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FINAL SITE INVESTIGATION FOR STUDY AREA 54 NTC ORLANDO FL
5/14/2003
TETRA TECH

TETRA TECH NUS, INC.
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0503-A038

May 14, 2003

Commander, Southern Division
Naval Facilities Engineering Command
ATTN: Ms. Barbara Nwokike, Code ES33
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 Site Investigation Report for Study Area 54
Naval Training Center, Orlando, Florida

Dear Ms. Nwokike:

Enclosed is the final Site Investigation Report for Study Area 54 in hardcopy and CD formats. Comments received from the Orlando Partnering Team have been incorporated into the report. A second copy of the transmittal has been mailed to Southern Division's Orlando office.

If you have any questions, please contact me at (865) 220-4730.

Sincerely,

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

SBM:ckf

Enclosure

c: Ms. Barbara Nwokike, Southern Division (Orlando Office) (hardcopy and CD)
Ms. Hope Wilson, Southern Division (hardcopy)
Mr. David Grabka, FDEP (hardcopy and CD)
Mr. Gregory Fraley, USEPA Region 4 (hardcopy and CD)
Mr. Steve Tsangaris, CH2M Hill (CD)
Mr. Mark Salvetti, Mactec (CD)
Mr. Michael Campbell, Tetra Tech NUS (hardcopy)
Mr. J.E. Bentkowski, Gannett Fleming (hardcopy and CD)
Mr. Mark Perry, Tetra Tech NUS (unbound hardcopy and CD)
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)
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00934

0703-E274

July 2, 2003

Commander, Southern Division
Naval Facilities Engineering Command
Attn: Ms. Barbara Nwokike, Code ES33
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: Study Area 54 Site Investigation Report
McCoy Annex, Naval Training Center, Orlando

Dear Ms. Nwokike:

Enclosed is a copy of the completed signature page for the final Site Investigation Report for Study Area 54 at McCoy Annex (May 2003). Please replace the unsigned page in your copy of the document with the signed page.

If you have any questions, please contact me at (865) 220-4730.

Sincerely,

Steven B. McCoy

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

SBM:tko

Enclosures

c: Ms. Barbara Nwokike, Southern Division (Orlando Office)
Ms. Hope Oaks, Southern Division
Mr. David Grabka, FDEP
Mr. Gregory Fraley, USEPA Region 4
Mr. Steve Tsangaris, CH2M Hill
Mr. Mark Salvetti, MACTEC Engineering
Mr. Michael Campbell, Tetra Tech NUS
Mr. J.E. Bentkowski, Gannett Fleming
Mr. James Young, Terraine
Mr. Mark Perry, Tetra Tech NUS (unbound)
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)
File/db

Rev. 1
05/14/03

SITE INVESTIGATION REPORT
for
STUDY AREA 54

Naval Training Center
Orlando, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888
Contract Task Order 0024

MAY 2003

Rev. 1
05/14/03

SITE INVESTIGATION REPORT
FOR
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:

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

Submitted by:

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

MAY 2003

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P.G. CERTIFICATION

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

Michael J. Campbell, P.G. / Date
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MICHAEL J. CAMPBELL
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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
bgs	below ground surface
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
HLA	Harding Lawson Associates
IA	immunoassay
MS	matrix spike
MSD	matrix spike duplicate
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
NFESC	Naval Facilities Engineering Service Center
NTC	Naval Training Center
OPT	Orlando Partnering Team
PAH	polynuclear aromatic hydrocarbon
POP	Project Operations Plan
PVC	polyvinyl chloride
RBC	Risk Based Concentration
SA	Study Area
SCTL	Soil Cleanup Target Level
SOUTHDIV	Southern Division, Naval Facilities Engineering Command
SPLP	Synthetic Precipitation Leading Procedure
TtNUS	Tetra Tech NUS, Inc.
USDA	U.S. Department of Agriculture
USEPA	U. S. Environmental Protection Agency

EXECUTIVE SUMMARY

An environmental site investigation was performed by Tetra Tech NUS, Inc. (TtNUS) at Study Area (SA) 54, located at the McCoy Annex of the former Naval Training Center (NTC), Orlando. The site investigation began in September 1999 and continued in several phases through August 2001. The objectives of the investigation were to delineate the extent of polynuclear aromatic hydrocarbons (PAHs) in the soil at concentrations exceeding screening criteria, investigate the potential leaching of PAHs to groundwater, and determine the volume of soil to be excavated and replaced to meet the requirements for nonresidential reuse. The scope of the investigation was based on the results of previous investigations that identified concentrations of PAHs exceeding the Florida residential and commercial/industrial Soil Cleanup Target Levels (SCTLs).

Study Area Description

SA 54 is located near the Family Camp in the southwest portion of McCoy Annex. The Family Camp was once a small airstrip operated in the 1950s with an aircraft hangar and several other associated buildings. In recent years, the U.S. Army has developed the western portion of SA 54 with tree removal, regrading, stormwater control, and the construction of two buildings with an asphalt parking lot.

SA 54 is comprised of two small areas that surround surface sampling locations selected for a background sampling study for the NTC (ABB-ES, 1995). The two locations, hereafter referred to as the “western” and “northeastern” areas, were believed to be in undisturbed areas; however, PAHs were detected at both sites at concentrations exceeding residential and commercial/industrial screening criteria.

Soil Sampling

As a result of the PAH exceedances identified in the background study, the Navy directed Harding Lawson Associates to perform soil sampling as part of a site screening investigation in 1997 and 1998 (HLA, 1998). The investigation employed a combination of semiquantitative immunoassay field tests and submission of selected soil samples to an off-site laboratory. Some of the samples contained concentrations of PAHs exceeding screening criteria, but the extent of contamination was not defined.

To define the extent of the PAH contamination in surface soil, the Navy directed TtNUS to perform a site investigation. TtNUS performed surface soil sampling in five phases beginning in September 1999. Analytical results of samples from the western area indicated that PAH exceedances occurred adjacent to

the unpaved road while samples away from the road did not exceed the SCTLs. The Orlando Partnering Team (OPT) concluded that the PAH exceedances were due to vehicle traffic along the road, not past site activities; thus, further investigation of the western area was not required. Subsequent sampling at SA 54 was performed in April, June, and December 2000, and August 2001 and was limited to the northeastern area. Sampling continued in the northeastern area until the limits of the contamination exceeding the Florida commercial/industrial SCTLs were determined.

To evaluate the gradation of PAH contamination with depth, samples were collected at five depths ranging from 6 to 30 inches below ground surface at the two locations in the northeastern area with the highest PAH concentrations. Analysis of the samples showed that PAH exceedances were present at all five sample depths at both locations. The highest concentrations were present in samples obtained from depths of 6 and 12 inches.

Potential Leaching of PAHs

To evaluate the potential for leaching of PAHs from soil into the groundwater at SA 54, a temporary 2-inch well was installed in May 2001 at one of the locations with elevated PAH concentrations. A groundwater sample was collected from the temporary monitoring well and a surface soil sample was collected at the same location. The samples were analyzed for PAHs, and the soil sample was subjected to the Synthetic Precipitation Leaching Procedure to determine the potential for leaching of PAHs. Of the 18 PAH parameters analyzed, all were non-detect in the groundwater and leachate samples with the exception of fluoranthene. The groundwater and leachate samples contained fluoranthene at 0.07 μg/L and 0.2 μg/L, respectively, which are well below its Groundwater Cleanup Target Level of 280 μg/L. From these results, the OPT determined that leaching of PAHs from soil does not pose a significant risk to groundwater at SA 54.

Soil Removal

In March and April 2002, CH2M Hill Constructors, Inc. excavated the contaminated surface soil in the northeastern area with PAH concentrations exceeding the Florida commercial/industrial SCTLs. The soil was excavated to a depth of 2 feet and replaced with clean fill to remediate the contaminated areas. A total of approximately 1,086 tons of soil was removed and transported to a licensed disposal site.

Conclusions and Recommendations

The extent of PAH contamination in surface soil exceeding commercial/industrial SCTLs was delineated at SA 54. The OPT concluded that PAH concentrations in the western area were most likely the result of vehicular traffic on the unpaved road which borders the site and not the result of past site usage. In the northeastern area, the levels of PAHs exceeding the State of Florida commercial/industrial SCTLs warranted cleanup and a soil removal was performed. Land use restrictions should be placed on SA 54 prohibiting residential use of the site. The results of a leaching test and groundwater sample analysis indicate that leaching of PAHs does not pose a significant risk to the groundwater. The Base Realignment and Closure Color Code for SA 54 should be changed to “dark green” to signify “an area where release, disposal, and/or migration of hazardous substances has occurred, and all remedial actions necessary to protect human health and the environment have been taken.”

1.0 INTRODUCTION

An environmental site investigation was performed at Study Area (SA) 54, located at the McCoy Annex of the former Naval Training Center (NTC), Orlando. Tetra Tech NUS, Inc. (TtNUS), under contract to the Department of the Navy, Southern Division, Naval Facilities Engineering Command (SOUTHDIV), performed the investigation in five phases between September 1999 and August 2001. The technical approach to the investigation was developed in conjunction with the Orlando Partnering Team (OPT), which includes representatives from the Florida Department of Environmental Protection (FDEP), the U.S. Environmental Protection Agency (USEPA) Region 4, and SOUTHDIV and their contractors. This report presents a description of the fieldwork performed, a discussion of the results, and conclusions and recommendations.

1.1 SITE DESCRIPTION

SA 54 lies in the southwest portion of the McCoy Annex at the former NTC, Orlando (Figure 1-1). The two areas that comprise SA 54 are located near surface sampling locations ORS009 and ORS016 (Figure 1-2). These locations were sampled in a background sampling study for the NTC and were found to have polynuclear aromatic hydrocarbon (PAH) contamination exceeding screening criteria (ABB-ES, 1995). Subsequently, the two sample locations, which are approximately 1,100 feet apart, were designated SA 54.

Sample location ORS009 lies between a retention pond to the west and an unpaved road to the east (Figure 1-2). A drainage swale extends along the eastern side of the road. Much of the western portion of SA 54 north and east of ORS009 has been developed in recent years by the U.S. Army, including tree removal, regrading, stormwater control, and the construction of two buildings with an asphalt parking lot. Sample location ORS016 lies in a pine grove west of the intersection of Family Camp Road and Eighth Street. The Pinecastle Aero Club once operated a small airstrip, including a hangar and other small buildings, on or near the Family Camp. In the text below, the SA 54 property near ORS009 is referred to as the “western” area and the property near ORS016 is referred to as the “northeastern” area.

1.2 BACKGROUND

The general soil map published by the U.S. Department of Agriculture, Soil Conservation Service (USDA, 1989) shows that the McCoy Annex lies across an area dominated by the Smyrna-Bassinger-St. Johns and the Urban land-Smyrna-Pomello soil mapping units. These soil units are parts of a group that

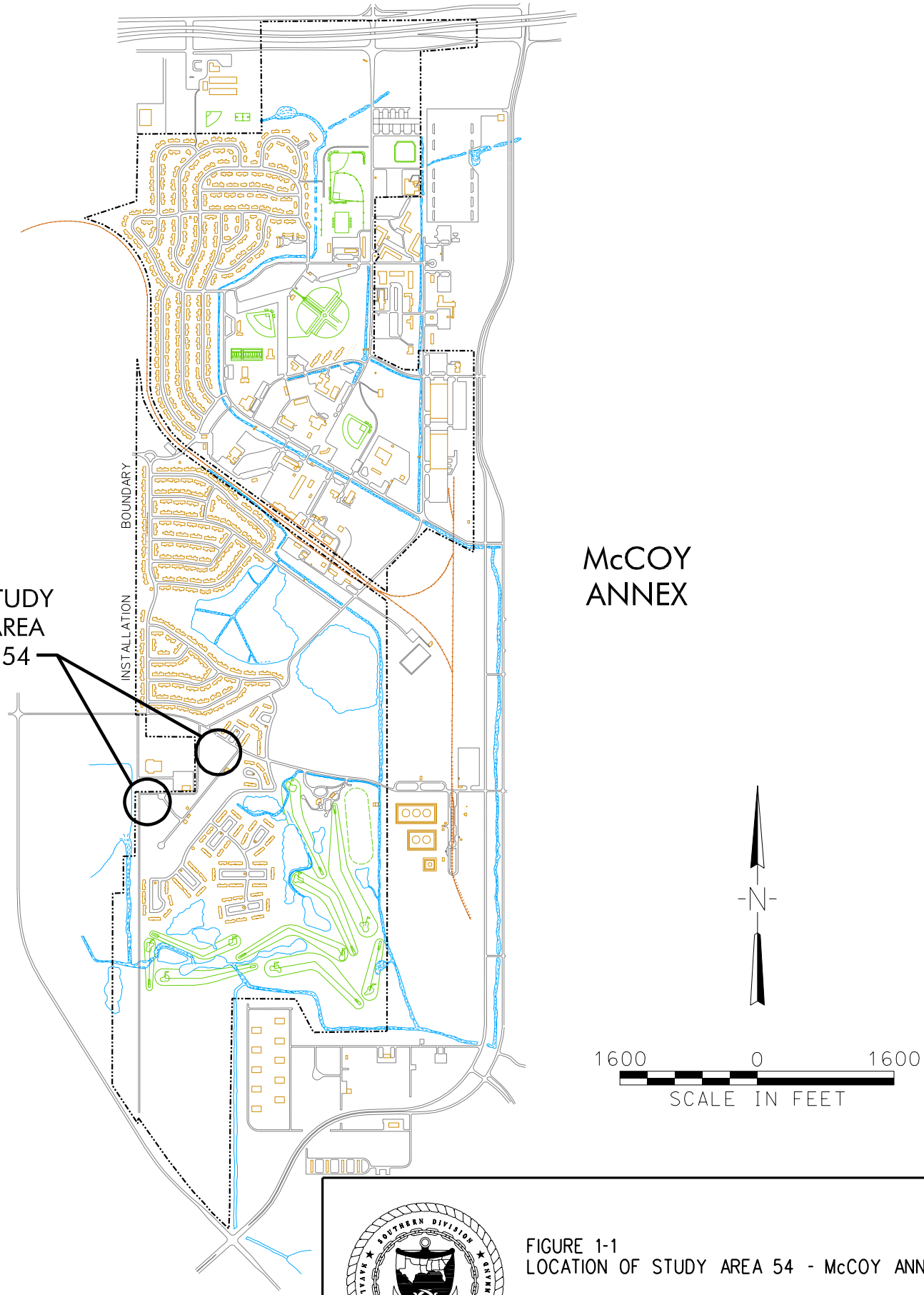

FIGURE 1-1
LOCATION OF STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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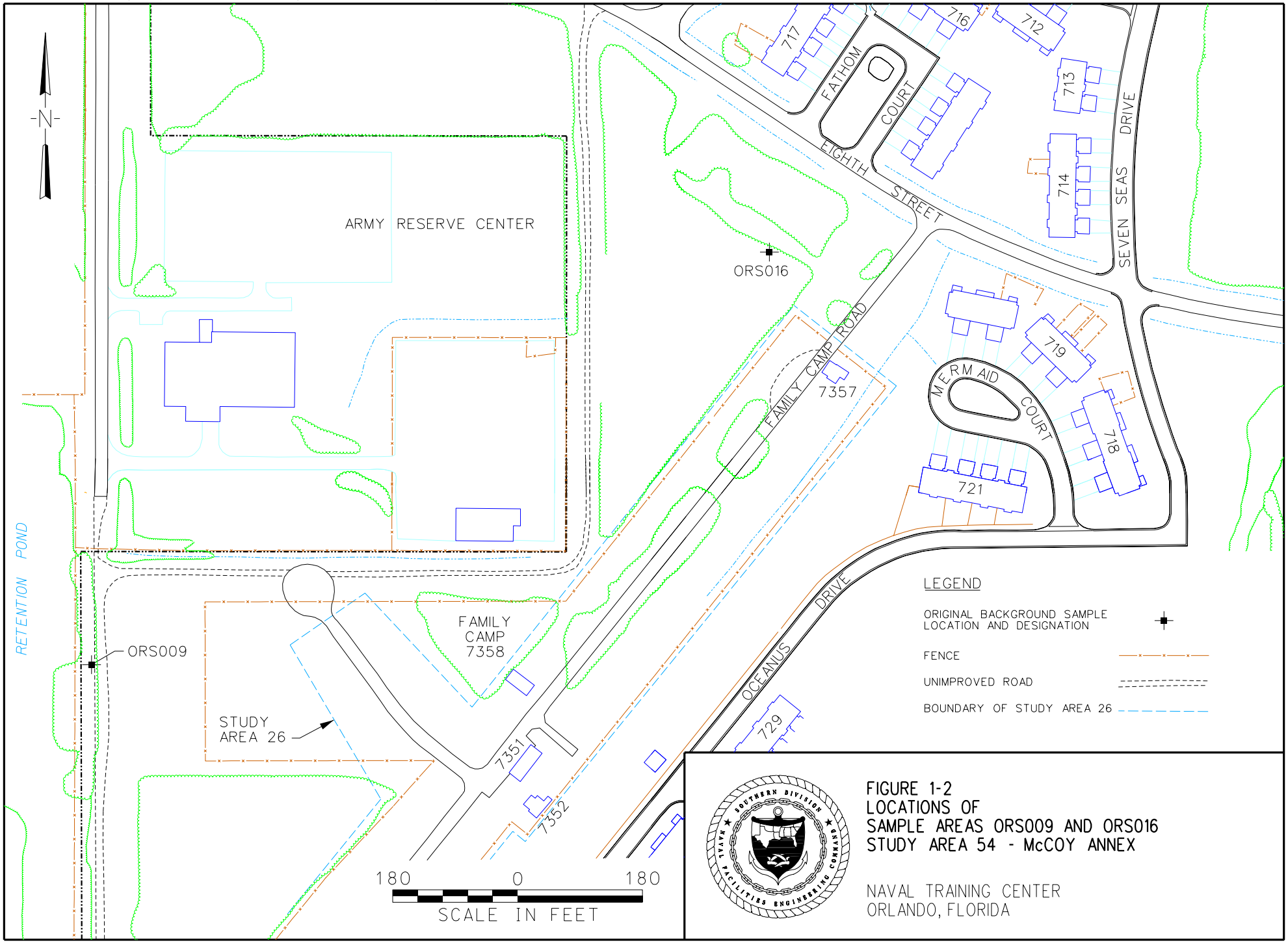


FIGURE 1-2
LOCATIONS OF
SAMPLE AREAS ORS009 AND ORS016
STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

occur predominantly on the flatwoods, low ridges, and knolls within the county. They are most extensive in the eastern half of Orange County, but are also scattered across the county where topography dictates their occurrence. This group of soils consists of "nearly level to gently sloping, poorly drained, moderately well drained, and very poorly drained soils" (USDA, 1989). All of the soils associated with these groups consist predominantly of fine sand in both the surface and subsurface layers. The soils formed from sandy marine sediments.

The soils at SA 54 are mostly comprised of Urban land-Smyrna deposits with the exception of a small area in the northwestern section of the northeast area (near ORS016) which is comprised of Bassinger soils. Soils observed at former well location OLD-OR-09 (near ORS009) in the western area of SA 54 were described as grey/black, fine grained with traces of silt and organics, which are typical of poorly drained Smyrna soils (HLA, 1998). Soils at the temporary well location near sample point ORS060 were described as fine-grained grey/black/tan sands with a low silt content, which is consistent with the description by HLA and the Soil Survey of Orange County, Florida (USDA, 1989). Bassinger soils are typical of very poorly drained, low-lying depression areas and are comprised of fine sands. Both soil types are highly acidic. The depth to groundwater measured at the temporary well installed at sample location 60 in the northeastern area of SA 54 in May 2001 was 6.5 feet below ground surface (bgs).

1.3 ENVIRONMENTAL ACTIONS

The environmental activities related to SA 54 are summarized in Table 1-1. The Background Sampling Study was performed by ABB Environmental Services, Inc. (ABB-ES) in 1994 (ABB-ES, 1995) and the Site Screening Investigation was performed by Harding Lawson Associates (HLA), formerly ABB-ES, in 1997 (HLA, 1998). Subsequent to the site investigation fieldwork documented in this report, CH2M Hill Constructors, Inc. (CH2M Hill) performed a soil removal to remediate PAH contamination exceeding the Florida commercial/industrial cleanup criteria.

