	FSA	IV
[Sediment <sup>e</sup>	1 (1)	FSA GS	IV IV]
TOTAL	139 (11)	FSA [[GS]]	IV IV]

Source: Modified from Ecology and Environment, Inc., 1992.

Notes:

- a — The number of samples shown in parentheses will be analyzed for the additional parameters indicated.
- b — DQO = Data Quality Objective
- c — Total number of soil samples = 9 soil borings x 3 sample intervals = 27 samples.
- d — Total number of groundwater samples = 11 monitoring wells (2 existing monitoring wells + 9 proposed shallow monitoring wells) x 1 sample each = 11 samples.
- e — Total number of sediment samples = 1 location x 1 sample interval = 1 sample.]

FSA — Full Scan of Analysis

Target Compound List (TCL) volatile organic compounds, TCL base-neutral/acid extractable organic compounds (BNAs), TCL pesticides, TCL polychlorinated biphenyls (PCBs), Target Analyte List (TAL) metals (unfiltered), and TCL cyanide.

The USEPA CLP TAL/TCL will be used to provide a legally defensible full spectrum of contaminant analysis. Soil, groundwater[, and sediment] will be analyzed for the full TAL/TCL list with additional non-CLP analysis also being conducted when warranted.

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[Hexavalent chromium analyses will not be performed on collected samples due to the lack of previous detection during other investigations at NAS Pensacola (OU10, Site 1, Site 39).

Samples for physical parameters and grain-size analyses will be collected during Phase II. The number of samples will be detailed in the Phase I technical memorandum.]

Analyses proposed in this SAP have been organized unlike the E&E site work plan (1992) which were subdivided into "Suites A through E." Proposed analytical parameters are now organized into the [four] basic groups listed below.

#### New Analytical Organization

- **Full Scan of Analysis (FSA)** — A full scan consists of analysis for TCL VOCs, TCL BNAs, TCL pesticides, TCL polychlorinated biphenyls (PCBs), TAL metals (unfiltered), and TCL cyanide.
- **Physical Parameters, Soil (PPS)** — The parameters include total phosphorus, nitrate-N, total Kjeldahl nitrogen (TKN), heterotrophic plate count, total organic carbon, and cation exchange capacity. Additional sample volume will be collected for the PPS samples.
- **Grain Size Analysis (GS)**
- **Physical Parameters, Water (PPW)** — The parameters include 5-day biological oxygen demand, chemical oxygen demand, hardness, total suspended solids, alkalinity, total phosphorus, nitrate-N, TKN, and heterotrophic plate count. Additional sample volume will be collected for the PPW samples.

