FIELD SAMPLING PLAN

RUNWAY STOCKPILES CHARACTERIZATION

HAMILTON ARMY AIRFIELD

NOVATO, CALIFORNIA

Final Submittal

Prepared by:

US Army Corps of Engineers ®

Sacramento District
Environmental Design Section

September 2003

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

COC	Chain of Custody
DQOs	Data Quality Objectives
EDS	Environmental Design Section
FSP	Field Sampling Plan
HAAF	Hamilton Army Airfield
IDW	Investigation Derived Waste
mg/kg	milligram/kilogram
OC	Organochlorine
PNAs	Polynuclear Aromatics
QAPP	Quality Assurance Project Plan
QC	Quality Control
SSHP	Site Safety and Health Plan
TPH-E	Total Petroleum Hydrocarbons - Extractable
TPH-P	Total Petroleum Hydrocarbons - Purgeable
USACE	U.S. Army Corps of Engineers
USTs	Underground Storage Tanks
WP	Work Plan

FIELD SAMPLING PLAN
STOCKPILE CHARACTERIZATION
HAMILTON ARMY AIRFIELD

1. INTRODUCTION

1.1 SCOPE OF PROJECT

This Field Sampling Plan (FSP) describes the work to be performed, which will complete the characterization of the soil in 92 stockpiles along the runways in the inboard area at Hamilton Army Airfield (HAAF). The stockpile characterization is designed to collect data that will be used to determine if the stockpiles at HAAF can remain on-site or must be removed from the site because the concentrations of the chemicals of concern in the piles are greater than the criteria.

The FSP outlines the method of sampling and analysis of the stockpile soils. The US Army Corps of Engineers (USACE), Sacramento District is performing the Stockpile Characterization.

1.2 SCOPE OF REPORT

This FSP presents the stockpile characterization sampling and analysis programs, sampling objectives, sampling strategy and rationale, sampling locations, sample collection methods, and sample handling procedures. The FSP is designed to ensure that field procedures and documentation are standardized, so that data collected are valid and defensible. All field personnel will become familiar with the FSP prior to conducting fieldwork.

The FSP will be implemented in conjunction with the Quality Assurance Project Plan (QAPP) and the Site Safety and Health Plan (SSHP).

1.3 SITE LOCATION

HAAF is located in Novato, CA. HAAF was a former Air Force Base and Army Airfield. The location of HAAF is shown in Figure 1-1.

1.4 ORIGIN OF STOCKPILE SOILS

The remedial activities conducted at the GSA Phase I Sale Area and BRAC Outparcels A-5 and A-6 consisted of the excavation and removal of contaminated soil with subsequent placement in stockpiles on the airfield. The stockpile soil was derived from the following actions:

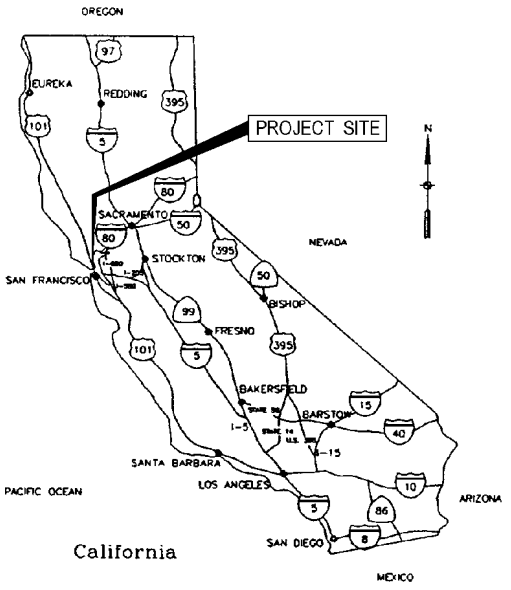

Figure 1-1: Project Location Map

- GSA Phase I Sale Area soil excavated prior to the GSA Phase I building demolitions.
- GSA Phase I Sale Area soil excavated after the building demolitions known as "Under the Buildings" soil.
- GSA Phase I Sale Area Lot 7 soil, which was segregated from the other lots because of VOC contamination.
- Soil excavated from BRAC Outparcels A-5 and A-6.

