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FINAL BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT STUDY AREA 16 NTC ORLANDO FL

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BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT

STUDY AREA 16

NAVAL TRAINING CENTER ORLANDO, FLORIDA

UNIT IDENTIFICATION CODE: N65928
CONTRACT NO.: N62467-89-D-0317/107

SEPTEMBER 1996

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

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BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT

STUDY AREA 16

NAVAL TRAINING CENTER ORLANDO, FLORIDA

Unit Identification Code: N65928

Contract No. N62467-89-D-0317/107

Prepared by:

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September 1996

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/107 are complete and accurate and comply with all requirements of this contract.

DATE: September 12, 1996

NAME AND TITLE OF CERTIFYING OFFICIAL: John Kaiser
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Richard Allen
Project Technical Lead

(DFAR 252.227-7036)

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Orlando, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CLP	Contract Laboratory program
DQO	data quality objective
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
GC/ECD	gas chromatograph equipped with an electron capture detector
GC/FID	gas chromatograph equipped with an flame ionization detector
GPR	ground penetrating radar
HSA	hollow-stem auger
IR	installation restoration
μg/kg	micrograms per kilogram
μg/ℓ	micrograms per liter
mg/kg	milligrams per kilogram
NTC	Naval Training Center
OPT	Orlando Partnering Team
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PPCBs	pesticides and PCBs
ppm	parts per million
RBC	risk-based concentration
SCG	soil cleanup goal
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
TOC	total organic carbon
TMP	Tank Management Plan
TPH	total petroleum hydrocarbons
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

1.0 STUDY AREA 16, MOTOR POOL COMPOUND, BUILDINGS 7168, 7169, 7170, 7171, 7172, AND FORMER BUILDING 7175, BACKGROUND AND CONDITIONS

1.1 STUDY AREA 16, BACKGROUND AND CONDITIONS. This report contains information gathered as a result of site screening activities conducted at Study Area 16. In March of 1996, after the review of site screening results, the Orlando Partnering Team (OPT) concluded that the site required no further action with regard to installation restoration (IR) issues. The OPT did observe that petroleum-related contaminants were of concern, including polynuclear aromatic hydrocarbons (PAHs) and the discovery of floating product in one monitoring well. Because all known environmental concerns at Study Area 16 are petroleum related, the OPT transferred the site for evaluation under the Naval Training Center (NTC), Orlando Tank Management Plan (TMP) (ABB Environmental Services, Inc. [ABB-ES], 1996). The results of subsequent investigations are not included in this document but may be found in the appropriate TMP reports, as they become available.

The following sections include a brief background summary for Study Area 16 (Figure 1). Further details can be found in the Site Screening Plan (ABB-ES, 1995).

1.1.1 Building 7168 Building 7168 was constructed in 1966 and is a 2,700-square-foot Auto Maintenance Shop located in the central portion of the Motor Pool Compound (Figure 2). The building is a metal structure on a concrete slab with an exhaust system vented to the outside. There are two floor drains inside the building that were connected to an oil-water separator outside the northwest corner of the building. Under the TMP, the oil-water separator was removed along with a used oil underground storage tank (UST), and the oil lines to the building were capped.

1.1.2 Building 7169 Building 7169 was constructed in 1960 as a supply shed and equipment base, but is currently listed as the Tire Storage Shop. The building is an 800-square-foot metal structure on a concrete slab.

1.1.3 Building 7170 Building 7170 was constructed in 1952 as a grease and oil storage shed and by 1972 was listed as an Auto Maintenance Shop. The 507-square-foot facility has masonry walls and a concrete slab foundation.

1.1.4 Building 7171 Building 7171, which was constructed in 1952, is a 20,471-square-foot vehicle repair building. The facility is a two-story concrete block structure built on a concrete slab and has maintenance bays with hydraulic lifts (currently inoperable), a paint booth, storage areas, office space, and two oil-water separators. The building has a 5,000-gallon diesel oil UST, which will be evaluated under the NTC, Orlando TMP (ABB-ES, 1996).

1.1.5 Building 7172 Building 7172, constructed in 1952 as an auto maintenance and administration building, is used by two Army Reserve units for offices and the storage of tools and equipment (lead acid batteries and containers of sulfuric acid). Batteries were stored on wooden pallets on the asphalt pavement, and staining was observed on the pavement around the pallets. The pallets and batteries had been removed by October 1994.

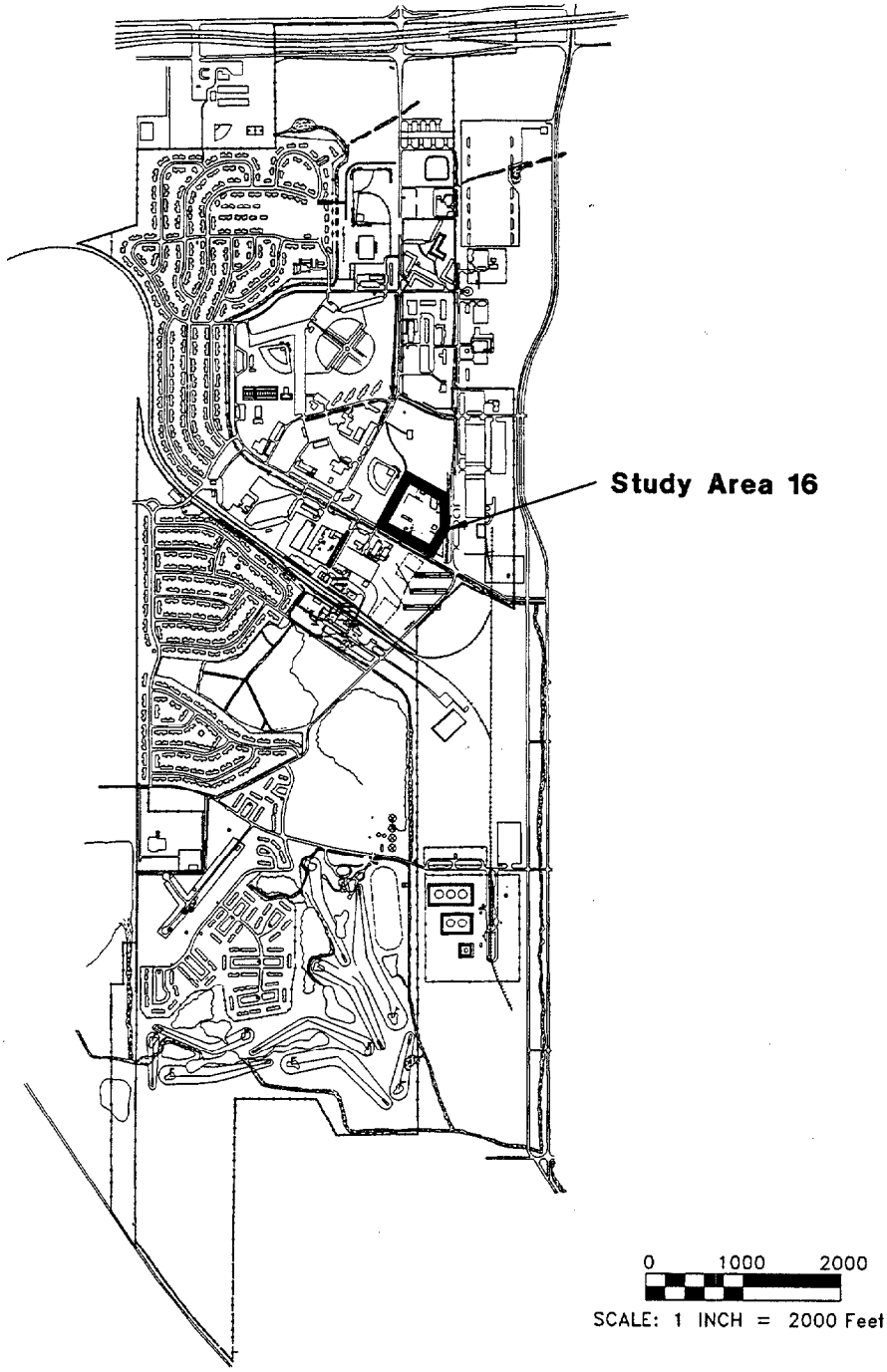

FIGURE 1
LOCATION OF STUDY AREA 16

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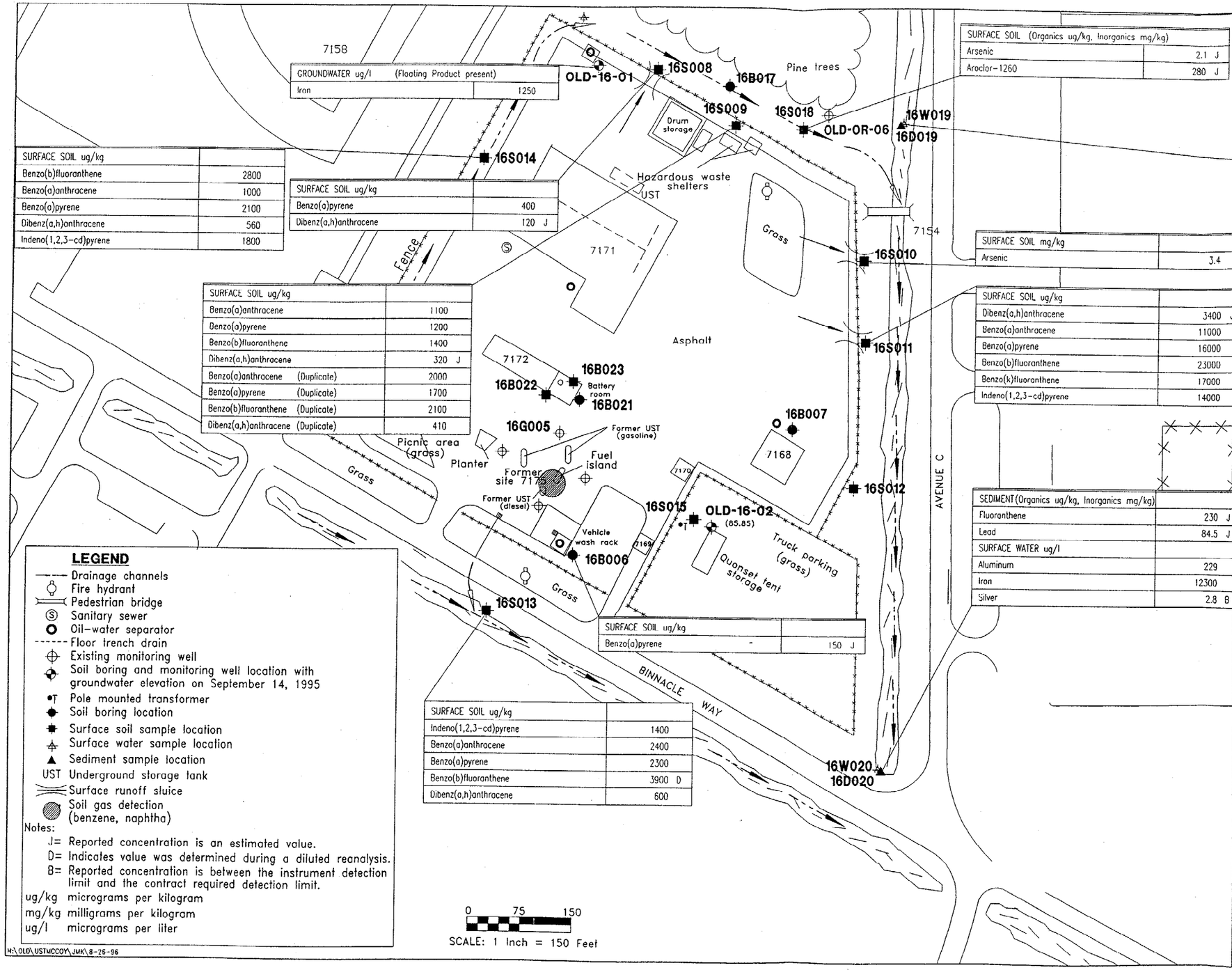

GROUNDWATER ug/l (Floating Product present)	
Iron	1250

SURFACE SOIL ug/kg	
Benzo(b)fluoranthene	2800
Benzo(a)anthracene	1000
Benzo(a)pyrene	2100
Dibenz(a,h)anthracene	560
Indeno(1,2,3-cd)pyrene	1800

SURFACE SOIL ug/kg	
Benzo(a)pyrene	400
Dibenz(a,h)anthracene	120 J

SURFACE SOIL ug/kg	
Benzo(a)anthracene	1100
Benzo(a)pyrene	1200
Benzo(b)fluoranthene	1400
Dibenz(a,h)anthracene	320 J
Benzo(a)anthracene (Duplicate)	2000
Benzo(a)pyrene (Duplicate)	1700
Benzo(b)fluoranthene (Duplicate)	2100
Dibenz(a,h)anthracene (Duplicate)	410

SURFACE SOIL ug/kg	
Benzo(a)pyrene	150 J

SURFACE SOIL ug/kg	
Indeno(1,2,3-cd)pyrene	1400
Benzo(a)anthracene	2400
Benzo(a)pyrene	2300
Benzo(b)fluoranthene	3900 D
Dibenz(a,h)anthracene	600

SURFACE SOIL (Organics ug/kg, Inorganics mg/kg)	
Arsenic	2.1 J
Aroclor-1260	280 J

SURFACE SOIL mg/kg	
Arsenic	3.4

SURFACE SOIL ug/kg	
Dibenz(a,h)anthracene	3400 J
Benzo(a)anthracene	11000
Benzo(a)pyrene	16000
Benzo(b)fluoranthene	23000
Benzo(k)fluoranthene	17000
Indeno(1,2,3-cd)pyrene	14000

SEDIMENT (Organics ug/kg, Inorganics mg/kg)	
Fluoranthene	230 J
Lead	84.5 J
SURFACE WATER ug/l	
Aluminum	229
Iron	12300
Silver	2.8 B

SEDIMENT (Organics ug/kg, Inorganics mg/kg)	
bis(2-Ethylhexyl)phthalate	190 J
bis(2-Ethylhexyl)phthalate (Duplicate)	320 J
Aroclor-1260	280 J
Aroclor-1260 (Duplicate)	270 J
Lead (Duplicate)	27.9 J
SURFACE WATER ug/l	
Aluminum	2400
Iron	9800
Lead	13.5
Mercury	.13 B
Zinc	48.1

LEGEND

- Drainage channels
- Fire hydrant
- Pedestrian bridge
- Sanitary sewer
- Oil-water separator
- Floor trench drain
- Existing monitoring well
- Soil boring and monitoring well location with groundwater elevation on September 14, 1995
- Pole mounted transformer
- Soil boring location
- Surface soil sample location
- Surface water sample location
- Sediment sample location
- UST Underground storage tank
- Surface runoff sluice
- Soil gas detection (benzene, naphtha)

Notes:

J= Reported concentration is an estimated value.
D= Indicates value was determined during a diluted reanalysis.
B= Reported concentration is between the instrument detection limit and the contract required detection limit.

ug/kg micrograms per kilogram
mg/kg milligrams per kilogram
ug/l micrograms per liter

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FIGURE 2

SOIL BORING, MONITORING WELL, SURFACE SOIL, SEDIMENT, AND SURFACE WATER SAMPLING LOCATIONS, MCCOY ANNEX BUILDINGS 7168,7171, 7172, AND FORMER 7175, U.S. ARMY MOTOR POOL COMPOUND, STUDY AREA 16

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A steam heating sump was located in the northwest corner of the battery room. The steam return pump was inoperable, allowing the steam condensate to overflow onto the floor.

In an interview with facility personnel, it was determined that the floor drain from the battery room may discharge to a leach field located near the northern corner of the grassy truck parking area at the southern end of Study Area 16.

1.1.6 Former Building 7175 Building 7175, which was constructed in 1952, consisted of a three-pump fueling island and a small building to monitor dispensed fuel. The building was moved to another location (Building 7244) in the early 1980s (ABB-ES, 1995). Three USTs for gasoline and diesel fuel were removed between November 1990 and the last quarter of 1993 in accordance with the NTC, Orlando TMP (ABB-ES, 1996).

1.2 STUDY AREA 16 INVESTIGATION SUMMARY. Site screening activities were carried out at Study Area 16 to evaluate specific environmental concerns associated with numbered facilities and to provide a general evaluation of potential environmental concerns associated with unnumbered facilities and surrounding areas.

1.2.1 STUDY AREA 16, General Area

1.2.1.1 Passive Soil Gas Survey A passive soil gas survey of the entire area within the fenced motor pool compound was completed to identify areas of elevated volatile organic compounds (VOCs) and semivolatile organic compound (SVOCs) in the subsurface soil and groundwater (Appendix A).

Soil gas data are always semiqualitative, as multiple sources in soil and/or groundwater cannot be differentiated. Further, compound concentrations in each collector are compared on a relative basis, depending on whether or not the data are interpreted to be of high, moderate to high, moderate, etc., intensity. These qualitative soil gas values do not represent actual concentrations of the reported compounds. Efforts to relate soil gas response directly to groundwater or soil contaminant concentrations are generally not regarded as productive owing to the assumptions that are required for heterogeneity and source distribution.

Soil gas collectors were installed at 114 locations on 60-foot grid centers. Soil gas collected from one location in the vicinity of the USTs at the former fueling island (Facility 7175) indicated a very low level of petroleum hydrocarbons. No elevated VOC or SVOC concentrations were detected at any of the other soil gas collection points.

1.2.1.2 Surface Soil Samples Nine surface soil samples were collected around the perimeter of Study Area 16. One surface sample was collected from the centerline of the drainage swale along the northwest perimeter of the study area (16S014). Seven surface soil samples were collected along preferential drainage paths, hydraulically downgradient of areas of potential environmental concern, including fuel truck parking areas, oil-water separators, hazardous waste storage shelters, and a washrack drainage discharge point (16S008 through 16S013, and 16S018). These samples were submitted for total petroleum hydrocarbons (TPH) analysis as well as full suite Contract Laboratory program (CLP) target compound list (TCL) and target analyte list (TAL) analyses excluding pesticides, in

accordance with U.S. Environmental Protection Agency (USEPA) Level IV data quality objectives (DQOs).

The remaining surface soil sample (16S015) was composited from four subsamples collected beneath a pole-mounted transformer in the grassed truck parking area south of Building 7170. The four subsamples tested negative for polychlorinated biphenyls (PCBs) based on onsite immunoassay analyses. The composite sample was submitted for full suite CLP TCL and TAL analyses excluding pesticides to confirm the field screening results. No flame ionization detector (FID) deflections were noted during surface soil sample collection.

Additional surface soil samples in the depth range of 0 to 2 feet below land surface (bls) were collected from soil borings associated with structures within the study area and are described below.

1.2.1.3 **Surface Water and Sediment Samples** Two surface water and sediment samples were collected from the drainage ditch between the east perimeter of Study Area 16 and Avenue C. One surface water and sediment sample pair (16W019 and 16D019) was collected upgradient of the study area, approximately 50 feet north of the steel footbridge. The second surface water and sediment sample pair (16W020 and 16D020) was collected downgradient of the study area, approximately 10 feet north of the culvert at the intersection of Avenue C and Binnacle Way. The surface water was approximately 3 to 6 inches deep at each location, with dense hyacinth growth and a surface sheen. Sediment at both locations consisted of dark brown to black soft organic muck. Surface water samples were submitted for TPH, alkalinity, and full suite CLP TCL and TAL analyses in accordance with USEPA Level IV DQOs. Sediment samples were submitted for TPH, total organic carbon (TOC), and full suite CLP TCL and TAL analyses. No FID deflections were noted during sample collection.

