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WORK PLAN FOR INVESTIGATION OF CONTAMINATED SOIL AT STUDY AREA 54 NTC  
ORLANDO FL  
4/1/2000  
TETRA TECH

03.04.54.0001

00187

# **WORK PLAN FOR THE INVESTIGATION OF CONTAMINATED SOIL**

## **STUDY AREA 54**

**Naval Training Center  
Orlando, Florida**



**Southern Division  
Naval Facilities Engineering Command**

**Contract Number N62467-94-D-0888**

**Contract Task Order CTO-0024**

**APRIL 2000**



5-4-91-0002

99-A152

August 31, 1999

Ms. Barbara Nwokike (Code 1873) (IRP RPM)  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888  
Contract Task Order No. 0024

Subject: Final Work Plan for the Investigation of Study Area 54,  
Naval Training Center, Orlando

Dear Ms. Nwokike:

Enclosed is the final work plan for SA 54. The plan incorporates comments provided at the August meeting by the Orlando Partnering Team. If you have any further questions regarding the plan, please contact me at (423) 220-4730.

Sincerely,

Steven B. McCoy, P.E.  
Task Order Manager

SBM:ckf

Enclosure

- c: Mr. Allan Aikens, CH2M Hill  
Mr. Rick Allen, Harding Lawson  
Mr. Michael J. Campbell, Tetra Tech NUS  
Mr. David Grabka, FDEP  
Mr. Wayne Hansel, SOUTHDIV  
Mr. Ches Lyon, Tetra Tech NUS  
Ms. Nancy Rodriguez, EPA  
Mr. Mark Perry/File, Tetra Tech NUS (unbound)  
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)  
File/Edb

**WORK PLAN  
FOR THE  
INVESTIGATION OF CONTAMINATED SOIL**

**STUDY AREA 54**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

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

Submitted to:

**Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29406**

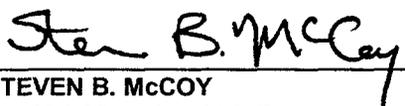
Submitted by:

**Tetra Tech NUS, Inc.  
661 Andersen Drive  
Foster Plaza 7  
Pittsburgh, Pennsylvania 15220**

**CONTRACT NO. N62467-94-D-0888  
CONTRACT TASK ORDER 0024**

**April 2000**

PREPARED UNDER THE SUPERVISION OF:

  
\_\_\_\_\_  
**STEVEN B. McCOY  
TASK ORDER MANAGER  
TETRA TECH NUS, INC.  
OAK RIDGE, TENNESSEE**

APPROVED FOR SUBMITTAL BY:

  
\_\_\_\_\_  
**DEBBIE WROBLEWSKI  
PROGRAM MANAGER  
TETRA TECH NUS, INC.  
PITTSBURGH, PENNSYLVANIA**

### PROFESSIONAL GEOLOGIST CERTIFICATION

I hereby certify that this document, *Work Plan for the Investigation of Contaminated Soil, Study Area 54*, Naval Training Center, Orlando, was prepared under my direct supervision in accordance with acceptable standards of geological practice.

*Michael J. Campbell* 4/14/00  
MICHAEL J. CAMPBELL  
LICENSE  
No. 1983  
Michael J. Campbell, P.G. / Date  
License No. P.G. 1983  
FLORIDA  
PROFESSIONAL GEOLOGIST

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## ACRONYMS

ABB-ES	ABB Environmental Services
B&R Environmental	Brown & Root Environmental
bgs	below ground surface
COPC	contaminant of potential concern
DPT	direct push technology
HLA	Harding Lawson Associates
IA	immunoassay
IDW	investigation-derived waste
IR	Installation Restoration
MS	matrix spike
MSD	matrix spike duplicate
NTC	Naval Training Center
PAH	polynuclear aromatic hydrocarbon
SA	Study Area
SCTL	Florida Soil Cleanup Target Level
SQL	Sample Quantitation Limit
UCL	Upper Confidence Limit
USEPA	U. S. Environmental Protection Agency

## 1.0 INTRODUCTION

### 1.1 SITE DESCRIPTION

Study Area (SA) 54 lies in the southwest portion of the McCoy Annex at the former Naval Training Center (NTC), Orlando (Figure 1-1). The two small areas that comprise SA 54 surround surface sampling locations that were selected for inclusion in a background sampling study (ABB-ES, 1995). Investigators selected the locations because a review of past operations and an examination of aerial photographs suggested that they were in undisturbed areas. The sample locations were designated ORS009 and ORS016. In the text below, the area surrounding ORS009 is referred to as the western area and the area surrounding ORS016 is called the northeastern area. Sample location ORS009 lies between an unpaved road and a retention pond near the western boundary of the facility. Sample location ORS016 lies in a pine grove west of Family Camp Road and northeast of SA 26 (the Family Camp). The Pinecastle Aero Club once operated an airstrip, a hangar, and other small buildings on or near the Family Camp.