GSA Phase I Sale Area consisted of the following:

- Lot 1 - Jet Engine Test Facility
- Lots 1 and 2 – Fuel Distribution Lines
- Lot 3 – Hangar Avenue Fuel Lines (3,500 feet of fuel lines)
- Lot 8 – Plan Location 5 (base motor pool area)
- Lot 8 – Plan Location 6/10 (three steel tanks and twenty six underground storage tanks (USTs)

Under the Buildings Soil consisted of soils from under Buildings 309, 312, 315, 318, 345, 346, 348, 405, and 410.

Lot 7 consisted of Building 141/147, a depression area, storm drain, and Building 99.

BRAC Outparcel A-5 was northwest of Building 95. BRAC Outparcel A-6 was west of Building 95.

1.5 PROJECT STAFFING

This study is being designed and implemented by the Environmental Design Section (EDS), Sacramento District, and USACE under the general supervision of Rick Meagher, Section Chief. The technical design team includes:

Person	Responsibility
Kathy Siebenmann	Technical Team Lead and Chemist
Chuck Richmond, PE	Environmental Engineer
Donna Maxey	Industrial Hygienist

Each team member provides an integral part in completing this Study, including preparation and implementation of the Design Quality Objectives (DQOs), Work Plan (WP), performing fieldwork, and report.

2. SAMPLING OBJECTIVES

Stockpiles from previous remedial activities at HAAF remain throughout the inboard area. Much of the inboard area is planned for a future wetland and any soil remaining at this location must be protective of species anticipated to occupy the wetland.

The objective for this sampling effort is to complete the characterization of the stockpiles. This information collected will be used to determine if the soil from the stockpiles may be left on-site, restricted or unrestricted or must be disposed off-site.

3. SAMPLING STRATEGY AND RATIONALE

This section provides the sample locations, number of samples, analytical methods, and the rationale for the sampling and analytical program. Investigation and sampling techniques and procedures are discussed in Section 4.0. The investigation will include soil sampling.

During the performance of fieldwork, sampling locations and depths stated in this FSP may be adjusted, deleted, or additional samples added, based on field observations or conditions.

3.1 SOIL SAMPLING

Soil samples will be collected at the stockpile locations shown in Figure 3-1 utilizing a hand auger, glass jars, and EnCores™ (for total purgeable petroleum hydrocarbons [TPH-P] and volatile organic compound [VOC] analysis only). Sample locations may be adjusted based on site conditions and accessibility. Soil samples will be collected from the sample locations at a depth of 2-foot below the stockpile soil surface, if possible. Samples will be collected as deep as possible, yet above the bottom of the stockpile, for stockpiles less than 2-feet deep.

Four discrete soil samples will be composited together to make a composite soil sample. Each discrete soil sample to be used for making a composite sample shall be of approximately the same volume. The soil from four discrete samples shall be placed in a clean mixing bowl, thoroughly mixed for uniformity, and placed into a glass jar.

3.2 ANALYTICAL PLAN

The analytes were selected based on the results of previous analytical results at HAAF. Soil samples will be analyzed for the following analytes:

Metals by Method SW6010B/SW7471A.

Organochlorine (OC) Pesticides by Method SW8081A.

Polynuclear Aromatic Hydrocarbons (PNAs) by Modified Method SW8270C.

Total Extractable Petroleum Hydrocarbons (TPH-E) by Method SW8015B.

TPH-P by Method SW8015B.

Select VOCs by Method SW8260B.

Table 3-1 shows the summary of the proposed analytical parameters.