1.2.1.4 **Soil Boring Investigation** Two soil borings were advanced to a depth of approximately 15 feet bls using a hollow-stem auger (HSA) drilling technique. One boring (16B001) was advanced adjacent to the oil-water separator near the northern corner of the study area. The second boring (16B002) was advanced in the southern corner of the study area, near an alleged leach field for Building 7172 and generally downgradient of most of the study area. During drilling operations, FID readings on split-spoon soil samples from 16B001 ranged from 20 to 80 parts per million (ppm) in the depth interval from 0 to 12 feet bls. One surface soil sample and one subsurface soil sample were collected from each boring. The subsurface soil samples were collected from the interval overlying the groundwater table, approximately 8 to 10 feet bls. The four soil samples (two from each boring) were submitted for TPH and full suite CLP TCL and TAL analyses excluding pesticides, in accordance with USEPA Level IV DQOs.

An additional subsurface soil sample (16B017, 3.5 to 4 feet bls) was collected from a hand-auger soil boring located approximately 15 feet northeast of the hazardous waste storage areas along the northeast fenceline of the study area, hydraulically downgradient of the oil-water separator. The sample was collected to evaluate whether or not potential releases from the hazardous waste storage areas or oil-water separator have affected the subsurface soil. No FID deflections were noted during sample collection. The soil sample was submitted for TPH and full suite CLP TCL and TAL analyses excluding pesticides, in accordance with USEPA Level IV DQOs.

Surface and subsurface soil samples were collected from a hand-auger soil boring (16B006) located adjacent to and hydraulically downgradient of an oil-water separator associated with the vehicle washrack west of Building 7169. The surface sample was collected at a depth of 0 to 1 foot bls, while the subsurface soil sample was collected at a depth of 5.5 to 6 feet bls. No FID deflections were noted during sample collection. Both samples were submitted for analysis to evaluate whether or not potential releases from the oil-water separator have affected the soil. The samples were analyzed for TPH and full suite CLP TCL and TAL analyses excluding pesticides and PCBs (PPCBs) in accordance with USEPA Level IV DQOs.

Soil boring logs are included in Appendix B.

Additional hand-augered soil samples were collected at other Study Area 16 locations, primarily focusing on specific concerns. These samples are discussed in Subsection 1.2.2.

1.2.1.5 **Groundwater Monitoring Well Installation and Sampling** Borings 16B001 and 16B002 were completed as monitoring wells OLD-16-01 and OLD-16-02, respectively. Both well screens were installed across the water table. One groundwater sample from each monitoring well was submitted for TPH, total suspended solids (TSS), and full suite CLP TCL and TAL analyses excluding PPCBs, in accordance with USEPA Level IV DQOs. Appendix B presents the monitoring well installation diagrams.

1.2.2 STUDY AREA 16, Specific Areas of Concern

1.2.2.1 **Building 7168** Heavy equipment, fuel trucks, and other vehicles have historically been parked in the area adjacent to Building 7168. In addition to the potential for release of hazardous materials from these vehicles, other environmental concerns associated with the building included the former oil-water separator and the associated underground used oil storage tank. Both the oil-water separator and the used oil storage tanks were removed under the TMP (ABB-ES, 1996) and a tank closure assessment report was approved by Florida Department of Environmental Protection (FDEP) in May, 1996 with a clean closure recommendation.

A hand-augered soil boring (16B007) was located between the oil-water separator and the associated UST. The boring was advanced to a total depth of 9 feet bls. The pavement construction in the area consisted of approximately 1½ inches of asphaltic concrete overlying approximately 8 inches of crushed stone base course material. The general soil profile encountered in the soil boring was composed of silty fine to medium sand with occasional traces of clay. Groundwater was encountered at a depth of approximately 8 feet bls. A surface soil sample (16B00701) was collected at a depth of 9½ to 18 inches bls from the soil interval underlying the crushed stone base. An additional soil sample (16B00702) was collected from the interval between 8 and 9 feet bls. No FID deflections were noted during sample collection. Both soil samples were submitted for TPH and CLP TCL and TAL analyses excluding PPCBs, in accordance with USEPA Level IV DQOs.

1.2.2.2 **Buildings 7169, 7170, 7171** No specific environmental concerns were identified in association with Buildings 7169 and 7170. Specific environmental concerns identified for Building 7171 relate to issues addressed in the TMP (ABB-ES, 1996). Elevated concentrations of VOCs were not detected in passive

soil gas collectors installed in the vicinity of these buildings. Groundwater was sampled downgradient from Buildings 7170 and 7171 (OLD-16-02 and an existing well near Former Building 7175 [16G005]). Therefore, no soil or groundwater samples were collected or analyzed specifically to address issues associated with these structures.

1.2.2.3 **Building 7172** The primary environmental concern identified for this facility is the potential for release of battery acid to the soil and groundwater. Elevated concentrations of VOCs were not detected in passive soil gas collectors installed in the vicinity of the building. It is visually apparent that the floor slab within the building has been affected by releases of acid. A trench excavated along a drain line on the east side of the building was open at the time of the field operations. The facility contact indicated the drain pipe had been destroyed by acid and that the drain pipe was connected to a leach field located in the grass parking area to the southeast.

A hand-auger soil boring was advanced adjacent to the drain pipe in the open trench on the southeast side of Building 7172 (16B021). In addition, two holes were cored through the concrete floor slab of the building in order to expose the underlying soil. The concrete cores indicate the floor slab had been repaired following extensive deterioration. Soil samples were collected from the interval directly beneath the floor slab at each of the two locations (16B022 and 16B023). One soil sample was collected at the estimated pipe invert elevation (1 to 2 feet bls). An additional soil sample was collected at a depth of approximately 6 to 7 feet bls. No FID deflections were noted during sample collection. The four soil samples collected at Building 7172 were submitted for pH determination and CLP TAL analyses.

These soil samples were collected in addition to the soil boring and monitoring well installed near the alleged leach field. The boring and well are discussed in Paragraphs 1.2.1.4 and 1.2.1.5, respectively.

1.2.2.4 **Building 7175** A groundwater sample (16G005) was collected from an existing groundwater monitoring well north of the former UST locations at Facility 7175. The sample was submitted for TPH, TSS, and CLP TCL and TAL analyses excluding PPCBs, in accordance with USEPA Level IV DQOs.

1.3 STUDY AREA 16, RESULTS. The results of site screening investigations at Study Area 16 are discussed below. Analytical results from the surface soil, subsurface soil, groundwater, surface water, and sediment collected from Study Area 16 are presented as Positive Hits Tables in Appendix C (Tables C-1 to C-5). A complete set of analytical results for these media is presented in Appendix D. Exceedances of background or regulatory guidance concentrations (shaded on the positive hits tables) are displayed in chem-boxes near their respective explorations on Figure 2.

1.3.1 Surface Soil There were no detections of VOCs in surface soil exceeding regulatory guidance levels (Table C-1). However, a number of SVOCs, primarily consisting of several PAHs have been detected in six surface sampling locations (16B006, 16S008, 16S009, 16S011, 16S013, and 16S014). Both the soil cleanup goals (SCGs) and residential risk-based concentrations (RBCs) were exceeded for six carcinogenic PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)-fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-

(Aroclor-1260) at location 16S018 at 280 micrograms per kilogram (μg/kg) exceeded the residential RBC of 83 μg/kg, but is below the SCG of 900 μg/kg.

There were no detections of inorganics in surface soil exceeding regulatory guidance levels, with the exception of arsenic at two locations (16S010 at 3.4 mg/kg and 16S018 at 2.1 mg/kg), which exceeded the SCG and residential RBC for arsenic as a carcinogen.

Leachability-based SCG values do not apply, as no organic compounds were present in groundwater above FDEP groundwater guidance concentrations (see below).

1.3.2 Subsurface Soil There are no exceedances of guidance concentrations for organic and inorganic analytes detected in subsurface soil samples (Table C-2). Several PAH compounds were detected in soil boring 16B006, but all are below their respective residential RBCs. Leachability-based SCG values do not apply, as no organic compounds were present in groundwater above FDEP groundwater guidance concentrations (see below).

1.3.3 Groundwater Approximately 1 foot of free product was noted in well OLD-16-01 on November 22, 1995. Fuel-related aromatic hydrocarbons ethylbenzene, toluene, and xylene were detected in groundwater from this well (sample 16G001) at 0.6J, 0.2J, and 3 micrograms per liter (μg/ℓ), respectively (Table C-3). Naphthalene was also detected at 2J μg/ℓ. All organic detections, however, are below their respective FDEP groundwater guidance concentrations. There are no other organic detections except for a bis(2-ethylhexyl)phthalate detection of 4 μg/ℓ at 16G005, which is interpreted to be a sampling and/or laboratory artifact. This concentration is below the FDEP groundwater primary standard.

All inorganic detections in groundwater do not exceed FDEP guidance concentrations, except for iron in one sample (16G001) at 1250 μg/ℓ. However, this iron concentration is only slightly above the background screening value of 1227 μg/ℓ (Table C-3).

1.3.4 Surface Water The calculations and rationale for determining appropriate ecological screening values for surface water are presented in Appendix E. Aluminum, iron, lead, mercury, silver, and zinc were detected in surface water samples exceeding surface water screening values.

1.3.5 Sediment The calculations and rationale for determining appropriate ecological screening values for sediment are presented in Appendix E. 1,2-Dichloroethene was detected in the upstream sediment sample at 2J μg/kg (16D019, Table C-5) but not in the duplicate (16D019D). Bis(2-ethylhexyl)phthalate was detected in two upstream sediment samples at 190J and 320J μg/kg (16D019 and 16D019D), exceeding the screening value of 182 μg/kg, but not in the downstream sample, 16D020. A PAH compound, fluoranthene, was detected in the downstream sediment sample at 230J μg/kg (16D020), exceeding the screening value of 113 μg/kg. Aroclor-1260 was detected in two upstream sediment samples at 280J μg/kg and 270 μg/kg, exceeding the screening value of 5 μg/kg.

Lead was detected in two sediment samples at an average of 24.2 mg/kg (20.5 mg/kg in 16D019 and 27.9 mg/kg in the duplicate) and 84.5 mg/kg (16D020), exceeding the screening value of 21 mg/kg. Sample 16D019 is the upstream sample, and 16D020 is the downstream sample.

1.4 STUDY AREA 16, CONCLUSIONS AND RECOMMENDATIONS. The pattern of semi-volatiles and PCB contamination in sediment suggests that some compounds may be entering the study area from an upstream source, although others are likely present due to past site usage.

There are no inorganic exceedances in surface soil, except for arsenic at two locations (16S010 at 3.4 mg/kg and 16S018 at 2.1 mg/kg), which exceeded the background concentration of 1.9 mg/kg and the SCG and residential RBC for arsenic as a carcinogen. These exceedances do not appear to be a contamination problem, due to the low levels detected and the lack of a significant contamination pattern and distribution. In surface soil, the concentrations of several PAHs exceeded both their respective residential RBCs and SCGs. These exceedances are likely related to use of the site as a motor pool and to the apparent lack of proper stormwater controls at the facility.

The nature and extent of the free product measured in monitoring well OLD-16-01 must be evaluated.

Because all known environmental concerns at Study Area 16 are petroleum related, the OPT transferred the site for evaluation under the NTC, Orlando TMP (ABB-ES, 1996). The results of subsequent investigations are not included in this document but may be found in the appropriate TMP reports, as they become available.

The undersigned members of the OPT concur with the findings and recommendations of the preceding investigation.

STUDY AREA 16	
Nancy Rodriguez U.S. Environmental Protection Agency, Region IV	10/16/96 Date
[illegible signature] Florida Department of Environmental Protection	10/16/96 Date
Wayne [illegible] U.S. Department of the Navy	10/16/96 Date

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ABB-ES, 1996, Base Realignment and Closure Tank Management Plan, NTC, Orlando, Florida: prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

APPENDIX A

SOIL GAS SURVEY FINDINGS

FINAL REPORT ON THE FINDINGS OF PASSIVE SOIL GAS SURVEYS STUDY AREA 16 NAVAL TRAINING CENTER (NTC), ORLANDO, FLORIDA

1.0 Executive Summary

The information contained herein has been extracted from the Target Environmental Services, Inc. (TARGET) report so that only information pertinent to Study Area 16 at NTC, Orlando is included. The complete report contains detailed information on quality assurance and quality control (QA/QC), laboratory procedures, and data tables. The complete report may be obtained from ABB Environmental Services, Inc. (ABB-ES), Orlando, Florida.

On April 18-23, 26, and May 1, 1995, TARGET conducted a soil gas survey at NTC, Orlando. Ninety-six passive soil gas samples were collected from Study Area 16 from depths of 2 to 3 feet. The samples were analyzed on a gas chromatograph equipped with an electron capture detector (GC/ECD) for halogenated hydrocarbons and a flame ionization detector (GC/FID) for petroleum hydrocarbons. The objective of the survey was to identify and possibly delineate the extent of volatile organic contamination within the shallow subsurface of the survey areas.

A very low level of petroleum hydrocarbons is present at location SG-47, but does not suggest the presence of a significant petroleum hydrocarbon contamination problem in the shallow subsurface of Study Area 16. Chlorinated hydrocarbon contamination was not evident in the shallow subsurface of Study Area 16.

2.0 Introduction

ABB-ES contracted TARGET to perform a passive soil gas survey of Study Area 16 at NTC, Orlando in Orlando, Florida. The objective of the survey was to identify and delineate the extent of possible volatile organic contamination within the shallow subsurface of these sites.

The survey sampling grids were designed by ABB-ES, and onsite changes to the sampling plan were directed by ABB-ES in response to site conditions encountered by TARGET during sampling. The proposed sampling plan included passive soil gas samples to be collected from the sites at depths of 2 to 3 feet and at an approximate grid spacing of 50 feet. The depth to groundwater was expected to be approximately 5 feet, but varied at some locations from 3 feet to 10 feet. The field phase of the survey was conducted on April 18-23, 26, and May 1, 1995.

3.0 Sample Collection and Analysis

Ninety-six passive soil gas samples were collected from the survey area at depths of 2 to 3 feet at the locations shown on Figure 1A. After multiple attempts, proposed soil gas sample SG-512 was not installed due to impenetrable ground at that location.

All of the samples collected during the field phase of the survey were subjected to dual analyses. One analysis was conducted according to U.S. Environmental Protection Agency (USEPA) Method 8010 (modified) on a GC/ECD and using direct injection. Specific analytes standardized for this analysis were as follows:

- 1,1-dichloroethene (11DCE)
- methylene chloride (CH_2Cl_2)
- trans-1,2-dichloroethene (t12DCE)
- 1,1-dichloroethane (11DCA)
- cis-1,2-dichloroethene (c12DCE)
- chloroform ($CHCl_3$)
- 1,1,1-trichloroethane (111TCA)
- carbon tetrachloride (CCl_4)
- trichloroethene (TCE)
- 1,1,2-trichloroethane (112TCA)
- tetrachloroethene (PCE)

The chlorinated hydrocarbons in this suite were chosen because of their common usage in industrial solvents and/or their degradational relationship to commonly used compounds.

The second analysis was conducted according to USEPA Method 8020 (modified) on a GC/FID and using direct injection. The analytes selected for standardization in this analysis were as follows:

benzene
toluene
ethylbenzene
meta- and para-xylene
ortho-xylene

These compounds were chosen because of their utility in evaluating the presence of fuel products or petroleum-based solvents.

The tabulated results of the laboratory analyses of the soil gas samples are reported in micrograms per liter-vapor, not to be confused with "micrograms per liter" (parts per billion) in water analyses. The two are not equivalent in gas analyses due to the difference in the mass of equal volumes of water and gas matrices.

4.0 Results and Interpretation

In order to provide graphic presentation of the results, selected data have been mapped and contoured to produce Figures 2 and 3. Dashed contours are used where patterns are extrapolated into areas of less complete data or as auxiliary contours. Map sample points with no data shown indicate that the analyte concentrations in the sample were below the reporting limit.

GC/FID analysis of the soil gas samples collected from Study Area 16 revealed a very low level of total FID volatiles as naphtha (Figure 2) in Sample SG-47, which was collected at the southern end of the fuel island. Sample SG-47 also contained a very low level of benzene (Figure 3). None of the remaining FID analytes were present above their respective reporting limits in any of the soil gas samples from Study Area 16. The FID chromatogram signature of Sample SG-47 exhibits a pattern of small peaks representing very low levels of petroleum hydrocarbons and is otherwise insufficient to allow chromatographic interpretation of the original product. The very low level of volatile hydrocarbons observed at this one location does not suggest the presence of a significant

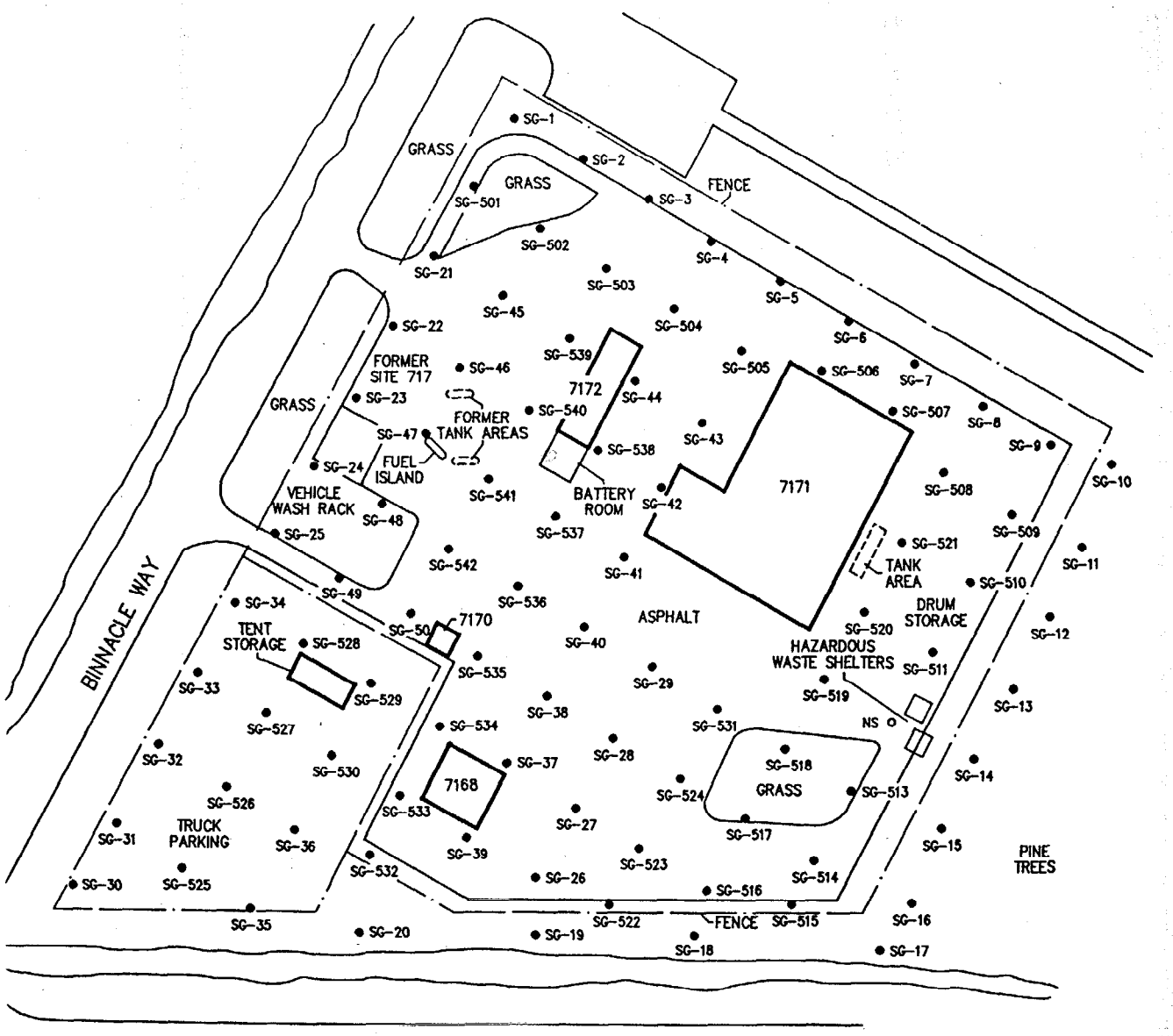
petroleum hydrocarbon contamination problem in the shallow subsurface of Study Area 16.