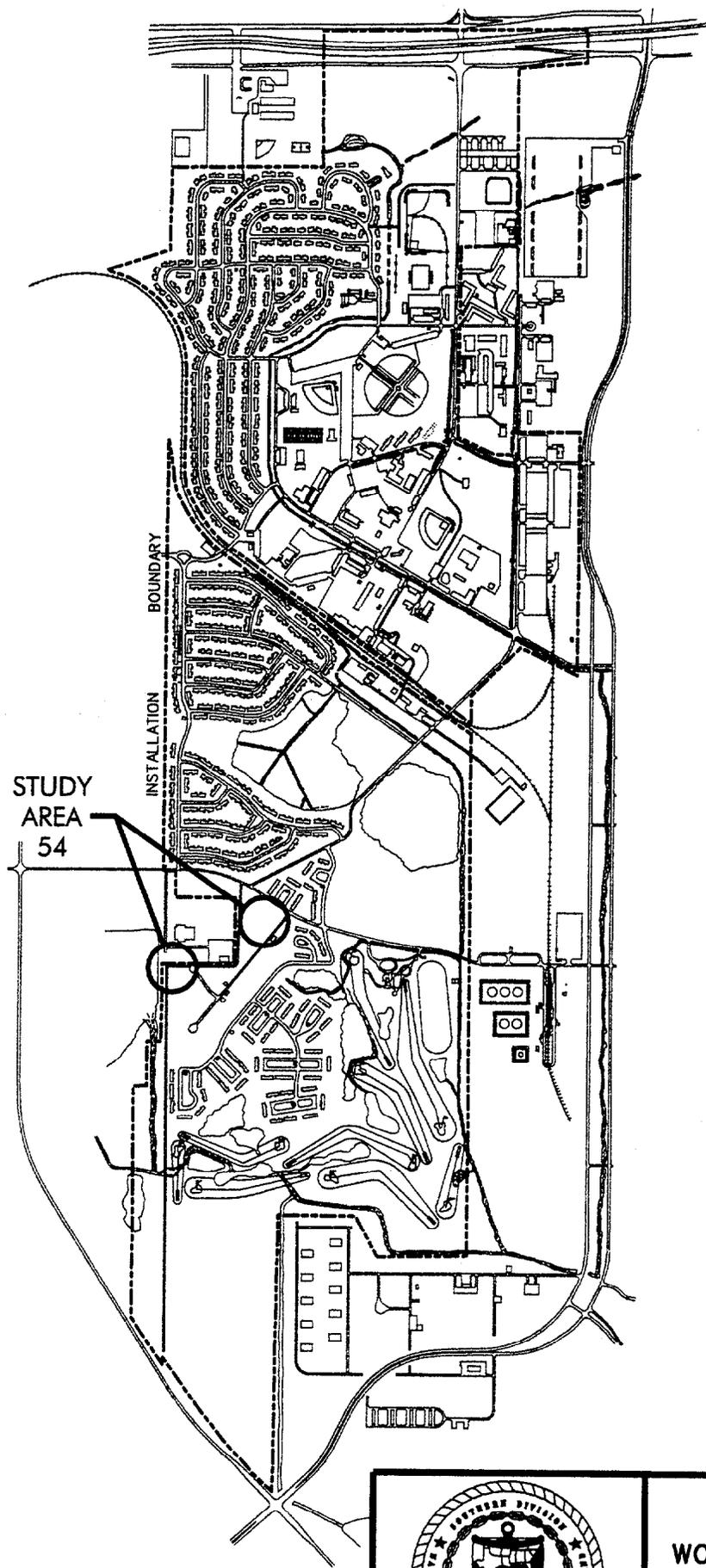
The U.S. Army redeveloped most of the area north and east of sample location ORS009 after completion of the background sampling. A fence establishes institutional control over the redeveloped area and a portion of it is now paved.

### 1.2 BACKGROUND

Although the samples were anticipated to represent background conditions, the first surface soil samples collected from the two locations in October 1994 were found to contain concentrations of polynuclear aromatic hydrocarbons (PAHs) that exceeded State of Florida residential and industrial screening criteria (ABB-ES, 1995). Confirmatory samples were collected in December 1996.

Additional surface soil samples [0-1 foot below ground surface (bgs)] and subsurface soil samples (1-2 feet bgs) were collected at locations surrounding ORS009 and ORS016 in November 1997 (HLA, 1998). The investigation employed a combination of semi-quantitative immunoassay (IA) field tests and submission of select soil samples to an approved off-site laboratory using SW-846 methods. The IA tests confirmed the presence of PAHs at each location as summarized below.

- IA tests near ORS009 confirmed elevated PAH concentrations up to 175 feet to the north and south, 25 feet to the west, and 50 feet to the east of the background sample location.



McCOY  
ANNEX

STUDY  
AREA  
54

INSTALLATION  
BOUNDARY

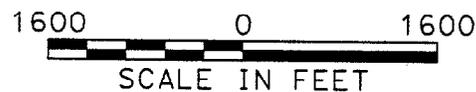
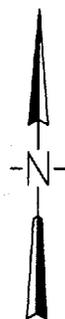


FIGURE 1-1



LOCATION OF STUDY AREA 54  
 McCOY ANNEX  
 WORK PLAN FOR THE INVESTIGATION  
 OF CONTAMINATED SOIL  
 STUDY AREA 54  
 NAVAL TRAINING CENTER  
 ORLANDO, FLORIDA

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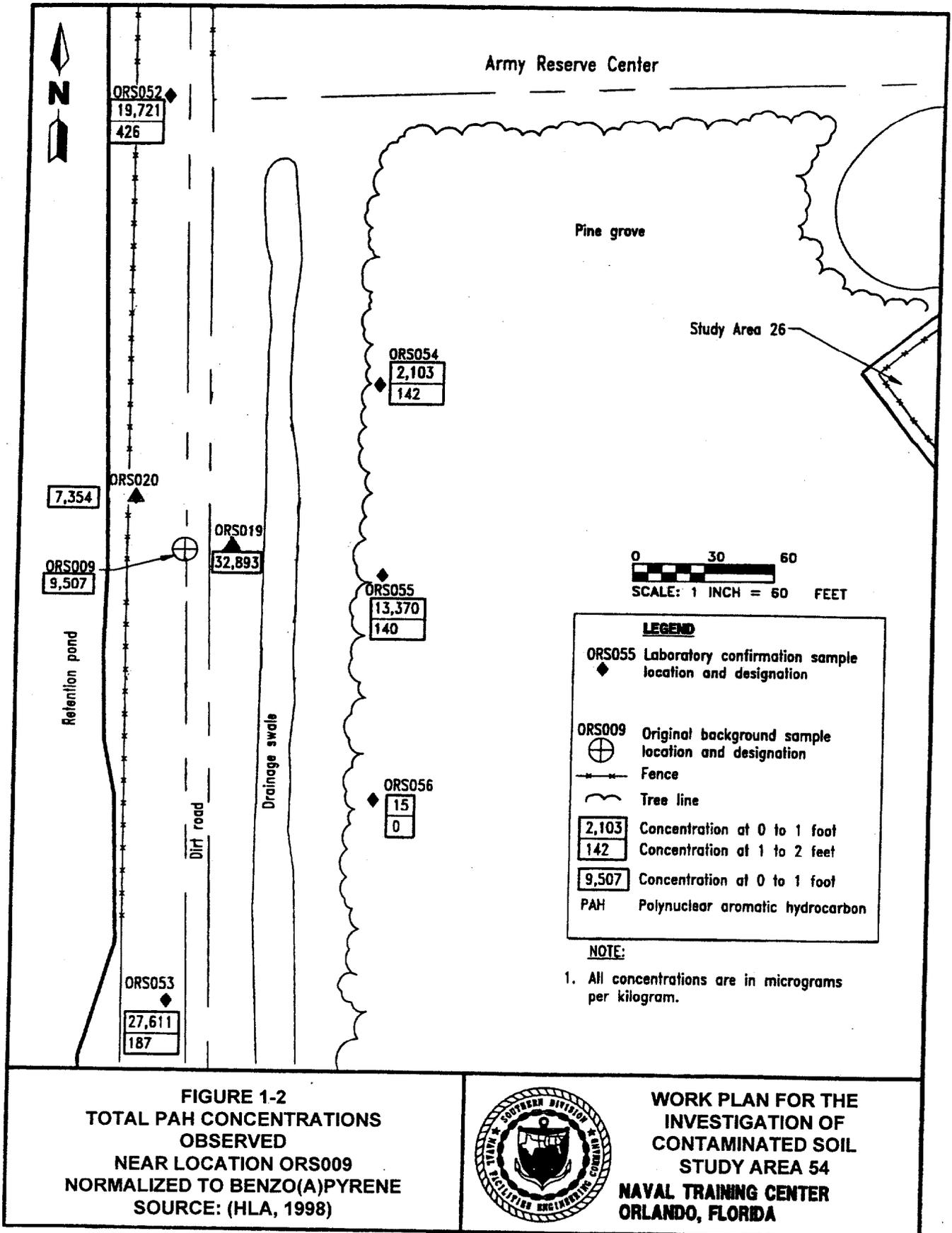
- IA tests near ORS016 confirmed elevated PAH concentrations up to 50 feet to the north and west of the location, 75 feet to the south, and 150 feet to the east of the background sample location.