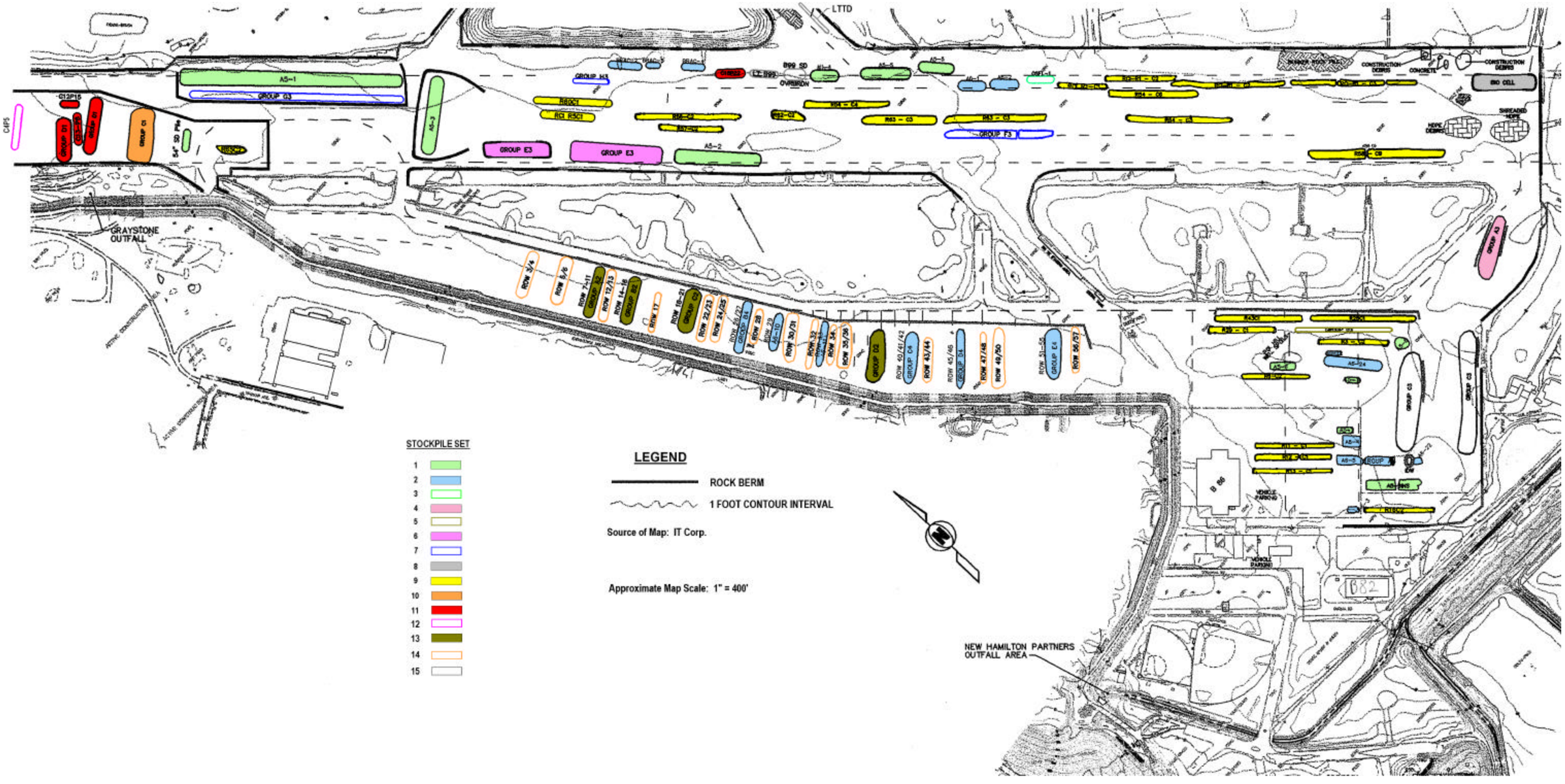

Figure 3-1: Stockpile Locations

TABLE 3-1: Summary of Proposed Analytical Parameters

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
1	HAAF-SP1-2001 HAAF-SP1-2002 HAAF-SP1-2003 HAAF-SP1-2004 HAAF-SP1-2005 HAAF-SP1-2006 HAAF-SP1-2007 HAAF-SP1-2008 HAAF-SP1-2009 HAAF-SP1-2010 HAAF-SP1-2011 HAAF-SPD-2101	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample and Field Duplicate Sample (12 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
2	HAAF-SP2-2012 HAAF-SP2-2013 HAAF-SP2-2014 HAAF-SP2-2015 HAAF-SP2-2016 HAAF-SP2-2017 HAAF-SP2-2018 HAAF-SP2-2019 HAAF-SP2-2xxx HAAF-SP2-2xxx HAAF-SP2-2xxx HAAF-SPD-2102	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample and Field Duplicate Sample (12 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
3	HAAF-SP3-2020	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (1 Jar Total)	OC Pesticides	SW 8081A
				PNAs	SW 8270C
				TPH-E	SW 8015B
4	HAAF-SP4-2021 HAAF-SP4-2022 HAAF-SP4-2023 HAAF-SP4-2xxx	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (4 Jars Total)	Metals	SW 6010B & 7471A
5	HAAF-SP5-2024	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (1 Jar Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
6	HAAF-SP6-2025 HAAF-SP6-2xxx	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
7	HAAF-SP7-2026 HAAF-SP7-2027 HAAF-SP7-2028 HAAF-SP7-2029 HAAF-SP7-2xxx HAAF-SP7-2xxx HAAF-SPD-2103	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible; discrete samples for TPH-P analysis at least 2-feet beneath surface of stockpile, if possible	3 EnCore®/Discrete Sample and Field Duplicate Sample (21 Total)	TPH-P	SW 8015B
			1 Glass jar/ Composite Sample and Field Duplicate Sample (7 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
				TPH-E	SW 8015B
				PNAs	SW 8270C

TABLE 3-1: Summary of Proposed Analytical Parameters (Continued)

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
8	HAAF-SP8-2030 HAAF-SP8-2031 HAAF-SP8-2032	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (3 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
9	HAAF-SP9-2033 HAAF-SP9-2034 HAAF-SP9-2035 HAAF-SP9-2036 HAAF-SP9-2037 HAAF-SP9-2038 HAAF-SP9-2xxx HAAF-SP9-2xxx HAAF-SP9-2xxx HAAF-SPD-2104	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample and Field Duplicate Sample (10 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