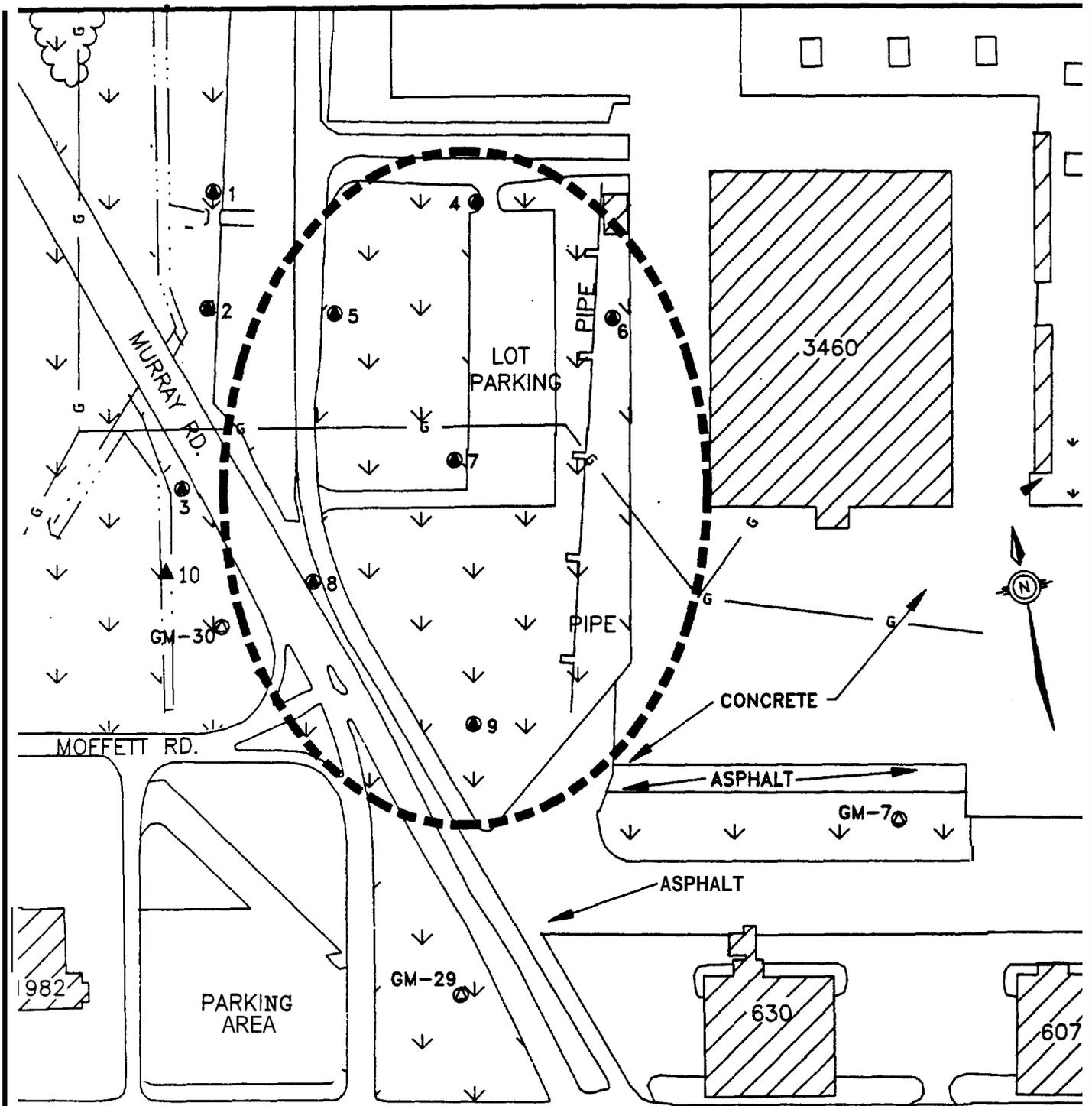
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**Modifications** have also been made to the list of remedial/physical characteristic parameters proposed in the E&E site work plan (1992). Changes were made to the proposed analyses to address CERCLA rather than RCRA requirements (i.e., the omission of Appendix IX analyses) and to acquire additional information regarding the physical characteristics of site soil and groundwater if a feasibility study is required. Therefore, certain parameters have been omitted from this SAP because they are either redundant to the comprehensive TAL/TCL analytical methods, provide [information] not legally defensible, or have limited use.

#### 4.3 Sample Locations and Rationale

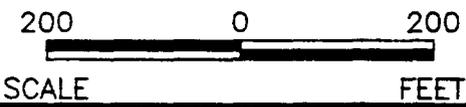
[As previously mentioned, the proposed field investigation will consist of a three-phased approach. Initial sampling locations, presented in Figure 4-1, will consist of nine soil borings/temporary monitoring wells. Soil and groundwater samples will be collected for FSA to identify the presence or absence of contaminants at the site. Contaminants identified in this phase will be compared to risk-based PRGs established for each contaminant. The investigation will proceed to delineate extent only if contaminants are found to exceed their respective PRGs. Phase II will consist of installation of additional soil borings/temporary monitoring wells until adequate definition of the contamination is established. Following an evaluation of the data, Phase III permanent monitoring wells and soil borings (if required) will be installed at locations selected to confirm nature and extent of contamination to replace temporary monitoring wells. Permanent wells will be used for possible long-term monitoring and risk assessment; locations will be based on current accessibility, anticipated construction activities, and geometry of the contaminant plume. If contaminants are not detected in the initial temporary monitoring well sampling, they will be replaced with permanent monitoring wells at selected locations and will be resampled for FSA.] The sampling program and additional proposed modifications to the E&E site work plan (1992) are described below.

[Bold items enclosed in brackets denote changes to the first draft of document.]



LEGEND

- 3460 - BUILDING
- EXISTING SHALLOW MONITORING WELL
- CONCRETE - CONCRETE PAVED AREA
- ASPHALT - ASPHALT PAVED AREA
- UNPAVED AREA
- SOIL BORING AND TEMPORARY SHALLOW MONITORING WELL
- APPROXIMATE SITE BOUNDARY
- INDUSTRIAL SEWER, GRAVITY LINE
- SEDIMENT SAMPLE



**SAMPLING AND ANALYSIS PLAN**  
 NAS PENSACOLA  
 PENSACOLA, FLORIDA

FIGURE 4-1  
 PROPOSED PHASE I  
 SAMPLING LOCATIONS  
 SITE 9

DWG DATE: 08/17/94 | DWG NAME: 70SAM9A

Soil Samples — A **FSA** will be conducted on approximately **[27]** soil samples collected from **[nine]** soil boring locations. All boring locations will be sampled at the following intervals: 0 to 1 feet below land surface (bls), 1 to 3 feet bls, 3 to 5 feet bls, etc., from the land surface to the depth of the water table, estimated to be 5 feet bls.