GC/ECD analysis revealed that none of the standardized chlorinated compounds were present above their respective reporting limits in any of the soil gas samples from Study Area 16.

5.0 Conclusions

- A very low level of petroleum hydrocarbons is present at location SG-47, but does not suggest the presence of a significant petroleum hydrocarbon contamination problem in the shallow subsurface of Study Area 16.

- Chlorinated hydrocarbon contamination was not evident in the shallow subsurface of Study Area 16.



0 50 100
FEET

● SOIL GAS SAMPLE LOCATION
○ NOT SAMPLED (UNCOLLECTABLE)

FIGURE 1A. Sample Locations

STUDY AREA 16
NAVAL TRAINING CENTER ORLANDO
ORLANDO, FLORIDA

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

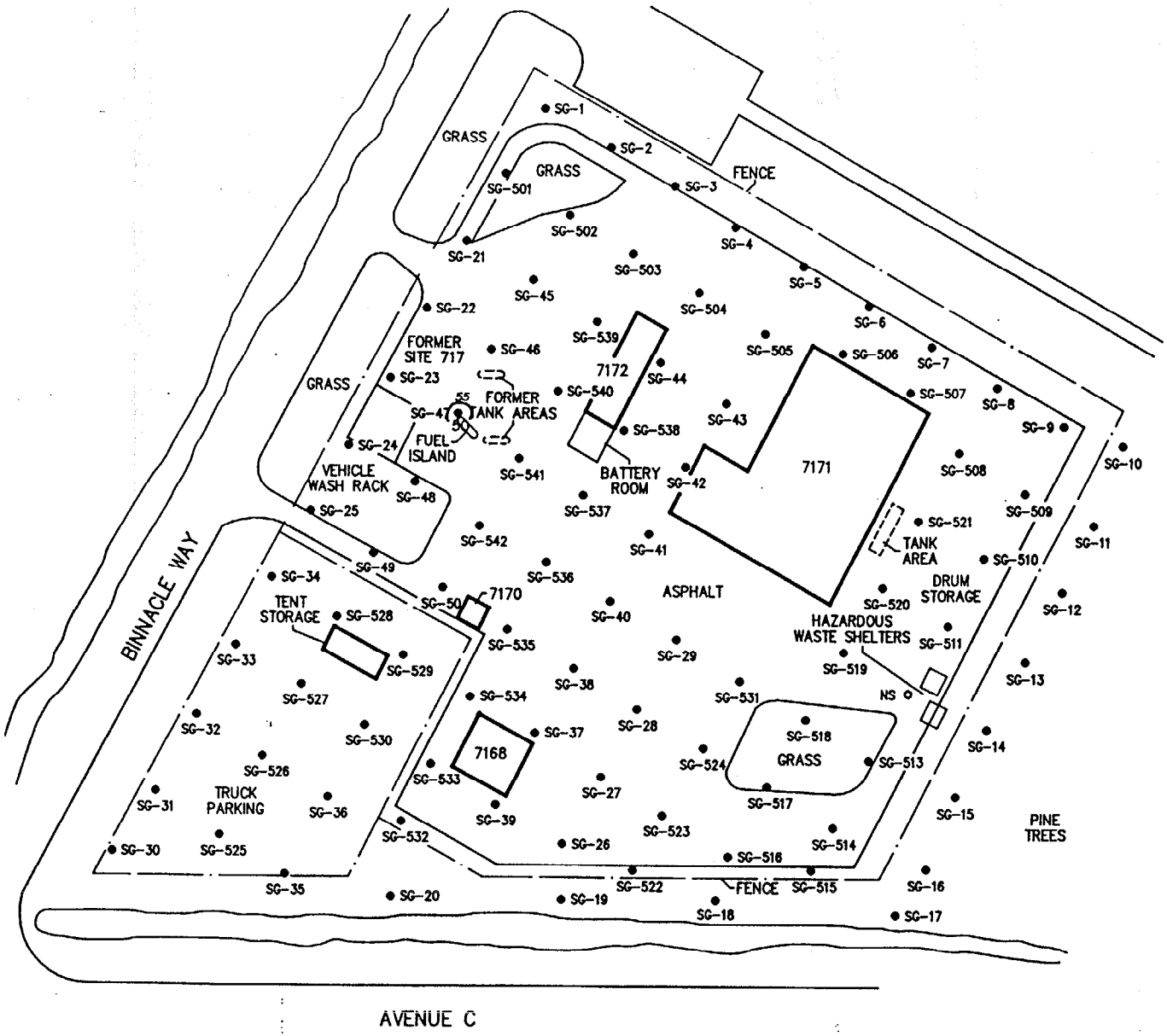
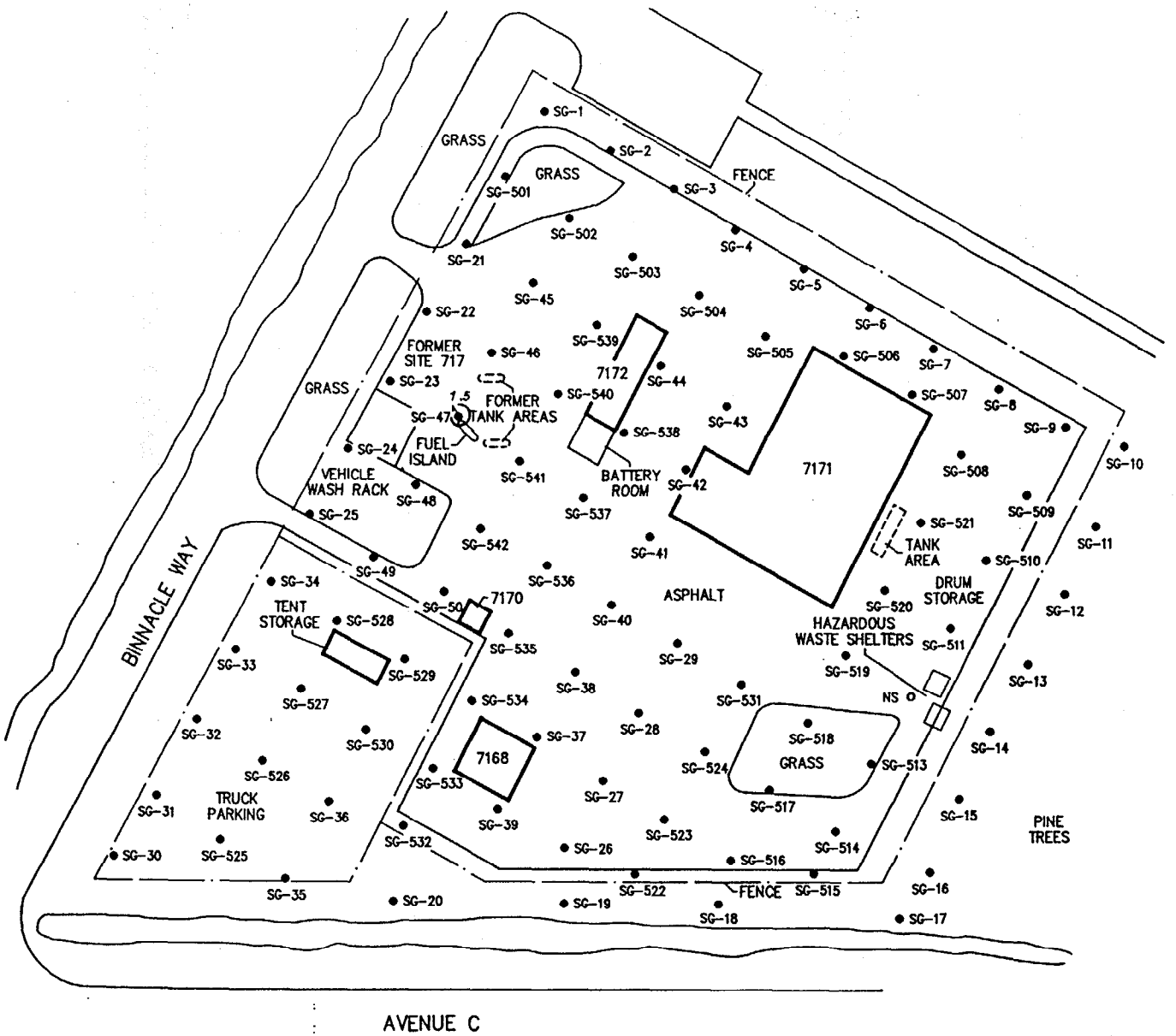


FIGURE 2. Total FID as Naphtha (calc'd $\mu g/l$)

STUDY AREA 16
NAVAL TRAINING CENTER ORLANDO
ORLANDO, FLORIDA

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.



0 50 100
FEET

● SOIL GAS SAMPLE LOCATION
○ NOT SAMPLED (UNCOLLECTABLE)

FIGURE 3. Benzene ($\mu g/l$)

STUDY AREA 16
NAVAL TRAINING CENTER ORLANDO
ORLANDO, FLORIDA

TARGET ENVIRONMENTAL SERVICES, INC.

This map is integral to a written report and should be viewed in that context.

APPENDIX B

BORING LOGS AND MONITORING WELL INSTALLATION DIAGRAMS

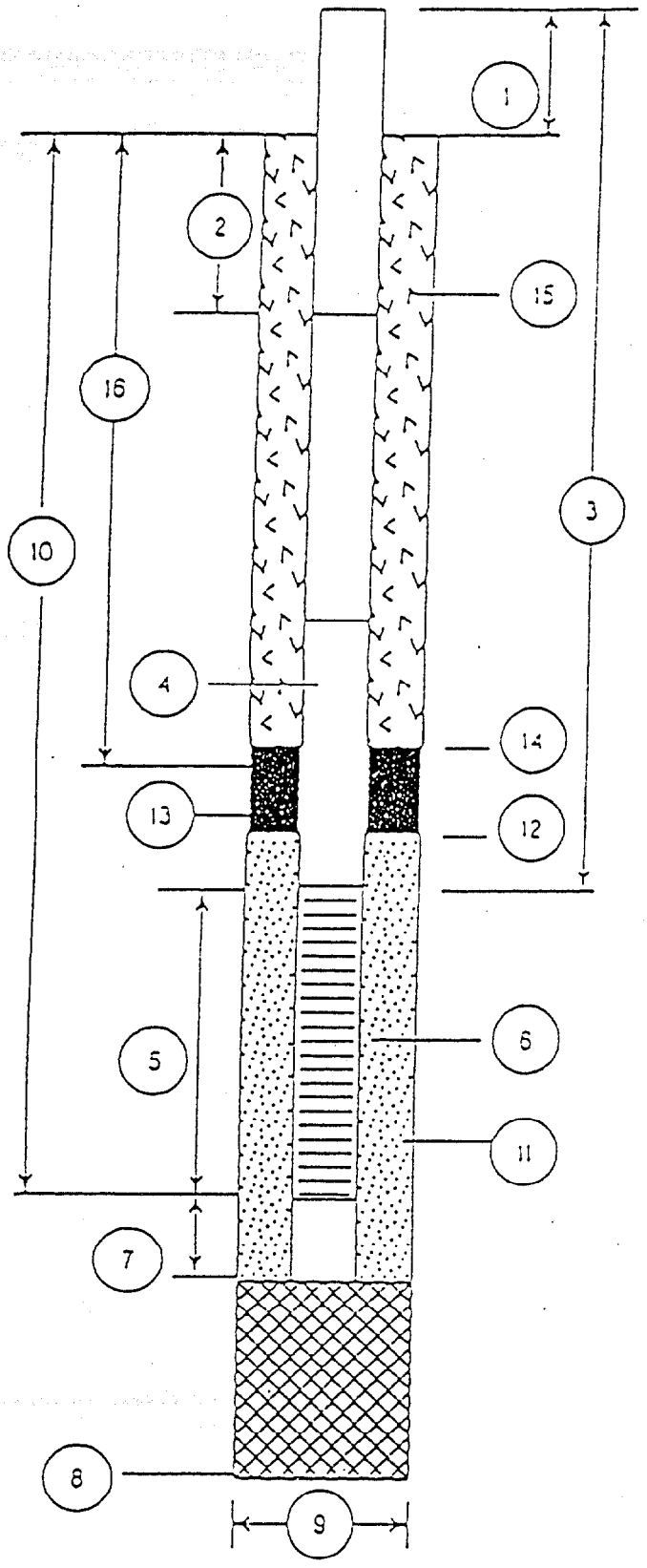
Project: BRAC NTC, Group III Site Screening		**Site:** S.A. 16	**Boring ID:** OLD-16-01
Client: SOUTHDIVNAVFACENGCOM			**Job No.:** CTO-107
Contractor: GEOTEK		**Date started:** 05/18/95	**Completd:** 05/18/95
Method: Hollow stem auger	**Boring Diam.:** 6.25"	**Screen:** 10 ft.	**Protection level:** D
Ground Elev.:	**Type of OVM.:** Porta FID	**Total depth:** 16Ft.	**Dpth to ∇** 9 Ft.
Logged by: M. Hawes	**Material:** PVC		

Depth Ft.	Sample ID (Depth)	Spoon Int.	Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.
					Asphalt			
	16B00101 (1-2')			50	QUARTZ SAND: Dark brown, fine, silty		SP	
				80				
					QUARTZ SAND: Light brown, fine, silty			2,2
5			80%	50				4,7
								8,13
			60%	40				14,20
	16B00102 (8-10')							7,7
			70%	40				14,14
10								6,9
			80%	20				12,14
								7,8
			80%	5				9,11
								2,2
15			80%	0				4,6

 ABB ENVIRONMENTAL SERVICES, INC.

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SC.



WELL CONSTRUCTION DETAIL

WELL NUMBER: OLD-16-01

DATE OF INSTALLATION: 5/18/9

1. Height of Casing above ground: 0
2. Depth to first Coupling: 4'

   Coupling Interval Depths: 10'
3. Total Length of Riser Pipe: 4'
4. Type of Riser Pipe: 2" ϕ Schedule 40 PVC
5. Length of Screen: 10'
6. Type of Screen: 2" ϕ, .010 in. slot size Sch 40 P
7. Length of Sump: ~~6" 2"~~ 6"
8. Total Depth of Boring: 15.5'
9. Diameter of Boring: 6.25"
10. Depth to Bottom of Screen: 13.5'
11. Type of Screen Filter: 20/30 Silica Sand / Top 1 6 30/65 Sil

    Quantity Used: 600 lb Size: 75
12. Depth to Top of Filter: 2'
13. Type of Seal: Baroid 3/8" ϕ Bentonite Pellots

    Quantity Used: 20 lb
14. Depth to Top of Seal: 1.5'
15. Type of Grout: Portland Cement

    Grout Mixture:

    Method of Placement: ____
16. Tot. Depth of 6 in. Steel Casing: N/A

Project: BRAC NTC, Group III Site Screening	**Site:** S.A. 16	**Boring ID:** OLD-16-02
Client: SOUTHDIVNAVFACENGCOM		**Job No.:** CTO-107
Contractor: GEOTEK	**Date started:** 05/18/95	**Compltd:** 05/18/95
Method: Hollow stem auger	**Boring Diam.:** 8.25"	**Screen:** 10 ft. **Protection level:** D
Ground Elev.:	**Type of OVM.:** Porta FID	**Total depth:** 16Ft. **Dpth to ∇** 9.5 Ft.
Logged by: M. Hawes	**Material:** PVC	

Depth Ft.	Sample ID (Depth)	Spoon Int.	Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.
	16B00201 (0-2')				QUARTZ SAND: Gray, fine		SP	
					SILTY SAND: Dark brown, fine, trace organics		SM	
				0				3,4
5			90%					3,4
				0				4,6
			90%					6,8
	16B00202 (8-10')			0				3,6
			90%					5,7
10				0				3,6
			80%					7,8
				0				3,3
			80%					6,8
				0				3,6
15			80%					10,13

 ABB ENVIRONMENTAL SERVICES, INC.

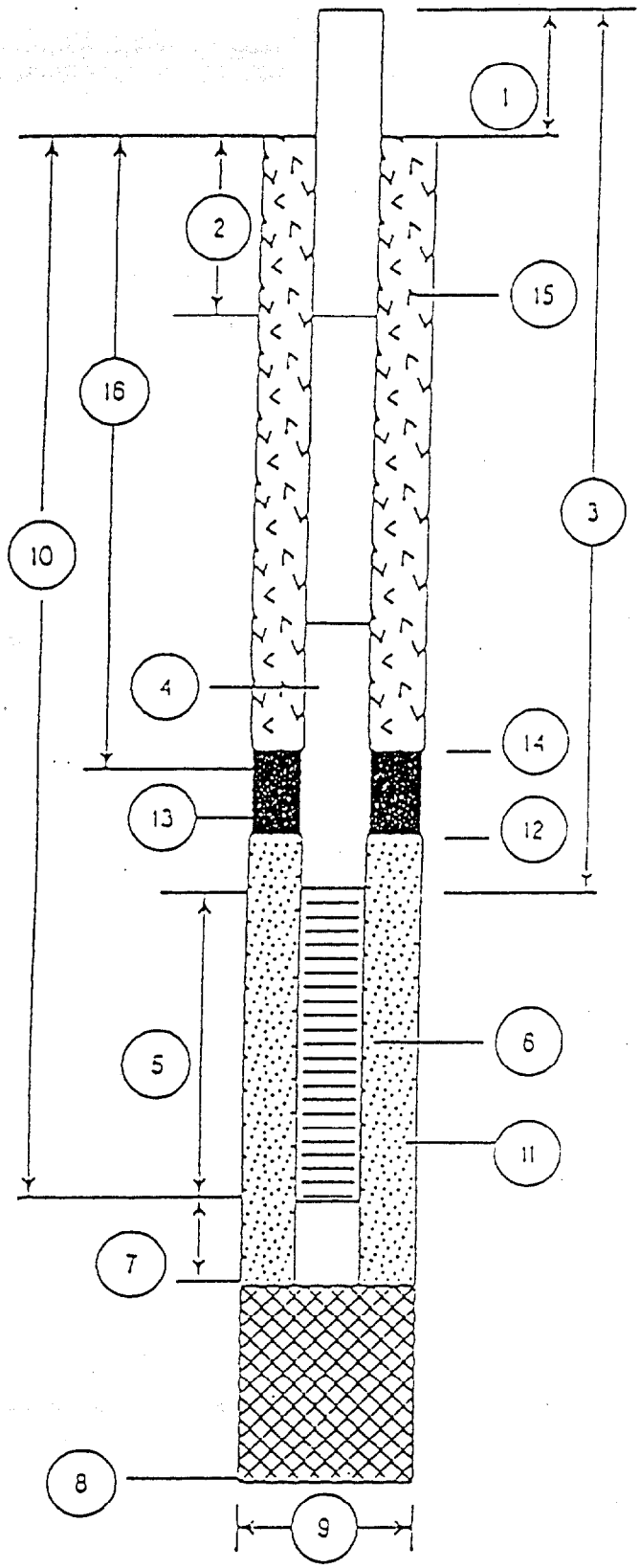
DEPARTMENT OF THE NAVY

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SC.