10	HAAF-SP10-2039 HAAF-SP10-2040	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
11	HAAF-SP11-2041 HAAF-SP11-2042 HAAF-SP11-2043 HAAF-SP11-2044 HAAF-SP11-2xxx	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (5 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
12	HAAF-SP12-2045	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (1 Jar Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
13	HAAF-SP13-2046 HAAF-SP13-2047 HAAF-SP13-2048 HAAF-SP13-2049 HAAF-SP13-2xxx HAAF-SP13-2xxx HAAF-SP13-2xxx HAAF-SPD-2105	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample and Field Duplicate Sample (8 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
14	HAAF-SP14-2050 HAAF-SP14-2051 HAAF-SP14-2052 HAAF-SP14-2053	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample and Field Duplicate Sample (13 Jars Total)	Metals	SW 6010B & 7471A

TABLE 3-1: Summary of Proposed Analytical Parameters (Continued)

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
	HAAF-SP14-2054 HAAF-SP14-2055 HAAF-SP14-2056 HAAF-SP14-2057 HAAF-SP14-2058 HAAF-SP14-2xxx HAAF-SP14-2xxx HAAF-SP14-2xxx HAAF-SPD-2106			OC Pesticides	SW 8081A
15	HAAF-SP15-2059 HAAF-SP15-2xxx	4-point composite sampling at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2 Jars Total)	Metals	SW 6010B & 7471A
				OC Pesticides	SW 8081A
				OC Pesticides	SW 8081A
Individual Stockpile Sampling					
D3	HAAF-D3-2061	1 discrete sample at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (3 Total)	TPH-P	SW 8015B
RCI R1C2	HAAF-R1C2-2062	1 discrete sample at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (3 Total)	TPH-P	SW 8015B
RCI R1C1	HAAF-R1C1-2063 HAAF-SPD-2107	1 discrete sample at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample or Field Duplicate Sample (6 Total)	TPH-P	SW 8015B
C12P15	HAAF-P15-2064	1 discrete sample at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (3 Total)	TPH-P	SW 8015B
C4P5	HAAF-C4P5-2065 HAAF-C4P5-2066 HAAF-C4P5-2067	1 discrete sample at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (9 Total)	TPH-P	SW 8015B
A5-4	HAAF-A54-2068 HAAF-A54-2069	1 composite sample at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2 Jars Total)	TPH-E	SW 8015B
R29C1-5,-27	HAAF-R29-2070 HAAF-SPD-2108	1 composite sample at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample or Field Duplicate Sample (2 Jar Total)	TPH-E	SW 8015B