TABLE 1-1

**CHRONOLOGICAL SUMMARY OF ENVIRONMENTAL ACTIVITIES
STUDY AREA 54**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

October 1994	Background soil samples ORS009 and ORS016 were collected at SA 54; PAH concentrations exceeded FDEP screening criterion (ABB-ES, 1995).
December 1996	Confirmation samples confirmed the PAH exceedances at locations ORS009 and ORS016 (HLA, 1998).
Jul/Oct/Nov 1997	Site Screening Investigation was performed (HLA, 1998).
September 1999	Phase 1 of the Site Investigation was performed (soil sampling and PAH analysis).
November 1999	FDEP issued letter concurring with the OPT that no further investigation was required in the western area (near ORS009).
April 2000	Phase 2 of the Site Investigation was performed (soil sampling and PAH analysis).
June 2000	Phase 3 of the Site Investigation was performed (soil sampling and PAH analysis).
December 2000	Phase 4 of the Site Investigation was performed (soil sampling and PAH analysis). Samples were collected to evaluate the distribution of PAHs with soil depth.
April/May 2001	A temporary well was installed and the Synthetic Precipitation Leaching Procedure performed to evaluate the potential for PAHs to leach from soil to groundwater.
August 2001	Phase 5 of Site Investigation was performed (soil sampling and PAH analysis).
March/April 2002	1,086 tons of contaminated soil were removed to remediate the site to commercial/industrial cleanup criteria (CH2M Hill, 2002).

2.0 PREVIOUS INVESTIGATION

2.1 BACKGROUND SAMPLING STUDY

Surface soil samples ORS009 and ORS016 were collected during the Background Sampling Study in October 1994. Investigators selected the locations because a review of past operations and an examination of aerial photographs suggested that these locations were in undisturbed areas. However, there were detections of PAHs at concentrations exceeding residential and commercial/industrial screening criteria in the samples from both locations. The Background Sampling Report was issued by ABB Environmental Services, Inc., in August 1995. Confirmation samples were subsequently collected from each location in December 1996, and both samples exceeded the screening criteria.

2.2 SITE SCREENING INVESTIGATION

To investigate the PAH exceedances detected in the background study, a site screening investigation was performed. Additional surface soil samples were collected from locations near ORS009 and ORS016 in July, October, and November 1997 (HLA, 1998). The purpose of the investigation was to evaluate the nature and extent of PAHs in the surface soil at concentrations exceeding the screening criteria. Surface soil samples were collected at depths of 0-1 foot and 1-2 feet bgs and subsurface soil samples were collected at a depth of 2-3 feet bgs. The investigation employed a combination of semiquantitative immunoassay (IA) field tests and off-site laboratory analysis. The IA tests were used to determine the concentration of total PAHs present and indicated the presence of PAHs at both locations.

Additional samples were collected and sent to an approved off-site laboratory for PAH analysis using USEPA SW-846 Method 8270 to confirm the results of the IA testing. The laboratory results confirmed that six samples from the western area (near ORS009) and five samples from the northeastern area (near ORS016) contained concentrations of PAHs exceeding Florida residential and commercial/industrial Soil Cleanup Target Levels (SCTLs) and USEPA Region III Risk Based Concentrations (RBCs). The results of the site screening investigation are presented in Figures 2-1 and 2-2. The figures show the IA sample locations, and the laboratory confirmation results as concentrations of total carcinogenic PAHs normalized to benzo(a)pyrene based on the Florida residential SCTL. Tables presenting summaries of positive detections from the Site Screening Report are provided in Appendix A.

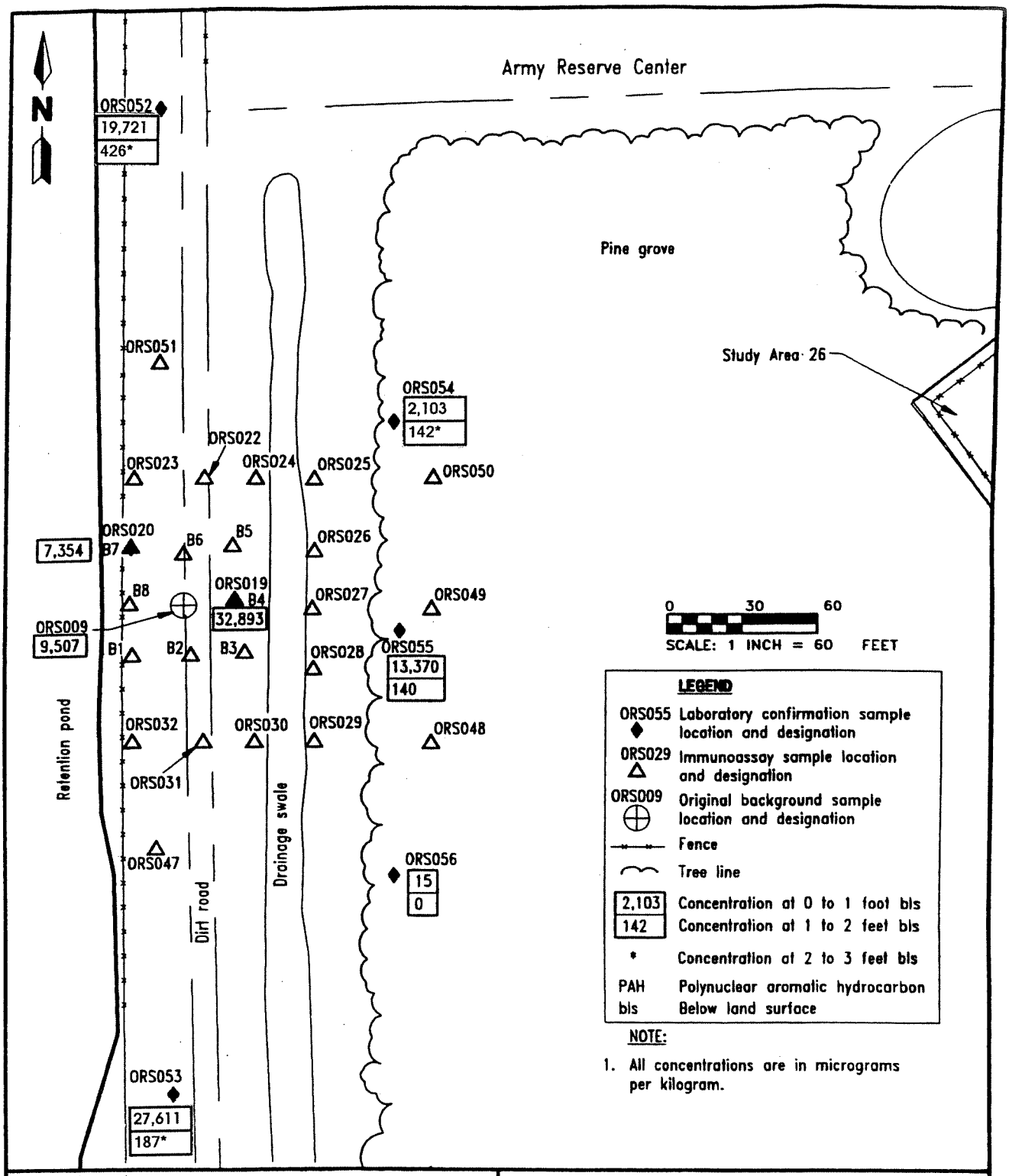
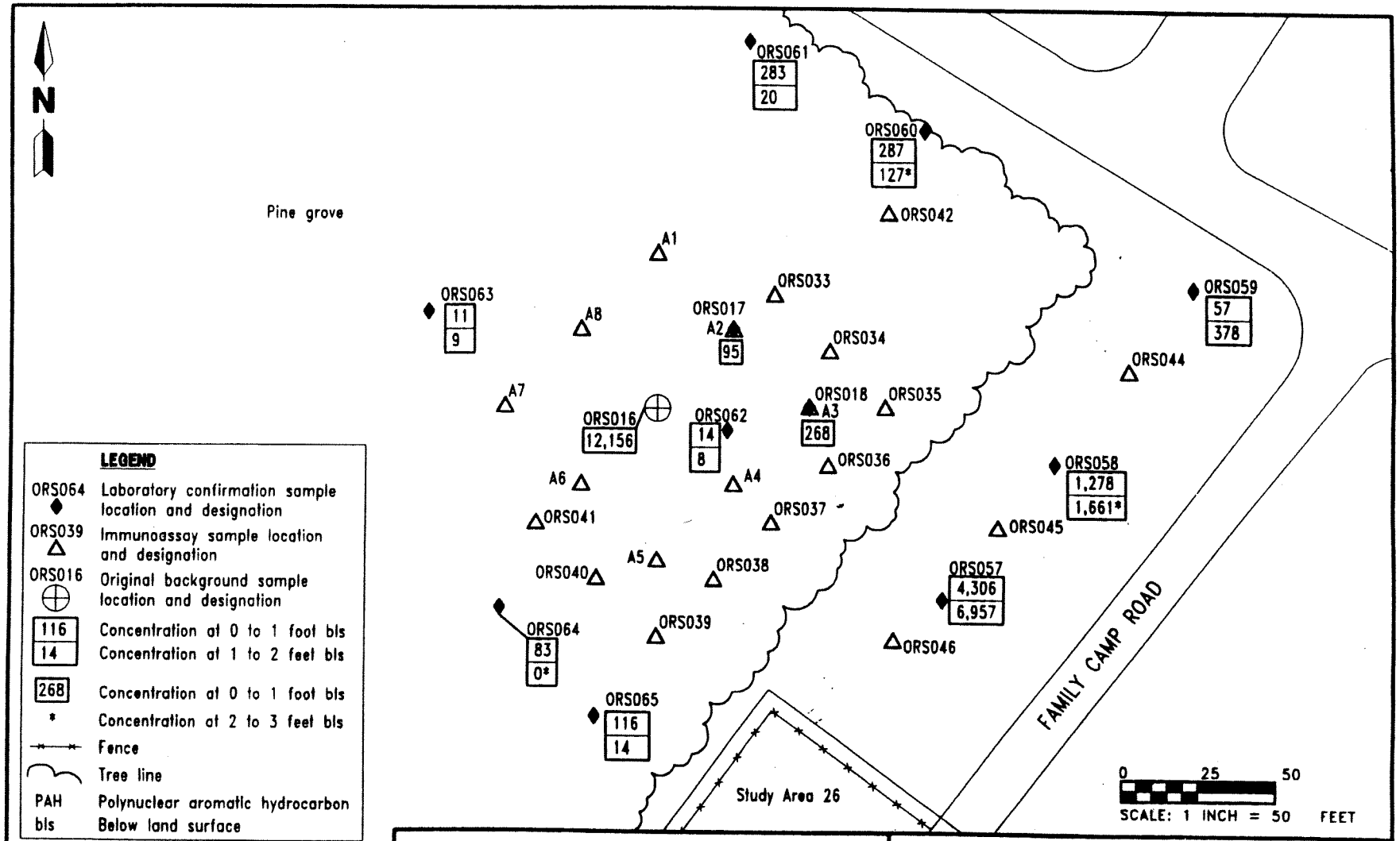


FIGURE 2-1

TOTAL PAH CONCENTRATIONS NORMALIZED TO BENZO(A)PYRENE VICINITY OF SAMPLE ORS009 SOURCE: HLA, 1998

SITE INVESTIGATION REPORT STUDY AREA 54

NAVAL TRAINING CENTER ORLANDO, FLORIDA



LEGEND

ORS064 ◆	Laboratory confirmation sample location and designation
ORS039 △	Immunoassay sample location and designation
ORS016 ⊕	Original background sample location and designation
116 / 14	Concentration at 0 to 1 foot bls / Concentration at 1 to 2 feet bls
268	Concentration at 0 to 1 foot bls
*	Concentration at 2 to 3 feet bls
—×—×—	Fence
⌒	Tree line
PAH	Polynuclear aromatic hydrocarbon
bls	Below land surface

NOTE:

1. All concentrations are in micrograms per kilogram.

FIGURE 2-2

TOTAL PAH CONCENTRATIONS NORMALIZED TO BENZO(A)PYRENE VICINITY OF SAMPLE ORS016
SOURCE: HLA, 1998

SITE INVESTIGATION REPORT STUDY AREA 54

NAVAL TRAINING CENTER ORLANDO, FLORIDA

3.0 FIELD INVESTIGATION

TtNUS conducted a site investigation at SA 54, comprised of five sampling events beginning in September 1999 and concluding in August 2001, to determine the nature and extent of PAH contamination near locations ORS009 and ORS016. The objectives of the investigation were:

- Collect surface soil samples along the unpaved road adjacent to ORS009 in the western area.
- Collect surface soil samples surrounding former sampling locations ORS016, ORS057, and ORS058 in the northeastern area.
- Collect a surface soil sample and a groundwater sample from the same location to evaluate leaching.
- Submit the samples to an approved off-site, fixed-base laboratory for PAH analysis by USEPA SW-846 Method 8310.
- Use the analytical data to determine the extent of the PAH exceedances and the quantity of soil to be removed from the study area to meet the requirements for nonresidential reuse.

All work was performed in accordance with the *Work Plan for the Investigation of Contaminated Soil, Study Area 54* (TtNUS, 2000), and addenda. This work plan defined the site-specific activities performed and was consistent with guidance detailed in the *Project Operations Plan for Site Investigations and Remedial Investigations, Naval Training Center, Orlando, Florida* [POP], (ABB-ES, 1997). Health and safety aspects of the work at SA 54 were controlled in accordance with the *Health and Safety Plan for Completion of Investigative Work and Data Sampling. Naval Training Center, Orlando, Florida* (B&R Environmental, 1997), and addenda.

3.1 SOIL SAMPLING

A total of 102 surface soil samples were collected and analyzed in five sampling phases between September 1999 and August 2001. The samples were collected from a depth of 0 to 2 feet bgs with hand augers, placed in 4-ounce sample jars, then transported on ice to an off-site analytical laboratory.

After completing the sampling event in June 2000, the OPT directed that samples be obtained at various depth ranges to evaluate the distribution of PAHs with depth. Samples were subsequently obtained in December 2000 at depths of 0-6, 6-12, 12-18, 18-24, and 24-30 inches bgs at the two locations where the highest PAH concentrations had been identified.

3.1.1 Sample Numbering

Soil samples collected during the investigation were numbered as follows:

NTC54*TNNNDD*

where: NTC = Naval Training Center
54 = two-digit SA designation (54)
T = sample type ("HA" for surface soil samples collected via hand auger or "S" for subsurface soil samples)
NNN = location number (e.g., 001 or 015)
DD = sample depth in feet bgs (e.g., 01 or 02)

For example, a sample collected at the 5th sampling location at a depth of 0 to 2 feet was designated NTC54H00502. Field duplicate samples were identified with a "blind" number (e.g., NTC54D1000). The corresponding environmental sample was noted in the field logbook.

To designate the sample depth in inches bgs for the depth profile samples, the following letter designations were applied: A = 6 inches bgs, B = 12 inches bgs, C = 18 inches bgs, D = 24 inches bgs, and E = 30 inches bgs. For example, the sample collected between 18 and 24 inches bgs at location No. 49 was designated NTC54S049CD.

3.1.2 Quality Control Samples

Quality control samples were 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" was added to the sample number on the sample labels and the chain-of-custody form. New sample numbers were not created for these samples.

When nondisposable sampling equipment was used and decontaminated, additional quality control samples were collected as listed below.

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

3.1.3 Laboratory Analysis and Data Validation

The samples were analyzed for PAHs using USEPA Method 8310. Validation of the data was performed using the USEPA *Contract Laboratory Program Functional Guidelines for Organic Data Review* (USEPA, 1999) and the Naval Facilities Engineering Service Center guidelines *Navy Installation Restoration Chemical Data Quality Manual* (NFESC, 1999). The data validation evaluated data completeness, holding time compliance, calibration compliance, laboratory blank contamination, surrogate spike recovery, matrix spike recovery, blank spike recovery, internal standard response, sample quantitation, and detection limits.

3.2 LEACHING OF PAHs INTO GROUNDWATER

Due to the PAH exceedances in the surface soils, testing was performed to evaluate the potential for leaching of PAHs into groundwater at the study area. The testing is summarized below:

- A temporary 2-inch monitoring well was installed at sampling location No. 60 where previous soil sampling detected high concentrations of PAHs in the soil.

- A soil sample was collected at the same location from a depth of 0 to 1 foot bgs to confirm the presence of PAHs and determine the leachability of the compounds into the groundwater.

- The soil sample was analyzed for PAHs using SW-846 Method 8310 and subjected to testing with the Synthetic Precipitation Leaching Procedure (SPLP), SW-846 Method 1312. The leachate from the soil sample was analyzed for PAHs.

- A groundwater sample was collected from the temporary well to determine if PAHs had leached from the soil and impacted the groundwater. The groundwater sample was analyzed for PAHs using SW-846 Method 8310.

Sampling location No. 60 was selected for placement of the temporary well because this location was one of two areas with the highest PAH concentrations in soil. This location was also easily accessible for the drill rig.

3.2.1 Temporary Well Installation

The 2-inch diameter polyvinyl chloride (PVC) temporary well, designated OLD-54-TW1, was installed through hollow stem augers at sampling location No. 60. The screen was 10 feet long with 0.010-inch

slots and was placed from 2 to 12 feet bgs. The screen and riser were assembled with flush threads and no solvents were used. The well was installed to a depth of approximately 12 feet bgs to place the center of the screen at the water table, approximately 6.5 feet bgs. Clean silica sand of U.S. Standard Sieve Size No. 30 to 65 was used to create a sand pack and fill the annulus around the riser to the surface.

The temporary well was developed until the discharge water was visibly clear. Field parameters (i.e., pH, temperature, specific conductance, and turbidity) were monitored during development. All development wastewater was drummed and discharged to the Orlando sanitary sewer at the permitted discharge location at McCoy Annex.

3.2.2 Monitoring Well Purging and Sampling

A peristaltic pump with dedicated Teflon®-lined discharge tubing was used for both purging and sampling of the temporary well. A flow-through cell was used for real-time groundwater parameter monitoring during purging.

The temporary well was purged using micro-flow purging techniques prior to sampling in accordance with the Work Plan (TtNUS, 2000). When purging was complete, groundwater sampling was performed in accordance with the procedures specified in Section 4.5.2.2 of the POP (ABB-ES, 1997). The flow-through cell was disconnected and sample bottles were filled directly from the Teflon®-lined tubing using the vacuum jug assembly method.

One groundwater sample designated NTC54G06001 was collected in two 1-liter amber glass bottles. The sample was placed on ice and shipped in a cooler to an off-site laboratory for analysis.

3.2.3 Quality Control Samples

Because only one groundwater sample and one soil sample were collected, no field duplicate or MS/MSD samples were required. In addition, only disposable sampling equipment was used; thus, rinsate or field blanks were not required.

3.2.4 Laboratory Analysis and Validation

The soil, groundwater, and SPLP leachate samples collected to evaluate PAH leaching were analyzed for PAHs using USEPA Method 8310. Limited validation of the data was performed using the USEPA *Contract Laboratory Program Functional Guidelines for Organic Data Review* (USEPA, 1999) and the Naval Facilities Engineering Service Center guidelines *Navy Installation Restoration Chemical Data Quality Manual* (NFESC, 1999). The limited data validation evaluated data completeness, holding time compliance, calibration compliance, laboratory blank contamination, and detection limits.

4.0 INVESTIGATION RESULTS

The results of the Site Investigation performed by TtNUS are described in this section. A description of the soil removal performed by CH2M Hill as a result of the investigation is also included.

4.1 SOIL SAMPLING RESULTS

4.1.1 Western Area

In 1999, TtNUS collected 48 samples at SA 54. Of the 24 locations sampled at the western area near ORS009 in September 1999, 13 samples exceeded the industrial SCTLs for PAHs (Figure 4-1). Concentrations were highest in the southern portion and along the center north-south sample line between the dirt road and the drainage swale. Samples collected along the eastern line of the grid were all below industrial SCTLs. The validated analytical results are provided in Appendix B.

The OPT concluded that the PAH contamination in this area was likely the result of regular vehicular traffic along the road. As a result, further sampling in the western area was not performed. A letter from the FDEP concurring with this decision is provided in Appendix C.

4.1.2 Northeastern Area

Soil samples were collected and analyzed in September 1999 and in subsequent sampling events in April, June, and December 2000 and August 2001. A total of 78 samples from the northeastern area were collected and analyzed in the five sampling events. The distribution of total carcinogenic PAHs, normalized to benzo(a)pyrene equivalent concentrations, based on the Florida industrial SCTL, is shown in Figure 4-2. To determine the equivalent concentrations, the carcinogenic PAHs were converted to an equivalent concentration of benzo(a)pyrene using Toxicity Equivalence Factors per USEPA Region 4 guidance (USEPA, 1995). The result is the sum of the individual PAH concentrations divided by the Florida industrial SCTL times the industrial SCTL for benzo(a)pyrene. The samples with the highest concentrations were collected from locations No. 49 and No. 60. The results of the sampling, shown as exceedances or non-exceedances of the industrial PAH SCTLs, are presented in Figure 4-3. The validated analytical results for the northeastern area are provided in Appendix B.