WELL CONSTRUCTION DETAIL

WELL NUMBER: OLD-16-02

DATE OF INSTALLATION: 5/18/95



1. Height of Casing above ground: 0
2. Depth to first Coupling: 5'
   Coupling Interval Depths: 10'
3. Total Length of Riser Pipe: ~~10'~~ ~~4'~~ 5'
4. Type of Riser Pipe: 2" ϕ Schedule 40 PVC
5. Length of Screen: 10'
6. Type of Screen: 2" ϕ .010 in. slot size Schedule 40 PV
7. Length of Sump: ~~2'~~ 6"
8. Total Depth of Boring: 15.5'
9. Diameter of Boring: 6.25"
10. Depth to Bottom of Screen: 14.5'
11. Type of Screen Filter: 20/30 Silica Sand / 30/65 Silica Sa (Top 1 ft)
    Quantity Used: 600 lb Size: 75 lb
12. Depth to Top of Filter: 2'
13. Type of Seal: Baroid 3/8" ϕ Bentonite Pellets
    Quantity Used: 20 lb
14. Depth to Top of Seal: 1.5'
15. Type of Grout: Portland Cement
    Grout Mixture:
    Method of Placement: ____
16. Tot. Depth of 6 in. Steel Casing: N/A

APPENDIX C

POSITIVE HITS TABLES

C-1 Summary of Positive Detections in Surface Soil Analytical Results
C-2 Summary of Positive Detections in Subsurface Soil Analytical Results
C-3 Summary of Positive Detections in Groundwater Analytical Results
C-4 Summary of Positive Detections in Surface Water Analytical Results
C-5 Summary of Positive Detections in Sediment Analytical Results

APPENDIX C-1

SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL ANALYTICAL RESULTS

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]	SCG [2]	RBC [3] for Residential Soil	RBC [3] for Industrial Soil	16S00800	16S00900	16S00900D	16S01000	16S01100	16S01200
Sampling Date					3/29/95	3/29/95	3/29/95	3/29/95	3/29/95	3/29/95
Feet bls					1	1	1	1	1	1
Volatile Organics, ug/kg										
2-Butanone		2,200,000	47,000,000 n	1,000,000,000 n						
Acetone		260,000	7,800,000 n	200,000,000 n						
Tetrachloroethene		12,000	12,000 c	110,000 c		1 J				
Semivolatile Organics, ug/kg										
Acenaphthene		2,800,000	4,700,000 n	120,000,000 n			110 J		580 J	
Anthracene		20,000,000	23,000,000 n	610,000,000 n		100 J	340 J		860 J	
Benzo(a)anthracene		1,400	880 c	7,800 c	360	1,100	2,000		11,000	
Benzo(a)pyrene		100	88 c	780 c	400	1,200	1,700		16,000	
Benzo(b)fluoranthene		1,400	880 c	7,800 c	710	1,400	2,100		23,000	39 J
Benzo(g,h,i)perylene		14,000	2300000 n	61,000,000 n	270 J	510	930		8,100	
Benzo(k)fluoranthene		14,000	8,800 c	78,000 c	610	1,200	1,600		17,000	38 J
Carbazole		42,000	32,000 c	290,000 c	77 J		89 J		2,700 J	
Chrysene		140,000	88,000 c	780,000 c	590 J	1,200 J	1,800 J		15,000 J	39 J
Dibenz(a,h)anthracene		100	88 c	780 c	120 J	320 J	410		3,400 J	
Dibenzofuran		240,000	310,000 n	8,200,000 n			76 J		380 J	
Fluoranthene		2,900,000	3,100,000 n	82,000,000 n	830	1,800	3,500 D		22,000	53 J
Fluorene		2,400,000	3,100,000 n	82,000,000 n			100 J		530 J	
Indeno(1,2,3-cd)pyrene		1,400	880 c	7,800 c	270 J	610	750		14,000	
Phenanthrene		1,700,000	2,300,000 n	61,000,000 n	270 J	330 J	1,200		9,000	
Pyrene		2,200,000	2,300,000 n	61,000,000 n	610	1,400	2,200		16,000	46 J
Pesticides/PCBs, ug/kg										
Aroclor-1260		900	83 c	740 c						
Inorganics, mg/kg										
Aluminum	4,870	75,000	78,000 n	1,000,000 n	247	1,430	1220	23900	5080	286
Antimony		26	31 n	820 n					2.9 B	
Arsenic	1.9	0.8	0.43 c/23 n	3.8 c/610 n		0.48 B	0.35 B	3.4	1.3 B	
Barium	21.6	5,200	5,500 n	140,000 n	4.1 B	4.7 B	4.1 B	3.3 B	19.4 B	3 B

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]		SCG [2]		RBC [3] for Residential Soil		RBC [3] for Industrial Soil		16S00800		16S00900		16S00900D		16S01000		16S01100		16S01200	
Sampling Date									3/29/95		3/29/95		3/29/95		3/29/95		3/29/95		3/29/95	
Feet bls									1		1		1		1		1		1	
Beryllium	0.46		0.2		0.15 c		1.3 c				0.07	B	0.05	B	0.26	B	0.23	B		
Cadmium			37		39 n		1,000 n										3.8			
Calcium	33,568		ND		1,000,000		1,000,000		637	B	2,130		2000		514	B	67100		1030	
Chromium	7.7		290		390 n		10,000 n		1.2	B	1.4	B	1.4	B	14.8		35		0.83	B
Cobalt			4,700		4,700 n		120,000 n													
Copper	2.6		ND		3,100 n		82,000 n		3.1	B							16.2			
Iron	843		ND		23,000 n		610,000 n		107		230		203		1260		3920		70.9	
Lead	21.3		500		400		400		11.9		4.6		4.9		3.8		146		4.5	
Magnesium	381		ND		460,468		460,468		17.9	B	69.7	B	65.7	B	26.9	B	525	B	32.8	B
Manganese	10.8		370		1800 n		47,000 n		1.8	B	2.1	B	2.4	B	0.61	B	30.1		0.57	B
Mercury	0.05		23		23 n		610 n								0.09					
Nickel			1,500		1,600 n		41,000 n				1.4	B			6.1	B	4.7	B		
Potassium	210		ND		1,000,000		1,000,000										122	B		
Selenium	1.1		390		390 n		10,000 n				0.17	B			1.4					
Sodium			ND		1,000,000		1,000,000		113	B	129	B	117	B	143	B	146	B	92.4	B
Vanadium	4.9		490		550 n		14,000 n		0.54	B	0.66	B	0.7	B	17.9		12.3		0.33	B
Zinc	4.6		23,000		23,000 n		610,000 n		6.3		5.5		6.9				131		27.9	
General chemistry																				
pH, Solid (units)	ND		ND		ND		ND		7.05		7.45		7.38		7.3		7.82		8.21	
Total Petroleum Hydrocarbons, mg/kg	ND		ND		ND		ND		74.5		52.5		138		53.1		269		18.4	

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]	SCG [2]	RBC [3] for Residential Soil	RBC [3] for Industrial Soil	16S01300	16S01400	16S01500	16S01800	16B00101	16B00201
Sampling Date					3/29/95	3/29/95	3/29/95	5/26/95	5/18/95	5/18/95
Feet bls					1	1	1	1	1	2
Volatile Organics, ug/kg										
2-Butanone		2,200,000	47,000,000 n	1,000,000,000 n	2 J					
Acetone		260,000	7,800,000 n	200,000,000 n				6 J	15	
Tetrachloroethene		12,000	12,000 c	110,000 c						
Semivolatile Organics, ug/kg										
Acenaphthene		2,800,000	4,700,000 n	120,000,000 n	87 J					
Anthracene		20,000,000	23,000,000 n	610,000,000 n	270 J	60 J				
Benzo(a)anthracene		1,400	880 c	7,800 c	2,400	1,000				
Benzo(a)pyrene		100	88 c	780 c	2,300	2,100				
Benzo(b)fluoranthene		1,400	880 c	7,800 c	3,900 D	2,800				
Benzo(g,h,i)perylene		14,000	2300000 n	61,000,000 n	1,200	1,300				
Benzo(k)fluoranthene		14,000	8,800 c	78,000 c	3,200	1,600				
Carbazole		42,000	32,000 c	290,000 c	870	220 J				
Chrysene		140,000	88,000 c	780,000 c	2,900 J	1,700 J				
Dibenz(a,h)anthracene		100	88 c	780 c	600	560				
Dibenzofuran		240,000	310,000 n	8,200,000 n	89 J					
Fluoranthene		2,900,000	3,100,000 n	82,000,000 n	5,400 D	2,200				
Fluorene		2,400,000	3,100,000 n	82,000,000 n	140 J					
Indeno(1,2,3-cd)pyrene		1,400	880 c	7,800 c	1,400	1,800				
Phenanthrene		1,700,000	2,300,000 n	61,000,000 n	2,900	710				
Pyrene		2,200,000	2,300,000 n	61,000,000 n	4,000 D	1,700				
Pesticides/PCBs, ug/kg										
Aroclor-1260		900	83 c	740 c				290 J		
Inorganics, mg/kg										
Aluminum	4,870	75,000	78,000 n	1,000,000 n	4,730	1,440		13,800	1,920	579
Antimony		26	31 n	820 n						
Arsenic	1.9	0.8	0.43 c/23 n	3.8 c/610 n	0.49 B	0.44 B		2.1 J	0.8 B	
Barium	21.6	5,200	5,500 n	140,000 n	32.4 B	8.3 B		13.6 B	1.9 J	1.9 J

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]	SCG [2]	RBC [3] for Residential Soil	RBC [3] for Industrial Soil	16S01300	16S01400	16S01500	16S01800	16B00101	16B00201
Sampling Date					3/29/95	3/29/95	3/29/95	5/26/95	5/18/95	5/18/95
Feet bls					1	1	1	1	1	2
Beryllium	0.46	0.2	0.15 c	1.3 c	0.08 B	0.07 B		0.17 B		
Cadmium		37	39 n	1,000 n	0.92 B	1.2				
Calcium	33,568	ND	1,000,000	1,000,000	577 B	1,970		570 B	3,400	354 B
Chromium	7.7	290	390 n	10,000 n	12.4	6.6		8	1.8 B	1.2 B
Cobalt		4,700	4,700 n	120,000 n				0.76 B		
Copper	2.6	ND	3,100 n	82,000 n	6.7	9.5		2.3 B		1.8 B
Iron	843	ND	23,000 n	610,000 n	466	516		262	671	39.8
Lead	21.3	500	400	400	128	43.3		10.6 J	1.4 J	5.7 J
Magnesium	381	ND	460,468	460,468	161 B	119 B		26.1 B	26.7 B	25 B
Manganese	10.8	370	1800 n	47,000 n	1.4 B	19.2		1.3 B	0.45 B	0.51 B
Mercury	0.05	23	23 n	610 n				0.06	0.03 B	0.04 B
Nickel		1,500	1,600 n	41,000 n	1.9 B	1.2 B		5.9 B		
Potassium	210	ND	1,000,000	1,000,000						
Selenium	1.1	390	390 n	10,000 n	0.21 B	0.17 B				
Sodium		ND	1,000,000	1,000,000	156 B	137 B		5.3 B		
Vanadium	4.9	490	550 n	14,000 n	5.1 B	3.7 B		3.3 B	1.2 B	0.87 B
Zinc	4.6	23,000	23,000 n	610,000 n	26.5	55.7		13.4		
General chemistry										
pH, Solid (units)	ND	ND	ND	ND	7.45	7.69	7.1			
Total Petroleum Hydrocarbons, mg/kg	ND	ND	ND	ND	561	136		22.2		

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]		SCG [2]		RBC [3] for Residential Soil		RBC [3] for Industrial Soil		16B00601		16B02101		16B02201		16B02301		16B00701	
Sampling Date									6/2/95		5/2/95		5/2/95		5/2/95		6/2/95	
Feet bls									1		2		1		1		1	
Volatile Organics, ug/kg																		
2-Butanone			2,200,000		47,000,000 n		1,000,000,000 n											
Acetone			260,000		7,800,000 n		200,000,000 n											
Tetrachloroethene			12,000		12,000 c		110,000 c											
Semivolatile Organics, ug/kg																		
Acenaphthene			2,800,000		4,700,000 n		120,000,000 n											
Anthracene			20,000,000		23,000,000 n		610,000,000 n											
Benzo(a)anthracene			1,400		880 c		7,800 c		170	J								
Benzo(a)pyrene			100		88 c		780 c		150	J								
Benzo(b)fluoranthene			1,400		880 c		7,800 c		280	J								
Benzo(g,h,i)perylene			14,000		2300000 n		61,000,000 n		120	J								
Benzo(k)fluoranthene			14,000		8,800 c		78,000 c		240	J								
Carbazole			42,000		32,000 c		290,000 c											
Chrysene			140,000		88,000 c		780,000 c		260	J								
Dibenz(a,h)anthracene			100		88 c		780 c											
Dibenzofuran			240,000		310,000 n		8,200,000 n											
Fluoranthene			2,900,000		3,100,000 n		82,000,000 n		410									
Fluorene			2,400,000		3,100,000 n		82,000,000 n											
Indeno(1,2,3-cd)pyrene			1,400		880 c		7,800 c		120	J								
Phenanthrene			1,700,000		2,300,000 n		61,000,000 n											
Pyrene			2,200,000		2,300,000 n		61,000,000 n		200	J								
Pesticides/PCBs, ug/kg																		
Aroclor-1260			900		83 c		740 c											
Inorganics, mg/kg																		
Aluminum	4,870		75,000		78,000 n		1,000,000 n		460	J	3,870		1,900		4,350		1,860	J
Antimony			26		31 n		820 n											
Arsenic	1.9		0.8		0.43 c/23 n		3.8 c/610 n											
Barium	21.6		5,200		5,500 n		140,000 n		3.7	B	2	B	4.6	B	16.6	B	2.3	B

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]		SCG [2]		RBC [3] for Residential Soil		RBC [3] for Industrial Soil		16B00601		16B02101		16B02201		16B02301		16B00701	
Sampling Date									6/2/95		5/2/95		5/2/95		5/2/95		6/2/95	
Feet bls									1		2		1		1		1	
Beryllium	0.46		0.2		0.15 c		1.3 c											
Cadmium			37		39 n		1,000 n											
Calcium	33,568		ND		1,000,000		1,000,000		708	B	649	J	137	J	5420	J	8,060	
Chromium	7.7		290		390 n		10,000 n		1.3	B	2.9		2.1	B	4.7		3	
Cobalt			4,700		4,700 n		120,000 n				0.8	B			0.69	B		
Copper	2.6		ND		3,100 n		82,000 n				48.6				3.9	B		
Iron	843		ND		23,000 n		610,000 n		132	J	453	J	159	J	447	J	55.6	J
Lead	21.3		500		400		400		4.5	J	4.4		2.4		10.6		4.9	J
Magnesium	381		ND		460,468		460,468		36.1	B	66	B	26.8	B	128	B	82.3	B
Manganese	10.8		370		1800 n		47,000 n		1.8	B	1.2	B	0.45	B	3.3	B	1.3	B
Mercury	0.05		23		23 n		610 n								0.03	B	0.06	
Nickel			1,500		1,600 n		41,000 n											
Potassium	210		ND		1,000,000		1,000,000						106	B	232	B		
Selenium	1.1		390		390 n		10,000 n											
Sodium			ND		1,000,000		1,000,000								54.2	B		
Vanadium	4.9		490		550 n		14,000 n				2.4	B	0.84	B	3.3	B	3.2	B
Zinc	4.6		23,000		23,000 n		610,000 n		13		0.78	B	0.27	B	4.6	B	26.4	
General chemistry																		
pH, Solid (units)	ND		ND		ND		ND		8.7		7.9		4.55		7.5			
Total Petroleum Hydrocarbons, mg/kg	ND		ND		ND		ND										148	

Table C-1. Summary of Positive Detections in Surface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

NOTES:

[1] The background screening value is twice the average of detected concentrations for inorganic analytes.

[2] SCG = Soil Cleanup Goals for Florida (Florida Department of Environmental Protection memorandum, September 29, 1995). Arsenic value is as revised in Applicability of Soil Cleanup Goals for Florida (FDEP memorandum, January 19, 1996). Values indicated are from a residential scenario.
Chromium values are for Chromium VI.

[3] RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith. RBC for chromium is based on chromium VI. RBC for lead is not available, value is Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER directive 9355-4-12). For essential nutrients (calcium, magnesium, potassium, and sodium) screening values were derived based on recommended daily allowances (RDAs). RBC for Aroclor-1260 is not available, value is RBC for PCBs. RBC for benzo(g,h,i)perylene and phenanthrene are not available, value is based on pyrene.

n = noncarcinogenic pathway
c = carcinogenic pathway
ND = Not determined.
bls = below land surface
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.
ug/kg = micrograms per kilogram.
OSWER = Office of Solid Waste and Emergency Response.
USEPA = U.S. Environmental Protection Agency.
B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).
D = Indicates value was determined during a diluted reanalysis.
J = Reported concentration is an estimated quantity.
All inorganics results expressed in milligrams per kilogram (mg/kg) soil dry weight; organics in micrograms per kilogram (ug/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.