Additional samples were collected and sent to an approved off-site laboratory. Some samples contained concentrations of PAHs that exceeded Florida industrial Soil Cleanup Target Levels (SCTLs) at each location. The sampling failed to define the extent of contamination at either location (HLA, 1998). Figures 1-2 and 1-3 show previous sampling locations and the observed concentrations at each. Table 1-1 shows the observed concentrations that exceed SCTLs near ORS009. Table 1-2 shows the observed concentrations that exceed SCTLs near ORS016.

### 1.3 OBJECTIVES

The objectives of this investigation are to:

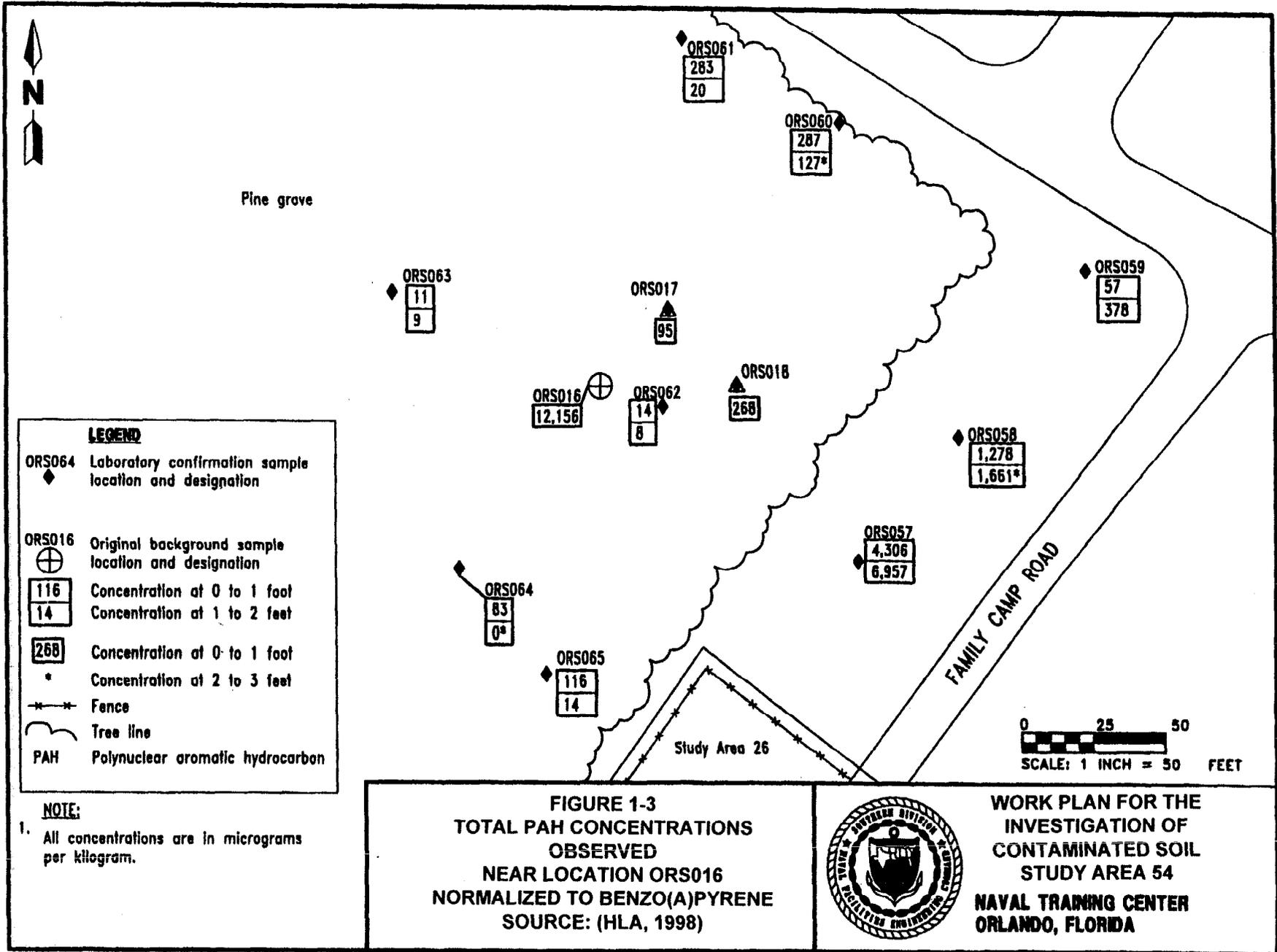
- Collect soil samples along the unpaved road adjacent to location ORS009 in the western area. Land lying west of the site is outside the western NTC boundary. As described above, land lying east of ORS009 is now under effective administrative control.
- Collect soil samples surrounding former sampling locations ORS016, ORS057, and ORS058 in the northeastern area.
- Submit the samples to an approved off-site fixed-base laboratory for PAH analysis by U.S. Environmental Protection Agency (USEPA) SW-846 Method 8310.
- Use the analytical data to determine the area and quantity of soil that must be removed from the study area to meet the requirements for nonresidential reuse.