As a result of the sampling completed in August 2001, the OPT determined that the extent of PAH contamination in surface soil at the northeastern area had been defined. As shown in Figure 4-3, Eighth Street bounds the extent of contamination in the northeastern direction.

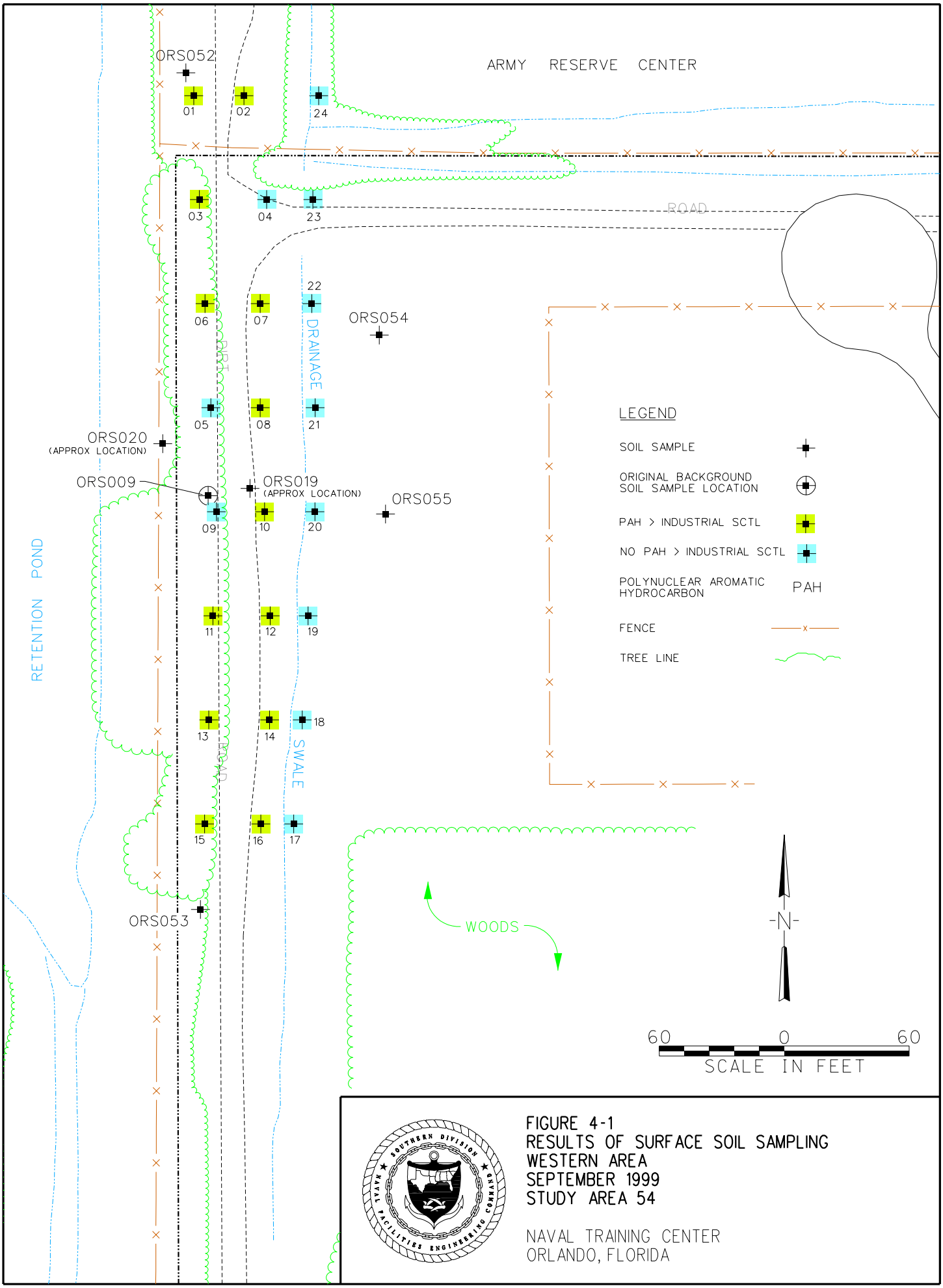


FIGURE 4-1
RESULTS OF SURFACE SOIL SAMPLING
WESTERN AREA
SEPTEMBER 1999
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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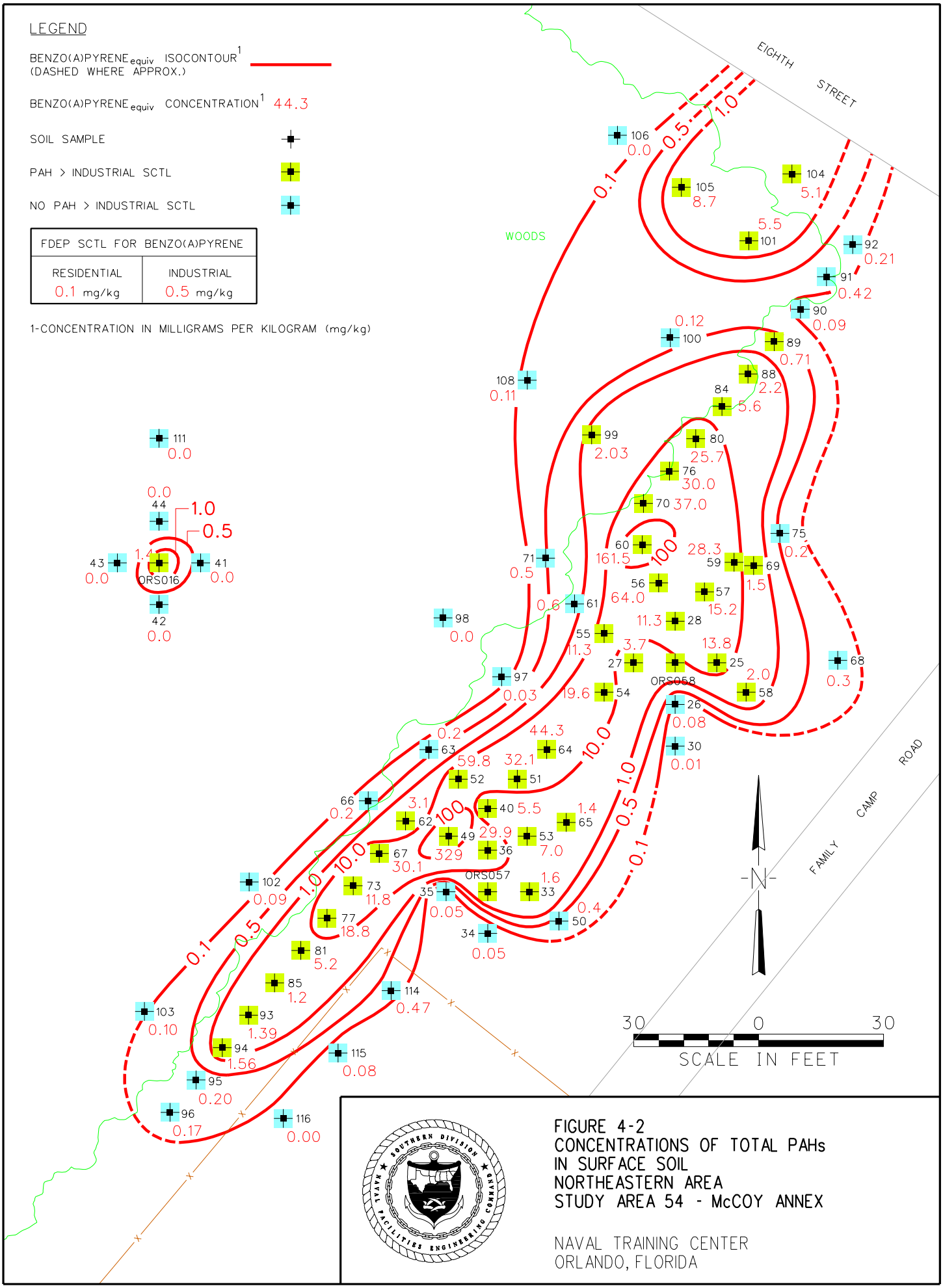

FIGURE 4-2
CONCENTRATIONS OF TOTAL PAHs
IN SURFACE SOIL
NORTHEASTERN AREA
STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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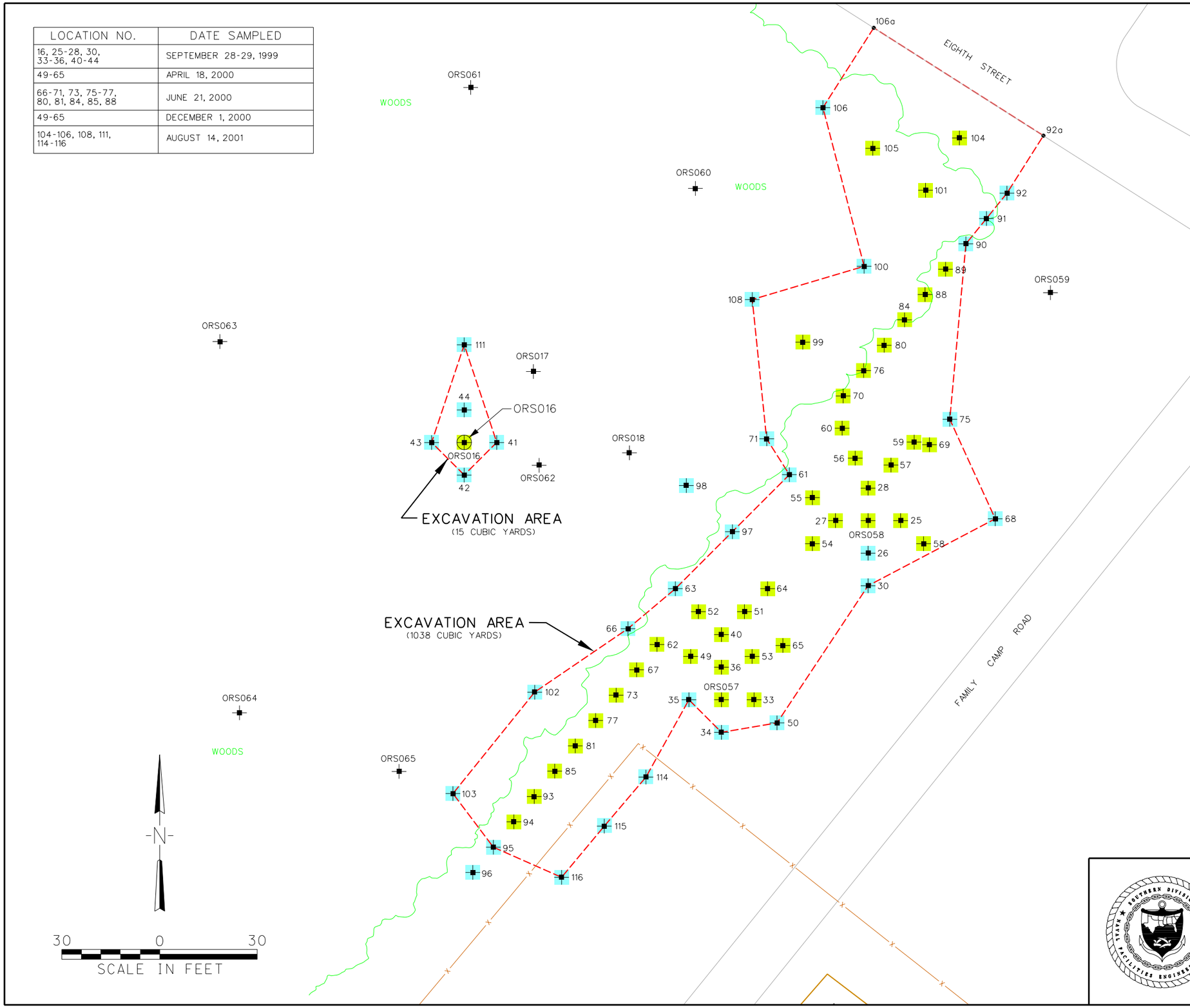
LOCATION NO.	DATE SAMPLED
16, 25-28, 30, 33-36, 40-44	SEPTEMBER 28-29, 1999
49-65	APRIL 18, 2000
66-71, 73, 75-77, 80, 81, 84, 85, 88	JUNE 21, 2000
49-65	DECEMBER 1, 2000
104-106, 108, 111, 114-116	AUGUST 14, 2001



LEGEND

- SOIL SAMPLE
- ORIGINAL BACKGROUND SOIL SAMPLE LOCATION
- PAH > INDUSTRIAL SCTL
- NO PAH > INDUSTRIAL SCTL
- TREE LINE
- FENCE
- POLYNUCLEAR AROMATIC HYDROCARBON — PAH

LOCATION COORDINATES		
LOCATION	NORTHING	EASTING
35	1488245	545698
34	1488235	545708
50	1488238	545725
30	1488280	545753
68	1488301	545792
75	1488331	545778
90	1488385	545783
91	1488393	545789
92	1488401	545796
92a	1488418	545807
106a	1488451	545755
106	1488427	545739
100	1488378	545752
108	1488368	545717
71	1488325	545722
61	1488314	545729
97	1488297	545711
63	1488279	545694
66	1488267	545679
102	1488247	545651
103	1488216	545626
95	1488200	545638
116	1488191	545659
115	1488206	545672
114	1488221	545685
41	1488324	545639
42	1488314	545629
43	1488324	545619
44	1488334	545629

ROUNDED TO NEAREST FOOT

NOTES:

1) EXCAVATED TO A DEPTH OF 2 FEET; REPLACED WITH CLEAN SOIL.
2) MULTIPLE UTILITIES ARE LOCATED SOUTHWEST OF DRAINAGE SWALE ALONG EIGHTH STREET.

FIGURE 4-3
RESULTS OF SURFACE SOIL SAMPLING
NORTHEASTERN AREA
SEPTEMBER 1999 THROUGH AUGUST 2001
STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING BASE
ORLANDO, FLORIDA

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4.1.3 Distribution of PAH Concentrations with Depth

In December 2000, samples from various depths were collected at locations No. 49 and No. 60 to evaluate the distribution of PAH concentrations with depth. The results presented in terms of benzo(a)pyrene equivalents are shown in Figure 4-4. The analytical data tables are presented in Appendix B. Samples were obtained at depths of 0-6, 6-12, 12-18, 18-24, and 24-30 inches bgs. All of the samples at both locations had concentrations of PAHs that exceeded the industrial SCTLs. As indicated in the figure, the highest concentrations were present in samples obtained from depths of 0-6 and 6-12 inches bgs.

4.2 LEACHABILITY TEST RESULTS

The results of the leachability testing are presented in Table 4-1. A groundwater sample was collected from the temporary monitoring well and a soil sample was collected at the same location. The soil sample contained detectable concentrations of 14 PAHs including 10 mg/kg of benzo(a)pyrene and 2.9J mg/kg of dibenz(a,h)anthracene. These concentrations are considerably less than those measured in April 2000 but still greater than the industrial SCTL values of 0.5 mg/kg for these compounds.

The soil sample was tested with the SPLP, SW-846 Method 1312, to determine the potential for leaching of PAHs into the groundwater. Of the 18 PAH parameters analyzed, all were non-detect in the SPLP leachate with the exception of fluoranthene, which had a concentration of 0.2 µg/L. This is well below the Groundwater Cleanup Target Level (GCTL) for fluoranthene of 280 µg/L and indicates that PAHs do not readily leach from the soil at SA 54.

The analysis of the groundwater sample confirmed the results of the leachability test. All of the PAH parameters were non-detect except for fluoranthene, which was measured at a concentration of 0.07 µg/L. Copies of the well construction log and the purging and sampling log are provided in Appendix D.

4.3 SOIL REMEDIATION

To remediate the contaminated soil in the northeastern area, the OPT directed that a soil removal be performed. In March and April 2002, CH2M Hill excavated the contaminated surface soil with PAH concentrations exceeding the Florida commercial/industrial SCTLs. The approximate boundaries of the two excavation areas are shown in Figure 4-3. The soil was excavated to a depth of 2 feet and replaced with clean fill to remediate the contaminated areas. A total of approximately 1,086 tons of soil was removed and transported to a licensed disposal facility. Copies of the text, photographs, and disposal log from the *Soil Remediation Completion Report* (CH2M Hill, 2002) are provided in Appendix E.

LEGEND

BENZO(A)PYRENE$_{equiv}$ CONCENTRATION[1] 35.4

1-CONCENTRATION IN MILLIGRAMS PER KILOGRAM (mg/kg)

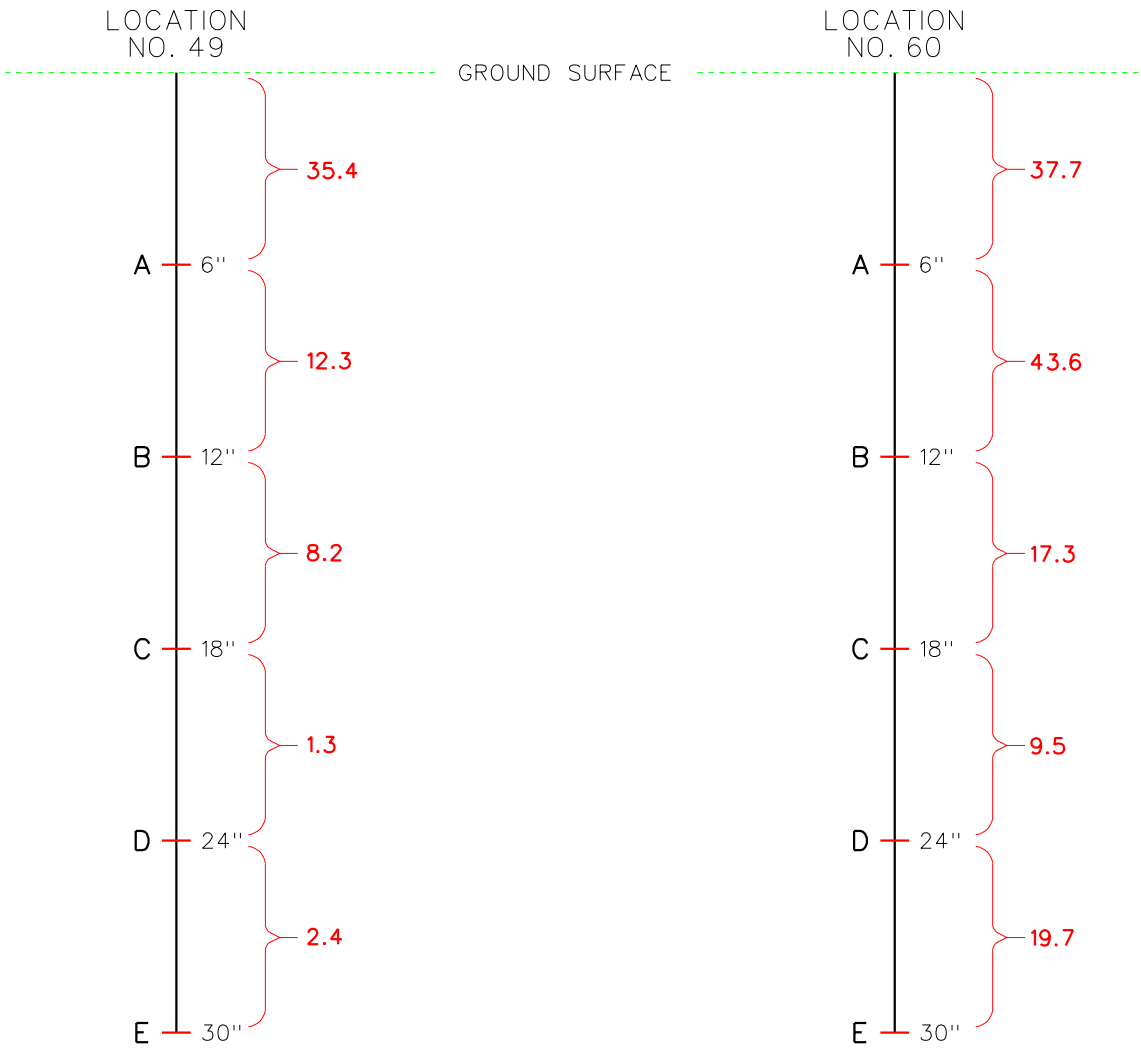

FIGURE 4-4
VERTICAL DISTRIBUTION OF PAHs
STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

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TABLE 4-1

SOIL LEACHING TEST RESULTS
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	Northeastern Area - Sample Point No. 60		
Environmental Sample Number	NTC54S06001	NTC54S06001	NTC54G06001
Laboratory ID	WR1411-1	WR1411-2	WR1452-7
Medium	Soil	Leachate	Groundwater
Sample Date	4/28/01	4/28/01	5/1/01
Semivolatiles/PAHs	**µg/kg**	**µg/L**	**µg/L**
1-Methylnaphthalene	420 U	1 U	0.2 U
2-Methylnaphthalene	420 U	1 U	0.2 U
Acenaphthene	660	1 U	0.2 U
Acenaphthylene	420 U	1 U	0.2 U
Anthracene	2100	1 U	0.2 U
Benzo(a)anthracene	11000	1 U	0.2 U
Benzo(a)pyrene	10000 J	1 U	0.2 U
Benzo(b)fluoranthene	16000 J	1 U	0.2 U
Benzo(g,h,i)perylene	6900 J	1 U	0.2 U
Benzo(k)fluoranthene	5500 J	1 U	0.2 U
Chrysene	9000	1 U	0.2 U
Dibenzo(a,h)anthracene	2900 J	1 U	0.2 U
Fluoranthene	18000	0.2 J	0.07 J
Fluorene	330 J	1 U	0.2 U
Indeno(1,2,3-cd)pyrene	7600 J	1 U	0.2 U
Naphthalene	420 U	1 U	0.2 U
Phenanthrene	6200 J	1 U	0.2 U
Pyrene	14000	1 U	0.2 U

Notes:

Analyses performed using USEPA Method 8310.
"J" qualifier indicates an estimated value.
"U" qualifier indicates analyte not detected.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

5.1.1 Soil Contamination

The extent of PAH concentrations in surface soil that exceeded the Florida commercial/industrial SCTLs in the study area was delineated in the Site Investigation. The PAH contamination in the western area surrounding ORS009 was determined to be the result of regular vehicular traffic and not from previous NTC activities. As a result, the OPT determined that remediation of this area will not be necessary unless property usage is changed from the Army Reserve's motor pool to residential or to another use that would not be protective of human health and the environment.