TABLE 3-1: Summary of Proposed Analytical Parameters (Continued)

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
A5-12	HAAF-A512-2071 HAAF-A512-2072 HAAF-A512-2073 HAAF-A512-2074 HAAF-A512-2075	1 composite sample/ 500 cy at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (5 Jars Total)	PNAs	SW 8270C
BRAC-2	HAAF-BRAC2-2076 HAAF-BRAC2-2077	1 composite sample/ 500 cy at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2 Jars Total)	PNAs	SW 8270C
Group D1	HAAF-D1-2078 HAAF-D1-2079 HAAF-D1-2080 HAAF-D1-2081 HAAF-D1-2082 HAAF-D1-2083 HAAF-D1-2084 HAAF-D1-2085 HAAF-SPD-2109	1 composite sample/ 500 cy at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample or Field Duplicate Sample (9Jars Total)	PNAs	SW 8270C
Rows 5 and 6	HAAF-R5&6-2086 HAAF-R5&6-2087	1 composite sample/ 500 cy at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2Jars Total)	PNAs	SW 8270C
Rows 12 and 13	HAAF-R12&13-2088 HAAF-R12&13-2089	1 composite sample/ 500 cy at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (2Jars Total)	PNAs	SW 8270C
B99 overburden	HAAF-B99O-2xxx	1 composite sample (discrete for TPH-P) at least 2-feet beneath the surface of the stockpile, if possible	1 Glass jar/ Composite Sample (1Jar and 3 EnCore®/total)	TPH-P, TPH-E, PNAs	SW8015B, SW8015B, SW8270C
Rows 40/41/42 Group C4	HAAF-R40/41/4242-2xxx HAAF-R40/41/4242-2xxx HAAF-R40/41/4242-2xxx HAAF-R40/41/4242-2xxx HAAF-SPD-2110	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample and duplicate sample (15 Total)	TCE and Breakdown products	SW8260B
Row 45/46, Group D4	HAAF-D4-2xxx HAAF-D4-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B

TABLE 3-1: Summary of Proposed Analytical Parameters (Continued)

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
Group A2, Rows 7,10,11	HAAF-A2-2xxx HAAF-A2-2xxx HAAF-A2-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (9 Total)	TCE and Breakdown products	SW8260B
Group B2, Rows 14-16	HAAF-B2-2xxx HAAF-B2-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B
Group D2, Rows 37-39	HAAF-D2-2xxx HAAF-D2-2xxx HAAF-D2-2xxx HAAF-SPD-2111	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample and duplicate sample (12 Total)	TCE and Breakdown products	SW8260B
Row 32	HAAF-R32-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (3 Total)	TCE and Breakdown products	SW8260B
Row 34	HAAF-R34-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (3 Total)	TCE and Breakdown products	SW8260B
Rows 35&36	HAAF-R35&36-2xxx HAAF-R35&36-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B
Rows 43&44	HAAF-R43&44-2xxx HAAF-R43&44-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B
Rows 47&48	HAAF-R47&48-2xxx HAAF-R47&48-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B
Rows 49&50	HAAF-R49&50-2xxx HAAF-R49&50-2xxx HAAF-SPD-2112	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore®/Discrete Sample and duplicate sample (9 Total)	TCE and Breakdown products	SW8260B

TABLE 3-1: Summary of Proposed Analytical Parameters (Continued)