**FIGURE 1-2**  
**TOTAL PAH CONCENTRATIONS**  
**OBSERVED**  
**NEAR LOCATION ORS009**  
**NORMALIZED TO BENZO(A)PYRENE**  
**SOURCE: (HLA, 1998)**



**WORK PLAN FOR THE**  
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**CONTAMINATED SOIL**  
**STUDY AREA 54**  
**NAVAL TRAINING CENTER**  
**ORLANDO, FLORIDA**



**TABLE 1-1  
SUMMARY OF PAH DETECTIONS EXCEEDING FLORIDA  
SOIL CLEANUP TARGET LEVELS  
NEAR SAMPLING LOCATION ORS009  
STUDY AREA 54**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

Sample Identifier	SCTL for Residential Soil	SCTL for Industrial Soil	ORS00901	ORS00901	ORS01901	ORS02001	ORS05201	ORB05201
Sampling Date			07/27/1994	12/06/1996	07/02/1997	07/02/1997	11/25/1997	11/25/1997
Sample Depth, feet bgs			0-1	0-1	0-1	0-1	0-1	2-3
Compound, µg/kg								
Benzo(a)anthracene	1,400	5,000	3,000	4,100	15,000	5,900	5,900	
Benzo(a)pyrene	100	500	5,500	8,600	25,000	5,900	16,000	310
Benzo(b)fluoranthene	1,400	4,800	5,900	1,200	5,900	5,900	12,000	
Dibenzo(a,h)anthracene	100	500			5,900		2,200	
Indeno(1,2,3-cd)pyrene	1,500	5,300	4,400	1,600	5,900	8,400	3,100	

Sample Identifier	SCTL for Residential Soil	SCTL for Industrial Soil	ORS05301	ORB05301	ORB05401	ORS05401	ORS05501
Sampling Date			11/25/1997	11/25/1997	11/25/1997	11/25/1997	11/25/1997
Sample Depth, feet bgs			0-1	2-3	0-1	2-3	0-1
Compound, µg/kg							
Benzo(a)anthracene	1,400	5,000	10,000				5,200
Benzo(a)pyrene	100	500	22,000	130	1,600	120	11,000
Benzo(b)fluoranthene	1,400	4,800	16,000		1,500		8,000
Dibenzo(a,h)anthracene	100	500	3,100		250		1,400
Indeno(1,2,3-cd)pyrene	1,500	5,300	9,000				

Source: HLA, 1998

**TABLE 1-2  
SUMMARY OF PAH DETECTIONS EXCEEDING FLORIDA  
SOIL CLEANUP TARGET LEVELS  
NEAR SAMPLING LOCATION ORS016  
STUDY AREA 54**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

Sample Identifier	SCTL for Residential Soil	SCTL for Industrial Soil	ORS01601	ORS01601	ORS01801	ORS05701	ORS05701D	ORB05701
Sampling Date			10/27/94	12/6/96	7/2/97	11/25/97	11/25/97	11/25/97
Sample Depth, feet bgs			0-1	0-1	0-1	0-1	0-1	1-2
Compound, µg/kg								
Benzo(a)anthracene	1,400	5,000	7,300	800		2,800		1,700
Benzo(a)pyrene	100	500	8,200	1,200	220	3,500	880	5,400
Benzo(b)fluoranthene	1,400	4,800	8,200			3,000		4,100
Dibenzo(a,h)anthracene	100	500	2,400			380	180	930
Indeno(1,2,3-cd)pyrene	1,500	5,300	5,800					3,000

Sample Identifier	ORS05801	ORS05801D	ORB05801D	ORB05901	ORS06001	ORS06101
Sampling Date	11/25/97	11/25/97	11/25/97	11/25/97	11/26/97	11/26/96
Sample Depth, feet bgs	0-1	0-1	2-3	1-2	0-1	0-1
Compound, µg/kg						
Benzo(a)anthracene						
Benzo(a)pyrene	710	1,000	1,300	280	230	230
Benzo(b)fluoranthene						
Dibenzo(a,h)anthracene		150	120			

Source: HLA, 1998

## 2.0 SOIL SAMPLING INVESTIGATION

A soil sampling investigation will be conducted to help evaluate the risk posed by PAH contamination near locations 0RS009 and 0RS016. The investigation will consist of collecting soil samples at selected locations for PAH analyses using USEPA Method 8310. Quanterra Environmental Services in North Canton, Ohio, will perform the analyses in accordance with USEPA Level IV Data Quality Objectives.

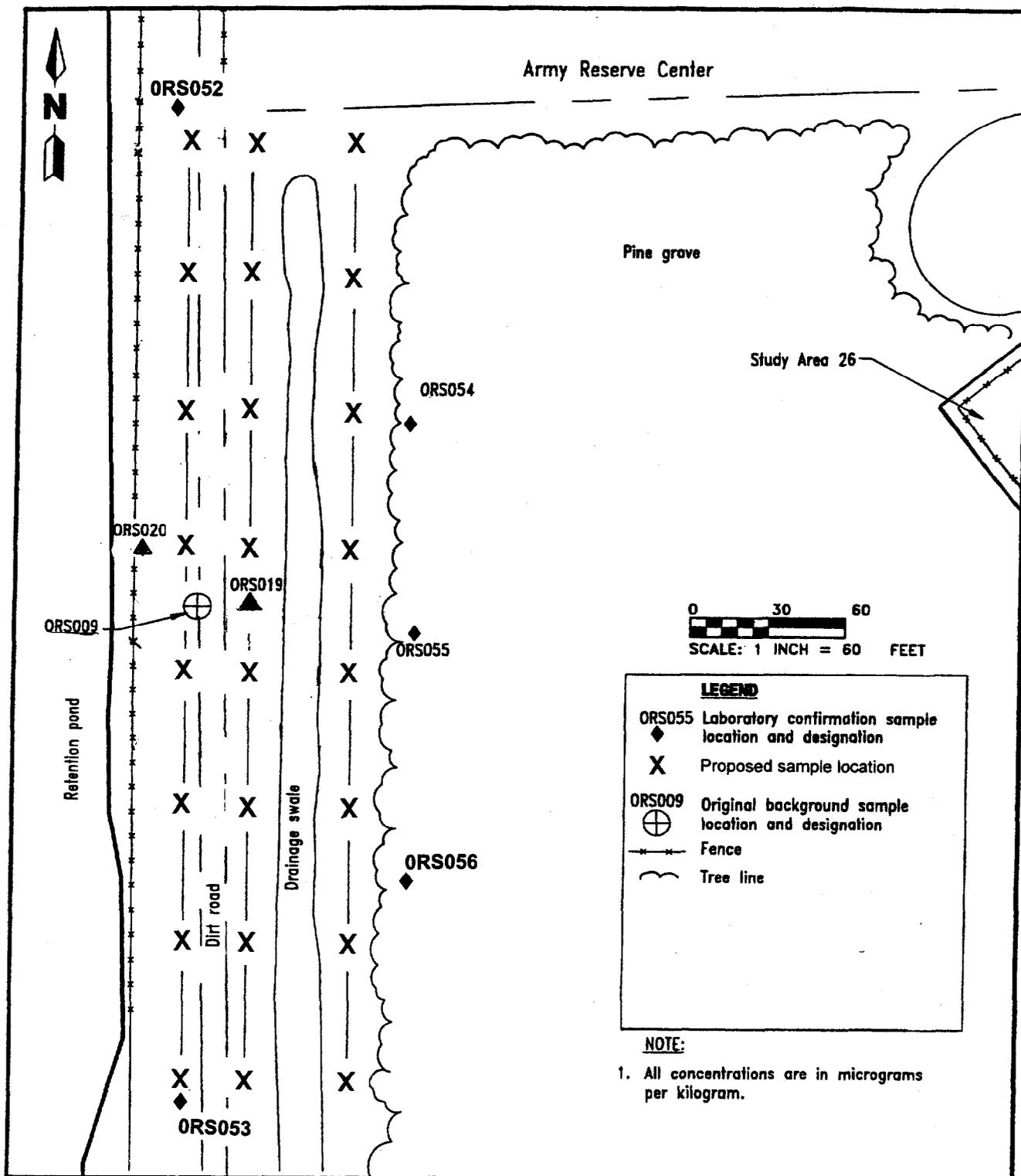
At each proposed sampling point, soil samples will be obtained from depths of 0-2 feet bgs using direct push technology (DPT). Hand augers may be used if equipment scheduling or physical features prevent the use of DPT. Sampling will be conducted following guidance detailed in the *Project Operations Plan for Site Investigations and Remedial Investigations, Volume I* (ABB-ES, 1997). Health and safety aspects of the work at SA 54 will be controlled in accordance with the *Health and Safety Plan for Completion of Investigative Work and Data Sampling* (B&R Environmental, 1997) and addenda.