[Additional soil borings will be installed if contaminants are identified above their respective **PRGs**. Any soil samples collected during Phase **II**, if needed, will not be analyzed for **FSA**, but for the contaminants positively identified above the **PRGs** in the **first** sampling phase. Confirmatory Phase **III** samples will be analyzed for **FSA**.]

**PPS** analyses needed for the feasibility study will be conducted [during Phase **II** only if the identified contaminants exceed the applicable **PRGs**.] **PPS** samples will be collected, representing both background and contaminated conditions. **GS** analysis [will also depend on exceedances of the **PRGs** and] conducted on two soil samples representative of the screened interval of the shallow monitoring wells. Results of the **GS** analysis will be used to calculate recovery well specifications if a groundwater remediation program is required.

Groundwater Samples — A **FSA** will be conducted on groundwater samples collected from [the 11 temporary] monitoring wells (**two** existing wells and **[nine]** proposed [temporary monitoring] wells). The proposed [temporary] monitoring wells will be shallow with a target depth of **[8]** feet bls.

[Additional temporary monitoring wells will be installed if contaminants are identified in groundwater above their respective **PRGs**. Groundwater samples collected during Phase **II** will not be analyzed for **FSA**, but for contaminants positively identified above the **PRGs** in the first sampling phase. Confirmatory Phase **III** samples will be analyzed for **FSA**.]

[Bold items enclosed in brackets denote changes to the **first draft** of document.]

[PPW analyses **will** be conducted during **Phase II** only if **contaminants exceed** applicable **PRGs** for groundwater.] Samples collected for **PPW analyses** will represent both background and contaminated conditions.

[Sediment Samples — **A FSA will** be conducted on a sediment sample **collected** from one sample location. **The** sample will be **collected** from a 0- to **6-inch** depth and **will** also be analyzed for GS.]

#### 4.4 Sampling Procedures

Proposed sampling procedures **are** presented in Sections **4, 6, and 7** of the **CSAP**. General sampling requirements will be performed in **accordance** with **Section 2.2** of the **CSAP** with sample processing **performed** in accordance with Section **12**. **A** brief description of sampling and any proposed modifications to the **CSAP** or **E&E** site work plan (**1992**) are discussed **below**.

##### 4.4.1 Soil Sampling

**Soil** brings will be advanced using hollow-stem auger drilling techniques. **Soil** samples will be collected in accordance with Section **4.6.1** of the **CSAP**.

##### 4.4.2 Monitoring Well Installation and Development

Monitoring well borings will be advanced using hollow-stem auger **drilling** techniques. **Because** of possible floating contaminants, the [**temporary**] monitoring wells will be **installed** so the well screen brackets the water table. **The drilling** methods and monitoring well **installations** will be in accordance with Sections **5.2** and **5.3** of the **CSAP**. [**The temporary wells, with** the exception of a bentonite seal and grout, **will** be **constructed in** a manner identical to the permanent wells.]

[Bold items enclosed in brackets denote changes to the **first draft** of document.]

Monitoring wells will be developed in accordance with **Section 5.4** of the **CSAP**. [Temporary monitoring wells will be developed **using** peristaltic pumps following an **initial** purging of coarse sediment-laden water **using** centrifugal pumps.] **Monitoring** well development [for both temporary and permanent **monitoring** wells,] will continue **until** the withdrawn water is free of turbidity based on the geology of the **area** and **pH**, temperature and **specific** conductivity have **stabilized**. These measurements will **be recorded** in accordance with Section 10.1 of the **CSAP**.

#### **4.4.3** Groundwater Sampling

Groundwater sampling will be performed **in accordance** with Section **6** of the **CSAP**. [peristaltic pumps may be used in place of **bailers**. Purge and sample tubing on peristaltic pumps will be constructed of Teflon and sample collection will take place between the pump and the well **as** outlined in Section **F.1.3** of SOP/QAM. **To** prevent potential degassing of volatiles, samples collected for VOCs will be collected by **disconnecting** the tubing from the pump, and allowing the water in the tube to **drain** into the sample vials. Groundwater samples collected with a peristaltic pump should be collected **near** the top of the water column and water should be **as** clear **as** possible given the subsurface geology (generally between **10** and **30 NTUs**).] Field measurements to **be recorded** during groundwater **sampling** include **pH**, temperature, specific conductance, groundwater level, turbidity, and organic vapor detection, in accordance with Section 10.1 of the **CSAP**.

