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**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION
FINAL SAMPLING AND ANALYSIS PLAN
FOR SITE 27 - RADIUM DIAL SHOP
NAVAL AIR STATION
PENSACOLA, FLORIDA**

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**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN)
NAVAL SUPPORT ACTIVITY
NAVAL AIR STATION
PENSACOLA, FLORIDA**

Prepared by:
**ENSAFE/ALLEN & HOSHALL
5724 Summer Trees Drive
Memphis, Tennessee 38134
(901) 372-7962**



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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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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 27 under Contract Task Order (CTO) 059. This document will serve as the Sampling and Analysis **Plan** (**SAP**) for the investigation. **Primary** references for this **SAP** include the [*Comprehensive Sampling and Analysis **Plan** for Naval Air Station Pensacola (CSAP)*](E/A&H, 1993), the EPA Region IV *Standard Operating Procedures and **Quality Assurance Manual*** (SOP/QAM), and the *Contamination Assessment/Remedial Activities (CA/RA) Investigation Work Plan[s for]* Group G, Ecology & Environment (E & E 1992a). These documents will be referred to throughout this **SAP** and should accompany this document during review or use. The investigation of Site 27 will fulfill requirements set forth in the Work Plan and the other references cited above.

The investigation **will** delineate the nature, magnitude, and extent of any contamination identified in work previously conducted by E&E as Phase I of the Work Plan. [Any additional sources or previously undetected contamination will be investigated by the collection of additional samples from any given media, sampling of additional media not included in this **SAP**, installation of monitoring wells to delineate extent and depth of contaminants, and performance of aquifer response tests to **characterize** subsurface hydrologic conditions. Prior to the initiation of additional field activities, a field change **request** will be submitted to SOUTHDIIV for approval.] Data collected during the Phase I **has** been presented as an Interim Data **Report** (IDR). Proposed work for the RI has taken into consideration **all** previous work completed at Site 27, including Phase I activities.

Sampling during the RI will include soil and groundwater. The analytical **tasks** will be completed a laboratory [that is approved by the Naval Energy and Environmental Support

Activity (NEESA) using the EPA Contract Laboratory Program (CLP) protocol]. Field sampling, analytical methods, and **reporting will** be conducted at EPA [Data Quality Objective] Level IV protocol.

An RI report will be submitted to SOUTHDIV upon completion of the investigative **work** and laboratory analysis, summarizing the activities, results and conclusions of the investigation. The report will provide [**the basis/**]supporting data for an **FS** [and a **Baseline Risk Assessment (BRA)**] to **be** completed at the site.

This **SAP** will provide guidelines for sampling and analytical techniques to be used at the site and to outline proper documentation procedures for the investigation.

2.0 BACKGROUND INFORMATION

This section will provide a condensed description of the site, previous work completed at the site, and environmental setting.

2.1 Site 27 Description and History

The following description of Site 27 has **been** prepared from a more comprehensive version contained in Section 2, page 2-4 of the Work **Plan**. Site 27 is a former radium dial shop located in Building 709. Building 709 was dismantled in 1976, and the remaining concrete pad is currently being used as a parking lot. Approximately 1,500 gallons per year of radioactive waste was reported to be disposed of through drains in the floor of the building. These drains led to the sanitary sewer system. A portion of the drainpipe was excavated to 18 inches below ground surface and found to emit radiation at a rate of 1.2 milliRoentgens per hour (mR/hr). Background levels are estimated to be 0.02 mR/hr.

Site 27 is located 150 feet west of building 780 (Site 25). There **are** Currently two groundwater monitoring wells at site 27.

2.2 Previous Work Completed

This section will provide a condensed description of the studies completed to date for Site 27. Comprehensive versions of the above may be found in Section 3, page 3-2 of the Work **Plan**. Results of [the] five previous studies listed below **are** currently available for Site 27.

Previous Studies:

- e 1983 Initial Assessment Study (**IAS**) (**NEESA 1983**)
- e 1984 Verification Study (**G & M 1984**)
- e 1986 Characterization Study (**G & M 1986**)

- 1991 Phase I **Interim** Data Report of the Contamination Assessment/Remedial Activities Work Plan (E & E 1992a)
- 1992 Site Investigation (E & E 1992b)

2.3 Environmental Setting

The environmental setting of Site 27, including climatological **data**, habitat/biota survey, and geologic/hydrogeologic setting, **are** described in Sections 4 through 7 of the **Work Plan** (E & E 1992).