Figures 2-1 and 2-2 show the proposed sampling points near locations 0RS009 and 0RS016, respectively. Field personnel will prepare composite samples for each sampling point by carefully mixing the soil collected in a stainless steel bowl. The mixed soil will then be transferred to pre-cleaned sample bottles provided by the laboratory.

Three rows of samples will be collected in lines parallel to the unpaved road near 0RS009. Eight samples will be collected at 50-foot intervals along each line. One row will lie near the western edge of the road, approximately in line with 0RS009 and the previous sampling locations 0RS052 and 0RS053. The second line will lie near the eastern side of the road and the third row will lie east of the drainage swale. The centers of the rows will lie in an east-west line intersecting 0RS009.

Twenty-four samples will be collected near 0RS016. Four samples will be collected at points 10 feet from each of the former sampling locations 0RS016, 0RS057, and 0RS058, where previously observed concentrations exceeded SCTLs. An additional four samples will be collected at points 20 feet from each of those locations. The laboratory will hold the samples collected at 20-foot radii pending analysis of the samples collected at 10-foot radii and review of the analytical data. Samples collected at 20-foot radii will be analyzed only if needed to define the extent of contamination.

Horizontal locations of the samples will be determined by a global positioning system or by a Florida-registered land surveyor.

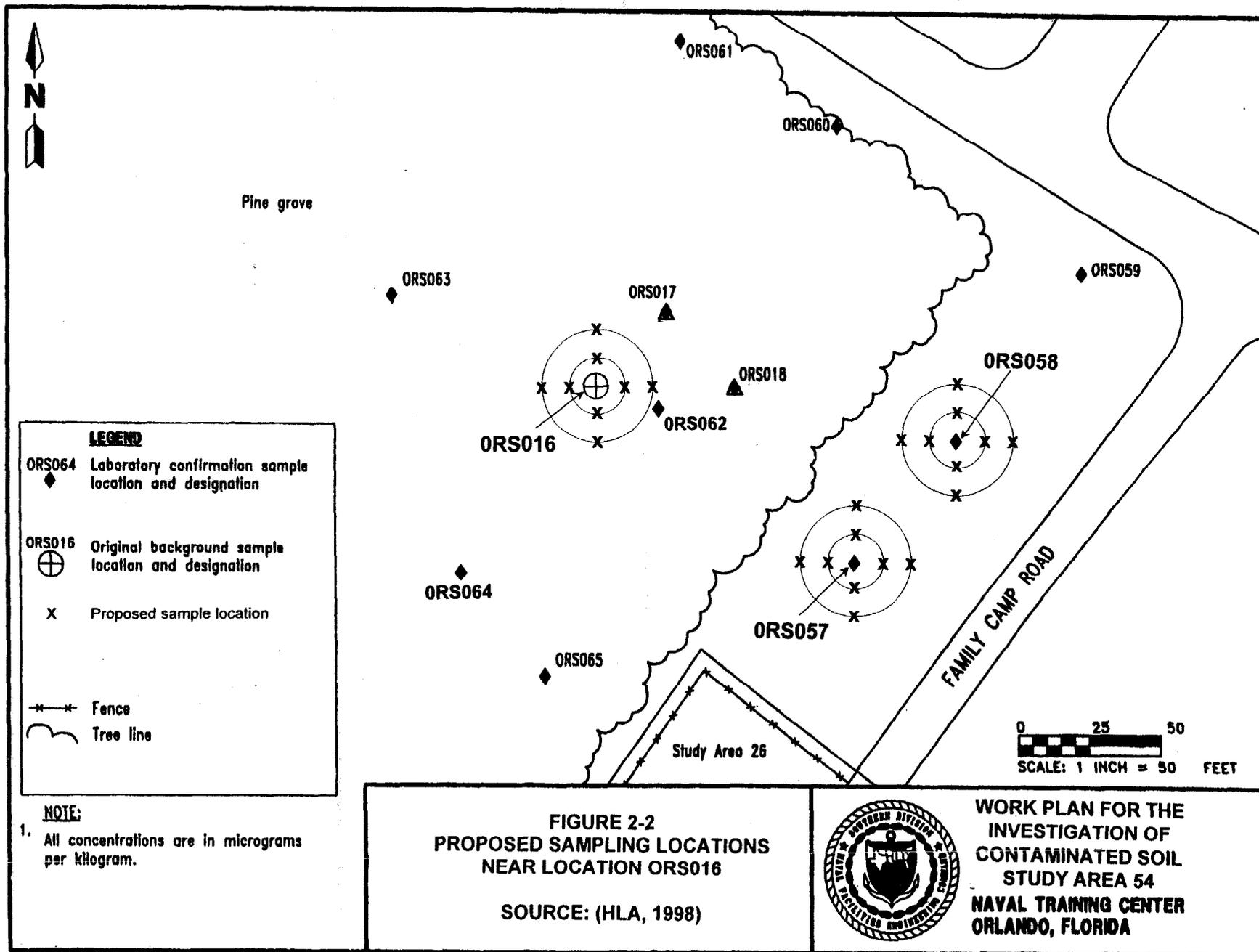


**FIGURE 2-1  
PROPOSED SURFACE SOIL SAMPLING  
LOCATIONS NEAR LOCATION ORS009**

SOURCE: (HLA, 1998)



**WORK PLAN FOR THE  
INVESTIGATION OF  
CONTAMINATED SOIL  
STUDY AREA 54  
NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**



## 2.1 SAMPLE NUMBERING

The soil samples will be numbered as follows:

NTC54PNNDD

where: NTC = Naval Training Center  
54 = two-digit SA designation (54)  
P = sample type ("P" for DPT)  
NNN = location number (e.g., 001 or 015)  
DD = sample depth (e.g., 01 or 02)

For example, a sample collected at the 5th sampling location at a depth of 2 feet will be designated NTC54P00502. Samples for field duplicates will be identified with a "blind" number (e.g., NTC39D1000). The corresponding environmental sample will be noted in the field logbook.