SAMPLE IDENTIFICATION				ANALYTE PROGRAM	
STOCKPILE SET	**SAMPLE ID**	**SAMPLING DESIGN**	**CONTAINER TYPE/NUMBER**	**ANALYTE**	**METHOD**
Rows 56&57	HAAF-R56&57-2xxx HAAF-R56&57-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore® /Discrete Sample (6 Total)	TCE and Breakdown products	SW8260B
LTTD1	HAAF-LTTD-2xxx	1 discrete sample / 500 cy at least 2-feet beneath the surface of the stockpile, if possible	3 EnCore® /Discrete Sample (3 Total)	TCE and Breakdown products	SW8260B

cy: cubic yards
PNAs: Polynuclear Aromatic Hydrocarbons
TPH-E: Total Petroleum Hydrocarbons - Extractable
TPH-P: Total Petroleum Hydrocarbons – Purgeable
TCE: Trichloroethene

4. SAMPLING EQUIPMENT AND PROCEDURES

The field methods to be employed during the stockpile characterization fieldwork performed under this FSP will be conducted in accordance with the SSHP and the QAPP, both prepared specifically for this study.

4.1 INVESTIGATIVE EQUIPMENT AND PROCEDURES

To collect soil samples for chemical analysis (except TPH-P and select VOCs), a hand auger or shovel shall be used. The auger or shovel shall be pushed to the appropriate sample collection depth and withdrawn. If necessary, a backhoe will be used to expose the soil at the proper depth and samples will be collected from the side wall of the excavation. The four discrete soil samples shall be placed into a stainless steel bowl and composited prior to shipping to the laboratory for analysis.

A specially designed sampling device, EnCore®, will be used to collect soil samples for TPH-P and select VOC analysis. Soil is collected using the EnCore® coring device, which seals the soil in the container for laboratory shipment.

Samples collected for laboratory analysis will be labeled as described in Section 5.0, sealed in zip-lock bags, and placed in ice-filled coolers. The samples will be sent to the laboratory daily via Federal Express under chain of custody, or hand delivered.

4.2 QUALITY CONTROL PROGRAM

The purpose of this section is to describe the field quality control (QC) samples that will be included in this project to support the data quality presented in the QAPP. The sampling methodologies, preservation techniques, and decontamination procedures described in this FSP have been selected to ensure appropriate data quality. The appropriateness of the field sampling protocol will be verified by inclusion of QC samples as described below. Specific QC duplicate samples are included in Table 3-1.

4.2.1 Field Duplicates (QC Samples)

QC duplicate samples collected in the field will provide precision information for the entire measurement system, including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. The field duplicates will be placed in a separate sample jar as the normal sample after homogenization of the four discrete samples in the mixing bowl. The identity of these samples will be held blind to the analysts and laboratory personnel until the data are in deliverable form. Duplicate analyses will be performed on approximately 10% of the total investigative samples for each method. QC sample locations are defined in this FSP, however, the locations may be adjusted based on information determined in the field. Odors or visual indicators may be used to assist in directing the location of QC samples to areas suspected to have the highest concentrations of the contaminants of interest. Duplicate samples will be analyzed by the laboratory for the same parameters as the primary sample (i.e., the sample that is being duplicated).

4.2.2 Blanks

4.2.2.1 Equipment Blanks

Contamination of samples introduced by sampling equipment can be detected by analyzing equipment blanks. Equipment blanks will be collected for all non-disposable sampling equipment after decontamination has been performed. Equipment blanks will be obtained with reagent grade water that is determined to be free of the analyte of concern. Pouring the reagent grade water over the sampling equipment and collecting the water in an amber glass jar is the method to be used to collect equipment blanks. One equipment blank will be collected per day of sampling for an estimated total of 5.

4.2.2.2 Temperature Blanks

A small sample container of water will be labeled as a temperature blank. One temperature blank will be included in each cooler. The temperature blank will be packaged and handled in the same manner as the other samples to assure that its temperature is representative of the samples in that cooler. The laboratory will use a calibrated thermometer to directly measure the

temperature of this sample. The temperature reading from the temperature blank will be used to determine whether samples were stored under the appropriate thermal conditions.

4.3 EQUIPMENT DECONTAMINATION PROCEDURES

During sampling activities, appropriate decontamination measures will be taken to minimize sample contamination from sampling equipment. The decontamination procedures for sampling equipment will incorporate the washing steps outlined below.