30 PHYSICAL SURVEY

Procedures for conducting physical surveys of the site, including a **preliminary** site survey, radiation survey, habitat/biota survey, and soil gas survey, **are** in accordance with those described in Section **[3.0]** of the **[C]SAP**. Physical surveys have already been conducted at Site **27** during **Phase I** activities; the results **can be** found in Section 3, page 3-1 of the **IDR**. Applicable points have been taken into account in planning the RI. **[A Phase I habitat/biota survey will be completed for Site 27.1**

[Habitat/Biota Survey

[A Phase I habitat/biota survey will be performed at Site 27 as outlined in Section 8 of the CSAP. Data obtained during the Site 27 RI investigation will also be used to help assess ecological risk. The Site 27 Phase I habitat/biota survey will use the information collected during the previous E&E Site 27 investigation. This will help assess any onsite terrestrial and aquatic habitats or any surrounding habitats potentially affected by contaminant migration. If ecological impacts are suspected at Site 27 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 details the sampling and field measurement procedures to be used during the RI. The field investigation includes advancing soil borings, installing groundwater monitoring wells, and the collection of soil and groundwater samples using various techniques. A summary of sampling and analytical requirements is presented in Table 4-1.

Table 4-1 Site 27 RI Sampling and Analytical Requirements			
Medium	No. of Samples ^a	Analytical Parameter	[DQO Level ^b]
Soil ^c	[342] (3) (9)	FSA PPS ST	[IV] [IV] [IV]
Groundwater ^d	[20] (6)	FSA PPW	[IV] [IV]
TOTAL	[362] (6) (3) (9)	FSA PPW PPS ST	[IV] [IV] [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 Number of soil samples = 38 total boring locations; [38] boring locations x [9] depth intervals = [342].
- b Number of groundwater samples = [20]; [12] new onsite shallow wells + [6] new onsite intermediate wells + 2 existing wells.

Analytical Parameters

Full Scan = TCL VOCs; TCL base-neutrallacid extractable organic compounds (BNA)s; TCL Analysis pesticides and TCL polychlorinated biphenyls (PCBs); TAL metals total (i.e., unfiltered) (water only); TCL cyanide; (FSA) and gross alpha [and] beta radioactivity screen [with selected gamma spectrometry.]

Physical Parameters

Water (PPW) = 5-day biological oxygen demand (BOD), chemical oxygen demand (COD), hardness, total suspended solids, alkalinity, total phosphorus, nitrate-N, total Kjeldahl nitrogen (TKN), and heterotrophic plate count.

Physical Parameters

Soil (ST) = Permeability, porosity, [bulk density, particle size, percent moisture, and specific gravity] (taken with Shelby tube).

NR = Not required

The EPA Contract Laboratory Program (CLP), Target Analyte List (TAL), and Target Compound List (TCL) will be used to provide a legally defensible full spectrum contaminant analysis. Soil and groundwater samples will be analyzed for the full TAL/TCL list, with additional non-CLP analysis also being conducted.

Organization of the RI analytical parameters has been changed from "suites" A through [D], proposed in the Work Plan, to four subdivisions explained below.

[Organization of Analytical Parameters:]