## 2.2 QUALITY CONTROL SAMPLES

Quality control samples will be collected at the frequencies listed below.

- One field duplicate per 10 environmental samples.
- One matrix spike/matrix spike duplicate (MS/MSD) per 20 environmental samples.

"MS/MSD" will be added to the sample number on the sample labels and the chain of custody form. New sample numbers will not be created for these samples. Additional soil will be collected for each MS and MSD if requested by the laboratory.

If any nondisposable sampling equipment is used and decontaminated, the additional quality control samples listed below will be collected.

- One rinsate blank per 10 environmental samples.
- One field blank from each water source used for decontamination.

Section 3.0 describes the decontamination procedure for nondisposable equipment.

### 3.0 DECONTAMINATION

Those parts of the DPT rig that contact soil will be steam cleaned on these occasions:

- Prior to arrival on site.
- Prior to beginning work.
- Between sampling locations.
- Any time the rig leaves the site.
- At the conclusion of the DPT sampling program.

All large equipment decontamination activities will take place at a location designated by base personnel. However, all loose soil material and debris will be removed at the individual site prior to decontamination. Decontamination operations will consist of washing large equipment (DPT rig, push probes, down-hole tools, etc.) using a high-pressure potable water steam wash.

All small sampling tools and miscellaneous sampling equipment coming in contact with contaminated media will be decontaminated using the steps identified below.

1. Wash with potable water and Alconox.
2. Rinse thoroughly with potable water.
3. Rinse with deionized water or analyte-free water.
4. Rinse with isopropanol.
5. Rinse with analyte-free water and air dry.

Clean sampling equipment will be wrapped in aluminum foil to prevent contamination during storage or transport.

#### 4.0 INVESTIGATION-DERIVED WASTE (IDW) MANAGEMENT

Wash and rinse water will be temporarily stored in Department of Transportation-approved steel 55-gallon drums and will be properly disposed of after the analytical results of the DPT sampling are received. Each drum will be clearly marked with the following information or as otherwise directed by the base contact:

- Company name (Tetra Tech NUS).
- Base contact (Wayne Hansel) and phone number (407-895-6714).
- Site identification where the IDW originated (SA 54).
- Material contained in the drum (e.g., wash water, decon water).
- The date the IDW was produced.

The IDW will be sampled and analyzed as required for disposal.

## 5.0 LOGBOOKS AND FORMS

All pertinent information gathered during the soil sampling will be written in detail in the field logbook or on sampling forms. In addition to the standard logbook entries, entries will include (at a minimum) those items listed below:

- Sample collection times, sample numbers, and observations about DPT rig operation.
- Approximate sample recovery, if less than 100%.
- Documentation of decontamination activities.
- Documentation of sample storage and shipping methods, including the FedEx airbill number for each shipment.

## 6.0 EVALUATION OF ANALYTICAL RESULTS

Investigators will perform the following functions to evaluate the analytical results.

- Review the analytical data packages for completeness and accuracy, noting any data flagged "R" (rejected).
- Validate the analytical data in accordance with USEPA guidelines (USEPA, 1994).
- Compile separate databases of acceptable data for the western and northeastern areas. This effort is described in greater detail in the next paragraph.
- For each area, calculate the 95% upper confidence limit (UCL) of the data.
- For each area, compare the 95% UCL with industrial SCTLs.

Appendix A contains a procedure describing the calculation method. Figure 1 in Appendix A illustrates the process.

A letter from S.M. Roberts of the University of Florida Center for Environmental & Human Technology to L. Mora-Applegate of the Florida Department of Environmental Protection describes the following two key points that must be observed during site evaluation (Roberts, 1999):

1. There must be a sufficient number of data points for a meaningful statistical analysis. A minimum of ten data points is required.
2. The area evaluated must be one that the most-exposed receptor could reasonably be expected to encounter. Use of a site-wide average may not be appropriate if that exposure scenario does not exist.

Twenty-four additional samples will be collected along the unpaved road in the western area. Acceptable results will be combined with the laboratory analytical data previously collected along the road by Harding Lawson Associates (HLA). Much of the area is now under effective institutional control, so sampling will be restricted to the sides of the unpaved road, between the installation boundary and the controlled area. The 95% UCL for each compound will be compared to three times the corresponding SCTL to determine if the area warrants further investigation.

Twelve additional samples will be collected in the northeastern area. Acceptable results will be combined with the laboratory analytical data previously provided by HLA from sample locations 0RS016, 0RS057, and 0RS058. Those apparent hot spots are the only three locations at which previous PAH detections exceeded SCTLs, posing the greatest risk to the most-exposed receptor. Investigators will determine if the area surrounding each location is sufficiently delineated to define excavation boundaries.

### 7.0 CONTACTS

<b>Project Area</b>	<b>Responsible Personnel</b>	<b>Phone Number</b>
Task Order Management	Steven McCoy	(423) 220-4730
Technical Issues	Michael Campbell or Allan Jenkins	(423) 220-4714 / 4724
Health & Safety	Matt Soltis	(412) 921-8912
Procurement	Sandy D'Alessandris	(412) 921-8435
Laboratory Services	Debora Hula	(330) 497-9396
Base Contact	Wayne Hansel	(407) 895-6714

## REFERENCES

- ABB-ES (ABB Environmental Services, Inc.), 1995. *Background Sampling Report at the Naval Training Center in Orlando, Orange County, Florida.*
- ABB-ES, 1997. *Project Operations Plan for Site Investigations and Remedial Investigations [POP], Volume I.*
- B&R Environmental (Brown & Root Environmental), 1997. *Health and Safety Plan for Completion of Investigative Work and Data Sampling and addenda.*
- HLA (Harding Lawson Associates), 1998. *Base Realignment and Closure Environmental Site Screening Report, Study Area 54, Naval Training Center, Orlando, Florida.*
- Roberts, S.M., January 10, 1999. University of Florida, Gainesville, Letter to L. Mora-Applegate, Florida Department of Environmental Protection, Tallahassee, on "the use of average soil concentrations in risk assessment."
- USEPA (U.S. Environmental Protection Agency), 1994. *Contract Laboratory Program National Functional Guidelines for Organic Data Review.* EPA/540/R-94-012, Office of Emergency and Remedial Response, Washington, D.C., February.