APPENDIX C-2

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL ANALYTICAL RESULTS

Table C-2. Summary of Positive Detections in Subsurface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Background Screening [1]	SCG [2]	RBC [3] for Residential Soil	RBC [3] for Industrial Soil	16B00102	16B00202	16B00602	16B00702	16B01701	16B02102
Sampling Date					5/18/95	5/18/95	6/2/95	6/2/95	5/26/95	5/2/95
Feet bls					8	8	5.5	8	3.5	6
Volatile Organics, ug/kg										
2-Butanone		NA	47,000,000 n	1,000,000,000 n		5 J				
Acetone		NA	7,800,000 n	200,000,000 n	49	23	6 J	7 J	19	
Pesticides/PCBs, ug/kg										
Aroclor-1260		NA	83 c	740 c					43 J	
Inorganics, mg/kg										
Aluminum	11,130	NA	78,000 n	1,000,000 n	617	4,810	4,900 J	6,960 J	866	1,310
Arsenic	2.0	NA	0.43 c/23 n	3.8 c/610 n		0.84 B	0.47 B	0.61 B	0.74 B	
Barium	11.3	NA	5,500 n	140,000 n	4.1 J	18.3 J	23.9 B	32.2 B	3 B	3.6 B
Beryllium	0.18	NA	0.15 c	1.3 c		0.05 J				
Calcium	321	NA	1,000,000	1,000,000	533 B	98.6 B	457 B	697 B	95 B	879 J
Chromium	11.3	NA	390 n	10,000 n	1.9 B	7.2	6.7	7.7	1.7 B	1.7 B
Cobalt	1.3	NA	4,700,000 n	120,000,000						0.83 B
Copper	2.8	NA	3,100 n	82,000 n		4.2 B				3.3 B
Iron	829	NA	23,000	610,000	91.5	229	350 J	205 J	65.2	89.9 J
Lead	7.0	NA	400	400	1.2 J	6.3 J	12.7 J	5.3 J	2.7 J	5.6 J
Magnesium	38.9	NA	460,468	460,468	8.3 B	49.7 B	66.8 B	86.5 B	6.3 B	15.8 B
Manganese	0.69	NA	1,800 n	47,000 n	0.61 B	0.78 B	0.93 B	0.76 B	0.28 B	1 B
Mercury	0.12	NA	23 n	610 n		0.09		0.03 B		
Nickel	11.3	NA	1,600 n	41,000 n			3.4 B			
Potassium		NA	1,000,000	1,000,000						113 B
Selenium	1.4	NA	390 n	10,000 n		0.96 B		0.69 B		
Silver	1.1	NA	390 n	10,000 n						0.62 B
Vanadium	5.9	NA	550 n	14,000 n	1.4 B	2.8 B	2.7 B	4.3 B	0.72 B	1.2 B
Zinc	0.66	NA	23,000 n	610,000 n	0.44 B	1.3 B	1.2 B	2.2 B	1.5 B	0.65 B
General chemistry										
pH, Solids	ND	NA	ND	ND						8
Total Petroleum Hydrocarbons, mg/kg	ND	NA	ND	ND	17.4		98.3	329	252	

Table C-2. Summary of Positive Detections in Subsurface Soil Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

NOTES:

[1] The background screening value is twice the average of detected concentrations for inorganic analytes.
[2] SCG = Soil Cleanup Goals for Florida (Florida Department of Environmental Protection memorandum, September 29, 1995).
[3] RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith. RBC for chromium is based on chromium VI. RBC for lead is not available, value is Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER directive 9355-4-12). For essential nutrients (calcium, magnesium, and potassium) screening values were derived based on recommended daily allowances (RDAs). RBC for Aroclor-1260 is not available, value is RBC for PCBs.

n = noncarcinogenic pathway
c = carcinogenic pathway
NA = Not applicable.
bls = below land surface
mg/kg = milligrams per kilogram.
ug/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
OSWER = Office of Solid Waste and Emergency Response.
USEPA = U.S. Environmental Protection Agency.
B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).
J = Reported concentration is an estimated quantity.
All inorganics results expressed in milligrams per kilogram (mg/kg) soil dry weight; organics in micrograms per kilogram (ug/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.

APPENDIX C-3

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER ANALYTICAL RESULTS

Table C-3. Summary of Positive Detections in Groundwater Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Well ID					OLD-16-01		OLD-16-02			
Identifier	Background Screening [1]	FDEPG	FEDMCL	RBC [2] for Tap Water	16G00101		16G00201		16G00501	
Sampling Date					6/1/95		6/1/95		6/1/95	
Volatile Organics, ug/L										
Ethylbenzene		30 [3] /700 [5]	700	1,300 n	0.6	J				
Toluene		40 [3] /1,000 [5]	1,000	750 n	0.2	J				
Xylene (total)		20 [3] /10,000 [5]	10,000	12,000 n	3					
Semivolatile Organics, ug/L										
bis(2-Ethylhexyl)phthalate		6 [6]	ND	4.8 c					4	
Naphthalene		6.8 [6]	ND	1,500 n	2	J				
Inorganics, ug/L										
Aluminum	4,067	200 [3]	ND	37,000 n	34.7	B	496		1,010	
Antimony	4.1	6 [5]	6	15 n	2.7	B			2.8	B
Arsenic	5	50 [5]	50	0.045 c/11 n	2.7	J				
Barium	31.4	2,000 [5]	2,000	2,600 n	20	J	17	J	41.9	J
Beryllium		4 [5]	4	0.016 c					0.12	J
Calcium	36,830	ND	ND	1,000,000	90,800		4,220	B	23,000	
Copper	5.4	1,000 [3]	ND	1,500 n					191	
Iron	1,227	300 [3]	ND	11,000 n	1,250		484		217	
Lead	4	15 [5]	15	15					5.1	
Magnesium	4,560	ND	ND	118,807	3,280	B	1,360	B	1,350	B
Manganese	17	50 [3]	ND	840 n	14.4	B	7.7	B	5.9	B
Potassium	5,400	ND	ND	297,016	683	J	804	J	2,080	J
Selenium	9.7	50 [5]	ND	180 n					3.6	J
Sodium	18,222	160,000 [5]	ND	396,022	2,810	B	2,680	B	7,990	
Vanadium	20.6	49 [4]	ND	260 n	4.2	B	7.5	B	10.7	B
Zinc	4	5,000 [3]	ND	11,000 n	3	B	9.3	B	12.6	B
General chemistry, mg/L										
pH	ND	ND	ND	ND	NA		NA		6.45	
Total Suspended Solids	ND	ND	ND	ND	ND		1		1	

Table C-3. Summary of Positive Detections in Groundwater Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

NOTES:

[1] Groundwater background screening value is twice the average of detected concentrations for inorganic analytes.
[2] RBC = Risk-Based Concentration Table, USEPA Region III, May 1996, R.L. Smith. RBC for chromium is based on chromium VI. RBC for lead is not available, value is treatment technology action limit for lead in drinking water distribution system identified in Drinking Water Standards and Health Advisories (USEPA, 1995). For essential nutrients (calcium, magnesium, potassium, and sodium) screening values were derived based on recommended daily allowances (RDAs).
[3] Secondary Standard.
[4] Systemic Toxicant
[5] Primary Standard
[6] Organoleptic
n = noncarcinogenic pathway
c = carcinogenic pathway
ND = Not determined.
ID = identifier
USEPA = U.S. Environmental Protection Agency.
FDEPG = Florida Department of Environmental Protection, Groundwater Guidance Concentrations, June 1994.
FEDMCL= Federal Maximum Contaminant Levels, Primary Drinking Water Regulations and Health Advisories, February 1996.
B = Reported concentration is between the instrument detection limit (IDL) and the contract required detection limit (CRDL).
J = Reported concentration is an estimated quantity.
ug/l = micrograms per liter.
mg/l = miligrams per liter.
Bold/shaded numbers indicate exceedance of groundwater guidance and background.
Blank space indicates analyte/compound was not detected at the reporting limit.

APPENDIX C-4

SUMMARY OF POSITIVE DETECTIONS IN SURFACE WATER ANALYTICAL RESULTS

Table C-4. Summary of Positive Detections in Surface Water Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Surface Water Screening Value		16W01900		16W02000	
Sampling Date			5/16/95		5/16/95	
Volatile Organics, ug/L						
Acetone			12		23	
Semivolatile Organics, ug/L						
2-Methylphenol					4	J
Phenol	256 (2)				1	J
Inorganics, ug/L						
Aluminum	87 (1,4)		2,400		229	
Arsenic	50 (3)		3.1	B	3.1	J
Barium			26.8	B	20.1	B
Beryllium	0.13 (3)		0.13	B		
Calcium			11,600		11,700	
Iron	1,000 (1,3)		9,800		12,300	
Lead	0.7 (1,5)		13.5			
Magnesium			2,270	B	2,230	B
Manganese			49.2		71.5	
Mercury	0.012 (1)		0.13	B		
Potassium					1,620	B
Silver	0.012 (2)				2.8	B
Sodium			5,430		6,020	
Zinc	38 (1,5)		48.1			
General chemistry, mg/L						
Alkalinity as $CaCO_3$	NA		26		34	

Table C-4. Summary of Positive Detections in Surface Water Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

NOTES:

[1] Federal Ambient Water Criteria, chronic values (USEPA, 1991; 1988)
[2] USEPA Region IV Waste Management Division Chronic Freshwater Quality Screening Values based on the Water Quality Standards Units Screening List (USEPA, 1992).
[3] Chapter 62-302. Florida Administrative Code Surface Water Quality Standards; 1995
[4] Criterion is based on pH of 6.5 - 9 (USEPA, 1988).
[5] Hardness dependent criterion. Average water hardness of 30 mg/L $CaCO_3$ was used to calculate criteria.

mg/L = milligrams per liter
ug/L = micrograms per liter.
NA = Not applicable.
J = Reported concentration is an estimated quantity.
B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).
Bold/shaded values indicate exceedance of surface water screening value.
Blank space indicates analyte/compound was not detected at the reporting limit.

APPENDIX C-5

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT ANALYTICAL RESULTS

Table C-5. Summary of Positive Detections in Sediment Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

Identifier	Sediment Screening Value		16D01900		16D01900D		16D02000	
Sampling Date			5/26/95		5/26/95		5/26/95	
Volatile Organics, ug/kg								
1,2-Dichloroethene (total)			2	J				
Acetone			11	J	14	J	24	
Semivolatile Organics, ug/kg								
bis(2-Ethylhexyl)phthalate	182		190	J	320	J		
Fluoranthene	113 (2)						238	J
Pesticides/PCBs, ug/kg								
Aroclor-1260	4		280	J	270			
Inorganics, mg/kg								
Aluminum			3060		4340		4910	
Arsenic	6		1.8	B	2.6	J	2.7	J
Barium			6.5	B	11.1	B	8	B
Beryllium			0.07	B	0.11	B	0.1	B
Calcium			36.8	B	50	B	159	B
Chromium	26 (3)		4.3		7.5		7.9	
Cobalt	50 (3)				1.1	B		
Copper	16 (3)		3.6	B	7.5	B	6.4	B
Iron	20,000 (3)		288		370		618	
Lead	21 (1)		20.5	J	27.9	J	64.5	J
Magnesium			26.8	B	38.6	B	49.6	B
Manganese	460 (3)		0.19	B	0.24	B	0.88	B
Mercury	0.1 (1)		0.05		0.08		0.09	
Sodium			6.2	B	15.1	B	21.6	B
Vanadium			4.2	B	6.2	B	5.7	B
Zinc	68 (1)		17.2		28.2		50.2	
General chemistry, mg/kg								
Total Organic Carbon	NA		9130		12200		17900	
Total Petroleum Hydrocarbons	NA		577		335		377	

Table C-5. Summary of Positive Detections in Sediment Analytical Results, Study Area 16

Naval Training Center, Orlando
Orlando, FL

NOTES:

[1] Draft Region IV Waste Management Division Sediment Screening Values for Hazardous Waste Sites (2/16/94 Version).

[2] MacDonald, 1994. Approach to the Assessment of Sediment Quality in Florida Coastal Waters. Volume 1 - Development and Evaluation of Sediment Quality Assessment Guidelines. Prepared by MacDonald Environmental Sciences Ltd., Ladysmith, BC for Florida Department of Environmental Protection, Tallahassee, Florida.

[3] Persaud et al. 1992. Guidelines of the Protection and Management of Aquatic Sediment Quality in Ontario. Ontario Ministry of the Environment, Water Resources Branch. June 1992, reprinted August 1992. ISBN 0-7729-9248-7.

NA = Not applicable
mg/kg = milligrams per kilogram
ug/kg = micrograms per liter.
PCB = polychlorinated biphenyl.
J = Reported concentration is an estimated quantity.
B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).
Bold/shaded values indicate exceedance of sediment screening value.
Blank space indicates analyte/compound was not detected at the reporting limit.

APPENDIX D

ANALYTICAL RESULTS

D-1 Summary of Surface Soil Analytical Results
D-2 Summary of Subsurface Soil Analytical Results
D-3 Summary of Surface Water Analytical Results
D-4 Summary of Sediment Analytical Results
D-5 Summary of Groundwater Analytical Results

APPENDIX D-1

SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS

Appendix D-1. Summary of Surface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16S00800		16S00900		16S00900		16S00900D		16S00900D		16S01000		16S01100		16S01100		16S01200	
Lab ID	G7225006		G7225009		G7225009R		G7225007		G7225007DL		G7225008		G7225002		G7225002R		G7225001	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95	
Volatile organics, ug/kg																		
1,1,1-Trichloroethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,1,2,2-Tetrachloroethane	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
1,1,2-Trichloroethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,1-Dichloroethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,1-Dichloroethene	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,2-Dichloroethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,2-Dichloroethene (total)	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
1,2-Dichloropropane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
2-Butanone	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
2-Hexanone	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
4-Methyl-2-pentanone	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
Acetone	10	U	3	U	2	UR	11	U	NA		12	U	11	U	2	UR	10	U
Benzene	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Bromodichloromethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Bromoform	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Bromomethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Carbon disulfide	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Carbon tetrachloride	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Chlorobenzene	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
Chloroethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Chloroform	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Chloromethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
cis-1,3-Dichloropropene	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Dibromochloromethane	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Ethylbenzene	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
Methylene chloride	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Styrene	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
Tetrachloroethene	10	U	1	J	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
Toluene	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U
trans-1,3-Dichloropropene	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Trichloroethene	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Vinyl chloride	10	U	11	U	11	UR	11	U	NA		12	U	11	U	11	UR	10	U
Xylene (total)	10	U	11	UJ	11	UR	11	U	NA		12	U	11	UJ	11	UR	10	U

Appendix D-1. Summary of Surface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16S00800		16S00900				16S00900D				16S01000		16S01100				16S01200	
Lab ID	G7225006		G7225009		G7225009R		G7225007		G7225007DL		G7225008		G7225002		G7225002R		G7225001	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95	
Semivolatile organics, ug/kg																		
1,2,4-Trichlorobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
1,2-Dichlorobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
1,3-Dichlorobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
1,4-Dichlorobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,2'-oxybis(1-Chloropropane)	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,4,5-Trichlorophenol	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
2,4,6-Trichlorophenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,4-Dichlorophenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,4-Dimethylphenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,4-Dinitrophenol	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
2,4-Dinitrotoluene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2,6-Dinitrotoluene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2-Chloronaphthalene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2-Chlorophenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2-Methylnaphthalene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2-Methylphenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
2-Nitroaniline	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
2-Nitrophenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
3,3'-Dichlorobenzidine	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
3-Nitroaniline	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
4,6-Dinitro-2-methylphenol	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
4-Bromophenyl-phenylether	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
4-Chloro-3-methylphenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
4-Chloroaniline	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
4-Chlorophenyl-phenylether	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
4-Methylphenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
4-Nitroaniline	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
4-Nitrophenol	830	U	870	U	NA		870	U	1400	UR	980	U	8600	U	NA		820	U
Acenaphthene	340	U	360	U	NA		110	J	99	DR	400	U	580	J	NA		340	U
Acenaphthylene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Anthracene	340	U	100	J	NA		340	J	330	DR	400	U	860	J	NA		340	U
Benzo(a)anthracene	360		1100		NA		2000		2000	DR	400	U	11000		NA		340	U
Benzo(a)pyrene	400		1200		NA		1700		1700	DR	400	U	16000		NA		340	U

Appendix D-1. Summary of Surface Soil Analytical Results
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Naval Training Center, Orlando
Orlando, FL

Sample ID	16S00800		16S00900				16S00900D				16S01000		16S01100				16S01200	
Lab ID	G7225006		G7225009		G7225009R		G7225007		G7225007DL		G7225008		G7225002		G7225002R		G7225001	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95	
Benzo(b)fluoranthene	710		1400		NA		2100		1800	DR	400	U	23000		NA		39	J
Benzo(g,h,i)perylene	270	J	510		NA		930		1000	DR	400	U	8100		NA		340	U
Benzo(k)fluoranthene	610		1200		NA		1600		1300	DR	400	U	17000		NA		38	J
bis(2-Chloroethoxy)methane	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
bis(2-Chloroethyl)ether	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
bis(2-Ethylhexyl)phthalate	340	U	360	U	NA		360	U	120	DR	400	U	3500	U	NA		340	U
Butylbenzylphthalate	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Carbazole	77	J	360	U	NA		89	J	83	DR	400	U	2700	J	NA		340	U
Chrysene	590	J	1200	J	NA		1800	J	1900	DR	400	U	15000	J	NA		39	J
Di-n-butylphthalate	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Di-n-octylphthalate	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Dibenz(a,h)anthracene	120	J	320	J	NA		410		480	DR	400	U	3400	J	NA		340	U
Dibenzofuran	340	U	360	U	NA		76	J	65	DR	400	U	380	J	NA		340	U
Diethylphthalate	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Dimethylphthalate	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Fluoranthene	830		1800		NA		3200	ER	3500	D	400	U	22000		NA		53	J
Fluorene	340	U	360	U	NA		100	J	89	DR	400	U	530	J	NA		340	U
Hexachlorobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Hexachlorobutadiene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Hexachlorocyclopentadiene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Hexachloroethane	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Indeno(1,2,3-cd)pyrene	270	J	610		NA		750		1000	DR	400	U	14000		NA		340	U
Isophorone	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
N-Nitroso-di-n-propylamine	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
N-Nitrosodiphenylamine (1)	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Naphthalene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Nitrobenzene	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Pentachlorophenol	830	U	870	U	NA		870	U	1400	UR	400	U	8600	U	NA		820	U
Phenanthrene	270	J	330	J	NA		1200		1200	DR	400	U	9000		NA		340	U
Phenol	340	U	360	U	NA		360	U	570	UR	400	U	3500	U	NA		340	U
Pyrene	610		1400		NA		2200		2600	DR	400	U	16000		NA		46	J
PCBs, ug/kg																		
Aroclor-1016	34	U	180	UJ	NA		180	UJ	NA		40	U	350	U	NA		34	U
Aroclor-1221	70	U	360	UJ	NA		360	UJ	NA		82	U	720	U	NA		69	U