Contamination exceeding commercial/industrial SCTLs in the northeastern area was located in a small area around location ORS016, and an area approximately 50 feet wide by 280 feet long which parallels Family Camp Road. Benzo(a)pyrene and dibenzo(a,h)anthracene were observed at concentrations as high as 260,000 µg/kg (sample location 49) and 4,400 µg/kg (sample location 70A), respectively.

5.1.2 Leaching of PAHs into Groundwater

The investigation results indicate that the potential for leaching PAHs from the SA 54 soil is low and does not pose a significant threat to groundwater.

5.1.3 Soil Removal

In March and April 2002, approximately 1,086 tons of soil were excavated and removed from the northeastern area near ORS016 to remediate the soil contamination. The soil was excavated to a depth of 2 feet and replaced with clean fill to remediate the study area. The contaminated soil was transported to a licensed disposal facility and disposed of as non-hazardous material.

5.2 RECOMMENDATIONS

Land use restrictions should be placed on SA 54 to prohibit residential use of the site. It is recommended that the Base Realignment and Closure Color Code for SA 54 be changed to "dark green" to signify "an area where release, disposal, and /or migration of hazardous substances has occurred, and all remedial actions necessary to protect human health and the environment have been taken."

5.3 OPT CONCURRENCE

The undersigned members of the OPT concur with the findings and recommendations presented in this investigation report.

STUDY AREA 54

U.S. Environmental Protection Agency, Region 4	6/26/03 Date
Florida Department of Environmental Protection	6/26/03 Date
U.S. Department of the Navy	26 JUNE 2003 Date

REFERENCES

ABB-ES (ABB Environmental Services, Inc.), 1995. *Background Sampling Report, Naval Training Center, Orlando, Florida*. August.

ABB-ES, 1997. *Project Operations Plan for Site Investigations and Remedial Investigations, Volume I.* August.

B&R Environmental (Brown & Root Environmental), 1997. *Health and Safety Plan for Completion of Investigative Work and Data Sampling* and addenda. August.

CH2M Hill (CH2M Hill Constructors, Inc.), 2002. *Summary of Soil Removal Activities and Results, Study Area 54, Naval Training Center, Orlando, Florida*. December.

HLA (Harding Lawson Associates), 1998. *Base Realignment and Closure Environmental Site Screening Report, Study Area 54, Naval Training Center, Orlando, Florida*. December.

NFESC (Naval Facilities Engineering Service Center), 1999. *Navy Installation Restoration Chemical Data Quality Manual*. Naval Facilities Engineering Command, Washington, D.C., September.

TtNUS (Tetra Tech NUS, Inc.), 2000. *Work Plan for the Investigation of Contaminated Soil, Study Area 54* and addenda. April.

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USEPA (U.S. Environmental Protection Agency), 1995. Supplemental Guidance to RAGS: Region 4 Bulletin No. 2, *Toxicity Assessment.* November.

USEPA, 1999. *Contract Laboratory Program National Functional Guidelines for Organic Data Review.* EPA/540/R-99/008, Office of Emergency and Remedial Response, Washington, D.C., October.

APPENDIX A

SUMMARY OF POSITIVE DETECTIONS TABLES
SITE SCREENING INVESTIGATION (HLA, 1998)

Table A-1. Summary of Positive Detections in Soil, Location ORS009
Table A-2. Summary of Positive Detections in Soil, Location ORS016

TABLE A-1

Table A-1. Summary of Positive Detections in Soil, Location ORS009

Appendix A.
Table A-1. Summary of Positive Detections in Soil Analytical Results, Location ORS009
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORS00901		ORS01901	ORS02001	ORS05201	ORB05201
Sampling Date					10/27/94	12/6/96	7/2/97	7/2/97	11/25/97	11/25/97
Sampling depth, ft bls					0-1	0-1	0-1	0-1	0-1	2-3
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene					NQ	4	NQ	NQ		
2-Methylnaphthalene					NQ	9	NQ	NQ		
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n		46			6000	220
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n		70				
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n		1,200	1500			
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c	**3000**	**4100**	**15000**	**5900**	**5900**	270
Benzo(a)pyrene	100	7,800	88 c	780 c	**5500**	**8600**	**25000**	**5900**	**16000**	**310**
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	**5900** J	**1200**	**5900**	**5900**	**12000**	350
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	4,400 J	1,500	12000	6500	10000	290
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	4,400	1,200	11000	5500	4500	160
Chrysene	140,000	80,000	88,000 c	780,000 c	4,700 J	4,000	41000	20000	6400	260
Dibenz(a,h)anthracene	100	14,000	88 c	780 c		410	**5900**		**2200** PF	58 PF
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	3,500	3500	19000	9800	8600	580
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n		35	7400			
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c	**4400**	**1600**	**5900**	**8400**	**3100** PF	190
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n		16	15000			
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n	900 J	500	7400			
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n	3,900	4400	15000		7700	420
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**6462**	**9507**	**32893**	**7354**	**19721**	**426**

Appendix A.
Table A-1. Summary of Positive Detections in Soil Analytical Results, Location ORS009
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORS05301	ORB05301	ORS05401	ORB05401	ORS05501	ORB05501
Sampling Date					11/25/97	11/25/97	11/25/97	11/25/97	11/25/97	11/25/97
Sampling depth, ft bls					0-1	2-3	0-1	2-3	0-1	1-2
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene										
2-Methylnaphthalene										
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n	9400		1100		6300	
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n						
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n						
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c	**10000**	180	1200	130	**5200**	58
Benzo(a)pyrene	100	7,800	88 c	780 c	**22000**	**130**	**1600**	**120**	**11000**	100
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	**16000**	190	**1500**	170	**8000**	130
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	13000	150	1200	120	6600	130
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	6500	90	710	77	3300	54
Chrysene	140,000	80,000	88,000 c	780,000 c	11000	200	1100	160	5800	80
Dibenz(a,h)anthracene	100	14,000	88 c	780 c	**3100** PF	28 PF	**250** PF		**1400** PF	26 PF
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	17000	560	2400	370	7800	81
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n						
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c	**9000**	33 PF	810			
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n		200				
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n						
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n	15000	390	1700	250	7200	76
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**27611**	**187**	**2103**	**142**	**13370**	**140**

Appendix A.
Table A-1. Summary of Positive Detections in Soil Analytical Results, Location ORS009
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil		RBC for Industrial Soil		ORS05601		ORB05601
Sampling Date							11/25/97		11/25/97
Sampling depth, ft bls							0-1		1-2
Polynuclear Aromatic Hydrocarbons, µg/kg									
1-Methylnaphthalene									
2-Methylnaphthalene									
Acenaphthene	2,300,000	4,000	4,700,000	n	120,000,000	n			
Acenaphthylene	1,100,000	22,000	2,300,000	n	61,000,000	n			
Anthracene	19,000,000	2,000,000	23,000,000	n	610,000,000	n			
Benzo(a)anthracene	1,400	2,900	880	c	7,800	c	4.1	PF	
Benzo(a)pyrene	100	7,800	88	c	780	c	13		
Benzo(b)fluoranthene	1,400	9,800	880	c	7,800	c	17		
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000	n	61,000,000	n	17		
Benzo(k)fluoranthene	15,000	25,000	8,800	c	78,000	c	7.8		
Chrysene	140,000	80,000	88,000	c	780,000	c	23		4.6
Dibenz(a,h)anthracene	100	14,000	88	c	780	c			
Fluoranthene	2,800,000	550,000	3,100,000	n	82,000,000	n	13	PF	
Fluorene	2,100,000	87,000	3,100,000	n	82,000,000	n			
Indeno(1,2,3-cd)pyrene	1,500	28,000	880	c	7,800	c	4.1	PF	
Naphthalene	1,000,000	1,000	3,100,000	n	82,000,000	n			
Phenanthrene	1,900,000	120,000	2,300,000	n	61,000,000	n			
Pyrene	2,200,000	570,000	2,300,000	n	61,000,000	n	11		
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)							**15**		**0**

Appendix A.
Notes for Summary of Positive Detections in Soil Analytical Results, Locations OR009 and OR016
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

NOTES:

SCTL = Florida Department of Environmental Protection, Soil Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.
Values indicated are for direct exposure residential scenario (SCTL Residential) and leachability based on groundwater criteria.
RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith.
RBC for benzo(g,h,i)perylene and phenanthrene are not available, value is based on pyrene.
µg/kg = micrograms per kilogram.
n = noncarcinogenic effects.
c = carcinogenic effects.
ND = Not determined.
NQ = Not quantified or parameter not included in reporting list.
J = Reported concentration is an estimated quantity.
PF = This laboratory qualifier indicated that the reported result is uncertain since the percent difference between the original and confirmation analysis is greater than 50%.
FDEP = Florida Department of Environmental Protection.
OSWER = Office of Solid Waste and Emergency Response.
USEPA = U.S. Environmental Protection Agency.
All results expressed in micrograms per kilogram (µg/kg) soil dry weight.
Bold/shaded values indicate exceedance of regulatory guidance and background.
Blank space indicates analyte/compound was not detected at the reporting limit.

Total PAHs Normalized to Benzo(a)pyrene - is the result of the sum of the individual PAH concentrations divided by the Florida SCTL times the SCTL for benzo(a)pyrene (100 µg/kg); i.e., (PAH1/SCTL1 + PAH2/SCTL2 + PAH3/SCTL3 + ... + PAHn/SCTLn)*100

TABLE A-2

Table A-2. Summary of Positive Detections in Soil, Location ORS016

Appendix A.
Table A-2. Summary of Positive Detections in Soil Analytical Reslts, Location ORS016
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORS01601		ORS01701	ORS01801	ORS05701	ORS05701D
Sampling Date					10/27/94	12/6/96	7/2/97	7/2/97	11/25/97	11/25/97
Sampling depth, ft bls					0-1	0-1	0-1	0-1	0-1	0-1
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene					NQ		NQ	NQ		
2-Methylnaphthalene					NQ	4	NQ	NQ		
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n		14			4800	910
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n		12				
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n	600	180				
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c	**7300**	**800**		110	**2800**	770
Benzo(a)pyrene	100	7,800	88 c	780 c	**8200**	**1200**	78	**220**	**3500**	**880**
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	**8200**	230	130	340	**3000**	990
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	5,700	220	88	190	2500	860
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	8,300	230	43	120	1300	420
Chrysene	140,000	80,000	88,000 c	780,000 c	8,300	800			2800	760
Dibenz(a,h)anthracene	100	14,000	88 c	780 c	**2400**	60			**380** PF	**180** PF
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	14,000	800	92	300	7400	1900
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n	190 J	10				
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c	**5800**	260	110	230		240 PF
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n		5.5			2400	
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n	2,100	100				
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n	11,000	900			4900	1300
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**12156**	**1353**	**#REF!**	**#REF!**	**4306**	**1205**

Appendix A.
Table A-2. Summary of Positive Detections in Soil Analytical Reslts, Location ORS016
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORB05701	ORS05801	ORS05801D	ORB05801	ORB05801D	ORS05901
Sampling Date					11/25/97	11/25/97	11/25/97	11/25/97	11/25/97	11/25/97
Sampling depth, ft bls					1-2	0-1	0-1	2-3	2-3	0-1
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene										
2-Methylnaphthalene										
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n			800			180
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n						
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n						
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c	**1700**	460	640	430	1400	35
Benzo(a)pyrene	100	7,800	88 c	780 c	**5400**	**710**	**1000**	61 PF	**1300**	28
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	**4100**	650	810	480	1300	76
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	4200	690	660	300	800	62
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	1600	310	390	250	710	37
Chrysene	140,000	80,000	88,000 c	780,000 c	1900	470	600	370	1100	58
Dibenz(a,h)anthracene	100	14,000	88 c	780 c	**930** PF		**150** PF	84 PF	**120** PF	19 PF
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	2000	1100	1400	860	3000	95
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n						
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c	**3000**		320		640	32
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n						
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n					1200	
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n	2000	780	950	810	2800	110
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**6957**	**792**	**1278**	**212**	**1661**	**57**

Appendix A.
Table A-2. Summary of Positive Detections in Soil Analytical Reslts, Location ORS016
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORB05901	ORS06001	ORB06001	ORS06101	ORB06101	ORS06201
Sampling Date					11/25/97	11/26/97	11/26/97	11/26/97	11/26/97	11/25/97
Sampling depth, ft bls					1-2	0-1	2-3	0-1	1-2	0-1
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene										
2-Methylnaphthalene										
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n	850	250		340		
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n						
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n						
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c	330	120	55	130	26	
Benzo(a)pyrene	100	7,800	88 c	780 c	**280**	**230**	99	**230**	15 PF	14
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	320	190	84	170	43	6.3 PF
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	250	160	84	140		
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	150	73	36	75	19	2
Chrysene	140,000	80,000	88,000 c	780,000 c	310	140	70	140	33	4.8
Dibenz(a,h)anthracene	100	14,000	88 c	780 c	50 PF	31 PF	17 PF	31 PF		
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	730	280	140	380	69	9
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n						
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c		46 PF	13 PF			
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n						
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n	470					
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n	480	220	110	250	48	14
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**378**	**287**	**127**	**283**	**20**	**14**

Appendix A.

Table A-2. Summary of Positive Detections in Soil Analytical Reslts, Location ORS016

Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando

Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil	RBC for Industrial Soil	ORB06201	ORS06301	ORB06301	ORS06401	ORB06401	ORS06501
Sampling Date					11/25/97	11/26/97	11/26/97	11/26/97	11/26/97	11/26/97
Sampling depth, ft bls					1-2	0-1	1-2	0-1	2-3	0-1
Polynuclear Aromatic Hydrocarbons, µg/kg										
1-Methylnaphthalene										
2-Methylnaphthalene										
Acenaphthene	2,300,000	4,000	4,700,000 n	120,000,000 n						120
Acenaphthylene	1,100,000	22,000	2,300,000 n	61,000,000 n				98		
Anthracene	19,000,000	2,000,000	23,000,000 n	610,000,000 n						
Benzo(a)anthracene	1,400	2,900	880 c	7,800 c				43		47
Benzo(a)pyrene	100	7,800	88 c	780 c	7.5	11	9.4	66		98
Benzo(b)fluoranthene	1,400	9,800	880 c	7,800 c	4.7			49		67
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000 n	61,000,000 n	4.5 PF		4.2 PF	36		
Benzo(k)fluoranthene	15,000	25,000	8,800 c	78,000 c	1.8			22		27
Chrysene	140,000	80,000	88,000 c	780,000 c			4.2	60		56
Dibenz(a,h)anthracene	100	14,000	88 c	780 c				9.8 PF		9.8 PF
Fluoranthene	2,800,000	550,000	3,100,000 n	82,000,000 n	4.7 PF	8.6		88		120
Fluorene	2,100,000	87,000	3,100,000 n	82,000,000 n						
Indeno(1,2,3-cd)pyrene	1,500	28,000	880 c	7,800 c						
Naphthalene	1,000,000	1,000	3,100,000 n	82,000,000 n						
Phenanthrene	1,900,000	120,000	2,300,000 n	61,000,000 n						
Pyrene	2,200,000	570,000	2,300,000 n	61,000,000 n					37	85
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)					**8**	**11**	**9**	**83**	**0**	**116**

Appendix A.

Table A-2. Summary of Positive Detections in Soil Analytical Reslts, Location ORS016

Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando

Orlando, FL

Identifier	SCTL for Residential Soil	SCTL Leachability	RBC for Residential Soil		RBC for Industrial Soil		ORB06501
Sampling Date							11/26/97
Sampling depth, ft bls							1-2
Polynuclear Aromatic Hydrocarbons, µg/kg							
1-Methylnaphthalene							
2-Methylnaphthalene							
Acenaphthene	2,300,000	4,000	4,700,000	n	120,000,000	n	
Acenaphthylene	1,100,000	22,000	2,300,000	n	61,000,000	n	
Anthracene	19,000,000	2,000,000	23,000,000	n	610,000,000	n	
Benzo(a)anthracene	1,400	2,900	880	c	7,800	c	
Benzo(a)pyrene	100	7,800	88	c	780	c	13
Benzo(b)fluoranthene	1,400	9,800	880	c	7,800	c	8.8
Benzo(g,h,i)perylene	2,300,000	13,000,000	2,300,000	n	61,000,000	n	
Benzo(k)fluoranthene	15,000	25,000	8,800	c	78,000	c	
Chrysene	140,000	80,000	88,000	c	780,000	c	
Dibenz(a,h)anthracene	100	14,000	88	c	780	c	
Fluoranthene	2,800,000	550,000	3,100,000	n	82,000,000	n	10
Fluorene	2,100,000	87,000	3,100,000	n	82,000,000	n	
Indeno(1,2,3-cd)pyrene	1,500	28,000	880	c	7,800	c	
Naphthalene	1,000,000	1,000	3,100,000	n	82,000,000	n	
Phenanthrene	1,900,000	120,000	2,300,000	n	61,000,000	n	
Pyrene	2,200,000	570,000	2,300,000	n	61,000,000	n	
TOTAL PAHs NORMALIZED TO BENZO(A)PYRENE (µg/kg)							**14**

Appendix A.
Notes for Summary of Positive Detections in Soil Analytical Results, Locations OR009 and OR016
Polynuclear Aromatic Hydrocarbons

Naval Training Center, Orlando
Orlando, FL

NOTES:

SCTL = Florida Department of Environmental Protection, Soil Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.
Values indicated are for direct exposure residential scenario (SCTL Residential) and leachability based on groundwater criteria.
RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith.
RBC for benzo(g,h,i)perylene and phenanthrene are not available, value is based on pyrene.
µg/kg = micrograms per kilogram.
n = noncarcinogenic effects.
c = carcinogenic effects.
ND = Not determined.
NQ = Not quantified or parameter not included in reporting list.
J = Reported concentration is an estimated quantity.
PF = This laboratory qualifier indicated that the reported result is uncertain since the percent difference between the original and confirmation analysis is greater than 50%.
FDEP = Florida Department of Environmental Protection.
OSWER = Office of Solid Waste and Emergency Response.
USEPA = U.S. Environmental Protection Agency.
All results expressed in micrograms per kilogram (µg/kg) soil dry weight.
Bold/shaded values indicate exceedance of regulatory guidance and background.
Blank space indicates analyte/compound was not detected at the reporting limit.