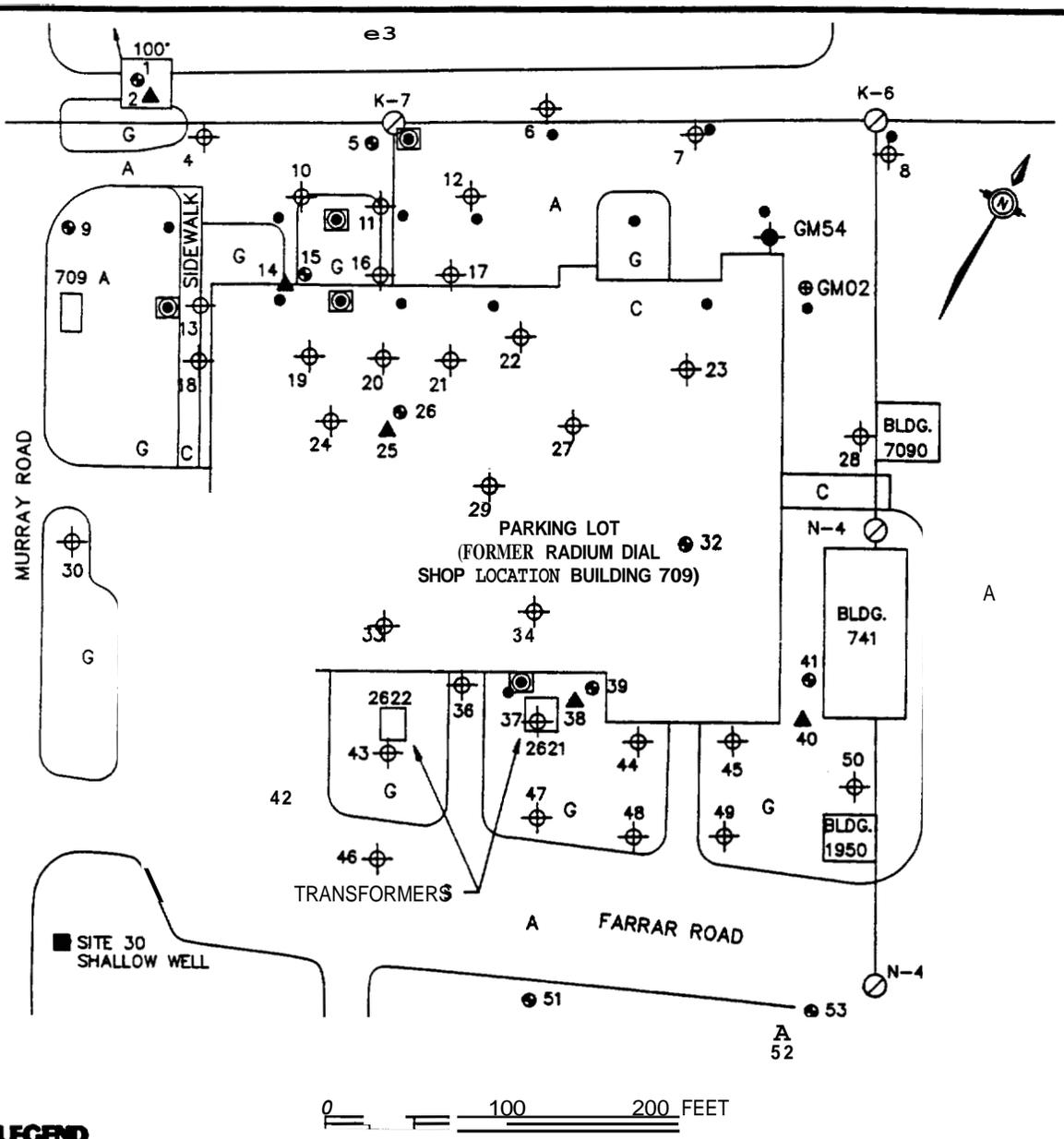
- Full Scan Analysis (FSA) A full scan will be run for all designated sample points. The full scan consists of analysis for TCL volatile organic compounds (VOCs), base/neutral acids extractables (BNAs), polychlorinated biphenyls (PCBs), pesticides, cyanide, TAL metals [(unfiltered)], and gross alpha [and] beta radioactivity. [All water samples will be analyzed with gamma spectrometry. Soil samples will be screened for gamma radiation in the field; soils with gamma radiation] exceeding the background level [also will be analyzed with gamma spectrometry.]
- Physical Parameters, Water (PPW) will be run (in addition to the FSA) for selected locations where surface water or groundwater will be sampled. [The PPW analyses will be used to determine the physical characteristics of the water and for completion of the feasibility study.] The parameters include 5-day biological oxygen demand (BOD), chemical oxygen demand (COD), hardness, suspended solids, alkalinity, total phosphorus, nitrate-N, total Kjeldahl nitrogen (TKN), and heterotrophic plate count.

- Physical Parameters, Soil (**PPS**) will be run (in addition to the **FSA**) for **selected** locations where sediment or soil will be sampled. The parameters include total phosphorus, nitrate-N, TKN, heterotrophic plate count, and cation exchange capacity. [The **PPS** analyses will be **used** to determine the physical characteristics of the **soil** and for completion of the feasibility study.]
- Physical Parameters, Soil (**ST**) Shelby **tubes** will be collected at selected locations where soil is to be sampled. The analysis will be in addition to the **FSA** at some locations and will be the only sample type at other locations. Shelby **tubes** will be analyzed for permeability, porosity[, bulk density, particle size, percent moisture, and specific gravity].

The changes in analytical organization were made **to conform to CERCLA** as opposed to RCRA requirements, for simplification, and to acquire additional information about physical parameters for the upcoming Feasibility Study.