**APPENDIX A**

**PROCEDURE FOR CALCULATION OF THE 95% UPPER CONFIDENCE LIMIT  
OF THE MEAN CONCENTRATION FOR A DATA SET**

## 1.0 PURPOSE

This procedure presents a risk-based approach for determining the areas of contaminated surface soil that must be remediated at Installation Restoration (IR) sites at the former Naval Training Center (NTC) in Orlando. At IR sites where remediation has been performed, this procedure can help determine whether remediation goals have been met.

## 2.0 SCOPE

This procedure has been prepared to address only IR contamination sites at NTC, Orlando. This procedure does not apply to underground or aboveground storage tank sites. The terminology and regulatory requirements cited are those recognized or issued by the State of Florida.

## 3.0 DEFINITIONS

COPC – Chemical of Potential Concern

FDEP – Florida Department of Environmental Protection

SCTL – Soil Cleanup Target Level (FDEP, 1998)

SQL – Sample Quantitation Limit

UCL – Upper Confidence Limit

## 4.0 DISCUSSION

The FDEP, through its risk assessment consultant the University of Florida, has indicated that the 95% UCL is "generally the most appropriate basis for comparing site contaminant concentrations with SCTLs" (Roberts, 1999). Exceptions to this, where the maximum concentrations instead of the 95% UCLs should be compared with SCTLs, are as follows:

1. The 95% UCL exceeds the maximum observed concentration.
2. There are insufficient data to support calculation of the 95% UCL (fewer than 10 samples).

Large variations in data may result in distributions that are neither normal nor lognormal. In such cases, it may be appropriate to use the maximum detected concentration or collect additional samples.

Two additional conditions may also exclude calculating an average soil concentration over a site and instead require remediation below specified criteria:

3. The contaminants include barium, cadmium, copper, cyanide, fluoride, nickel, phenol, or vanadium, which have SCTLs based on acute toxicity in children. In a residential scenario the levels of these chemicals must be reduced below the SCTLs.
4. Contaminant "hot spots" exceed three times the SCTL for the intended land use.

The University of Florida provides the additional qualification cited below (Roberts, 1999):

"In evaluating whether contaminant concentrations on site are consistent with the SCTLs, it should not be automatically assumed that a site-wide average should be used. The general idea is to average concentrations over an area based on reasonable activity patterns for the most-exposed potential receptor. Observations of human activity associated with the site can be used to assist in a determination of the appropriate size of areas for averaging when evaluating risks posed by current site conditions. It is often more difficult to decide what constitutes reasonable averaging for future land use where human activity patterns are unknown. It has been suggested that when future residential exposure scenarios are involved, concentrations should be averaged over no more than 0.5-acre sections, corresponding to an average residential lot, for comparison with residential SCTLs."

After consideration of the conditions and discussion above, the 95% UCLs may be calculated and compared to the SCTLs. The results should assist decision makers in determining which areas of soil, if any, must be remediated. After remediation and confirmation sampling are performed, the same logic may be applied to determining if remediation goals have been met or if further remediation is required.

## 5.0 PROCEDURE

A logic diagram is shown in Figure 1. The procedure steps are explained below.

1. **Identify the COPCs** – Identify COPCs by comparing the analytical results with the applicable SCTL (residential, industrial, etc.) for each chemical. If the maximum observed concentration is greater than the SCTL, then the chemical is considered a COPC and will be evaluated further.
2. **Do the COPCs include barium, cadmium, copper, cyanide, fluoride, nickel, phenol, or vanadium?** If one of these chemicals is present under a residential use scenario, that location must be remediated.