#### [4.4.4 Sediment Sampling

Sediment samples will be collected using a Ponar grab sampler, hand auger or **stainless** steel spoon **as** described in Section **7.2** of the **CSAP**.]

[Bold items **enclosed** in brackets denote changes to the **first draft** of document.]

#### 4.5 Hydrologic Assessment

[An initial water level assessment will be performed utilizing the **temporary** wells during the Phase I portion of the investigation to determine shallow groundwater elevations, shallow groundwater flow direction(s), and hydraulic gradient(s).] A hydrologic assessment will be performed [on the **permanent monitoring wells installed during Phase III**] in accordance with Section 9.6 of the *CSAP*. Slug **tests and/or** specific capacity tests will be performed at selected monitoring wells sufficient for site characterization. If groundwater remediation is **required**, the results of the **slug and/or specific capacity tests** will be used to design the appropriate pumping tests. The Navy will **accept technical responsibility** for the design and implementation of these tests. The Navy, USEPA, and FDEP will be kept apprised of the investigation as it progresses, and will be notified **before** conducting **full-scale** pumping tests. Pumping tests will be performed in accordance with the procedures provided in Section 9.6.2 of the *CSAP*.

#### 4.6 Ecologic Assessment

A minimum of a Phase I habitat and biota **survey** will be conducted in accordance with Section 8.1 of the *CSAP*.

#### 4.7 Geodetic Survey

[A geodetic survey will be performed using a global positioning system (GPS) in accordance with manufacturer's specifications.]

#### 4.8 Decontamination

Decontamination procedures will be performed in accordance with Section 11 of the *CSAP*.

#### 4.9 Investigation-Derived ~~Wastes~~

[**Bold items enclosed in brackets denote changes to the first draft of document.**]

Investigation-derived wastes will be handled in accordance with Section 13 of the CSAP.

#### **4.10 Field Quality Assurance/Quality Control**

Field quality assurance/quality control (QA/QC) samples will be collected in accordance with the frequency presented in Table 15-1 of the CSAP. QA/QC procedures will be in accordance with Section 15.2 of the CSAP.

#### **5.0 QUALITY ASSURANCE PLAN**

The Quality Assurance Plan presented in Section 15 of the CSAP will be followed during the Site 9 RI.

#### **6.0 DATA MANAGEMENT PLAN**

The Data Management Plan presented in Section 14 of the CSAP will be followed during the Site 9 RI.

[**Bold items enclosed in brackets denote changes to the first draft of document.**]

## 7.0 REFERENCES

- Ecology and Environment, Inc. (1992). *Contamination Assessment/Remedial Activities Investigation Work Plan — Group F, Naval Air Station Pensacoh, Pensacoh, Florida.* Ecology and Environment, Inc.: Pensacola, Florida.
- Ecology and Environment, Inc. (1992). *Interim Data Report, Contamination Assessment/Remedial Investigation, Navy Yard Disposal Area (Site 9), Naval Air Station Pensacoh, Pensacoh, Florida.* Ecology and Environment, Inc.: Pensacola, Florida.
- EnSafe/Allen & Hoshall. (1993). *Comprehensive Sampling and Analysis Plan For Naval Air Station Pensacoh, Pensacoh, Florida — Draft Final.* EnSafe/Allen & Hoshall: Memphis, Tennessee.
- Gexaghty and Miller, Inc. (1984). *Verification Study, Assessment of Potential Groundwater Pollution of Naval Air Station, Pensacoh, Florida.* Geraghty and Miller, Inc.: Tampa, Florida.
- Naval Energy and Environmental Support Activity (NEESA). (1983). *Initial Assessment Study of Naval Air Station, Pensacoh, Florida.* NEESA 13-015
- U.S. Environmental Protection Agency. (1991). *Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual,* U.S. Environmental protection Agency, Region IV: Athens, Georgia.

[Bold items enclosed in brackets denote changes to the ~~first~~ draft of document.]

**FLORIDA PROFESSIONAL GEOLOGIST SEAL**

I have **read** and approve of **this** Final Sampling and Analysis Plan for Site 9 — Navy Yard Disposal Area and **seal** it in accordance with Chapter **492** of the Florida Statutes. In sealing this document, I certify the **geological** information contained in it is true to the best of my knowledge and **the** **geological** methods and procedures included herein are consistent with currently accepted geological **practices**.

Name: Steven J. Parker  
License Number: **#1651**  
State: Florida  
Expiration Date: July **31**, 1996

  
\_\_\_\_\_  
Steven J. Parker

\_\_\_\_\_  
8/24/94  
Date