Appendix D-1. Summary of Surface Soil Analytical Results
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Naval Training Center, Orlando
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Sample ID	16S00800		16S00900			16S00900D			16S01000		16S01100			16S01200	
Lab ID	G7225006		G7225009		G7225009R	G7225007		G7225007DL	G7225008		G7225002		G7225002R	G7225001	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95	29-Mar-95		29-Mar-95	29-Mar-95		29-Mar-95		29-Mar-95	29-Mar-95	
Aroclor-1232	34	U	180	UJ	NA	180	UJ	NA	40	U	350	U	NA	34	U
Aroclor-1242	34	U	180	UJ	NA	180	UJ	NA	40	U	350	U	NA	34	U
Aroclor-1248	34	U	180	UJ	NA	180	UJ	NA	40	U	350	U	NA	34	U
Aroclor-1254	34	U	180	UJ	NA	180	UJ	NA	40	U	350	U	NA	34	U
Aroclor-1260	34	U	180	UJ	NA	180	UJ	NA	40	U	350	U	NA	34	U
Inorganics, ug/kg															
Aluminum	247		1430		NA	1220		NA	23900		5080		NA	286	
Antimony	1.9	U	1.9	U	NA	1.9	U	NA	2.2	U	2.9	B	NA	1.8	U
Arsenic	0.15	U	0.48	B	NA	0.35	B	NA	3.4		1.3	B	NA	0.14	U
Barium	4.1	B	4.7	B	NA	4.1	B	NA	3.3	B	19.4	B	NA	3	B
Beryllium	0.04	U	0.07	B	NA	0.05	B	NA	0.26	B	0.23	B	NA	0.04	U
Cadmium	0.27	U	0.28	U	NA	0.28	U	NA	0.32	U	3.8		NA	0.27	U
Calcium	637	B	2130		NA	2000		NA	514	B	67100		NA	1030	
Chromium	1.2	B	1.4	B	NA	1.4	B	NA	14.8		35		NA	0.83	B
Cobalt	0.6	U	0.59	U	NA	1.2	U	NA	0.68	U	2.8	U	NA	0.55	U
Copper	3.1	B	1.5	U	NA	2	U	NA	1.3	U	16.2		NA	1.3	U
Iron	107		230		NA	203		NA	1260		3920		NA	70.9	
Lead	11.9		4.6		NA	4.9		NA	3.8		146		NA	4.5	
Magnesium	17.9	B	69.7	B	NA	65.7	B	NA	26.9	B	525	B	NA	32.8	B
Manganese	1.8	B	2.1	B	NA	2.4	B	NA	0.61	B	30.1		NA	0.57	B
Mercury	0.03	U	0.03	U	NA	0.03	U	NA	0.09		0.03	U	NA	0.03	U
Nickel	1.1	U	1.4	B	NA	1.1	U	NA	6.1	B	4.7	B	NA	1.1	U
Potassium	95.9	U	99.9	U	NA	99.7	U	NA	112	U	122	B	NA	94.3	U
Selenium	0.13	U	0.17	B	NA	0.13	U	NA	1.4		0.13	UJ	NA	0.12	U
Silver	0.48	U	0.5	U	NA	0.5	U	NA	0.56	U	0.5	U	NA	0.47	U
Sodium	113	B	129	B	NA	117	B	NA	143	B	146	B	NA	92.4	B
Thallium	0.13	U	0.13	U	NA	0.13	U	NA	0.15	U	0.13	U	NA	0.12	U
Vanadium	0.54	B	0.66	B	NA	0.7	B	NA	17.9		12.3		NA	0.33	B
Zinc	6.3		5.5		NA	6.9		NA	1.5	U	131		NA	27.9	
General Chemistry															
pH, units	7.05		7.45		NA	7.38		NA	7.3		7.82		NA	8.21	
Total Petroleum Hydrocarbons, mg/k	74.5		52.5		NA	138		NA	53.1		269		NA	18.4	

Appendix D-1. Summary of Surface Soil Analytical Results
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Naval Training Center, Orlando
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Sample ID	16S01300				16S01400		16S01500		16S01800	
Lab ID	G7225005		G7225005DL		G7225004		G7225010		G7678005	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		26-May-95	
Volatile organics, ug/kg										
1,1,1-Trichloroethane	13	U	NA		11	U	NA		11	U
1,1,2,2-Tetrachloroethane	13	U	NA		11	U	NA		11	U
1,1,2-Trichloroethane	13	U	NA		11	U	NA		11	U
1,1-Dichloroethane	13	U	NA		11	U	NA		11	U
1,1-Dichloroethene	13	U	NA		11	U	NA		11	U
1,2-Dichloroethane	13	U	NA		11	U	NA		11	U
1,2-Dichloroethene (total)	13	U	NA		11	U	NA		11	U
1,2-Dichloropropane	13	U	NA		11	U	NA		11	U
2-Butanone	2	J	NA		11	U	NA		11	U
2-Hexanone	13	U	NA		11	U	NA		11	U
4-Methyl-2-pentanone	13	U	NA		11	U	NA		11	U
Acetone	13	U	NA		11	U	NA		6	J
Benzene	13	U	NA		11	U	NA		11	U
Bromodichloromethane	13	U	NA		11	U	NA		11	U
Bromoform	13	U	NA		11	U	NA		11	U
Bromomethane	13	U	NA		11	U	NA		11	U
Carbon disulfide	13	U	NA		11	U	NA		11	U
Carbon tetrachloride	13	U	NA		11	U	NA		11	U
Chlorobenzene	13	U	NA		11	U	NA		11	U
Chloroethane	13	U	NA		11	U	NA		11	U
Chloroform	13	U	NA		11	U	NA		11	U
Chloromethane	13	U	NA		11	U	NA		11	U
cis-1,3-Dichloropropene	13	U	NA		11	U	NA		11	U
Dibromochloromethane	13	U	NA		11	U	NA		11	U
Ethylbenzene	13	U	NA		11	U	NA		11	U
Methylene chloride	13	U	NA		11	U	NA		11	U
Styrene	13	U	NA		11	U	NA		11	U
Tetrachloroethene	13	U	NA		11	U	NA		11	U
Toluene	13	U	NA		11	U	NA		11	U
trans-1,3-Dichloropropene	13	U	NA		11	U	NA		11	U
Trichloroethene	13	U	NA		11	U	NA		11	U
Vinyl chloride	13	U	NA		11	U	NA		11	U
Xylene (total)	13	U	NA		11	U	NA		11	U

Appendix D-1. Summary of Surface Soil Analytical Results
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Naval Training Center, Orlando
Orlando, FL

Sample ID	16S01300				16S01400		16S01500		16S01800	
Lab ID	G7225005		G7225005DL		G7225004		G7225010		G7678005	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		26-May-95	
Semivolatile organics, ug/kg										
1,2,4-Trichlorobenzene	420	U	680	UR	360	U	NA		380	U
1,2-Dichlorobenzene	420	U	680	UR	360	U	NA		380	U
1,3-Dichlorobenzene	420	U	680	UR	360	U	NA		380	U
1,4-Dichlorobenzene	420	U	680	UR	360	U	NA		380	U
2,2'-oxybis(1-Chloropropane)	420	U	680	UR	360	U	NA		380	U
2,4,5-Trichlorophenol	1000	U	1600	UR	880	U	NA		960	U
2,4,6-Trichlorophenol	420	U	680	UR	360	U	NA		380	U
2,4-Dichlorophenol	420	U	680	UR	360	U	NA		380	U
2,4-Dimethylphenol	420	U	680	UR	360	U	NA		380	U
2,4-Dinitrophenol	1000	U	1600	UR	880	U	NA		960	U
2,4-Dinitrotoluene	420	U	680	UR	360	U	NA		380	U
2,6-Dinitrotoluene	420	U	680	UR	360	U	NA		380	U
2-Chloronaphthalene	420	U	680	UR	360	U	NA		380	U
2-Chlorophenol	420	U	680	UR	360	U	NA		380	U
2-Methylnaphthalene	420	U	680	UR	360	U	NA		380	U
2-Methylphenol	420	U	680	UR	360	U	NA		380	U
2-Nitroaniline	1000	U	1600	UR	880	U	NA		960	U
2-Nitrophenol	420	U	680	UR	360	U	NA		380	U
3,3'-Dichlorobenzidine	420	U	680	UR	360	U	NA		380	U
3-Nitroaniline	1000	U	1600	UR	880	U	NA		960	U
4,6-Dinitro-2-methylphenol	1000	U	1600	UR	880	U	NA		960	U
4-Bromophenyl-phenylether	420	U	680	UR	360	U	NA		380	U
4-Chloro-3-methylphenol	420	U	680	UR	360	U	NA		380	U
4-Chloroaniline	420	U	680	UR	360	U	NA		380	U
4-Chlorophenyl-phenylether	420	U	680	UR	360	U	NA		380	U
4-Methylphenol	420	U	680	UR	360	U	NA		380	U
4-Nitroaniline	1000	U	1600	UR	880	U	NA		960	U
4-Nitrophenol	1000	U	1600	UR	880	U	NA		960	U
Acenaphthene	87	J	85	DR	360	U	NA		380	U
Acenaphthylene	420	U	680	UR	360	U	NA		380	U
Anthracene	270	J	160	DR	60	J	NA		380	U
Benzo(a)anthracene	2400		2400	DR	1000		NA		380	U
Benzo(a)pyrene	2300		2400	DR	2100		NA		380	U

Appendix D-1. Summary of Surface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16S01300				16S01400		16S01500		16S01800	
Lab ID	G7225005		G7225005DL		G7225004		G7225010		G7678005	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		26-May-95	
Benzo(b)fluoranthene	3500	ER	3900	D	2800		NA		380	U
Benzo(g,h,i)perylene	1200		1300	DR	1300		NA		380	U
Benzo(k)fluoranthene	3200		2700	DR	1600		NA		380	U
bis(2-Chloroethoxy)methane	420	U	680	UR	360	U	NA		380	U
bis(2-Chloroethyl)ether	420	U	680	UR	360	U	NA		380	U
bis(2-Ethylhexyl)phthalate	420	U	320	DR	360	U	NA		380	U
Butylbenzylphthalate	420	U	680	UR	360	U	NA		380	U
Carbazole	870		600	DR	220	J	NA		380	U
Chrysene	2900	J	3200	DR	1700	J	NA		380	U
Di-n-butylphthalate	420	U	680	UR	360	U	NA		380	U
Di-n-octylphthalate	420	U	680	UR	360	U	NA		380	U
Dibenz(a,h)anthracene	600		640	DR	560		NA		380	U
Dibenzofuran	89	J	74	DR	360	U	NA		380	U
Diethylphthalate	420	U	680	UR	360	U	NA		380	U
Dimethylphthalate	420	U	680	UR	360	U	NA		380	U
Fluoranthene	6400	ER	5400	D	2200		NA		380	U
Fluorene	140	J	78	DR	360	U	NA		380	U
Hexachlorobenzene	420	U	680	UR	360	U	NA		380	U
Hexachlorobutadiene	420	U	680	UR	360	U	NA		380	U
Hexachlorocyclopentadiene	420	U	680	UR	360	U	NA		380	U
Hexachloroethane	420	U	680	UR	360	U	NA		380	U
Indeno(1,2,3-cd)pyrene	1400		1500	DR	1800		NA		380	U
Isophorone	420	U	680	UR	360	U	NA		380	U
N-Nitroso-di-n-propylamine	420	U	680	UR	360	U	NA		380	U
N-Nitrosodiphenylamine (1)	420	U	680	UR	360	U	NA		380	U
Naphthalene	420	U	680	UR	360	U	NA		380	U
Nitrobenzene	420	U	680	UR	360	U	NA		380	U
Pentachlorophenol	1000	U	1600	UR	880	U	NA		960	U
Phenanthrene	2900		2300	DR	710		NA		380	U
Phenol	420	U	680	UR	360	U	NA		380	U
Pyrene	3600	ER	4000	D	1700		NA		380	U
PCBs, ug/kg										
Aroclor-1016	210	UJ	NA		180	UJ	37	U	77	U
Aroclor-1221	430	UJ	NA		370	UJ	76	U	160	U

Appendix D-1. Summary of Surface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16S01300				16S01400		16S01500		16S01800	
Lab ID	G7225005		G7225005DL		G7225004		G7225010		G7678005	
Sampling Date	29-Mar-95		29-Mar-95		29-Mar-95		29-Mar-95		26-May-95	
Aroclor-1232	210	UJ	NA		180	UJ	37	U	77	U
Aroclor-1242	210	UJ	NA		180	UJ	37	U	77	U
Aroclor-1248	210	UJ	NA		180	UJ	37	U	77	U
Aroclor-1254	210	UJ	NA		180	UJ	37	U	77	U
Aroclor-1260	210	UJ	NA		180	UJ	37	U	280	J
Inorganics, ug/kg										
Aluminum	4730		NA		1440		NA		13800	
Antimony	2.3	U	NA		1.9	U	NA		6.8	U
Arsenic	0.49	B	NA		0.44	B	NA		2.1	J
Barium	32.4	B	NA		8.3	B	NA		13.6	B
Beryllium	0.08	B	NA		0.07	B	NA		0.17	B
Cadmium	0.92	B	NA		1.2		NA		0.71	U
Calcium	577	B	NA		1970		NA		570	B
Chromium	12.4		NA		6.6		NA		8	
Cobalt	1.4	U	NA		2.9	U	NA		0.76	B
Copper	6.7		NA		9.5		NA		2.3	B
Iron	466		NA		516		NA		262	
Lead	128		NA		43.3		NA		10.6	J
Magnesium	161	B	NA		119	B	NA		26.1	B
Manganese	1.4	B	NA		19.2		NA		1.3	B
Mercury	0.04	U	NA		0.03	U	NA		0.06	
Nickel	1.9	B	NA		1.2	B	NA		5.9	B
Potassium	118	U	NA		100	U	NA		101	U
Selenium	0.21	B	NA		0.17	B	NA		0.52	U
Silver	0.59	U	NA		0.5	U	NA		0.59	U
Sodium	156	B	NA		137	B	NA		5.3	B
Thallium	0.15	U	NA		0.13	U	NA		0.41	U
Vanadium	5.1	B	NA		3.7	B	NA		3.3	B
Zinc	26.5		NA		55.7		NA		13.4	
General Chemistry										
pH, units	7.45		NA		7.69		7.1		NA	
Total Petroleum Hydrocarbons, mg/k	561		NA		136		NA		22.2	

APPENDIX D-2

SUMMARY OF SUBSURFACE SOIL ANALYTICAL RESULTS

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B00101		16B00102		16B00201		16B00202		16B00601		16B00602		16B00701		16B00702		16B01701	
Lab_ID	G7608006		G7608007		G7608008		G7608009		G7730001		G7730002		G7730003		G7730004		G7678004	
Sampling Date	18-May-95		18-May-95		18-May-95		18-May-95		2-Jun-95		2-Jun-95		2-Jun-95		2-Jun-95		26-May-95	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,1,2,2-Tetrachloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,1,2-Trichloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,1-Dichloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,1-Dichloroethene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,2-Dichloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,2-Dichloroethene (total)	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
1,2-Dichloropropane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
2-Butanone	11	U	12	U	10	U	5	J	10	U	11	U	11	U	13	U	13	U
2-Hexanone	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
4-Methyl-2-pentanone	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Acetone	15		49		10	U	23		10	U	6	J	11	U	7	J	19	
Benzene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Bromodichloromethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Bromoform	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Bromomethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Carbon disulfide	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Carbon tetrachloride	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Chlorobenzene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Chloroethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Chloroform	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Chloromethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
cis-1,3-Dichloropropene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Dibromochloromethane	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Ethylbenzene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Methylene chloride	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Styrene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Tetrachloroethene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Toluene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
trans-1,3-Dichloropropene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Trichloroethene	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Vinyl chloride	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U
Xylene (total)	11	U	12	U	10	U	12	U	10	U	11	U	11	U	13	U	13	U

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B00101		16B00102		16B00201		16B00202		16B00601		16B00602		16B00701		16B00702		16B01701	
Lab_ID	G7608006		G7608007		G7608008		G7608009		G7730001		G7730002		G7730003		G7730004		G7678004	
Sampling Date	18-May-95		18-May-95		18-May-95		18-May-95		2-Jun-95		2-Jun-95		2-Jun-95		2-Jun-95		26-May-95	
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
1,2-Dichlorobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
1,3-Dichlorobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
1,4-Dichlorobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,2'-oxybis(1-Chloropropane)	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,4,5-Trichlorophenol	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
2,4,6-Trichlorophenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,4-Dichlorophenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,4-Dimethylphenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,4-Dinitrophenol	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
2,4-Dinitrotoluene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2,6-Dinitrotoluene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2-Chloronaphthalene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2-Chlorophenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2-Methylnaphthalene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2-Methylphenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
2-Nitroaniline	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
2-Nitrophenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
3,3'-Dichlorobenzidine	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
3-Nitroaniline	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
4,6-Dinitro-2-methylphenol	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
4-Bromophenyl-phenylether	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
4-Chloro-3-methylphenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
4-Chloroaniline	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
4-Chlorophenyl-phenylether	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
4-Methylphenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
4-Nitroaniline	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
4-Nitrophenol	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
Acenaphthene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Acenaphthylene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Anthracene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Benzo(a)anthracene	370	U	400	U	340	U	390	U	170	J	370	U	370	U	410	U	410	U
Benzo(a)pyrene	370	U	400	U	340	U	390	U	150	J	370	U	370	U	410	U	410	U

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B00101		16B00102		16B00201		16B00202		16B00601		16B00602		16B00701		16B00702		16B01701	
Lab_ID	G7608006		G7608007		G7608008		G7608009		G7730001		G7730002		G7730003		G7730004		G7678004	
Sampling Date	18-May-95		18-May-95		18-May-95		18-May-95		2-Jun-95		2-Jun-95		2-Jun-95		2-Jun-95		26-May-95	
Benzo(b)fluoranthene	370	U	400	U	340	U	390	U	280	J	370	U	370	U	410	U	410	U
Benzo(g,h,i)perylene	370	U	400	U	340	U	390	U	120	J	370	U	370	U	410	U	410	U
Benzo(k)fluoranthene	370	U	400	U	340	U	390	U	240	J	370	U	370	U	410	U	410	U
bis(2-Chloroethoxy)methane	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
bis(2-Chloroethyl)ether	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
bis(2-Ethylhexyl)phthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Butylbenzylphthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Carbazole	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Chrysene	370	U	400	U	340	U	390	U	260	J	370	U	370	U	410	U	410	U
Di-n-butylphthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Di-n-octylphthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Dibenz(a,h)anthracene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Dibenzofuran	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Diethylphthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Dimethylphthalate	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Fluoranthene	370	U	400	U	340	U	390	U	410		370	U	370	U	410	U	410	U
Fluorene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Hexachlorobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Hexachlorobutadiene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Hexachlorocyclopentadiene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Hexachloroethane	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Indeno(1,2,3-cd)pyrene	370	U	400	U	340	U	390	U	120	J	370	U	370	U	410	U	410	U
Isophorone	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
N-Nitroso-di-n-propylamine	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
N-Nitrosodiphenylamine (1)	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Naphthalene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Nitrobenzene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Pentachlorophenol	920	U	990	U	850	U	970	U	850	U	940	U	920	U	1000	U	1000	U
Phenanthrene	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Phenol	370	U	400	U	340	U	390	U	340	U	370	U	370	U	410	U	410	U
Pyrene	370	U	400	U	340	U	390	U	200	J	370	U	370	U	410	U	410	U
PCBs, ug/kg																		
Aroclor-1016	37	U	40	U	34	U	39	U	NA		NA		NA		NA		40	U
Aroclor-1221	75	U	81	U	70	U	79	U	NA		NA		NA		NA		81	U