Total PAHs Normalized to Benzo(a)pyrene - is the result of the sum of the individual PAH concentrations divided by the Florida SCTL times the SCTL for benzo(a)pyrene (100 µg/kg); i.e., (PAH1/SCTL1 + PAH2/SCTL2 + PAH3/SCTL3 + ... + PAHn/SCTLn)*100

APPENDIX B

SURFACE SOIL ANALYTICAL RESULTS TABLES
SITE INVESTIGATION (TtNUS)

Table B-1. Surface Soil Analytical Results – Western Area
Table B-2. Surface Soil Analytical Results – Northeastern Area

Table B-1

Surface Soil Analytical Results – Western Area

TABLE B-1

SURFACE SOIL ANALYTICAL RESULTS - WESTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	01	02	03	04	05	06
Sample Number			NTC54HA00102	NTC54HA00202	NTC54HA00302	NTC54HA00402	NTC54HA00502	NTC54HA00602
Sample Date			9/28/99	9/28/99	9/28/99	9/28/99	9/28/99	9/28/99
Sample Depth (ft bgs)			0-2	0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)								
1-Methylnaphthalene	90-12-0	470,00	5500 U	1100 U	1400 U	560 U	110 U	540 U
2-Methylnaphthalene	91-57-6	560,000	5500 U	1100 U	1400 U	560 U	110 U	540 U
Acenaphthene	83-32-9	18,000,000	5500 U	1100 U	1400 U	560 U	110 U	540 U
Acenaphthylene	208-96-8	11,000,000	5500 U	1100 U	1400 U	560 U	110 U	540 U
Anthracene	120-12-7	260,000,000	5500 U	1100 U	1400 U	560 U	53 J	260 J
Benzo(a)anthracene	56-55-3	5,000	1200	530	560	150	89	520
Benzo(a)pyrene	50-32-8	500	1800	670	770	300	220	1000
Benzo(b)fluoranthene	205-99-2	4,800	1500	610	710	320	180	870
Benzo(g,h,i)perylene	191-24-2	41,000,000	1600	520	680	240	200	1000
Benzo(k)fluoranthene	207-08-9	52,000	1100	440	550	170	140	650
Chrysene	218-01-9	450,000	1400	650	680	190	120	730
Dibenzo(a,h)anthracene	53-70-3	500	550 U	110 U	140 U	61	36	140
Fluoranthene	206-44-0	48,000,000	3000	1500	1400	350	170	1200
Fluorene	86-73-7	28,000,000	5500 U	1100 U	1400 U	560 U	110 U	540 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	1700	530	770	270	220	980
Naphthalene	91-20-3	270,000	5500 U	1100 U	1400 U	560 U	110 U	540 U
Phenanthrene	85-01-8	30,000,000	5500 U	410 J	270 J	560 U	22 J	190 J
Pyrene	129-00-0	37,000,000	2200	1000	1100	230	140	860
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			2,252	842	980	437	306	1,384

TABLE B-1

SURFACE SOIL ANALYTICAL RESULTS - WESTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	07	08	09	10	
Sample Number			NTC54HA00702	NTC54HA00802	NTC54HA00902	NTC54HA01002	NTC54HA01002-D
Sample Date			9/28/99	9/28/99	9/28/99	9/28/99	9/28/99
Sample Depth (ft bgs)			0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,00	5700 U	5600 U	58 U	5600 U	5700 UJ
2-Methylnaphthalene	91-57-6	560,000	5700 U	5600 U	58 U	5600 U	5700 UJ
Acenaphthene	83-32-9	18,000,000	5700 U	5600 U	58 U	5600 U	5700 UJ
Acenaphthylene	208-96-8	11,000,000	5700 U	5600 U	58 U	5600 U	5700 UJ
Anthracene	120-12-7	260,000,000	5700 U	5600 U	27 J	5600 U	2500 J
Benzo(a)anthracene	56-55-3	5,000	1100	2100	26	3500	4400 J
Benzo(a)pyrene	50-32-8	500	2000	3400	84	4300	8000 J
Benzo(b)fluoranthene	205-99-2	4,800	1700	3000	62	4000	6700 J
Benzo(g,h,i)perylene	191-24-2	41,000,000	1700	2800	74	3100	6300 J
Benzo(k)fluoranthene	207-08-9	52,000	1300	2200	49	3000	4900 J
Chrysene	218-01-9	450,000	1400	2900	38	4200	5500 J
Dibenzo(a,h)anthracene	53-70-3	500	570 U	530 J	17	420 J	1000 J
Fluoranthene	206-44-0	48,000,000	2500	4600	33	8400	6900 J
Fluorene	86-73-7	28,000,000	5700 U	5600 U	58 U	5600 U	5700 UJ
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	2100	3000	94	3500	6400 J
Naphthalene	91-20-3	270,000	5700 U	5600 U	58 U	5600 U	5700 UJ
Phenanthrene	85-01-8	30,000,000	5700 U	1800 J	58 U	2200 J	1200 J
Pyrene	129-00-0	37,000,000	1800	3700	20	6700	6000 J
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			2,504	4,765	120	5,854	10,805

TABLE B-1

SURFACE SOIL ANALYTICAL RESULTS - WESTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	11	12	13	14	15	16
Sample Number			NTC54HA01102	NTC54HA01202	NTC54HA01302	NTC54HA01402	NTC54HA01502	NTC54HA01602
Sample Date			9/28/99	9/28/99	9/28/99	9/28/99	9/28/99	9/28/99
Sample Depth (ft bgs)			0-2	0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)								
1-Methylnaphthalene	90-12-0	470,00	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
2-Methylnaphthalene	91-57-6	560,000	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
Acenaphthene	83-32-9	18,000,000	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
Acenaphthylene	208-96-8	11,000,000	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
Anthracene	120-12-7	260,000,000	5500 U	570 U	5400 U	5600 U	2700 J	5400 U
Benzo(a)anthracene	56-55-3	5,000	1800	310	1700	1600	4800	1000
Benzo(a)pyrene	50-32-8	500	3500	500	2800	2700	6300	1700
Benzo(b)fluoranthene	205-99-2	4,800	2800	410	2600	2300	5500	1500
Benzo(g,h,i)perylene	191-24-2	41,000,000	2600	400	2300	2200	4400	1600
Benzo(k)fluoranthene	207-08-9	52,000	2200	320	1900	1800	4100	1100
Chrysene	218-01-9	450,000	2500	400	2200	2100	5500	1200
Dibenzo(a,h)anthracene	53-70-3	500	360 J	72	540 U	560 U	760	540 U
Fluoranthene	206-44-0	48,000,000	3200	760	3800	3300	13000	2100
Fluorene	86-73-7	28,000,000	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	3300	430	2600	2400	5300	1700
Naphthalene	91-20-3	270,000	5500 U	570 U	5400 U	5600 U	5400 U	5400 U
Phenanthrene	85-01-8	30,000,000	5500 U	230 J	5400 U	5600 U	3000 J	5400 U
Pyrene	129-00-0	37,000,000	2500	520	3100	2300	8800	1700
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			4,675	691	3,511	3,350	8,667	2,132

TABLE B-1

SURFACE SOIL ANALYTICAL RESULTS - WESTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	17	18	19	20		21
Sample Number			NTC54HA01702	NTC54HA01802	NTC54HA01902	NTC54HA02002	NTC54HA02002-D	NTC54HA02102
Sample Date			9/28/99	9/28/99	9/28/99	9/28/99	9/28/99	9/28/99
Sample Depth (ft bgs)			0-2	0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)								
1-Methylnaphthalene	90-12-0	470,00	55 U	56 U	57 U	57 U	58 UJ	58 U
2-Methylnaphthalene	91-57-6	560,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Acenaphthene	83-32-9	18,000,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Acenaphthylene	208-96-8	11,000,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Anthracene	120-12-7	260,000,000	55 U	56 U	57 U	57 U	58 UJ	29 J
Benzo(a)anthracene	56-55-3	5,000	8.8	5.6 U	5.7 U	4.8 J	12 J	43
Benzo(a)pyrene	50-32-8	500	22	5.6 U	5.7 U	5.7 U	23 J	87
Benzo(b)fluoranthene	205-99-2	4,800	16	5.6 U	5.7 U	5.7 U	19 J	79
Benzo(g,h,i)perylene	191-24-2	41,000,000	5.5 U	5.6 U	5.7 U	5.7 U	18 J	78
Benzo(k)fluoranthene	207-08-9	52,000	13	5.6 U	5.7 U	5.7 U	17 J	67
Chrysene	218-01-9	450,000	12	5.6 U	5.7 U	5.3 J	12 J	63
Dibenzo(a,h)anthracene	53-70-3	500	5.5 U	5.6 U	5.7 U	5.7 U	6.2 J	16
Fluoranthene	206-44-0	48,000,000	19	5.6 U	5.7 U	5.7 U	19 J	93
Fluorene	86-73-7	28,000,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	5.5 U	5.6 U	5.7 U	5.7 U	20 J	95
Naphthalene	91-20-3	270,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Phenanthrene	85-01-8	30,000,000	55 U	56 U	57 U	57 U	58 UJ	58 U
Pyrene	129-00-0	37,000,000	12	5.6 U	5.2 J	8.4	14 J	71
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			25	0	0	0.5	34	125

TABLE B-1

SURFACE SOIL ANALYTICAL RESULTS - WESTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	22	23	24
Sample Number			NTC54HA02202	NTC54HA02302	NTC54HA02402
Sample Date			9/28/99	9/28/99	9/28/99
Sample Depth (ft bgs)			0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)					
1-Methylnaphthalene	90-12-0	470,00	58 UJ	56 U	60 U
2-Methylnaphthalene	91-57-6	560,000	58 UJ	56 U	60 U
Acenaphthene	83-32-9	18,000,000	58 UJ	56 U	60 U
Acenaphthylene	208-96-8	11,000,000	58 UJ	56 U	60 U
Anthracene	120-12-7	260,000,000	58 UJ	56 U	60 U
Benzo(a)anthracene	56-55-3	5,000	5.8 UJ	7.2	16
Benzo(a)pyrene	50-32-8	500	5.8 UJ	14	30
Benzo(b)fluoranthene	205-99-2	4,800	5.8 UJ	13	27
Benzo(g,h,i)perylene	191-24-2	41,000,000	5.8 UJ	15	24
Benzo(k)fluoranthene	207-08-9	52,000	5.8 UJ	9.9	24
Chrysene	218-01-9	450,000	5.8 UJ	9.5	19
Dibenzo(a,h)anthracene	53-70-3	500	5.8 UJ	5.6 U	17
Fluoranthene	206-44-0	48,000,000	5.8 UJ	17	33
Fluorene	86-73-7	28,000,000	58 UJ	56 U	60 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	5.8 UJ	15	37
Naphthalene	91-20-3	270,000	58 UJ	56 U	60 U
Phenanthrene	85-01-8	30,000,000	58 UJ	56 U	60 U
Pyrene	129-00-0	37,000,000	5.8 UJ	11	29
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			0	18	55

Notes:

[a] Soil Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

[b] Only detections were used to calculate B(a)P equivalents.

"J" qualifier indicates an estimated value.

"U" qualifier indicates the analyte was not detected.

Values in shaded cells are equal to or exceed the SCTL for that analyte.

Table B-2

Surface Soil Analytical Results – Northeastern Area

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	25	26	27	28	30
Sample Number			NTC54HA02502	NTC54HA02602	NTC54HA02702	NTC54HA02802	NTC54HA03002-D
Sample Date			9/29/99	9/29/99	9/29/99	9/29/99	9/29/99
Sample Depth (feet bgs)			0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	28000 U	56 U	2700 U	27000 U	56 U
2-Methylnaphthalene	91-57-6	560,000	28000 U	56 U	2700 U	27000 U	56 U
Acenaphthene	83-32-9	18,000,000	28000 U	56 U	2700 U	27000 U	56 U
Acenaphthylene	208-96-8	11,000,000	28000 U	56 U	2700 U	27000 U	56 U
Anthracene	120-12-7	260,000,000	28000 U	31 J	1300 J	27000 U	56 U
Benzo(a)anthracene	56-55-3	5,000	11000	37	2100	8900	6.6
Benzo(a)pyrene	50-32-8	500	9700	52	2600	8800	11
Benzo(b)fluoranthene	205-99-2	4,800	8900	50	2500	7700	5.6 U
Benzo(g,h,i)perylene	191-24-2	41,000,000	6800	44	2400	6800	5.6 U
Benzo(k)fluoranthene	207-08-9	52,000	7200	40	2000	6400	5.6 U
Chrysene	218-01-9	450,000	11000	44	2300	8800	8.6
Dibenzo(a,h)anthracene	53-70-3	500	1200 J	8.9	360	2700 U	5.6 U
Fluoranthene	206-44-0	48,000,000	44000	110	5500	25000	16
Fluorene	86-73-7	28,000,000	28000 U	56 U	2700 U	27000 U	56 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	8500	53	2400	7400	11
Naphthalene	91-20-3	270,000	28000 U	56 U	2700 U	27000 U	56 U
Phenanthrene	85-01-8	30,000,000	22000 J	32 J	730 J	27000 U	56 U
Pyrene	129-00-0	37,000,000	27000	71	3700	17000	11
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			13,823	75	3,682	11,273	13

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	33	34	35	36	40
Sample Number			NTC54HA03302	NTC54HA03402	NTC54HA03502	NTC54HA03602	NTC54HA04002-D
Sample Date			9/29/99	9/29/99	9/29/99	9/29/99	9/29/99
Sample Depth (feet bgs)			0-2	0-2	0-2	0-2	0-2
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	2700 U	55 U	55 U	28000 U	5500 U
2-Methylnaphthalene	91-57-6	560,000	2700 U	55 U	55 U	28000 U	5500 U
Acenaphthene	83-32-9	18,000,000	2700 U	55 U	55 U	28000 U	5500 U
Acenaphthylene	208-96-8	11,000,000	2700 U	55 U	55 U	28000 U	5500 U
Anthracene	120-12-7	260,000,000	2700 U	55 U	55 U	14000 J	5500 U
Benzo(a)anthracene	56-55-3	5,000	1100	19	15	24000	3500
Benzo(a)pyrene	50-32-8	500	1100	38	34	21000	4300
Benzo(b)fluoranthene	205-99-2	4,800	1100	35	33	22000	4300
Benzo(g,h,i)perylene	191-24-2	41,000,000	920	25	20	15000	3000
Benzo(k)fluoranthene	207-08-9	52,000	900	26	24	16000	3200
Chrysene	218-01-9	450,000	1300	29	24	26000	4100
Dibenzo(a,h)anthracene	53-70-3	500	150 J	5.5 U	4.3 J	2600 J	550 U
Fluoranthene	206-44-0	48,000,000	3000	45	40	72000	8200
Fluorene	86-73-7	28,000,000	2700 U	55 U	55 U	28000 U	5500 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	1000	50	53	15000	3700
Naphthalene	91-20-3	270,000	2700 U	55 U	55 U	28000 U	5500 U
Phenanthrene	85-01-8	30,000,000	1200 J	55 U	55 U	10000 J	5500 U
Pyrene	129-00-0	37,000,000	2100	37	31	46000	5700
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			1,580	49	49	29,886	5,486

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	41	42	43	44	49
Sample Number			NTC54HA04102	NTC54HA04202	NTC54HA04302	NTC54HA04402	NTC54S04901
Sample Date			9/29/99	9/29/99	9/29/99	9/29/99	4/18/00
Sample Depth (feet bgs)			0-2	0-2	0-2	0-2	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	56 U	54 U	57 U	55 U	260000 U
2-Methylnaphthalene	91-57-6	560,000	56 U	54 U	57 U	55 U	260000 U
Acenaphthene	83-32-9	18,000,000	56 U	54 U	57 U	55 U	260000 U
Acenaphthylene	208-96-8	11,000,000	56 U	54 U	57 U	55 U	260000 U
Anthracene	120-12-7	260,000,000	56 U	54 U	57 U	55 U	130000 J
Benzo(a)anthracene	56-55-3	5,000	5.6 U	5.4 U	5.7 U	7.2	280000
Benzo(a)pyrene	50-32-8	500	5.6 U	5.4 U	5.7 U	5.5 U	260000
Benzo(b)fluoranthene	205-99-2	4,800	5.6 U	5.4 U	5.7 U	13	230000
Benzo(g,h,i)perylene	191-24-2	41,000,000	5.6 U	5.4 U	5.7 U	5.5 U	110000
Benzo(k)fluoranthene	207-08-9	52,000	5.6 U	5.4 U	5.7 U	5.5 U	170000
Chrysene	218-01-9	450,000	5.6 U	5.4 U	5.7 U	10	300000
Dibenzo(a,h)anthracene	53-70-3	500	5.6 U	5.4 U	5.7 U	5.5 U	26000 U
Fluoranthene	206-44-0	48,000,000	5.6 U	5.4 U	5.7 U	21	830000
Fluorene	86-73-7	28,000,000	56 U	54 U	57 U	55 U	260000 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	5.6 U	5.4 U	5.7 U	5.5 U	160000
Naphthalene	91-20-3	270,000	56 U	54 U	57 U	55 U	260000 U
Phenanthrene	85-01-8	30,000,000	56 U	54 U	57 U	55 U	110000 J
Pyrene	129-00-0	37,000,000	5.6 U	5.4 U	5.7 U	5.5 U	510000
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			0	0	0	2	329,000

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	49				
Sample Number			NTC54S0490A	NTC54S049AB	NTC54S049BC	NTC54S049CD	NTC54S049DE
Sample Date			12/1/00	12/1/00	12/1/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-0.5	0.5-1	1-1.5	1.5-2	2-2.5
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53000 U	10000 U	11000 U	5400 U	2600 U
2-Methylnaphthalene	91-57-6	560,000	53000 U	10000 U	11000 U	5400 U	2600 U
Acenaphthene	83-32-9	18,000,000	17000 J	10000 U	11000 U	5400 U	2600 U
Acenaphthylene	208-96-8	11,000,000	53000 U	10000 U	11000 U	5400 U	2600 U
Anthracene	120-12-7	260,000,000	30000 J	2400 J	11000 U	5400 U	2600 U
Benzo(a)anthracene	56-55-3	5,000	46000	9300	7200	930	2000
Benzo(a)pyrene	50-32-8	500	27000	9300	6400	1000	1800
Benzo(b)fluoranthene	205-99-2	4,800	25000	8600	5700	1000	1800
Benzo(g,h,i)perylene	191-24-2	41,000,000	9900	4700	3900	830	1100
Benzo(k)fluoranthene	207-08-9	52,000	15000	6100	3800	550	920
Chrysene	218-01-9	450,000	43000	10000	7800	1000	2100
Dibenzo(a,h)anthracene	53-70-3	500	5300 U	500 J	1100 U	540 U	87 J
Fluoranthene	206-44-0	48,000,000	170000	22000	19000	2300	4600
Fluorene	86-73-7	28,000,000	53000 U	10000 U	11000 U	5400 U	2600 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	11000	6300	4200	850	1500
Naphthalene	91-20-3	270,000	53000 U	10000 U	11000 U	5400 U	2600 U
Phenanthrene	85-01-8	30,000,000	110000	2300 J	4500 J	5400 U	590 J
Pyrene	129-00-0	37,000,000	91000	13000	11000	1300	2800
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			35,400	12,300	8,200	1,300	2,400

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	50		51	52	53
Sample Number			NTC54S05001	NTC54S05001-D	NTC54S05101	NTC54S05201	NTC54S05301
Sample Date			4/18/00	4/18/00	4/18/00	4/18/00	4/18/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	280 U	560 U	55000 U	260000 U	5300 U
2-Methylnaphthalene	91-57-6	560,000	280 U	560 U	55000 U	260000 U	5300 U
Acenaphthene	83-32-9	18,000,000	280 U	560 U	55000 U	260000 U	5300 U
Acenaphthylene	208-96-8	11,000,000	280 U	560 U	55000 U	260000 U	5300 U
Anthracene	120-12-7	260,000,000	130 J	560 U	55000 U	26000 J	2500 J
Benzo(a)anthracene	56-55-3	5,000	190	140	18000	53000	3600
Benzo(a)pyrene	50-32-8	500	380 J	190 J	27000	47000	5500
Benzo(b)fluoranthene	205-99-2	4,800	270 J	150 J	16000	43000	4200
Benzo(g,h,i)perylene	191-24-2	41,000,000	190 J	100 J	27000	19000 J	2900
Benzo(k)fluoranthene	207-08-9	52,000	210 J	96 J	11000	31000	2900
Chrysene	218-01-9	450,000	260	170	22000	56000	4700
Dibenzo(a,h)anthracene	53-70-3	500	22 J	56 U	5500 U	26000 U	240 J
Fluoranthene	206-44-0	48,000,000	460	360	61000	160000	11000
Fluorene	86-73-7	28,000,000	280 U	560 U	55000 U	260000 U	5300 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	260 J	140 J	16000	28000	4100
Naphthalene	91-20-3	270,000	280 U	560 U	55000 U	260000 U	5300 U
Phenanthrene	85-01-8	30,000,000	94 J	560 U	26000 J	28000 J	2800 J
Pyrene	129-00-0	37,000,000	290	180	30000	100000	6600
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			476	234	32,132	59,766	6,964