All down-hole sampling equipment (excluding disposable equipment) used in the collection of samples will be decontaminated as described in the following paragraphs. Decontamination should be executed immediately prior to equipment use. Whenever this is not possible or practical, measures will be taken to assure that contamination of clean equipment will not occur. Clean disposable gloves will be worn while decontaminating sampling equipment and tools. Clean sampling equipment will not be placed on the ground or other contaminated surfaces prior to use. All non-disposable sampling equipment will be constructed of stainless steel and/or Teflon™.

Detergent and reagent grade water rinses are the first steps in the decontamination process. Deionized water will be stored in plastic containers and applied via pump sprayers or decanted directly from the storage container. The waste decontamination fluids will be collected and handled in accordance with Section 6.0.

Decontamination will consist of:

1) Wash with non-phosphate detergent,
2) Rinse with potable water,
3) Rinse with analyte free water (type II reagent grade water or equivalent),
4) Air dry,
5) Wrap equipment completely with aluminum foil (shiny side out) and place in a plastic bag to prevent contamination if equipment is to be stored or transported.

4.4 SAMPLING CONTAINERS AND PRESERVATION

The laboratory performing the analyses will supply sample containers for this project. A complete set of sampling containers will be prepared for each sample in advance of the sampling event. Containers will be labeled with the date, time, project name, sample number, samplers initials, parameters for analysis, and preservative. A total of 135 primary samples, 12 QC samples, and 5 equipment blanks (estimated) shall be collected. Temperature blanks will be used for all coolers containing samples requiring preservation at 4°C ± 2°C.

5. SAMPLING DOCUMENTATION AND HANDLING

5.1 SAMPLE NUMBERING SYSTEM

A unique identification number will be assigned to each sample. The number is typically an alphanumeric sequence or integer that serves as an acronym to identify the sample. Specific sample identification procedures will follow the strategy outlined below:

Primary Sample	HAAF - SPY - XX
Duplicate Sample	HAAF - SPD - ZZ
Equipment Blank	HAAF - EB - Sequential Sample Number

SP designator is for stockpiles. Y is the stockpile set number or the stockpile indicator. XX is the sequential sample number, starting at 2001. D indicates the sample is a duplicate sample. ZZ is the sequential duplicate sample number starting at 2001. EB is the designator for equipment blanks. The equipment blank sequential sample number shall start at 1.

As an example, sample ID "HAAF-SP7-2024" is the first composite sample from stockpile set 7, sample 24.

5.2 SAMPLE LABELS

The identification number references information pertaining to a particular sample. It is recorded on the sample container, in the field logbook, and on the sample chain-of-custody form. Following sample collection, the sample label is completed in waterproof ink and secured to the sample container with clear tape.

Each sample collected at the site will be labeled with the following information:

- Sample identification number;
- Site name;
- Date and time of collection;
- Name of person collecting the sample;
- Analysis requested;
- Preservation;
- Any other information pertinent to the sample.

5.3 FIELD LOGBOOK

A field notebook bound with serially numbered pages will be used to record personnel on site, sample identification numbers, sampling date and time, and any significant observations or

events during field activities. The project name, site location, sampling event, project leader, telephone number and address of contact office (should the book be misplaced or lost) will be listed in ink. The field notebook is intended to record events during sampling in sufficient detail to allow field personnel to reconstruct events that transpired during the project

The Sampling Team Leader, who will sign and date the notebook prior to initiation of fieldwork will maintain the field notebook. If it is necessary to transfer the logbook to alternative personnel during the course of fieldwork, the person relinquishing the logbook will sign and date the logbook at the time the logbook is transferred and the person receiving the logbook will do likewise. Crossing a line through the entry and entering the correct information will make corrections to erroneous data. The correction will be initialed and dated by the person making the entry. Unused portions of logbook pages will be crossed out, signed, and dated at the end of each workday. Logbook entries must be dated, legible, in ink, and contain accurate documentation. Language used will be objective, factual, and free of personal opinions. Hypotheses for observed phenomena may be recorded, however, they must be clearly indicated as such and only relate to the subject observation.

The sample identification number, sample media, number of containers and laboratory analyses to be conducted are recorded with the sample identification number in the field log book and on the chain-of-custody.