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B00101		16B00102		16B00201		16B00202		16B00601		16B00602		16B00701		16B00702		16B01701	
Lab_ID	G7608006		G7608007		G7608008		G7608009		G7730001		G7730002		G7730003		G7730004		G7678004	
Sampling Date	18-May-95		18-May-95		18-May-95		18-May-95		2-Jun-95		2-Jun-95		2-Jun-95		2-Jun-95		26-May-95	
Aroclor-1232	37	U	40	U	34	U	39	U	NA		NA		NA		NA		40	U
Aroclor-1242	37	U	40	U	34	U	39	U	NA		NA		NA		NA		40	U
Aroclor-1248	37	U	40	U	34	U	39	U	NA		NA		NA		NA		40	U
Aroclor-1254	37	U	40	U	34	U	39	U	NA		NA		NA		NA		40	U
Aroclor-1260	37	U	40	U	34	U	39	U	NA		NA		NA		NA		43	J
Inorganics, mg/kg																		
Aluminum	1920		617		579		4810		460	J	4900	J	1860	J	6960	J	866	
Antimony	7.1	UJ	7.1	UJ	6.1	UJ	6.9	UJ	6	U	6.6	U	6.5	U	7.8	U	7.5	U
Arsenic	0.8	B	0.45	U	0.39	U	0.84	B	0.38	U	0.47	B	0.41	U	0.61	B	0.74	B
Barium	1.9	J	4.1	J	1.9	J	18.3	J	3.7	B	23.9	B	2.3	B	32.2	B	3	B
Beryllium	0.02	U	0.02	UJ	0.02	UJ	0.05	J	0.02	U	0.07	U	0.07	U	0.07	U	0.03	U
Cadmium	0.75	U	0.74	U	0.63	U	0.73	U	0.63	U	0.69	U	0.68	U	0.82	U	0.78	U
Calcium	3400		533	B	354	B	98.6	B	708	B	457	B	8060		697	B	95	B
Chromium	1.8	B	1.9	B	1.2	B	7.2		1.3	B	6.7		3		7.7		1.7	B
Cobalt	0.7	U	0.69	U	0.59	U	0.68	U	0.59	U	0.65	U	0.64	U	0.76	U	0.73	U
Copper	0.34	U	0.34	U	1.8	B	4.2	B	2.3	U	0.85	U	0.34	U	0.93	U	0.35	U
Iron	671		91.5		39.8		229		132	J	350	J	55.6	J	205	J	65.2	
Lead	1.4	J	1.2	J	5.7	J	6.3	J	4.5	J	12.7	J	4.9	J	5.3	J	2.7	J
Magnesium	26.7	B	8.3	B	25	B	49.7	B	36.1	B	66.8	B	82.3	B	86.5	B	6.3	B
Manganese	0.45	B	0.61	B	0.51	B	0.78	B	1.8	B	0.93	B	1.3	B	0.76	B	0.28	B
Mercury	0.03	B	0.03	U	0.04	B	0.09		0.02	U	0.03	U	0.06		0.03	B	0.03	U
Nickel	3.4	U	3.4	U	2.9	U	3.3	U	2.9	U	3.4	B	3.1	U	3.7	U	3.6	U
Potassium	107	U	106	U	90.7	U	104	U	90.2	U	99.2	U	97.2	U	117	U	112	U
Selenium	0.55	U	0.55	U	0.47	U	0.96	B	0.47	U	0.51	U	0.5	U	0.69	B	0.58	U
Silver	0.63	U	0.62	U	0.53	U	0.61	U	0.53	U	0.58	U	0.57	U	0.69	U	0.66	U
Sodium	4.1	U	4	U	3.5	U	4	U	13.7	U	12.2	U	11.7	U	15	U	4.3	U
Thallium	0.44	UJ	0.43	U	0.37	UJ	0.42	U	0.37	U	0.4	U	0.4	U	0.48	U	0.46	U
Vanadium	1.2	B	1.4	B	0.87	B	2.8	B	0.51	U	2.7	B	3.2	B	4.3	B	0.72	B
Zinc	0.83	U	0.44	B	0.65	U	1.3	B	13		1.2	B	26.4		2.2	B	1.5	B
General chemistry																		
pH, Solid (units)	NA		NA		NA		NA		NA		NA		NA		NA		NA	
Total Petroleum Hydrocarbons, mg/k	4.5	U	17.4		4.1	U	4.6	U	8.7		98.3		148		329		252	

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B02101	16B02102	16B02201	16B02301
Lab_ID	G7468001	G7468002	G7468003	G7468004
Sampling Date	2-May-95	2-May-95	2-May-95	2-May-95
Volatile Organics, ug/kg				
1,1,1-Trichloroethane	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA
1,1-Dichloroethane	NA	NA	NA	NA
1,1-Dichloroethene	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA
1,2-Dichloroethene (total)	NA	NA	NA	NA
1,2-Dichloropropane	NA	NA	NA	NA
2-Butanone	NA	NA	NA	NA
2-Hexanone	NA	NA	NA	NA
4-Methyl-2-pentanone	NA	NA	NA	NA
Acetone	NA	NA	NA	NA
Benzene	NA	NA	NA	NA
Bromodichloromethane	NA	NA	NA	NA
Bromoform	NA	NA	NA	NA
Bromomethane	NA	NA	NA	NA
Carbon disulfide	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA
Chloroethane	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA
Chloromethane	NA	NA	NA	NA
cis-1,3-Dichloropropene	NA	NA	NA	NA
Dibromochloromethane	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA
Styrene	NA	NA	NA	NA
Tetrachloroethene	NA	NA	NA	NA
Toluene	NA	NA	NA	NA
trans-1,3-Dichloropropene	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA
Vinyl chloride	NA	NA	NA	NA
Xylene (total)	NA	NA	NA	NA

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B02101		16B02102		16B02201		16B02301	
Lab_ID	G7468001		G7468002		G7468003		G7468004	
Sampling Date	2-May-95		2-May-95		2-May-95		2-May-95	
Semivolatile Organics, ug/kg								
1,2,4-Trichlorobenzene	NA		NA		NA		NA	
1,2-Dichlorobenzene	NA		NA		NA		NA	
1,3-Dichlorobenzene	NA		NA		NA		NA	
1,4-Dichlorobenzene	NA		NA		NA		NA	
2,2'-oxybis(1-Chloropropane)	NA		NA		NA		NA	
2,4,5-Trichlorophenol	NA		NA		NA		NA	
2,4,6-Trichlorophenol	NA		NA		NA		NA	
2,4-Dichlorophenol	NA		NA		NA		NA	
2,4-Dimethylphenol	NA		NA		NA		NA	
2,4-Dinitrophenol	NA		NA		NA		NA	
2,4-Dinitrotoluene	NA		NA		NA		NA	
2,6-Dinitrotoluene	NA		NA		NA		NA	
2-Chloronaphthalene	NA		NA		NA		NA	
2-Chlorophenol	NA		NA		NA		NA	
2-Methylnaphthalene	NA		NA		NA		NA	
2-Methylphenol	NA		NA		NA		NA	
2-Nitroaniline	NA		NA		NA		NA	
2-Nitrophenol	NA		NA		NA		NA	
3,3'-Dichlorobenzidine	NA		NA		NA		NA	
3-Nitroaniline	NA		NA		NA		NA	
4,6-Dinitro-2-methylphenol	NA		NA		NA		NA	
4-Bromophenyl-phenylether	NA		NA		NA		NA	
4-Chloro-3-methylphenol	NA		NA		NA		NA	
4-Chloroaniline	NA		NA		NA		NA	
4-Chlorophenyl-phenylether	NA		NA		NA		NA	
4-Methylphenol	NA		NA		NA		NA	
4-Nitroaniline	NA		NA		NA		NA	
4-Nitrophenol	NA		NA		NA		NA	
Acenaphthene	NA		NA		NA		NA	
Acenaphthylene	NA		NA		NA		NA	
Anthracene	NA		NA		NA		NA	
Benzo(a)anthracene	NA		NA		NA		NA	
Benzo(a)pyrene	NA		NA		NA		NA	

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B02101		16B02102		16B02201		16B02301	
Lab_ID	G7468001		G7468002		G7468003		G7468004	
Sampling Date	2-May-95		2-May-95		2-May-95		2-May-95	
Benzo(b)fluoranthene	NA		NA		NA		NA	
Benzo(g,h,i)perylene	NA		NA		NA		NA	
Benzo(k)fluoranthene	NA		NA		NA		NA	
bis(2-Chloroethoxy)methane	NA		NA		NA		NA	
bis(2-Chloroethyl)ether	NA		NA		NA		NA	
bis(2-Ethylhexyl)phthalate	NA		NA		NA		NA	
Butylbenzylphthalate	NA		NA		NA		NA	
Carbazole	NA		NA		NA		NA	
Chrysene	NA		NA		NA		NA	
Di-n-butylphthalate	NA		NA		NA		NA	
Di-n-octylphthalate	NA		NA		NA		NA	
Dibenz(a,h)anthracene	NA		NA		NA		NA	
Dibenzofuran	NA		NA		NA		NA	
Diethylphthalate	NA		NA		NA		NA	
Dimethylphthalate	NA		NA		NA		NA	
Fluoranthene	NA		NA		NA		NA	
Fluorene	NA		NA		NA		NA	
Hexachlorobenzene	NA		NA		NA		NA	
Hexachlorobutadiene	NA		NA		NA		NA	
Hexachlorocyclopentadiene	NA		NA		NA		NA	
Hexachloroethane	NA		NA		NA		NA	
Indeno(1,2,3-cd)pyrene	NA		NA		NA		NA	
Isophorone	NA		NA		NA		NA	
N-Nitroso-di-n-propylamine	NA		NA		NA		NA	
N-Nitrosodiphenylamine (1)	NA		NA		NA		NA	
Naphthalene	NA		NA		NA		NA	
Nitrobenzene	NA		NA		NA		NA	
Pentachlorophenol	NA		NA		NA		NA	
Phenanthrene	NA		NA		NA		NA	
Phenol	NA		NA		NA		NA	
Pyrene	NA		NA		NA		NA	
PCBs, ug/kg								
Aroclor-1016	NA		NA		NA		NA	
Aroclor-1221	NA		NA		NA		NA	

Appendix D-2. Summary of Subsurface Soil Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16B02101		16B02102		16B02201		16B02301	
Lab_ID	G7468001		G7468002		G7468003		G7468004	
Sampling Date	2-May-95		2-May-95		2-May-95		2-May-95	
Aroclor-1232	NA		NA		NA		NA	
Aroclor-1242	NA		NA		NA		NA	
Aroclor-1248	NA		NA		NA		NA	
Aroclor-1254	NA		NA		NA		NA	
Aroclor-1260	NA		NA		NA		NA	
Inorganics, mg/kg								
Aluminum	3870		1310		1900		4350	
Antimony	6.2	U	6.3	U	6.6	U	6.9	U
Arsenic	0.74	UJ	0.61	UJ	0.42	UJ	0.98	U
Barium	2	B	3.6	B	4.6	B	16.6	B
Beryllium	0.07	U	0.07	U	0.06	U	0.07	U
Cadmium	0.65	U	0.66	U	0.69	U	0.72	U
Calcium	649	J	879	J	137	J	5420	J
Chromium	2.9		1.7	B	2.1	B	4.7	
Cobalt	0.8	B	0.83	B	0.65	U	0.69	B
Copper	48.6		3.3	B	0.31	U	3.9	B
Iron	453	J	89.9	J	159	J	447	J
Lead	4.4		5.6	J	2.4		10.6	
Magnesium	66	B	15.8	B	26.8	B	128	B
Manganese	1.2	B	1	B	0.45	B	3.3	B
Mercury	0.02	U	0.02	U	0.03	U	0.03	B
Nickel	3	U	3	U	3.2	U	3.3	U
Potassium	92.8	U	113	B	106	B	232	B
Selenium	0.48	U	0.49	U	0.51	U	0.54	U
Silver	0.54	U	0.62	B	0.58	U	0.61	U
Sodium	9.2	U	8.1	U	14.6	U	54.2	B
Thallium	0.39	U	0.4	U	0.42	U	0.44	U
Vanadium	2.4	B	1.2	B	0.84	B	3.3	B
Zinc	0.78	B	0.65	B	0.27	B	4.6	B
General chemistry								
pH, Solid (units)	7.9		8		4.55		7.5	
Total Petroleum Hydrocarbons, mg/k	NA		NA		NA		NA	

APPENDIX D-3

SUMMARY OF SURFACE WATER ANALYTICAL RESULTS

Appendix D-3. Summary of Surface Water Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16W01900		16W02000	
Lab ID	G7582005		G7582004	
Sampling Date	16-May-95		16-May-95	
Volatile organics, ug/L				
1,1,1-Trichloroethane	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U
1,1-Dichloroethane	10	U	10	U
1,1-Dichloroethene	10	U	10	U
1,2-Dichloroethane	10	U	10	U
1,2-Dichloroethene (total)	10	U	10	U
1,2-Dichloropropane	10	U	10	U
2-Butanone	10	U	10	U
2-Hexanone	10	U	10	U
4-Methyl-2-pentanone	10	U	10	U
Acetone	12		23	
Benzene	10	U	10	U
Bromodichloromethane	10	U	10	U
Bromoform	10	U	10	U
Bromomethane	10	U	10	U
Carbon disulfide	10	U	10	U
Carbon tetrachloride	10	U	10	U
Chlorobenzene	10	U	10	U
Chloroethane	10	U	10	U
Chloroform	10	U	10	U
Chloromethane	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U
Dibromochloromethane	10	U	10	U
Ethylbenzene	10	U	10	U
Methylene chloride	10	U	10	U
Styrene	10	U	10	U
Tetrachloroethene	10	U	10	U
Toluene	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U
Trichloroethene	10	U	10	U
Vinyl chloride	10	U	10	U
Xylene (total)	10	U	10	U
Semivolatile organics, ug/L				
1,2,4-Trichlorobenzene	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U
1,4-Dichlorobenzene	10	U	10	U
2,2'-oxybis(1-Chloropropane)	10	U	10	U
2,4,5-Trichlorophenol	25	U	25	U
2,4,6-Trichlorophenol	10	U	10	U
2,4-Dichlorophenol	10	U	10	U
2,4-Dimethylphenol	10	U	10	U
2,4-Dinitrophenol	25	U	25	U
2,4-Dinitrotoluene	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U
2-Chloronaphthalene	10	U	10	U
2-Chlorophenol	10	U	10	U
2-Methylnaphthalene	10	U	10	U
2-Methylphenol	10	U	4	J
2-Nitroaniline	25	U	25	U
2-Nitrophenol	10	U	10	U

Appendix D-3. Summary of Surface Water Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16W01900		16W02000	
Lab ID	G7582005		G7582004	
Sampling Date	16-May-95		16-May-95	
3,3'-Dichlorobenzidine	10	U	10	U
3-Nitroaniline	25	U	25	U
4,6-Dinitro-2-methylphenol	25	U	25	U
4-Bromophenyl-phenylether	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U
4-Chloroaniline	10	U	10	U
4-Chlorophenyl-phenylether	10	U	10	U
4-Methylphenol	10	U	10	U
4-Nitroaniline	25	U	25	U
4-Nitrophenol	25	U	25	U
Acenaphthene	10	U	10	U
Acenaphthylene	10	U	10	U
Anthracene	10	U	10	U
Benzo(a)anthracene	10	U	10	U
Benzo(a)pyrene	10	U	10	U
Benzo(b)fluoranthene	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	U
Benzo(k)fluoranthene	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U
bis(2-Chloroethyl)ether	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	U	10	U
Butylbenzylphthalate	10	U	10	U
Carbazole	10	U	10	U
Chrysene	10	U	10	U
Di-n-butylphthalate	10	U	10	U
Di-n-octylphthalate	10	U	10	U
Dibenz(a,h)anthracene	10	U	10	U
Dibenzofuran	10	U	10	U
Diethylphthalate	10	U	10	U
Dimethylphthalate	10	U	10	U
Fluoranthene	10	U	10	U
Fluorene	10	U	10	U
Hexachlorobenzene	10	U	10	U
Hexachlorobutadiene	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U
Hexachloroethane	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U
Isophorone	10	U	10	U
N-Nitroso-di-n-propylamine	10	U	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U
Naphthalene	10	U	10	U
Nitrobenzene	10	U	10	U
Pentachlorophenol	25	U	25	U
Phenanthrene	10	U	10	U
Phenol	10	U	1	J
Pyrene	10	U	10	U
Pesticides/PCBs, ug/L				
4,4'-DDD	0.1	UJ	0.1	UJ
4,4'-DDE	0.1	UJ	0.1	UJ
4,4'-DDT	0.1	UJ	0.1	UJ
Aldrin	0.05	UJ	0.05	UJ
alpha-BHC	0.05	UJ	0.05	UJ
alpha-Chlordane	0.05	UJ	0.05	UJ

Appendix D-3. Summary of Surface Water Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16W01900		16W02000	
Lab ID	G7582005		G7582004	
Sampling Date	16-May-95		16-May-95	
Aroclor-1016	0.5	UJ	0.5	UJ
Aroclor-1221	0.5	UJ	0.5	UJ
Aroclor-1232	0.5	UJ	0.5	UJ
Aroclor-1242	0.5	UJ	0.5	UJ
Aroclor-1248	0.5	UJ	0.5	UJ
Aroclor-1254	0.5	UJ	0.5	UJ
Aroclor-1260	0.5	UJ	0.5	UJ
beta-BHC	0.05	UJ	0.05	UJ
delta-BHC	0.05	UJ	0.05	UJ
Dieldrin	0.1	UJ	0.1	UJ
Endosulfan I	0.05	UJ	0.05	UJ
Endosulfan II	0.1	UJ	0.1	UJ
Endosulfan sulfate	0.1	UJ	0.1	UJ
Endrin	0.1	UJ	0.1	UJ
Endrin aldehyde	0.1	UJ	0.1	UJ
Endrin ketone	0.1	UJ	0.1	UJ
gamma-BHC (Lindane)	0.05	UJ	0.05	UJ
gamma-Chlordane	0.05	UJ	0.05	UJ
Heptachlor	0.05	UJ	0.05	UJ
Heptachlor epoxide	0.05	UJ	0.05	UJ
Methoxychlor	0.5	UJ	0.5	UJ
Toxaphene	5	UJ	5	UJ
Inorganics, ug/L				
Aluminum	2400		229	
Antimony	29.6	U	29.6	U
Arsenic	3.1	B	3.1	J
Barium	26.8	B	20.1	B
Beryllium	0.13	B	0.1	U
Cadmium	3.1	U	3.1	U
Calcium	11600		11700	
Chromium	3.7	U	3.1	U
Cobalt	2.9	U	2.9	U
Copper	6.7	U	3.4	U
Iron	9800		12300	
Lead	13.5		1.5	U
Magnesium	2270	B	2230	B
Manganese	49.2		71.5	
Mercury	0.13	B	0.12	U
Nickel	14.2	U	14.2	U
Potassium	444	U	1620	B
Selenium	2.3	U	2.3	U
Silver	2.6	U	2.8	B
Sodium	5430		6020	
Thallium	18.1	UJ	18.1	UJ
Vanadium	8.2	U	2.5	U
Zinc	48.1		15	U
General Chemistry, mg/L				
Alkalinity as CaCO3	26		34	
Total Petroleum Hydrocarbon	1	U	1	U