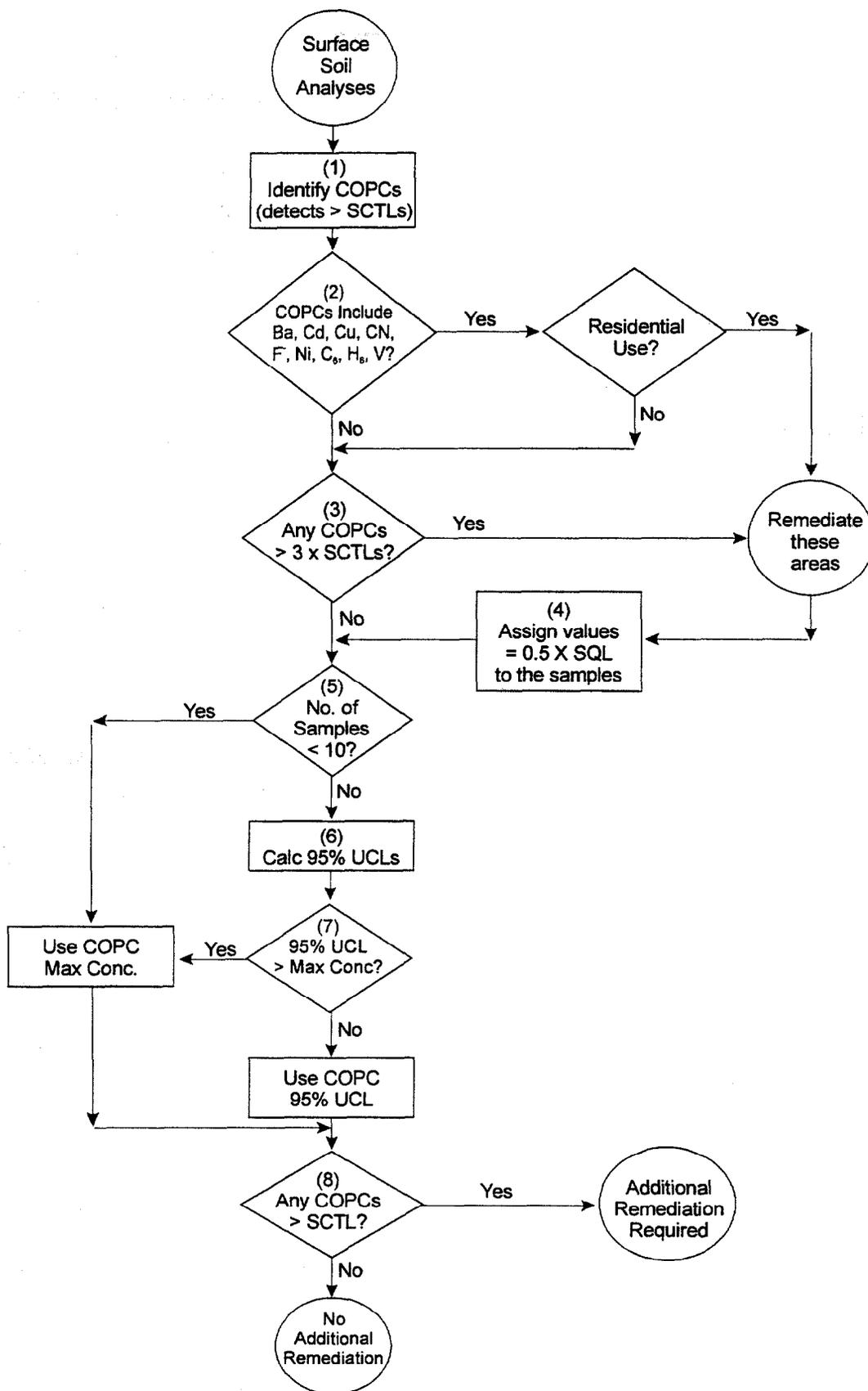


Figure 1. DETERMINING AREAS REQUIRING REMEDIATION OF SURFACE SOIL

3. **Are there "hot spots" (one or more COPCs >3 x the SCTL)?** If yes, those locations must be remediated.
4. **For the locations to be remediated, assign COPC values equal to one-half of the SQLs.** It is assumed that the locations identified in steps (2) and (3) will be remediated to non-detectable concentrations. Thus for further evaluation of the data set, the COPC concentrations for these samples are assigned values equal to one-half the detection limits (SQLs). If this is not realistic, assign more appropriate concentrations to these samples.
5. **Are there sufficient samples ( $\geq 10$ ) to calculate the 95% UCLs?** As indicated in Section 4.0, there must be a minimum of 10 samples or the maximum observed concentration for each COPC must be used.
6. **Calculate the 95% UCL for each COPC.** The specific steps involved in calculating the 95% UCL are described elsewhere (Gilbert, 1987). The first step, however, is determining whether the data fit a normal or lognormal distribution using the Shapiro-Wilk W test (Gilbert, 1987). If there is not sufficient correlation with either, the data will be assumed to be lognormally distributed.
7. **Is the 95% UCL > the maximum observed concentration?** If so, use the maximum concentration for that COPC for comparison with the SCTL.
8. **Is the value for any of the COPCs > the SCTL?** If not, no additional soil remediation is required. Otherwise, additional soil must be remediated.

## 6.0 REFERENCES

FDEP (Florida Department of Environmental Protection), 1998. *Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-785, F.A.C.*, April 30.

Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring*, Van Nostrand Reinhold, New York.

Roberts, S.M., January 10, 1999. University of Florida, Gainesville, Letter to L. Mora-Applegate, Florida Department of Environmental Protection, Tallahassee, on "the use of average soil concentrations in risk assessment."

## ADDENDUM A

### 1.0 INTRODUCTION

This addendum to the *Work Plan for the Investigation of Contaminated Soil, Study Area 54*, Naval Training Center, Orlando, Florida provides additional instructions for delineating PAH contamination at the site.

### 1.1 OBJECTIVES

The objectives of this supplemental investigation are to:

- Collect soil samples surrounding former sampling locations ORS057 and ORS058 in the northeastern area of Study Area 54.
- Submit the samples to an approved off-site fixed-base laboratory for PAH analysis by SW-846 Method 8310.
- Use the analytical data to determine the area and quantity of soil that must be removed from the study area to meet the requirements for nonresidential reuse.

### 2.0 ADDITIONAL SOIL SAMPLING

Soil samples will be collected at selected locations for PAH analyses using USEPA Method 8310. Severn Trent Laboratories in North Canton, Ohio, will perform the analyses in accordance with USEPA Level IV Data Quality Objectives (DQOs).

For samples collected by hand auger, disposable sleeves will not be required.

Figure A-1 shows the proposed sampling locations near ORS057 and ORS058. Nine samples will be collected near ORS057 and eight samples will be collected near ORS058 from 0-2 feet bgs following guidance detailed in the Project Operations Plan for Site Investigations and Remedial Investigations (POP), Volume I (ABB-ES, 1997). Previous sample locations 25-28, 30, 33-36, and 40-44 collected on 9/29/99 are also shown on Figure A-1. Sample locations 25, 27, 28, 33, 36, and 40 had concentrations that exceeded SCTLs.

**LEGEND**

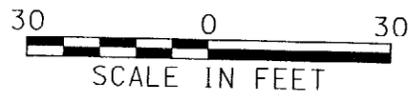
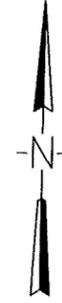
- HAND AUGER 
- PROPOSED SURFACE SOIL SAMPLE 
- PAH EXCEEDANCE 1 
- 10' FROM EXCEEDANCE SAMPLE A 
- 20' FROM EXCEEDANCE SAMPLE B 

1 - INDUSTRIAL SOIL CLEANUP TARGET LEVEL

WOODS

WOODS

WOODS



43  
44  
41  
42  
ORS016

28  
27  
25  
26  
30  
ORS058

40  
36  
35  
33  
34  
ORS057

EIGHTH

715

STREET

ROAD

FAMILY

CAMP

720

7357

FIGURE A-1



PROPOSED SAMPLE LOCATIONS  
STUDY AREA 54 - McCOY ANNEX  
WORK PLAN FOR SOIL SAMPLING PLAN

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

00187 H 01Z

A PAH extraction will be performed by Severn Trent Laboratories on all samples within 14 days to meet the holding time requirements. PAH analysis will be performed on surface soil samples designated "A", located closest to the previous sample locations that had concentrations that exceeded SCTLs (those approximately 10 ft from the previous exceedances). If concentrations exceed SCTLs at any of the "A" samples, an analysis will be performed on the corresponding "B" surface soil sample located approximately 20 ft from the previous exceedance along the same line as the "A" sample.

## 2.1 SAMPLE NUMBERING

The soil samples will be numbered as follows:

**NTC54SNNDD**

where: *NTC* = Naval Training Center  
*54* = two-digit SA designation (54)  
*S* = sample type ("S" for surface soil, "D" for duplicate)  
*NNN* = location number (e.g., 001 or 015)  
*DD* = sample depth (e.g., 01 or 02)

For example, a sample collected at the 50<sup>th</sup> surface soil location at a depth of 2 feet will be designated NTC54S05002. Samples for field duplicates will be identified with a "blind" number (e.g., NTC54D1000). The corresponding environmental sample will be noted in the logbook. The surface soil sample number NNN for this event will start with sample location 049.