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	54	55	56	57	58
Sample Number			NTC54S05401	NTC54S05501	NTC54S05601	NTC54S05701	NTC54S05801
Sample Date			4/18/00	4/18/00	4/18/00	4/18/00	4/18/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	11000 U	10000 U	540000 U	57000 U	5700 U
2-Methylnaphthalene	91-57-6	560,000	11000 U	10000 U	540000 U	57000 U	5700 U
Acenaphthene	83-32-9	18,000,000	11000 U	10000 U	540000 U	57000 U	5700 U
Acenaphthylene	208-96-8	11,000,000	11000 U	10000 U	540000 U	57000 U	5700 U
Anthracene	120-12-7	260,000,000	5500 J	5800 J	540000 U	5400 J	510 J
Benzo(a)anthracene	56-55-3	5,000	12000	7800	59000	7600	850
Benzo(a)pyrene	50-32-8	500	15000	9100	51000 J	12000	1500
Benzo(b)fluoranthene	205-99-2	4,800	12000	7400	41000 J	9000	1200
Benzo(g,h,i)perylene	191-24-2	41,000,000	7200	4700	24000 J	6800	870
Benzo(k)fluoranthene	207-08-9	52,000	9200	5200	29000 J	6600	910
Chrysene	218-01-9	450,000	14000	9300	63000	9900	1100
Dibenzo(a,h)anthracene	53-70-3	500	1100	1000 U	54000 U	620 J	130 J
Fluoranthene	206-44-0	48,000,000	35000	28000	210000	23000	2000
Fluorene	86-73-7	28,000,000	11000 U	10000 U	540000 U	57000 U	5700 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	9700	6500	26000 J	8200	1100
Naphthalene	91-20-3	270,000	11000 U	10000 U	540000 U	57000 U	5700 U
Phenanthrene	85-01-8	30,000,000	7200 J	11000	72000 J	5300 J	5700 U
Pyrene	129-00-0	37,000,000	22000	16000	110000	15000	1300
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			19,576	11,331	63,953	15,176	1,955

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	59	60			
Sample Number			NTC54S05901	NTC54S06001	NTC54S0600A	NTC54S060AB	NTC54S060BC
Sample Date			4/18/00	4/18/00	12/1/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-1	0-1	0-0.5	0.5-1	1-1.5
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	51000 U	270000 U	54000 U	53000 U	21000 U
2-Methylnaphthalene	91-57-6	560,000	51000 U	270000 U	54000 U	53000 U	21000 U
Acenaphthene	83-32-9	18,000,000	51000 U	270000 U	12000 J	11000 J	21000 U
Acenaphthylene	208-96-8	11,000,000	51000 U	270000 U	54000 U	53000 U	21000 U
Anthracene	120-12-7	260,000,000	51000 U	270000 U	23000 J	18000 J	21000 U
Benzo(a)anthracene	56-55-3	5,000	27000	130000	49000	51000	13000
Benzo(a)pyrene	50-32-8	500	22000	130000	27000	32000	14000
Benzo(b)fluoranthene	205-99-2	4,800	21000	100000	29000	32000	11000
Benzo(g,h,i)perylene	191-24-2	41,000,000	9800	58000	3500 J	9600	7800
Benzo(k)fluoranthene	207-08-9	52,000	15000	77000	19000	20000	7200
Chrysene	218-01-9	450,000	28000	140000	48000	48000	14000
Dibenzo(a,h)anthracene	53-70-3	500	5100 U	27000 U	1300 J	1300 J	2100 U
Fluoranthene	206-44-0	48,000,000	98000	420000	180000	170000	34000
Fluorene	86-73-7	28,000,000	51000 U	270000 U	54000 U	53000 U	21000 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	13000	76000	14000	18000	7800
Naphthalene	91-20-3	270,000	51000 U	270000 U	54000 U	53000 U	21000 U
Phenanthrene	85-01-8	30,000,000	33000 J	150000 J	80000	48000 J	6100 J
Pyrene	129-00-0	37,000,000	58000	210000	99000	92000	20000
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			28,278	161,510	37,700	43,600	17,300

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	60		61	62	63
Sample Number			NTC54S060CD	NTC54S060DE	NTC54S06101	NTC54S06201	NTC54S06301
Sample Date			12/1/00	12/1/00	4/18/00	4/18/00	4/18/00
Sample Depth (feet bgs)			1.5-2	2-2.5	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	11000 U	21000 U	550 U	5400 U	100 U
2-Methylnaphthalene	91-57-6	560,000	11000 U	21000 U	550 U	5400 U	100 U
Acenaphthene	83-32-9	18,000,000	11000 U	21000 U	550 U	5400 U	100 U
Acenaphthylene	208-96-8	11,000,000	11000 U	21000 U	550 U	5400 U	100 U
Anthracene	120-12-7	260,000,000	11000 U	21000 U	550 U	5400 U	50 J
Benzo(a)anthracene	56-55-3	5,000	8200	16000	290	1500	82
Benzo(a)pyrene	50-32-8	500	7200	15000	460	2500	170
Benzo(b)fluoranthene	205-99-2	4,800	6900	13000	380	2200	130
Benzo(g,h,i)perylene	191-24-2	41,000,000	4800	7500	280	1500	100
Benzo(k)fluoranthene	207-08-9	52,000	5600	9000	290	1600	81
Chrysene	218-01-9	450,000	9000	17000	440	2200	130
Dibenzo(a,h)anthracene	53-70-3	500	200 J	710 J	55 U	540 U	24
Fluoranthene	206-44-0	48,000,000	22000	43000	980	3800	230
Fluorene	86-73-7	28,000,000	11000 U	21000 U	550 U	5400 U	100 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	5600	9400	360	2200	130
Naphthalene	91-20-3	270,000	11000 U	21000 U	550 U	5400 U	100 U
Phenanthrene	85-01-8	30,000,000	3700 J	8500 J	180 J	5400 U	70 J
Pyrene	129-00-0	37,000,000	13000	24000	490	2000	120
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			9,500	19,700	566	3,108	229

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	64	65	66	67	68
Sample Number			NTC54S06401	NTC54S06501	NTC54S066A1	NTC54S067A	NTC54S068A
Sample Date			4/18/00	4/18/00	6/21/00	6/21/00	6/21/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53000 U	560 U	110 U	51000 U	520 U
2-Methylnaphthalene	91-57-6	560,000	53000 U	560 U	110 U	51000 U	520 U
Acenaphthene	83-32-9	18,000,000	53000 U	560 U	110 U	51000 U	520 U
Acenaphthylene	208-96-8	11,000,000	53000 U	560 U	110 U	51000 U	520 U
Anthracene	120-12-7	260,000,000	53000 U	280 J	110 U	51000 U	520 U
Benzo(a)anthracene	56-55-3	5,000	23000	610	56	27000	210
Benzo(a)pyrene	50-32-8	500	37000	1100	130	21000	250
Benzo(b)fluoranthene	205-99-2	4,800	25000	860	100	21000	210
Benzo(g,h,i)perylene	191-24-2	41,000,000	17000	840	92	18000	230
Benzo(k)fluoranthene	207-08-9	52,000	19000	630	81	18000	190
Chrysene	218-01-9	450,000	30000	860	110	28000	230
Dibenzo(a,h)anthracene	53-70-3	500	5300 U	110	31	2800 J	52 U
Fluoranthene	206-44-0	48,000,000	71000	1700	170	85000	610
Fluorene	86-73-7	28,000,000	53000 U	560 U	110 U	51000 U	520 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	23000	840	100	13000	190
Naphthalene	91-20-3	270,000	53000 U	560 U	110 U	51000 U	520 U
Phenanthrene	85-01-8	30,000,000	15000 J	520 J	30 J	51000 U	520 U
Pyrene	129-00-0	37,000,000	37000	1100	260	52000	390
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			44,320	1,448	188	30,108	313

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	69		70	71	73
Sample Number			NTC54S069A	NTC54S069A-D	NTC54S070A	NTC54S071A	NTC54S073B
Sample Date			6/21/00	6/21/00	6/21/00	6/21/00	6/21/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	1100 U	1100 U	54000 U	270 U	11000 U
2-Methylnaphthalene	91-57-6	560,000	1100 U	1100 U	54000 U	270 U	11000 U
Acenaphthene	83-32-9	18,000,000	1100 U	1100 U	54000 U	270 U	11000 U
Acenaphthylene	208-96-8	11,000,000	1100 U	1100 U	54000 U	270 U	11000 U
Anthracene	120-12-7	260,000,000	1100 U	1100 U	54000 U	270 U	11000 U
Benzo(a)anthracene	56-55-3	5,000	730	720	35000	150	6800
Benzo(a)pyrene	50-32-8	500	1100	1000	25000	290	8600
Benzo(b)fluoranthene	205-99-2	4,800	1000	920	24000	250	7600
Benzo(g,h,i)perylene	191-24-2	41,000,000	1100	950	18000	220	4200
Benzo(k)fluoranthene	207-08-9	52,000	740	720	21000	210	6000
Chrysene	218-01-9	450,000	1000	970	35000	260	8600
Dibenzo(a,h)anthracene	53-70-3	500	220	210	4400 J	93	1100
Fluoranthene	206-44-0	48,000,000	1900	2100	120000	510	20000
Fluorene	86-73-7	28,000,000	1100 U	1100 U	54000 U	270 U	11000 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	990	910	15000	290	5800
Naphthalene	91-20-3	270,000	1100 U	1100 U	54000 U	270 U	11000 U
Phenanthrene	85-01-8	30,000,000	1100 U	490 J	31000 J	270 U	11000 U
Pyrene	129-00-0	37,000,000	1300	1300	70000	260	13000
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			1,600	1,473	37,045	454	11,789

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	75	76	77	80	81
Sample Number			NTC54S075B	NTC54S076B	NTC54S077C	NTC54S080C	NTC54S81D1
Sample Date			6/21/00	6/21/00	6/21/00	6/21/00	6/21/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53 U	53000 U	52000 U	55000 U	5200 U
2-Methylnaphthalene	91-57-6	560,000	53 U	53000 U	52000 U	55000 U	5200 U
Acenaphthene	83-32-9	18,000,000	53 U	53000 U	52000 U	55000 U	5200 U
Acenaphthylene	208-96-8	11,000,000	53 U	53000 U	52000 U	55000 U	5200 U
Anthracene	120-12-7	260,000,000	53 U	53000 U	52000 U	55000 U	5200 U
Benzo(a)anthracene	56-55-3	5,000	60	27000	17000	29000	2800
Benzo(a)pyrene	50-32-8	500	140	20000	13000	17000	4400
Benzo(b)fluoranthene	205-99-2	4,800	110	20000	13000	17000	3200
Benzo(g,h,i)perylene	191-24-2	41,000,000	110	13000	5200 U	10000	3100
Benzo(k)fluoranthene	207-08-9	52,000	80	16000	11000	13000	2100
Chrysene	218-01-9	450,000	100	27000	18000 J	29000	3900
Dibenzo(a,h)anthracene	53-70-3	500	25	4000 J	1700 J	2800 J	180 J
Fluoranthene	206-44-0	48,000,000	180	100000	73000	140000	8000
Fluorene	86-73-7	28,000,000	53 U	53000 U	52000 U	55000 U	5200 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	120	12000	10000	11000	520 U
Naphthalene	91-20-3	270,000	53 U	53000 U	52000 U	55000 U	5200 U
Phenanthrene	85-01-8	30,000,000	21 J	34000 J	40000 J	100000	5200 U
Pyrene	129-00-0	37,000,000	120	56000	42000	84000	4800
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			195	30,087	18,828	25,659	5,205

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	84	85	88	89	
Sample Number			NTC54S84D	NTC54S85E	NTC54S88E	NTC54S08901	NTC54S08901-D
Sample Date			6/21/00	6/21/00	6/21/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	5100 U	1100 UJ	5300 UJ	540 U	220 U
2-Methylnaphthalene	91-57-6	560,000	5100 U	1100 UJ	5300 UJ	540 U	220 U
Acenaphthene	83-32-9	18,000,000	5100 U	1100 UJ	5300 UJ	540 U	45 J
Acenaphthylene	208-96-8	11,000,000	5100 U	1100 UJ	5300 UJ	540 U	220 U
Anthracene	120-12-7	260,000,000	5100 U	1100 U	5300 UJ	120 J	79 J
Benzo(a)anthracene	56-55-3	5,000	3600	870 J	1500 J	500 J	260 J
Benzo(a)pyrene	50-32-8	500	4700	1000 J	1800 J	760 J	350 J
Benzo(b)fluoranthene	205-99-2	4,800	3700	1100 J	2200 J	540 J	280 J
Benzo(g,h,i)perylene	191-24-2	41,000,000	2900	820 J	1400 J	690 J	290 J
Benzo(k)fluoranthene	207-08-9	52,000	2500	860 J	1400 J	420 J	200 J
Chrysene	218-01-9	450,000	4500	1200 J	2200 J	580 J	300 J
Dibenzo(a,h)anthracene	53-70-3	500	140 J	90 J	320 J	54 U	29 J
Fluoranthene	206-44-0	48,000,000	12000	2900 J	4500 J	1100 J	630 J
Fluorene	86-73-7	28,000,000	5100 U	1100 UJ	5300 UJ	540 U	220 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	510 U	920 J	2100 J	660 J	290 J
Naphthalene	91-20-3	270,000	5100 U	1100 UJ	5300 UJ	540 U	220 U
Phenanthrene	85-01-8	30,000,000	5100 U	1000 J	5300 UJ	220 J	190 J
Pyrene	129-00-0	37,000,000	7500	2500 J	3100 J	710 J	410 J
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			5,600	1,389	2,716	935	464

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	90	91	92	93	
Sample Number			NTC54S09001	NTC54S09101	NTC54S09201	NTC54S09301	NTC54S09301-D
Sample Date			12/1/00	12/1/00	12/1/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53 U	220 U	120 U	5300 U	530 U
2-Methylnaphthalene	91-57-6	560,000	53 U	220 U	120 U	5300 U	530 U
Acenaphthene	83-32-9	18,000,000	53 U	220 U	24 J	5300 U	530 U
Acenaphthylene	208-96-8	11,000,000	53 U	220 U	120 U	5300 U	530 U
Anthracene	120-12-7	260,000,000	12 J	54 J	43 J	5300 U	530 U
Benzo(a)anthracene	56-55-3	5,000	49	220	100	1400 J	300 J
Benzo(a)pyrene	50-32-8	500	68	330	160	1500 J	480 J
Benzo(b)fluoranthene	205-99-2	4,800	60	230	110	1200 J	410 J
Benzo(g,h,i)perylene	191-24-2	41,000,000	44	270	91	1100 J	440 J
Benzo(k)fluoranthene	207-08-9	52,000	58	170	94	850 J	320 J
Chrysene	218-01-9	450,000	65	270	120	1500 J	390 J
Dibenzo(a,h)anthracene	53-70-3	500	3.4 J	19 J	12	530 U	25 J
Fluoranthene	206-44-0	48,000,000	100	460	250	3600 J	650 J
Fluorene	86-73-7	28,000,000	53 U	220 U	120 U	5300 U	530 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	55	260	130	1100 J	470 J
Naphthalene	91-20-3	270,000	53 U	220 U	120 U	5300 U	530 U
Phenanthrene	85-01-8	30,000,000	28 J	94 J	87 J	1100 J	530 U
Pyrene	129-00-0	37,000,000	88	310	170	2300 J	450 J
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			88	422	207	1,880	627

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	94	95	96	97	
Sample Number			NTC54S09401	NTC54S09501	NTC54S09601	NTC54S09701	NTC54S09701-D
Sample Date			12/1/00	12/1/00	12/1/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	5300 U	110 U	110 U	540 U	530 U
2-Methylnaphthalene	91-57-6	560,000	5300 U	110 U	110 U	540 U	530 U
Acenaphthene	83-32-9	18,000,000	5300 U	110 U	110 U	540 U	530 U
Acenaphthylene	208-96-8	11,000,000	5300 U	110 U	110 U	540 U	530 U
Anthracene	120-12-7	260,000,000	5300 U	110 U	110 U	540 U	530 U
Benzo(a)anthracene	56-55-3	5,000	880	100	92	200	180
Benzo(a)pyrene	50-32-8	500	1300	150	130	54 U	53 U
Benzo(b)fluoranthene	205-99-2	4,800	990	130	100	200 J	53 U
Benzo(g,h,i)perylene	191-24-2	41,000,000	780	140	86	54 U	53 U
Benzo(k)fluoranthene	207-08-9	52,000	560	74	56	54 U	53 U
Chrysene	218-01-9	450,000	1000	140	120	260	210
Dibenzo(a,h)anthracene	53-70-3	500	530 U	8.3 J	11	54 U	53 U
Fluoranthene	206-44-0	48,000,000	2100	220	230	500	370
Fluorene	86-73-7	28,000,000	5300 U	110 U	110 U	540 U	530 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	620	150	120	54 U	53 U
Naphthalene	91-20-3	270,000	5300 U	110 U	110 U	540 U	530 U
Phenanthrene	85-01-8	30,000,000	5300 U	46 J	87 J	540 U	110 J
Pyrene	129-00-0	37,000,000	1600	160	150	280	230
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			1,556	197	173	40	18

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	98	99	100	101	102
Sample Number			NTC54S09801	NTC54S09901	NTC54S10001	NTC54S10101	NTC54S10201
Sample Date			12/1/00	12/1/00	12/1/00	12/1/00	12/1/00
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53 U	5400 U	230 U	5400 U	52 U
2-Methylnaphthalene	91-57-6	560,000	53 U	5400 U	230 U	5400 U	52 U
Acenaphthene	83-32-9	18,000,000	53 U	5400 U	230 U	5400 U	52 U
Acenaphthylene	208-96-8	11,000,000	53 U	5400 U	230 U	5400 U	52 U
Anthracene	120-12-7	260,000,000	53 U	5400 U	230 U	5400 U	17 J
Benzo(a)anthracene	56-55-3	5,000	15	1200	300	2400	46
Benzo(a)pyrene	50-32-8	500	5.3 U	1800	23 U	3300	64
Benzo(b)fluoranthene	205-99-2	4,800	5.3 U	1100	370	2100	63
Benzo(g,h,i)perylene	191-24-2	41,000,000	5.3 U	540 U	350	4900	56
Benzo(k)fluoranthene	207-08-9	52,000	5.3 U	540 U	260	1300	36
Chrysene	218-01-9	450,000	25	1200	410	2700	68
Dibenzo(a,h)anthracene	53-70-3	500	5.3 U	540 U	23 U	1500	8.1
Fluoranthene	206-44-0	48,000,000	38	2500	700	5800	92
Fluorene	86-73-7	28,000,000	53 U	5400 U	230 U	5400 U	52 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	5.3 U	540 U	480	2200	53
Naphthalene	91-20-3	270,000	53 U	5400 U	230 U	5400 U	52 U
Phenanthrene	85-01-8	30,000,000	53 U	5400 U	100 J	1500 J	18 J
Pyrene	129-00-0	37,000,000	27	1700	440	3700	75
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			2	2,031	118	5,486	89

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	103	104	105	106	108
Sample Number			NTC54S10301	NTC54S10401	NTC54S10501	NTC54S10601	NTC54S10801
Sample Date			12/1/00	8/14/01	8/14/01	8/14/01	8/14/01
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	53 U	1400 U	1900 U	430 U	370 U
2-Methylnaphthalene	91-57-6	560,000	53 U	1400 U	1900 U	430 U	370 U
Acenaphthene	83-32-9	18,000,000	53 U	2800 U	3800 U	860 U	750 U
Acenaphthylene	208-96-8	11,000,000	53 U	2800 U	3800 U	860 U	750 U
Anthracene	120-12-7	260,000,000	53 U	761 J	1470 J	430 U	370 U
Benzo(a)anthracene	56-55-3	5,000	55	3960	6700	430 U	370 U
Benzo(a)pyrene	50-32-8	500	74	3840	6510	86 U	96.6
Benzo(b)fluoranthene	205-99-2	4,800	110	2180	4070	86 U	65.9 J
Benzo(g,h,i)perylene	191-24-2	41,000,000	52	3540	7570	86 U	116
Benzo(k)fluoranthene	207-08-9	52,000	17	1300	2510	86 U	40.5 J
Chrysene	218-01-9	450,000	70	4160	6400	430 U	370 U
Dibenzo(a,h)anthracene	53-70-3	500	5.3 U	332	493	86 U	75 U
Fluoranthene	206-44-0	48,000,000	110	7050	15200	430 U	168 J
Fluorene	86-73-7	28,000,000	53 U	1400 U	1900 U	430 U	370 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	51	2710	5070	86 U	81.6
Naphthalene	91-20-3	270,000	53 U	1400 U	1900 U	430 U	370 U
Phenanthrene	85-01-8	30,000,000	53 U	2750	7160	430 U	370 U
Pyrene	129-00-0	37,000,000	61	6290	13000	430 U	172 J
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			96	5,074	8,619	0	112