The date and time of sample preparation and collection, and the personnel who conducted sampling are recorded with the sample identification number in the field logbook and on the chain-of custody form. The names of visitors and other persons on site are also recorded in the field logbook. Sampling personnel will also record the ambient weather conditions and other conditions at the sampling location that may affect sample collection, the apparent representativeness of the sample, or sample analysis in the field log book.

5.4 SAMPLE PACKAGING AND SHIPPING

Samples will be transported as soon as possible after sample collection to the primary laboratory for analysis. The following procedures are to be used when packing and transporting samples to the laboratory:

- Use rigid plastic coolers,
- Tape the cooler drain closed both inside and out,
- Wrap glass containers with cushioning material,
- Package samples in individual plastic bags and place in cooler (sets of EnCore® samples from the same sample location may be packaged in the same bag),

- Place a temperature blank in the cooler,
- Package ice in double plastic bags and place bags around, among, and on top of the samples,
- Put paperwork (chain-of-custody record, etc.) in a waterproof plastic bag and tape it to the inside lid of the cooler,
- Tape the cooler lid shut with fiber-reinforced tape,
- Place two signed custody seals on cooler, one at the front right and one at the back left of cooler,
- Attach completed shipping label to the top of cooler and ship following the carrier's instructions.

Sample coolers are typically shipped by overnight express carrier to the laboratory. A copy of the bill of lading (air bill) is to be retained and becomes part of the sample custody documentation. The laboratory will be notified in advance of all shipments, preferably by telephone on the day of shipment and by advanced scheduling.

5.5 CHAIN OF CUSTODY PROCEDURES

Custody of samples must be maintained and documented from the time of sample collection to completion of the analyses. Each sample will be considered to be in the sampler's custody, and the sampler will be personally responsible for the care and custody of the samples until they are delivered to the courier service for delivery to the laboratory. A sample is considered to be under a person's custody if:

- The sample is in the person's physical possession,
- The sample is in view of the person after that person has taken possession,
- The sample is secured by that person so that no one can tamper with the sample, or
- The sample is secured by that person in an area that is restricted to authorized personnel.

All samples will be accompanied to the laboratory by a chain-of-custody (COC) form, i.e. CESPK Form 111 (Figure 5-1). The chain-of-custody form contains the following information:

- Project name,
- Sample numbers,
- Sample collection point,

- Date and time of collection of samples (these must match the date and time recorded on the sample label),
- Sample matrix description,
- Analyses requested for each sample
- Preservation method,
- Number and type of containers used,
- Any special handling or analysis requirements,
- Signature of person collecting the samples,
- Signature of persons involved in the chain of possession, and
- Names and telephone numbers of the project point of contacts (POCs)

The chain-of-custody record forms will be filled out with ink. Prior to packaging samples for shipment, all samples should be double checked against the chain of custody form. When the samples are transferred from one party to another, the individuals will sign, date, and note the time on the form. A separate COC will accompany each delivery of samples to the laboratory. The chain-of-custody form will be included in the cooler used for preservation and transport of the samples. The sampling personnel will retain a copy of the form.

6. INVESTIGATION DERIVED WASTE

Expected or potential sources of IDW for this project include rinse water from decontamination procedures. The waste decontamination fluids will be collected during the decontamination procedures. Rinse water shall be collected in separate buckets during decontamination. All containers shall be Department of Transportation (DOT) approved. Each container shall be labeled with a potential hazardous waste label indicating date sample was collected and Contaminated Waste Water. IDW in each container shall be characterized prior to disposal. If the characterization results indicate the materials in a container are hazardous, the container shall be labeled with a Hazardous Waste Label. USACE will dispose of the small amounts of IDW in accordance with all Federal, state, and local regulations.

Personal Protective Equipment (PPE), including nitrile gloves and tyvek overalls/booties (not anticipated), will be handled as non-hazardous waste.

The field report will document IDW disposal.

7. REFERENCES

U.S. Environmental Protection Agency (EPA), 1996, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition*, December 1996.

IT Corporation, *Soil Stockpile Disposition Report for Hamilton Army Airfield, GSA Phase I Sale Area and BRAC Property, Novato, California*, March 1999.