FSA analysis will be conducted for **all** sample locations, sample intervals, and sample media designated on Figure 4-1. At Site 27, [362] **FSA** analyses are currently projected.

For soil, FSA sampling will be conducted at [**all**] locations [except 2, 11, 21, 33, 35, and 43] (total of [38] locations[;] see Figure 4-1). For planning purposes, the depth to groundwater is assumed to be 14 feet. [Surface soil samples **will** be **collected** from 0-1' using a decontaminated hand auger or Xi-Tech sampler prior to advancement of the **soil** boring. The remaining soil samples to be collected from the soil boring **will** be **collected** from 1-3', 3-5', etc. to reduce the risk of cross contamination by **allocating** one sample interval per 2 foot long split barrel sampler.] **All** locations will be sampled continuously **from** the ground



LEGEND

- ⊕ EXISTING PERMANENT SHALLOW MONITORING WELL
- ⊕ EXISTING PERMANENT DEEP MONITORING WELL
- PHASE I SOIL BORING
- ⊕ PHASE I TEMPORARY MONITORING WELL
- ⊕ PROPOSED SOIL BORING
- ⊕ PROPOSED SOIL BORING AND SHALLOW MONITORING WELL
- PROPOSED SHALLOW MONITORING WELL
- ▲ PROPOSED PHASE II INTERMEDIATE MONITORING WELL
- A ASPHALT-PAVED AREA
- C CONCRETE PAVED AREA
- G GRASS-COVERED AREA
- APPROXIMATE DISTANCE AND DIRECTION TO LOCATION OF PROPOSED MONITORING WELL
- ⊕ SANITARY SEWER MANHOLE

2191 BUILDING
 SOURCE : E&E 1991, [MODIFIED]



RI/FS SAMPLING AND ANALYSIS PLAN (SAP)
 NAS PENSACOLA CAT. II
 PENSACOLA FL.

FIGURE 4-1
 SITE 27

surface to the top of the water table, an estimated **[nine]** sample points per location. The total number of soil samples for **FSA** analysis is therefore **[342]**. **[In the hand-augered interval from 0-1', samples used for radiation analysis will be obtained from 0-15 cm beneath ground surface (bgs) in order to compare to EPA's benchmark of 5 pCi/g in this interval. In addition, if physical evidence of contamination is observed below the water table, a sample will be collected for FSA analyses for characterization and delineation of the source material.]**

For groundwater, **FSA** sampling will be conducted at a total of **[20]** groundwater wells (total of **[20]** samples, see Figure 4-1).

Groundwater Sampling Locations ([20] total):

- **[18]** onsite monitoring wells have been proposed for the following locations:

[12] shallow wells at locations:

1	3	5	9	15		
26	32	35	39	41	51	53

[Six] intermediate wells at locations:

2	14	25	38	40	52
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- One shallow and one intermediate well will be **[sampled at GM02/GM54, if the wells are in good condition]**.
- One shallow and one intermediate well **will** be clustered with each of three **existing**, deep supply wells during the RI for Site 1, and will be sampled as offsite background wells. The analysis will serve **as** offsite background for the Site **27** RI.

PPW Analysis

PPW analysis will be conducted at **six** groundwater sample locations (Figure 4-1). Groundwater samples will be taken from **[five]** shallow wells and **[two]** intermediate wells. The specific locations will be determined in the field during **FSA** sampling, **using** available physical **data** and best professional judgement. In this way, field personnel will be able to identify locations that offer the most representative sample, or a sample in a contaminated **area**.

PPS Analysis

PPS analysis will be conducted at **three** soil sample locations (Figure 4-1) determined in the same manner as **PPW** sample locations. Varying soil depth intervals will be selected for **PPS** analysis.

Shelby Tube Analysis

Shelby **tube** analysis (ST) will be conducted at **[7]** surficial **soil** sampling locations (**[1-3]** feet) and in the low permeability zone at **[two]** locations, to **be** determined as **outlined** above.

4.1 Sampling Objectives

Sampling objectives applicable to this site **are** presented in section **[2.0]** of the **[C]SAP**.

4.2 General Sampling Requirements

General sampling requirements applicable to this site **are** presented in **section [2.2]** of the **[C]SAP**.

4.3 Sample Processing

Sample processing procedures to be followed **are** presented in section **4** of the **[C]SAP**.