TABLE B-2

SURFACE SOIL ANALYTICAL RESULTS - NORTHEASTERN AREA
STUDY AREA 54

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

Sample Location	CAS No.	SCTL[a] (Industrial)	111	114		115	116
Sample Number			NTC54S11101	NTC54S11401	NTC54S11401-D	NTC54S11501	NTC54S11601
Sample Date			8/14/01	8/14/01	8/14/01	8/14/01	8/14/01
Sample Depth (feet bgs)			0-1	0-1	0-1	0-1	0-1
Semivolatiles/PAHs (µg/kg)							
1-Methylnaphthalene	90-12-0	470,000	380 U	380 U	380 U	380 U	380 U
2-Methylnaphthalene	91-57-6	560,000	380 U	380 U	380 U	380 U	380 U
Acenaphthene	83-32-9	18,000,000	750 U	770 U	760 U	760 U	760 U
Acenaphthylene	208-96-8	11,000,000	750 U	770 U	760 U	760 U	760 U
Anthracene	120-12-7	260,000,000	380 U	380 U	380 U	380 U	380 U
Benzo(a)anthracene	56-55-3	5,000	380 U	280 J	251 J	380 U	380 U
Benzo(a)pyrene	50-32-8	500	75 U	363	332	69.5 J	76 U
Benzo(b)fluoranthene	205-99-2	4,800	75 U	252	230	53.1 J	76 U
Benzo(g,h,i)perylene	191-24-2	41,000,000	75 U	452	467	123	60 J
Benzo(k)fluoranthene	207-08-9	52,000	75 U	149	130	76 U	76 U
Chrysene	218-01-9	450,000	380 U	292 J	267 J	380 U	380 U
Dibenzo(a,h)anthracene	53-70-3	500	75 U	45.8 J	76 U	76 U	76 U
Fluoranthene	206-44-0	48,000,000	380 U	448	390	380 U	380 U
Fluorene	86-73-7	28,000,000	380 U	380 U	380 U	380 U	380 U
Indeno(1,2,3-cd)pyrene	193-39-5	5,300	75 U	340	294	69.8 J	76 U
Naphthalene	91-20-3	270,000	380 U	380 U	380 U	380 U	380 U
Phenanthrene	85-01-8	30,000,000	380 U	380 U	380 U	380 U	380 U
Pyrene	129-00-0	37,000,000	380 U	434	381	380 U	380 U
Total Carcinogenic PAHs Normalized to Benzo(a)pyrene[b]			0	498	411	82	0

Notes:

[a] Soil Cleanup Target Level [Development of Soil Cleanup Target Levels (SCTLs) for Chapter 62-777, F.A.C., May 26, 1999].

[b] Only detections were used to calculate B(a)P equivalents.

Values in shaded cells are equal to or exceed the SCTL for that analyte.

"J" qualifier indicates an estimated value.

"U" qualifier indicates the analyte was not detected.

APPENDIX C

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION LETTER

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

November 19, 1999

Mr. Wayne Hansel
Code 18B7
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, South Carolina 29419-0068

RE: Data Sheets, Compounds Detected in Soil, Study Area 54, Naval Training Center, Orlando, Florida

Dear Mr. Hansel:

I have completed my review of the data sheets titled Compounds Detected in Soil at Study Area 54, Naval Training Center Orlando, submitted November 18, 1999 at the Orlando Partnering Team meeting.

Based upon the detections of PAHs in surface soil adjacent to the dirt road on the western portion of the site, I concur with the team's conclusion that the PAHs are most likely the result of regular vehicular traffic and are not the result of a release of contaminants. Therefore, further work to investigate contamination adjacent to this road and to conduct remediation of the PAHs is unnecessary. Continued vehicular traffic will likely impact the road in similar ways. However, if property usage of this area was to be changed from the Army Reserve's motor pool to a usage that would not be protective of human health and the environment (i.e. residential or commercial development), remediation of this area would likely be necessary.

PAHs detected on the eastern portion of the site near Family Camp Road should be further delineated.

If I can be of any further assistance with this matter, please contact me at (850)488-3693.

Sincerely,

David F. Grabka
Remedial Project Manager

APPENDIX D

WELL CONSTRUCTION LOG AND LEACHING PROCEDURE FIELD LOGSHEETS

Well Construction Logsheet
Purging and Sampling Logsheet

Tetra Tech NUS, Inc.

WELL COMPLETION FORM

JOB NAME: NTC Orlando - Study Area 54

JOB NUMBER: 7457 | PROJECT MANAGER: Steve McCoy

LOGGED BY: S. Barton | EDITED BY:

WELL NAME: OLD-54-01 | DATE: 4-24-01

DRILLING COMPANY: Groundwater Protection Inc.

EQUIPMENT: [✓] 4.25 INCH HOLLOW STEM AUGER [ ] __ INCH ROTARY WASH | DRILLER: Gary Wagner | HOURS DRILLED: 0.25

GALLONS OF WATER USED DURING DRILLING: NA

METHOD OF DECONTAMINATION PRIOR TO DRILLING: pressure steam wash

DEVELOPMENT

METHOD OF DEVELOPMENT: Submersible pump

DEVELOPMENT BEGAN DATE: 4-28-01 TIME: 1131

YEILD:	TIME:	DATE:
≈2.0 GPM	FROM 1131 TO 1159	4-28-01
GPM	FROM TO	
GPM	FROM TO	

TOTAL WATER REMOVED DURING DEVELOPMENT: 45 GALLONS

DESCRIPTION OF TURBIDITY AT END OF DEVELOPMENT: [✓] CLEAR [ ] SLIGHTLY CLOUDY [ ] MOD. TURBID [ ] VERY MUDDY

ODOR OF WATER: None

WATER DISCHARGED TO: [ ] GROUND SURFACE [ ] TANK TRUCK [ ] STORM SEWERS [ ] STORAGE TANK [ ] DRUMS [ ] OTHER Permitted Sewer man hole

MATERIALS USED

6 50lb SACKS OF 30/45 SAND

1/2 50lb SACKS OF 30/65 sand ~~CEMENT~~

– GALLONS OF GROUT USED

SACKS POWDERED BENTONITE

POUNDS OF BENTONITE PELLETS

2 FEET OF 2 INCH PVC BLANK CASING

10 FEET OF 2 INCH PVC SLOTTED SCREEN

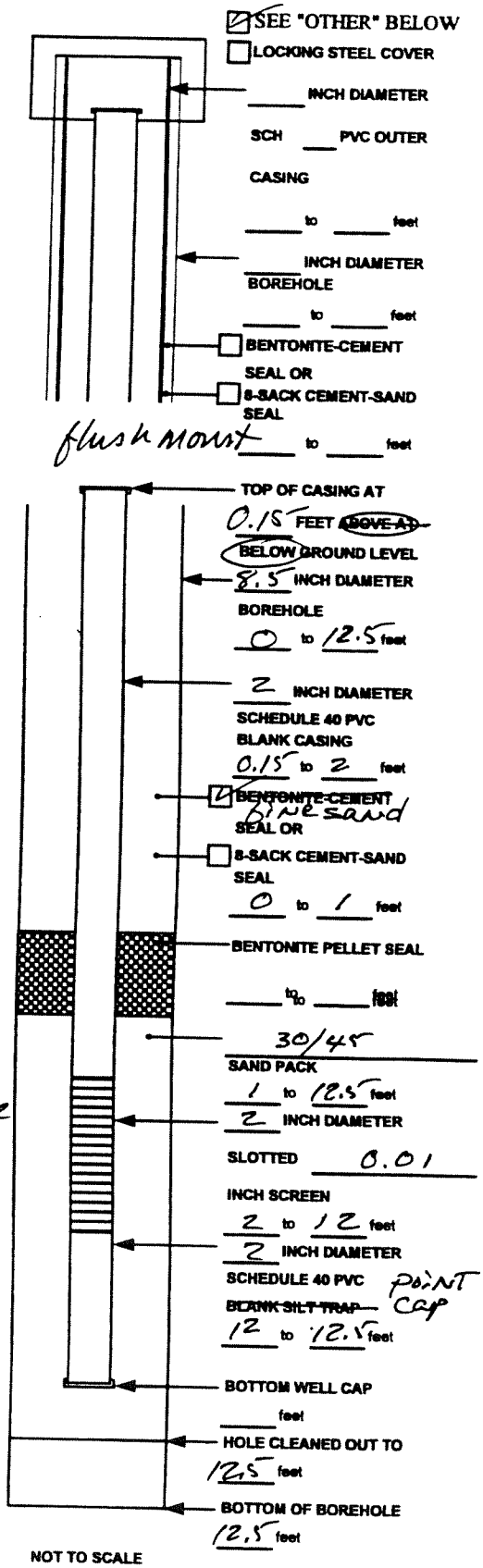
YARD3 CEMENT-SAND (REDI-MIX) ORDERED

YARDS3 CEMENT-SAND (REDI-MIX) USED

CONCRETE PUMPER USED? [ ] NO [ ] YES

NAME NA

WELL COVER USED: [ ] LOCKING STEEL COVER [ ] CHRISTY BOX [✓] OTHER 6-in 1-ft off man hole



NOT TO SCALE

ADDITIONAL INFORMATION:

Date 5-1-01

Tetra Tech NUS
Groundwater Purging and Sampling Log

Project Site Name: 7457
Project No.: NTC ORLANDO

Sample Location: Sta 54

[ ] Domestic Well Data

[X] Monitoring Well Data

[ ] Other Well Type:

Flow-Thru Cell Make\Model: Horiba U-22

Serial Nos.: 9012113/927030

Sample ID No.: NTC54-06001

Sampled By: KJM

C-O-C No.:

PURGING DATA

Casing Size (in.)	Gals. / Liters per ft. of Water	Time Hr:Min	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
0.5	0.01 / 0.038	825	5.07	.147	21.9	19.2	5.36	31	6.46	100
1	0.041 / 0.155	830	5.14	.383	21.6	11.1	3.45	13		
2	0.163 / 0.617	835	5.20	.683	21.7	9.57	2.53	-9		
4	0.653 / 2.47	840	5.20	.681	21.8	9.67	2.04	-17		
6	1.469 / 5.56	845	5.19	.634	21.9	9.80	1.09	-28		
8	2.611 / 9.88	850	5.20	.571	22.0	10.47	1.62	-33		
10	4.08 / 15.44	855	5.19	.518	22.3	10.40	1.60	-38		
	[1 gal. = 3.785 L]	900	5.18	.376	22.2	10.00	1.82	-47		
		905	5.19	.085	22.3	9.10	1.51	-51		
PID Reading (ppm):		910	5.19	.084	22.3	9.11	0.93	-52		
		915	5.19	.083	22.3	9.10	0.88	-53		
		920	5.20	.082	22.4	9.12	1.00	-53		

Well Casing Diameter: 2"
Total Well Depth: 15' CRL 12½'
Static Water Level: 6.46
Tube Intake Depth: 5' FB

Start Purge (hr): 820
End Purge (hr): 925
Total Purge Time (min): 65 min
Total Vol. Purged: 6.5 Lt

WATER QUALITY SAMPLE PARAMETERS

	Color Description	pH pH units	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	DTW ft BTOC	Flow Rate ml/min
Date: 5-01-01									
Time: 930	Clear	5.19	.082	22.4	9.12	0.99	-54	6.46	100

ANALYSES INFORMATION

Analysis		Preservative	Container Requirements			Collected
TCL VOCs	8260B	HCl	3	40 ml	glass vials	—
~~SVOCs~~/PAHs	8270C/8310	None	2	1-liter	amber glass	YES
Pesticides	8081A	None	1	1-liter	amber glass	
Herbicides	8151	None	1	1-liter	amber glass	—
X-tra Organic	8XXX	None	1 or 2	1-liter	amber glass	—
TAL Metals	6000/7000	HNO_3	1	1-liter	HDPE	—
TRPH	FL PRO	H_2SO_4	1	1-liter	amber glass	—

ADDITIONAL INFORMATION

Comments: Sample for PAH

Method:
[X] Peristaltic Pump
[ ] Centrifugal Pump
[ ] Bladder Pump
[ ] Tube Evacuation
[ ] Vacuum Jug Assembly
[ ] Bailer

Tubing Type:
[ ] Polyethylene
[ ] Teflon
[X] Teflon-lined Polyethylene

QA\QC SAMPLES

MS/MSD:

Duplicate ID No.:

Signature(s): [signature]

APPENDIX E

SOIL REMEDIATION COMPLETION REPORT

TECHNICAL MEMORANDUM

Summary of Soil Removal Activities and Results Study Area 54, Naval Training Center Orlando Florida

PREPARED FOR:	**Orlando Partnering Team:** *Barbara Nwokike – Southern Division* *Steve McCoy–TetraTech NUS* *Mark Salvetti – Harding ESE* *David Grabka – FDEP* *Greg Fraley - EPA*
PREPARED BY:	Steve Tsangaris – CH2M HILL Constructors, Inc.
COPIES:	Wayne Hansel – Southern Division
CONTRACT:	Navy Contract # N62467-98-D-0995
CTO:	CTO 017, Naval Training Center (NTC) Orlando
DATE:	December 30, 2002

1.0 Introduction

CH2M HILL Constructors, Inc. (CCI) was contracted by the Department of the Navy, Southern Division Naval Facilities Engineering Command (NAVFAC), to perform the removal of polycyclic aromatic hydrocarbon (PAH)-contaminated soil at Study Area (SA) 54 at the Naval Training Center (NTC), Orlando, Florida. The soil removal was conducted in accordance with *Work Plan Addendum No. 05 for the PAH-Contaminated Soil Removal at Study Areas 16, 18, and 54 (CCI 2002).* This work was authorized under Response Action Contract (RAC) No. N62467-98-D-0995, Contract Task Order (CTO) No. 0017.

1.1 Site Background

SA 54 is located in the southwest portion of McCoy Annex at the former NTC Orlando, Florida. The location of SA-54 is shown on Figure 1. The site is partially located in a pine grove on the corner of Eighth Street and Family Camp Road.

According to a previous report (Harding Lawson Associates [HLA], August 1999), the family campsite was once a small airstrip called the Pinecastle Aero Club. An aircraft hangar and several other buildings were located at the site. The airstrip was operated in the 1950s. During this period, the specific area was used as a parking area for trucks and maintenance vehicles and diesel fuel may have discharged to the ground. In December 1996, one soil

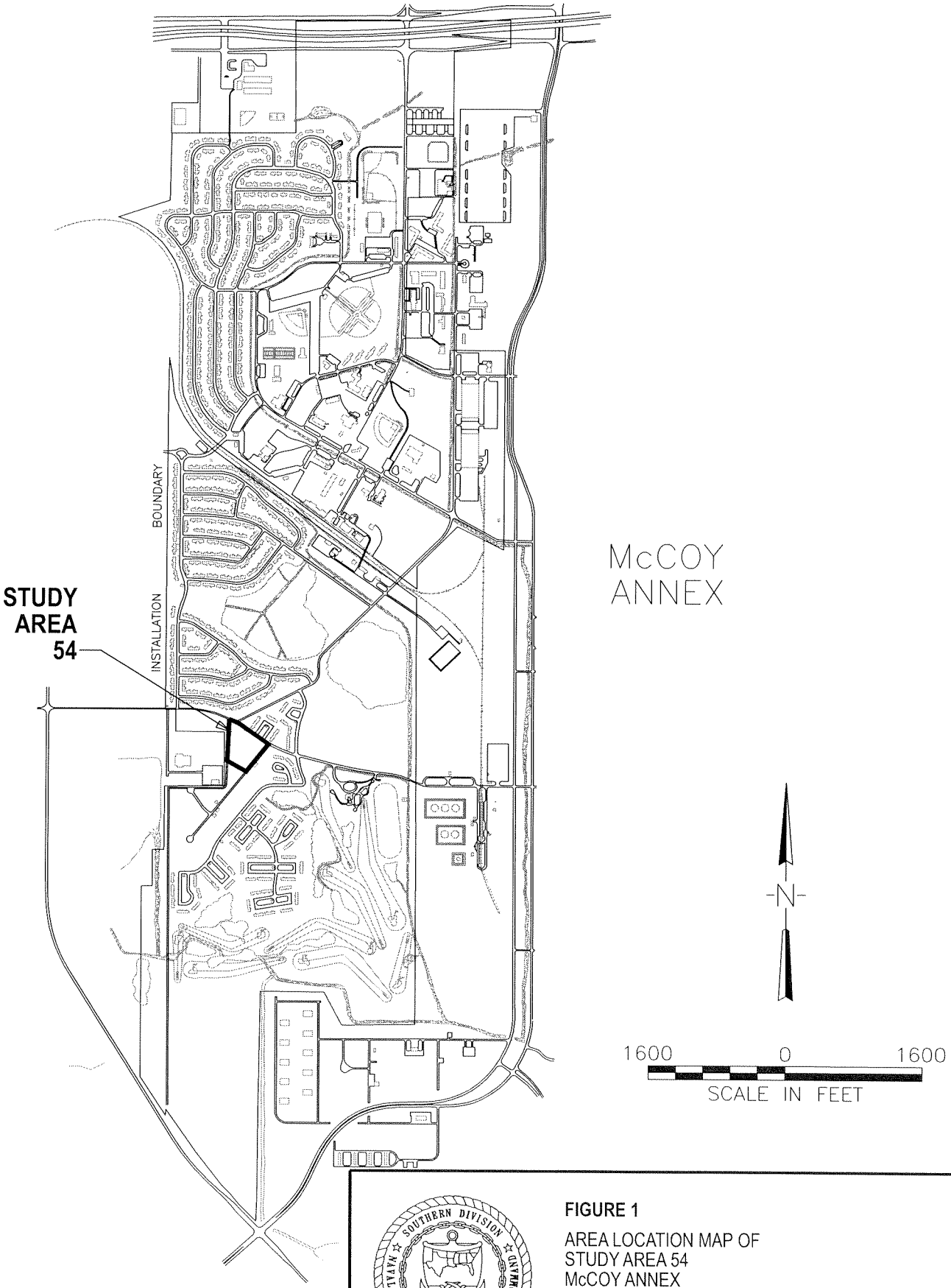


FIGURE 1

AREA LOCATION MAP OF
STUDY AREA 54
McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

152044.99.22.01.01 10/02 E102002004TPA

sample (ORS016) was collected from this area. The December 1996 results indicated total PAH concentrations exceeded State of Florida Soil Cleanup Target Levels (SCTLs).

In 1999, HLA conducted a soil assessment by establishing a grid sampling system from soil sample ORS016. The soil assessment was conducted to determine the extent of PAH constituents in the surface soils. The sampling methodology included the use of immunoassay (IA) test kits and laboratory confirmation analysis for USEPA Method 8270. Two samples (surface to 1 foot below land surface (bls) and 2 to 3 feet bls) were collected per boring location. Based on the laboratory confirmation results, two soil borings (ORS057 and ORS058) collected within the grid system indicated PAH concentrations above the SCTLs at both depth intervals.

In July 2001, Tetra Tech NUS Inc. (TtNUS) conducted further soil assessment activities by establishing a grid system around previous soil borings installed at the site. A total of 69 surface soil boring samples were collected at various depths for PAH constituent analysis using USEPA Method 8310 to establish the limits of the area to be remediated. Based on the laboratory analytical results, two soil removal areas (Areas A and B) were designated at SA 54 as determined by the TtNUS assessment. The excavation areas are shown on Figure 2.

1.2 Project Objectives

The objective of the soil removal activities at SA 54 was to remove and dispose of PAH contaminated surface soil at the site exceeding industrial SCTLs .

2.0 Contaminated Soil Removal Activities

The PAH-contaminated soil removal at SA 54 was performed during the period of March 15, 2002 through April 18, 2002.

Two excavations (shown on Figure 2) were performed at SA 54. The horizontal excavation limits were based on soil sample results obtained by TetraTech NUS as described in Section 1.1 of this Technical Memorandum. Soil was excavated with the horizontal limits of the excavation to a depth of 2 feet bls. No additional soil excavation beyond the pre-established limits was conducted.

A description of the soil removal activities is presented in the following sections. A photograph log documenting various stages of the excavating and backfilling activities is included in Attachment A.

2.1 Site Preparation

In preparation for excavation, CCI obtained utility clearance and excavation/tree removal permits for the work.

Underground utility locates were conducted by the Navy and other personnel at each of the areas. Documentation of the utility survey (including water, electricity, natural gas, fuel pipelines, telephone, or other utility lines) and its results were completed prior to any subsurface activities was performed. All utilities identified adjacent to the work area were clearly marked and identified.

LEGEND

SOIL SAMPLE

PAH > IND. SCTL

NO PAH > IND. SCTL

LOCATION COORDINATES		
LOCATION	NORTHING	EASTING
35	1488245	545698
34	1488235	545708
50	1488238	545725
30	1488280	545753
68	1488301	545792
75	1488331	545778
90	1488385	545783
91	1488393	545789
92	1488401	545796
92a	1488418	545807
106a	1488451	545755
106	1488427	545739
100	1488378	545752
108	1488368	545717
71	1488325	545722
61	1488314	545729
97	1488297	545711
63	1488279	545694
66	1488267	545679
102	1488247	545651
103	1488216	545626
95	1488200	545638
116	1488191	545659
115	1488206	545672
114	1488221	545685

ROUNDED TO NEAREST FOOT

NOTE:

1) EXCAVATION DEPTH 2 FEET; EXCAVATED AREAS RESTORED WITH SOD.

TREE NOTES:

APPROX. 60 PINE TREES TO BE REMOVED. 8"–10" AVERAGE DIA. 40'–60' TALL

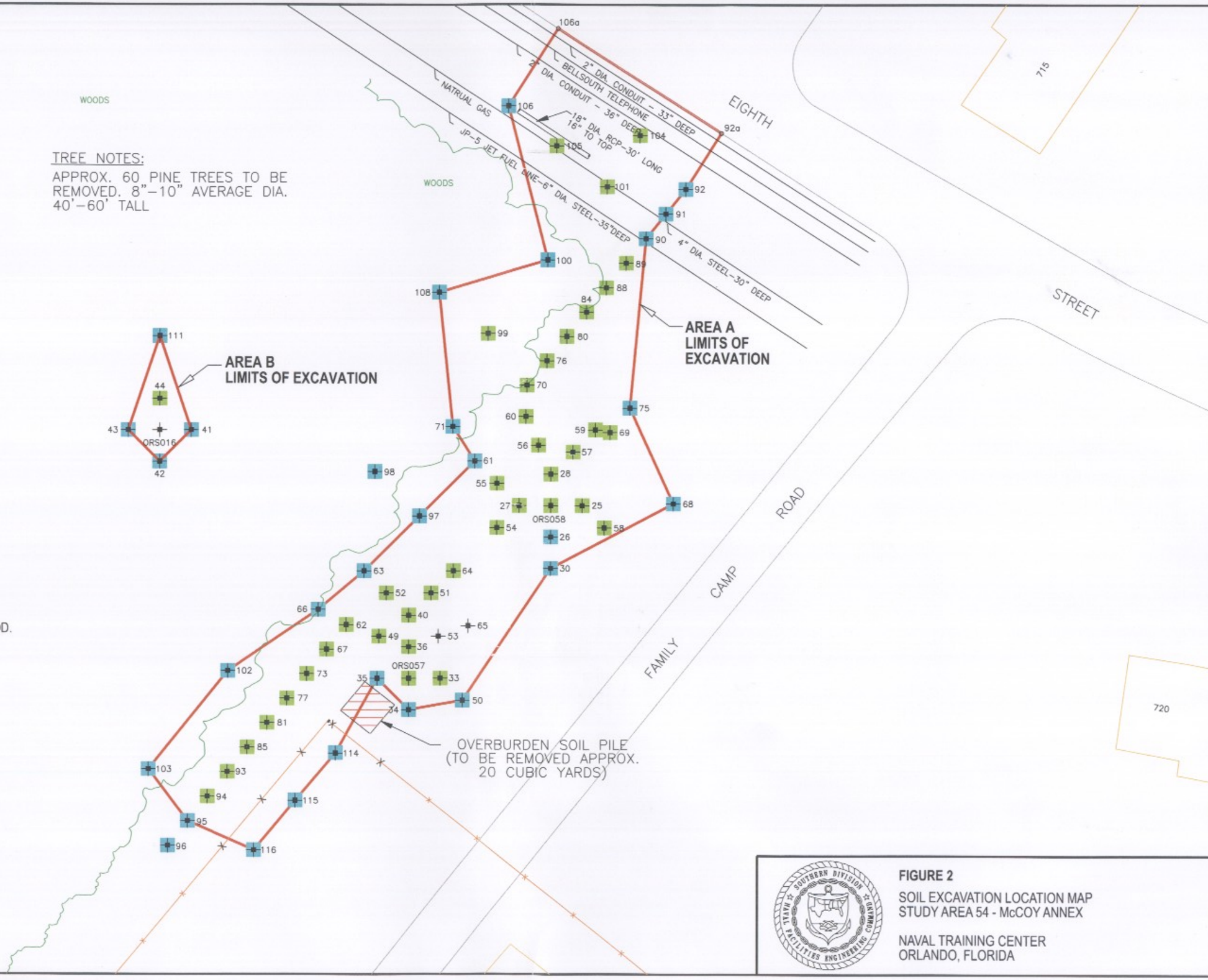


FIGURE 2

SOIL EXCAVATION LOCATION MAP
STUDY AREA 54 - McCOY ANNEX

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

152044.99.22.01.01 10/02 E102002004TPA

Underground utilities identified at the north end of the Excavation Area A at SA 54 were as follows:

- One 2-inch diameter telephone conduit - 33–inches bls
- One Bellsouth phone cable line - 36-inches bls
- One 2-inch diameter telephone conduit - 36–inches bls
- One 4-inch diameter steel natural gas line - 30 –inches bls
- One 6-inch diameter steel JP-5 Jet Fuel line - 35-inches bls

The locations of these utilities are shown on Figure 2.

The portion of the existing chain link fence located at sample locations 114 , 115, and 116 (see Figure 2) was partially and temporarily removed in order to conduct the soil excavation activities in this area. The chain link fence was reinstalled in the same area upon completion of backfilling, compaction, and sod installation.

Since much of the work area at SA 54 was located in a pine tree grove, trees needed to be removed prior to initiating excavation activities. CCI's subcontractor (Environmental Field Services, Inc. and Morgan's Tree Service) removed approximately 60 Southern Pines including the stumps and root base. A majority of the trees were chipped and used for mulch at NTC Orlando's OU4 phytoremediation project. The remaining root base and stumps were loaded onto trucks and transported to the Orange County Landfill as yard debris. Trees and roots within the footprint of the excavation areas were removed. Trees within 10 feet of the excavation footprint were cut down at the base with the root base and stump left undisturbed.

Survey stakes located throughout the site marked exact excavation limits. String lines were stretched across the excavation areas for use in measuring accurate excavation depth. Post-excavation soil laboratory confirmation sampling was not required.

2.2 Soil Excavation and Disposal

CCI's subcontractor (Environmental Field Services along with J.N. Malcolm & Sons Excavating Company) removed 1,086 tons of PAH-contaminated soil as part of the soil removal activities at SA 54. Areas A and B of SA 54 were excavated to a depth of 2 feet bls using an excavator and skidsteer. The contaminated soil was direct loaded onto DOT-approved trucks and transported to the Orange County Landfill for proper disposal.

Manual digging along utility corridors at the north end of Area A was also performed. Once the utilities were visually exposed, normal excavation was conducted with caution. Manual digging equipment used along the underground utility areas included picks and shovels.

Soil overburden material (approximately 5 feet high by 10 feet wide), located outside of the fence area near sample location 114 , was removed and handled as PAH-contaminated soil and disposed of accordingly.

A transportation and disposal log, copies of the waste profile information, and copies of the disposal manifests are provided in Attachment B. The certificates of disposal are provided in Attachment C.

2.3 Backfill and Site Restoration

A representative sample of backfill material was collected from the offsite source and analyzed for the presence of the following constituents using USEPA SW-846 procedures:

- Target compound list (TCL) volatile organic compounds (VOCs) (Methods 5035 / 8260B)
- TCL semi-volatile organic compounds (SVOCs) (Method 8270C)
- TCL pesticides (Method 8081A)
- Herbicides (Method 8151)
- Polychlorinated biphenyls (PCBs) (Method 8082)
- Target analyte list (TAL) metals (Methods 7471 and6010B)
- pH

The backfill material placed in the excavations was certified clean and a copy of the analytical data is provided in Attachment D.

Each excavation was backfilled with 18 inches of clean soil, followed by 6 inches of top soil. The soil was placed in lifts and machine compacted to a minimum of 85 percent dry density in accordance with American Society for Testing and Materials (ASTM) D698. The excavated area adjoining Eighth Street was compacted to a minimum of 95 percent dry density to insure stability of the roadway. A copy of the compaction testing results is provided in Attachment E.

After completing the placement of backfill material, Environmental Field Services, Inc. and Glass Ground Maintenance placed Bahia sod in the excavated areas of SA 54. Irrigation maintenance was provided for a period of 90 days. The excavated areas were restored to the original drainage contours.

3.0 Conclusions

The objective of the soil removal activities at SA 54 was to remove and dispose of PAH-contaminated surface soil at the site exceeding the State of Florida industrial SCTLs. CCI removed and disposed of 1,086 tons of PAH-contaminated soil from two areas at the site. Each area was restored with clean backfill and Bahia sod. As a result of the soil removal activities, the site is suitable for non-residential land use.

ATTACHMENT A

PHOTOGRAPHIC LOG

Photograph 1: Pre-excavation site conditions (looking south).

Photograph 2: Photograph of loader excavating contaminated soil.

Photograph 3: Contaminated soil excavation/loading activities (looking south).

Photograph 4: Contaminated soil excavation/loading at Study Area 54.

Photograph 5: Two-foot depth of excavation verification measurement.

Photograph 6: Contaminated soil excavation/loading in the vicinity of the northern utility corridor at Study Area 54.

Photograph 7: Site restoration activities in the vicinity of the utility corridor along the northern portion of Study Area 54.

Photograph 8: Site restoration activities along northern utility corridor.

Photograph 9: Restored site looking south/southwest.

Photograph 10: Restored site looking south.

Photograph 11: Restored site looking south.

ATTACHMENT B

WASTE DISPOSAL INFORMATION

STUDY AREA 54 TRANSPORTATION/DISPOSAL LOG

CTO No	Project No	Site Description	Container Type	Container Desig.	Contractor	Transporter	Date Transported	Load ID	Disposal Facility	Disp Fac OP. ID	Media	Waste Type (Haz, Nonhaz, TSCA)	Disposal Date	Manifest Number	Disposal Treatment Method				
															Incinerati	Recycle	Landfill	Other	Unit
0017	152044	SA-54	DT	218	EFS	J.N. Malcom	22-Mar-02	1	Orange County	SO480128169006	Soil	N/H	22-Mar-02	93086			17.17		tons
0017	152044	SA-54	DT	218	EFS	J.N. Malcom	22-Mar-02	2	Orange County	SO480128169006	Soil	N/H	22-Mar-02	93088			16.47		tons
0017	152044	SA-54	DT	218	EFS	J.N. Malcom	22-Mar-02	3	Orange County	SO480128169006	Soil	N/H	22-Mar-02	93089			18.55		tons
0017	152044	SA-54	DT	209	EFS	J.N. Malcom	22-Mar-02	4	Orange County	SO480128169006	Soil	N/H	22-Mar-02	93087			15.54		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	22-Mar-02	5	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93090			21.32		tons
0017	152044	SA-54	DT	211	EFS	J.N. Malcom	22-Mar-02	6	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93092			20.88		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	22-Mar-02	7	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93093			21.95		tons
0017	152044	SA-54	DT	208	EFS	J.N. Malcom	22-Mar-02	8	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93094			21.36		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	22-Mar-02	9	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93095			21.22		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	22-Mar-02	10	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93091			21.3		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	22-Mar-02	11	Orange County	SO480128169006	Soil	N/H	23-Mar-02	93096			19.57		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	25-Mar-02	12	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93099			19.66		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	25-Mar-02	13	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93104			19.02		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	25-Mar-02	14	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93097			18.99		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	25-Mar-02	15	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93102			20.43		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	25-Mar-02	16	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93107			17.38		tons
0017	152044	SA-54	DT	204	EFS	J.N. Malcom	25-Mar-02	17	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93100			19.56		tons
0017	152044	SA-54	DT	204	EFS	J.N. Malcom	25-Mar-02	18	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93105			20.08		tons
0017	152044	SA-54	DT	204	EFS	J.N. Malcom	25-Mar-02	19	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93109			18.06		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	25-Mar-02	20	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93098			17.84		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	25-Mar-02	21	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93103			18.78		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	25-Mar-02	22	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93108			18.23		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	25-Mar-02	23	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93101			18.71		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	25-Mar-02	24	Orange County	SO480128169006	Soil	N/H	25-Mar-02	93106			18.91		tons

STUDY AREA 54 TRANSPORTATION/DISPOSAL LOG

CTO No	Project No	Site Description	Container Type	Container Desig.	Contractor	Transporter	Date Transported	Load ID	Disposal Facility	Disp Fac OP. ID	Media	Waste Type (Haz, Nonhaz, TSCA)	Disposal Date	Manifest Number	Disposal Treatment Method				
															Incineration	Recycle	Landfill	Other	Unit
0017	152044	SA-54	DT	75	EFS	J.N. Malcom	26-Mar-02	25	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93111			20.86		tons
0017	152044	SA-54	DT	75	EFS	J.N. Malcom	26-Mar-02	26	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93116			21.75		tons
0017	152044	SA-54	DT	75	EFS	J.N. Malcom	26-Mar-02	27	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93123			18.75		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	26-Mar-02	28	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93117			21.67		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	26-Mar-02	29	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93122			19.86		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	26-Mar-02	30	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93126			21.84		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	26-Mar-02	31	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93110			19.99		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	26-Mar-02	32	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93112			20.74		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	26-Mar-02	33	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93118			22.10		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	26-Mar-02	34	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93124			18.65		tons
0017	152044	SA-54	DT	201	EFS	J.N. Malcom	26-Mar-02	35	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93127			20.23		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	26-Mar-02	36	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93113			21.51		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	26-Mar-02	37	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93121			20.39		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	26-Mar-02	38	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93125			21.07		tons
0017	152044	SA-54	DT	213	EFS	J.N. Malcom	26-Mar-02	39	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93128			18.79		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	26-Mar-02	40	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93114			22.00		tons
0017	152044	SA-54	DT	216	EFS	J.N. Malcom	26-Mar-02	41	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93119			21.09		tons
0017	152044	SA-54	DT	422	EFS	J.N. Malcom	26-Mar-02	42	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93115			19.98		tons
0017	152044	SA-54	DT	422	EFS	J.N. Malcom	26-Mar-02	43	Orange County	SO480128169006	Soil	N/H	26-Mar-02	93120			21.39		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	26-Mar-02	44	Orange County	SO480128169006	Stumps	N/H	26-Mar-02	N/A			3.23		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	26-Mar-02	45	Orange County	SO480128169006	Stumps	N/H	26-Mar-02	N/A			9.89		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	16-Apr-02	46	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93131			18.68		tons
0017	152044	SA-54	DT	200	EFS	J.N. Malcom	16-Apr-02	47	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93134			20.99		tons
0017	152044	SA-54	DT	206	EFS	J.N. Malcom	16-Apr-02	48	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93130			18.94		tons
0017	152044	SA-54	DT	206	EFS	J.N. Malcom	16-Apr-02	49	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93136			18.51		tons

STUDY AREA 54 TRANSPORTATION/DISPOSAL LOG

CTO No	Project No	Site Description	Container Type	Container Desig.	Contractor	Transporter	Date Transported	Load ID	Disposal Facility	Disp Fac OP. ID	Media	Waste Type (Haz, Nonhaz, TSCA)	Disposal Date	Manifest Number	Disposal Treatment Method				
															Incinerati	Recycle	Landfill	Other	Unit
0017	152044	SA-54	DT	206	EFS	J.N. Malcom	16-Apr-02	50	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93139			20.3		tons
0017	152044	SA-54	DT	203	EFS	J.N. Malcom	16-Apr-02	51	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93133			22.83		tons
0017	152044	SA-54	DT	203	EFS	J.N. Malcom	16-Apr-02	52	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93137			21.56		tons
0017	152044	SA-54	DT	208	EFS	J.N. Malcom	16-Apr-02	53	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93129			21.92		tons
0017	152044	SA-54	DT	208	EFS	J.N. Malcom	16-Apr-02	54	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93138			18.6		tons
0017	152044	SA-54	DT	211	EFS	J.N. Malcom	16-Apr-02	55	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93132			16.85		tons
0017	152044	SA-54	DT	211	EFS	J.N. Malcom	16-Apr-02	56	Orange County	SO480128169006	Soil	N/H	16-Apr-02	93135			20.44		tons

ORANGE COUNTY GOVERNMENT
FLORIDA

UTILITIES DEPARTMENT . SOLID WASTE DIVISION
5901 Young Pine Road • Orlando, Florida 32829
407-836-6601 • Fax 407-836-6658

February 7, 2002

Dave Demas
Environmental Field Services, Inc
40 West State Road 32
Westfield IN 46074
(317) 896 -1116

RE: Diesel Contaminated Soil Disposal

Dear Mr. Demas:

As per your Email of February 7, 2002 the 1,500 tons of non-hazardous diesel contaminated soil are approved for disposal since it passes TCLP test and is, therefore, not a hazardous waste for landfilling purposes. The waste will be accepted for disposal at the Class I lined landfill at /ton. All documentation has been filed for future reference. Should you have any questions, please contact Oscar Ramos at 407-836-6636

Sincerely,

Dan Morrical, P.E., Chief Engineer
Orange County
Solid Waste Division

OR/or

cc: Mr. James W. Becker
Special Waste 02

O:\FILE ROOM\Special Waste\McCoy Annex 2002.doc

ATTACHMENT B

(Refer to the original CH2M HILL Technical Memorandum dated Dec 30, 2002, for copies of the Waste Manifests, Chain-of-Custodies, and Certificates of Analysis.)

Tetra Tech NUS, Inc.
May 14, 2003

ATTACHMENT C

CERTIFICATE OF DISPOSAL

ORANGE COUNTY GOVERNMENT FLORIDA

UTILITIES DEPARTMENT • SOLID WASTE DIVISION
5901 Young Pine Road • Orlando, Florida 32829
(407) 836-6601 • Fax (407) 836-6658

August 5, 2002

Attention: David Demas, CHMM
Senior Project Manager
Environmental Field Services, Inc.
40 West State Road 32
Westfield, Indiana 46074

Subject: Certificate of Waste Disposal

In response to your email request, this letter is to certify that Environmental Field Services, Inc. has properly disposed of 1,894.26 tons of non regulated PAH impacted soil generated from the Orlando Navy Training Center, McCoy Annex. The material was disposed of at our Class 1 (lined cell) landfill between March 3 and April 17, 2002.

Sincerely,

Dan Morrical, P.E., Chief Engineer
Orange County Solid Waste Division

cc: Special Waste 2002

ATTACHMENT D

BACKFILL TEST RESULTS

ATTACHMENT D

(Refer to the original CH2M HILL Technical Memorandum dated Dec 30, 2002, for copies of the Backfill Chain-of-Custody Records and Reports of Analysis.)

Tetra Tech NUS, Inc.
May 14, 2003

ATTACHMENT E

COMPACTION TESTING RESULTS

Geotechnical and Environmental Consultants, Inc.

IN-PLACE SOIL DENSITY TEST RESULTS

Drive Sleeve and Speedy Moisture Gauge

Project Name: McCoy Annex Soil Compaction Testing
Date: 4/16/02

Project No. 1715C
Tests Performed By: KDD

Test No.	Mold & Soil Wt. (lb)	Soil Wt. (lb)	Wet Density (PCF)	Moisture Content (%)	Dry Density (PCF)	Proctor No.	Compaction (%)	Test Location	* Test Depth (ft)
3	4.96	3.85	113.6	11.6	101.8	1	96.3	South Right of way at 8th Street and Family Camp Rd. (Area 54)	0/0.75'
4	4.78	3.67	108.2	5.7	102.4	1	96.9	South Right of way at 8th Street and Family Camp Rd. (Area 54)	0.75'/1.5'

Minimum Compaction Requirement: 95%

Proctor No.	Maximum Density	Optimum Moisture Content
1	105.7	11.4

* Test depth referenced from Top of backfill

Mold Wt.: 1.11 lb Mold Volume: 0.0339 ft^3