4.4 Collection of Auxiliary Data

[Auxiliary data collection applicable to the Site 11 RI is in accordance with Section 9 of the **CSAP**. Pumping tests will be performed at the site if groundwater remediation is required. Prior to initiating the pumping tests, slug tests will be performed at selected monitoring wells. The results of the slug tests will be used to design the appropriate pumping tests. Pumping tests will be performed in accordance with the procedures provided in Section 9.6.2 of the CSAP.]

4.5 Specific Sampling Procedures

Sampling procedures proposed for the Site 27 RI will be conducted in accordance with those in sections [4 and 6] of the [C]SAP, with the following exceptions listed below.

Changes to the Original Work Plan:

- It has been determined that sampling saturated soil below the water table at **NAS** Pensacola would not offer any conclusive chemical analysis. Therefore, **soil** sampling below the water table will be limited to the collection of Shelby tubes. [In addition, if physical evidence of contamination is observed below the water table, a sample will be collected for FSA analyses for characterization and delineation of the source material.] Sampling and analysis at Site 27 will be conducted at the remaining locations designated on Figure 4-1 in accordance with Section[s 4 and 6] of the [C]SAP.
- **Soil** sample intervals have been changed from 0.0-1.0, 1.0-2.5, 2.5-5.0, etc. feet bgs to [hand augering from 0-1' and] continuous split-spoon sampling from ground surface to the water table ([1-3, 3-5], etc. feet bgs). This change has been made to ensure a regular and consistent sampling interval. Specific subsurface soil sampling procedures can be found in Section 4 of the [C]SAP.

- e Surface casing will no longer be required for the installation of intermediate wells. [Instead, the hollow stem auger will be used **as** a temporary casing during soil sample collection and monitoring well installation.] Information **regarding** practical drilling procedures at **NAS** Pensacola indicates that surface **casing** is **only** needed for deep wells [because of the lack of a **confining** unit between shallow and intermediate zones. The auger will therefore act **as** a temporary surface casing to reduce the potential for drawdown of contaminants during well installation.]

4.6 Decontamination

Decontamination procedures to be followed during the **RI are** described in Section **[11]** of the **[C]SAP**.

4.7 Sample Management

Sample management procedures to be followed during the **RI are** described in Section **[12]** of the **[C]SAP**.

4.8 Sample Custody

Sample custody procedures to be followed during the **RI are** described in Section **[12.5]** of the **[C]SAP**.

4.9 Investigation Derived Waste

Procedures to be followed for the handling of investigation-derived waste during the **RI are** described in Section **[13]** of the **[C]SAP**.

4.10 Quality Assurance/Quality Control

Quality assurance/quality control procedures to be followed during the investigation are described in Section [15] of the [C]SAP. Trip blank, field blank, and rinsate blank numbers will be determined in accordance with Section [15] of the [C]SAP. Matrix spike and matrix spike duplicate samples will be taken every 20th sample regardless of sample matrix or type. This will be accomplished by doubling the volume of all aliquots of the 20th sample.

5.0 ANALYSIS

Field measurements **wi**ll be collected and laboratory analysis **wi**ll be conducted as **ou**tlined in the [C]SAP.

6.0 QUALITY ASSURANCE PLAN

The comprehensive Quality Assurance Plan [contained in Section 15 of] the [C]SAP will be used for this investigation.

7.0 DATA MANAGEMENT PLAN

The comprehensive Data Management Plan [**contained in Section 15 of**] the [**C**]SAP will be used for this investigation,

8.0 REFERENCES

Ecology & Environment, Inc. (1992a). *Contamination Assessment/Remedial Activities Investigation Work Plan [for] Group G, Naval Air Station Pensacola*, Pensacoh, **Florida**. E & E, Inc. Pensacola, Florida.

Ecology & Environment, Inc. (1992b). *Contamination Assessment/Remedial Activities Investigation, Naval Air Station Pensacola, Pensacola, Florida, Data Summary and Preliminary Scoping Report for Ecological Risk Assessment Work Plans*, November 1992: E & E, Inc. Pensacola, Florida.

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9.0 FLORIDA PROFESSIONAL GEOLOGIST SEAL

I have read and approve of the **Final** Sampling and Analysis **Plan** for the Site **27** — Radium Dial Shop Sewer and seal it in accordance with Chapter **492** of the **Florida** Statutes. In sealing this document, I certify that the geological information contained in it is true **to the best** of my knowledge and that the geological methods **and** procedures included in this plan **are** consistent with currently accepted geological practices.

Name: Brian E. Caldwell
License Number: 1330
State: **Florida**
Expiration Date: July 31, 1994



Brian E. Caldwell

5-7-93

Date