APPENDIX D-4

SUMMARY OF SEDIMENT ANALYTICAL RESULTS

Appendix D-4. Summary of Sediment Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16D01900		16D01900D		16D02000	
Lab_ID	G7678001		G7678003		G7678002	
Sampling Date	26-May-95		26-May-95		26-May-95	
Volatile Organics, ug/kg						
1,1,1-Trichloroethane	16	U	16	U	21	U
1,1,2,2-Tetrachloroethane	16	U	16	U	21	U
1,1,2-Trichloroethane	16	U	16	U	21	U
1,1-Dichloroethane	16	U	16	U	21	U
1,1-Dichloroethene	16	U	16	U	21	U
1,2-Dichloroethane	16	U	16	U	21	U
1,2-Dichloroethene (total)	2	J	16	U	21	U
1,2-Dichloropropane	16	U	16	U	21	U
2-Butanone	16	U	16	U	21	U
2-Hexanone	16	U	16	U	21	U
4-Methyl-2-pentanone	16	U	16	U	21	U
Acetone	11	J	14	J	24	
Benzene	16	U	16	U	21	U
Bromodichloromethane	16	U	16	U	21	U
Bromoform	16	U	16	U	21	U
Bromomethane	16	U	16	U	21	U
Carbon disulfide	16	U	16	U	21	U
Carbon tetrachloride	16	U	16	U	21	U
Chlorobenzene	16	U	16	U	21	U
Chloroethane	16	U	16	U	21	U
Chloroform	16	U	16	U	21	U
Chloromethane	16	U	16	U	21	U
cis-1,3-Dichloropropene	16	U	16	U	21	U
Dibromochloromethane	16	U	16	U	21	U
Ethylbenzene	16	U	16	U	21	U
Methylene chloride	16	U	16	U	21	U
Styrene	16	U	16	U	21	U
Tetrachloroethene	16	U	16	U	21	U
Toluene	16	U	16	U	21	U
trans-1,3-Dichloropropene	16	U	16	U	21	U
Trichloroethene	16	U	16	U	21	U
Vinyl chloride	16	U	16	U	21	U
Xylene (total)	16	U	16	U	21	U
Semivolatile Organics, ug/kg						
1,2,4-Trichlorobenzene	480	U	570	U	580	U
1,2-Dichlorobenzene	480	U	570	U	580	U
1,3-Dichlorobenzene	480	U	570	U	580	U
1,4-Dichlorobenzene	480	U	570	U	580	U
2,2'-oxybis(1-Chloropropane)	480	U	570	U	580	U
2,4,5-Trichlorophenol	1200	U	1400	U	1500	U
2,4,6-Trichlorophenol	480	U	570	U	580	U
2,4-Dichlorophenol	480	U	570	U	580	U
2,4-Dimethylphenol	480	U	570	U	580	U
2,4-Dinitrophenol	1200	U	1400	U	1500	U
2,4-Dinitrotoluene	480	U	570	U	580	U
2,6-Dinitrotoluene	480	U	570	U	580	U
2-Chloronaphthalene	480	U	570	U	580	U
2-Chlorophenol	480	U	570	U	580	U
2-Methylnaphthalene	480	U	570	U	580	U

Appendix D-4. Summary of Sediment Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16D01900		16D01900D		16D02000	
Lab_ID	G7678001		G7678003		G7678002	
Sampling Date	26-May-95		26-May-95		26-May-95	
2-Methylphenol	480	U	570	U	580	U
2-Nitroaniline	1200	U	1400	U	1500	U
2-Nitrophenol	480	U	570	U	580	U
3,3'-Dichlorobenzidine	480	U	570	U	580	U
3-Nitroaniline	1200	U	1400	U	1500	U
4,6-Dinitro-2-methylphenol	1200	U	1400	U	1500	U
4-Bromophenyl-phenylether	480	U	570	U	580	U
4-Chloro-3-methylphenol	480	U	570	U	580	U
4-Chloroaniline	480	U	570	U	580	U
4-Chlorophenyl-phenylether	480	U	570	U	580	U
4-Methylphenol	480	U	570	U	580	U
4-Nitroaniline	1200	U	1400	U	1500	U
4-Nitrophenol	1200	U	1400	U	1500	U
Acenaphthene	480	U	570	U	580	U
Acenaphthylene	480	U	570	U	580	U
Anthracene	480	U	570	U	580	U
Benzo(a)anthracene	480	U	570	U	580	U
Benzo(a)pyrene	480	U	570	U	580	U
Benzo(b)fluoranthene	480	U	570	U	580	U
Benzo(g,h,i)perylene	480	U	570	U	580	U
Benzo(k)fluoranthene	480	U	570	U	580	U
bis(2-Chloroethoxy)methane	480	U	570	U	580	U
bis(2-Chloroethyl)ether	480	U	570	U	580	U
bis(2-Ethylhexyl)phthalate	190	J	320	J	580	U
Butylbenzylphthalate	480	U	570	U	580	U
Carbazole	480	U	570	U	580	U
Chrysene	480	U	570	U	580	U
Di-n-butylphthalate	480	U	570	U	580	U
Di-n-octylphthalate	480	U	570	U	580	U
Dibenz(a,h)anthracene	480	U	570	U	580	U
Dibenzofuran	480	U	570	U	580	U
Diethylphthalate	480	U	570	U	580	U
Dimethylphthalate	480	U	570	U	580	U
Fluoranthene	480	U	570	U	230	J
Fluorene	480	U	570	U	580	U
Hexachlorobenzene	480	U	570	U	580	U
Hexachlorobutadiene	480	U	570	U	580	U
Hexachlorocyclopentadiene	480	U	570	U	580	U
Hexachloroethane	480	U	570	U	580	U
Indeno(1,2,3-cd)pyrene	480	U	570	U	580	U
Isophorone	480	U	570	U	580	U
N-Nitroso-di-n-propylamine	480	U	570	U	580	U
N-Nitrosodiphenylamine (1)	480	U	570	U	580	U
Naphthalene	480	U	570	U	580	U
Nitrobenzene	480	U	570	U	580	U
Pentachlorophenol	1200	U	1400	U	1500	U
Phenanthrene	480	U	570	U	580	U
Phenol	480	U	570	U	580	U
Pyrene	480	U	570	U	580	U
PCBs, ug/kg						

Appendix D-4. Summary of Sediment Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample_ID	16D01900		16D01900D		16D02000	
Lab_ID	G7678001		G7678003		G7678002	
Sampling Date	26-May-95		26-May-95		26-May-95	
Aroclor-1016	94	U	99	U	270	U
Aroclor-1221	190	U	200	U	540	U
Aroclor-1232	94	U	99	U	270	U
Aroclor-1242	94	U	99	U	270	U
Aroclor-1248	94	U	99	U	270	U
Aroclor-1254	94	U	99	U	270	U
Aroclor-1260	280	J	270		270	U
Inorganics, mg/kg						
Aluminum	3060		4340		4910	
Antimony	7.1	U	9.6	U	12.5	U
Arsenic	1.8	B	2.6	J	2.7	J
Barium	6.5	B	11.1	B	8	B
Beryllium	0.07	B	0.11	B	0.1	B
Cadmium	0.75	U	1	U	1.3	U
Calcium	36.8	B	50	B	159	B
Chromium	4.3		7.5		7.9	
Cobalt	0.7	U	1.1	B	1.2	U
Copper	3.6	B	7.5	B	6.4	B
Iron	288		370		618	
Lead	20.5	J	27.9	J	84.5	J
Magnesium	26.8	B	38.6	B	49.6	B
Manganese	0.19	B	0.24	B	0.88	B
Mercury	0.05		0.08		0.09	
Nickel	3.4	U	4.6	U	6	U
Potassium	107	U	144	U	188	U
Selenium	0.55	U	0.75	U	0.97	U
Silver	0.62	U	0.85	U	1.1	U
Sodium	6.2	B	15.1	B	21.6	B
Thallium	0.44	U	0.59	U	0.77	U
Vanadium	4.2	B	6.2	B	5.7	B
Zinc	17.2		28.2		50.2	
General Chemistry, mg/kg						
Total Organic Carbon	9130		12200		17900	
Total Petroleum Hydrocarbons	577		335		377	

APPENDIX D-5

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Appendix D-5. Summary of Groundwater Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16G00101		16G00201		16G00501			
Lab ID	G7716012		G7716013		G7716014		G7716014RE	
Sampling Date	1-Jun-95		1-Jun-95		1-Jun-95		1-Jun-95	
Volatile organics, ug/L								
1,1,1-Trichloroethane	1	U	1	U	1	U	NA	
1,1,2,2-Tetrachloroethane	1	U	1	U	1	U	NA	
1,1,2-Trichloroethane	1	U	1	U	1	U	NA	
1,1-Dichloroethane	1	U	1	U	1	U	NA	
1,1-Dichloroethene	1	U	1	U	1	U	NA	
1,2-Dibromo-3-chloropropane	1	U	1	U	1	U	NA	
1,2-Dibromoethane	1	U	1	U	1	U	NA	
1,2-Dichloroethane	1	U	1	U	1	U	NA	
1,2-Dichloropropane	1	U	1	U	1	U	NA	
2-Butanone	5	UR	5	UR	5	UR	NA	
2-Hexanone	5	U	5	U	5	U	NA	
4-Methyl-2-pentanone	5	U	5	U	5	U	NA	
Acetone	8	UR	5	UR	8	UR	NA	
Benzene	1	U	1	U	1	U	NA	
Bromochloromethane	1	U	1	U	1	U	NA	
Bromodichloromethane	1	U	1	U	1	U	NA	
Bromoform	1	U	1	U	1	U	NA	
Bromomethane	1	U	1	U	1	U	NA	
Carbon disulfide	1	U	1	U	1	U	NA	
Carbon tetrachloride	1	U	1	U	1	U	NA	
Chlorobenzene	1	U	1	U	1	U	NA	
Chloroethane	1	U	1	U	1	U	NA	
Chloroform	1	U	1	U	1	U	NA	
Chloromethane	1	U	1	U	1	U	NA	
cis-1,2-Dichloroethene	1	U	1	U	1	U	NA	
cis-1,3-Dichloropropene	1	U	1	U	1	U	NA	
Dibromochloromethane	1	U	1	U	1	U	NA	
Ethylbenzene	0.6	J	1	U	1	U	NA	
Methylene chloride	2	U	2	U	2	U	NA	
Styrene	1	U	1	U	1	U	NA	
Tetrachloroethene	1	U	1	U	1	U	NA	
Toluene	0.2	J	1	U	1	U	NA	
trans-1,2-Dichloroethene	1	U	1	U	1	U	NA	
trans-1,3-Dichloropropene	1	U	1	U	1	U	NA	
Trichloroethene	1	U	1	U	1	U	NA	
Vinyl chloride	1	U	1	U	1	U	NA	
Xylene (total)	3		1	U	1	U	NA	
Semivolatile organics, ug/L								
1,2,4-Trichlorobenzene	10	U	10	U	10	UR	10	U
1,2-Dichlorobenzene	1	U	1	U	1	UR	1	U
1,3-Dichlorobenzene	1	U	1	U	1	UR	1	U
1,4-Dichlorobenzene	1	U	1	U	1	UR	1	U
2,2'-oxybis(1-Chloropropane)	10	U	10	U	10	UR	10	U
2,4,5-Trichlorophenol	25	U	25	U	25	UR	25	U
2,4,6-Trichlorophenol	10	U	10	U	10	UR	10	U
2,4-Dichlorophenol	10	U	10	U	10	UR	10	U
2,4-Dimethylphenol	10	U	10	U	10	UR	10	U
2,4-Dinitrophenol	25	UJ	25	UJ	25	UR	25	U
2,4-Dinitrotoluene	10	U	10	U	10	UR	10	U
2,6-Dinitrotoluene	10	U	10	U	10	UR	10	U
2-Chloronaphthalene	10	U	10	U	10	UR	10	U

Appendix D-5. Summary of Groundwater Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16G00101		16G00201		16G00501			
Lab ID	G7716012		G7716013		G7716014		G7716014RE	
Sampling Date	1-Jun-95		1-Jun-95		1-Jun-95		1-Jun-95	
2-Chlorophenol	10	U	10	U	10	UR	10	U
2-Methylnaphthalene	10	U	10	U	10	UR	10	U
2-Methylphenol	10	U	10	U	10	UR	10	U
2-Nitroaniline	25	U	25	U	25	UR	25	U
2-Nitrophenol	10	U	10	U	10	UR	10	U
3,3'-Dichlorobenzidine	10	U	10	U	10	UR	10	U
3-Nitroaniline	25	U	25	U	25	UR	25	U
4,6-Dinitro-2-methylphenol	25	UJ	25	UJ	25	UR	25	U
4-Bromophenyl-phenylether	10	U	10	U	10	UR	10	U
4-Chloro-3-methylphenol	10	U	10	U	10	UR	10	U
4-Chloroaniline	10	U	10	U	10	UR	10	U
4-Chlorophenyl-phenylether	10	U	10	U	10	UR	10	U
4-Methylphenol	10	U	10	U	10	UR	10	U
4-Nitroaniline	25	U	25	U	25	UR	25	U
4-Nitrophenol	25	UJ	25	UJ	25	UR	25	U
Acenaphthene	10	U	10	U	10	UR	10	U
Acenaphthylene	10	U	10	U	10	UR	10	U
Anthracene	10	U	10	U	10	UR	10	U
Benzo(a)anthracene	10	U	10	U	10	UR	10	U
Benzo(a)pyrene	0.2	U	0.2	U	0.2	UR	0.2	U
Benzo(b)fluoranthene	10	U	10	U	10	UR	10	U
Benzo(g,h,i)perylene	10	U	10	U	10	UR	10	U
Benzo(k)fluoranthene	10	U	10	U	10	UR	10	U
bis(2-Chloroethoxy)methane	10	U	10	U	10	UR	10	U
bis(2-Chloroethyl)ether	10	U	10	U	10	UR	10	U
bis(2-Ethylhexyl)phthalate	1	U	1	U	1	UR	4	J
Butylbenzylphthalate	10	U	10	U	10	UR	10	U
Carbazole	10	U	10	U	10	UR	10	U
Chrysene	10	U	10	U	10	UR	10	U
Di-n-butylphthalate	10	U	10	U	10	UR	10	U
Di-n-octylphthalate	10	U	10	U	3	R	10	U
Dibenz(a,h)anthracene	10	U	10	U	10	UR	10	U
Dibenzofuran	10	U	10	U	10	UR	10	U
Diethylphthalate	10	U	10	U	10	UR	10	U
Dimethylphthalate	10	U	10	U	10	UR	10	U
Fluoranthene	10	U	10	U	10	UR	10	U
Fluorene	10	U	10	U	10	UR	10	U
Hexachlorobenzene	1	U	1	U	1	UR	10	U
Hexachlorobutadiene	10	U	10	U	10	UR	10	U
Hexachlorocyclopentadiene	10	U	10	U	10	UR	10	U
Hexachloroethane	10	U	10	U	10	UR	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	10	UR	10	U
Isophorone	10	U	10	U	10	UR	10	U
N-Nitroso-di-n-propylamine	10	U	10	U	10	UR	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U	10	UR	10	U
Naphthalene	2	J	10	U	10	UR	10	U
Nitrobenzene	10	U	10	U	10	UR	10	U
Pentachlorophenol	1	U	1	U	1	UR	1	U
Phenanthrene	10	U	10	U	10	UR	10	U
Phenol	10	U	10	U	10	UR	10	U
Pyrene	10	U	10	U	10	UR	10	U

Appendix D-5. Summary of Groundwater Analytical Results
Study Area 16

Naval Training Center, Orlando
Orlando, FL

Sample ID	16G00101		16G00201		16G00501			
Lab ID	G7716012		G7716013		G7716014		G7716014RE	
Sampling Date	1-Jun-95		1-Jun-95		1-Jun-95		1-Jun-95	
Inorganics, ug/L								
Aluminum	34.7	B	496		1010		NA	
Antimony	2.7	B	2.5	U	2.8	B	NA	
Arsenic	2.7	J	1.9	UJ	1.9	UJ	NA	
Barium	20.2	J	17	J	41.9	J	NA	
Beryllium	0.1	UJ	0.1	UJ	0.12	J	NA	
Cadmium	3.1	U	3.1	U	3.5	U	NA	
Calcium	90800		4220	B	23000		NA	
Chromium	3.1	U	3.1	U	3.1	U	NA	
Cobalt	2.9	UJ	2.9	UJ	2.9	UJ	NA	
Copper	1.4	U	5.3	U	191		NA	
Iron	1250		484		217		NA	
Lead	1.5	U	1.5	U	5.1		NA	
Magnesium	3280	B	1360	B	1350	B	NA	
Manganese	14.4	B	7.7	B	5.9	B	NA	
Mercury	0.12	U	0.12	U	0.12	U	NA	
Nickel	14.2	U	14.2	U	14.2	U	NA	
Potassium	683	J	804	J	2080	J	NA	
Selenium	2.3	UJ	2.3	U	3.6	J	NA	
Silver	2.6	U	2.6	U	2.6	U	NA	
Sodium	2810	B	2680	B	7990		NA	
Thallium	1.8	U	1.8	UJ	1.8	U	NA	
Vanadium	4.2	B	7.5	B	10.7	B	NA	
Zinc	3	B	9.3	B	12.6	B	NA	
General Chemistry								
pH (units)	NA		NA		6.45		NA	
Total Petroleum Hydrocarbons, mg/L	1	U	1	U	1	U	NA	
Total Suspended Solids, mg/L	1	U	1		1		NA	

NOTES TO SUMMARY TABLES OF ANALYTICAL RESULTS

Naval Training Center
Orlando, FL

NA = Identified parameter not analyzed.
Sample ID = Sample Identifier
Lab ID = Laboratory identifier

Units:

mg/kg	milligram per kilogram
ug/kg	microgram per kilogram
mg/L	milligram per liter
ug/L	microgram per liter
pCi/L	picocuries per liter

The following standard validation qualifiers are used in this Appendix.

U	The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit
J	The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.
N	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
JN	The analysis indicates the presence of a compound that has been tentatively identified, and the associated numerical value represents an estimated concentration.
UJ	The analyte/compound was not detected above the reported sample quantitation limit. The reported quantitation limit, however, is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte/compound in the sample.
R	The sample results are rejected because of serious deficiencies in meeting quality control criteria.

The following laboratory qualifiers are typically dropped upon validation but are retained here to provide additional information on their associated numerical values.

B	The analyte was positively identified and the associated numerical value is an estimated concentration because the detection was below the contract required detection limit (CRDL) and above the instrument detection limit.
E	The reported value for the compound exceeds the linear calibration range for that compound. Therefore, the sample have been reanalyzed at an appropriate dilution (sample identifiers ending in DL).
D	The reported value for the compound has been quantified at a secondary dilution factor. This value typically is used in favor of E qualified values. When this applies, the E qualifier are flagged ER; D qualified values that are rejected in favor of the original results are flagged DR.

APPENDIX E

STUDY AREA 16, SURFACE WATER AND SEDIMENT ECOLOGICAL SCREENING VALUES CALCULATION

STUDY AREA 16, SURFACE WATER AND SEDIMENT ECOLOGICAL SCREENING VALUES CALCULATION

Surface water and sediment screening values were selected in order to evaluate the quality of the surface water at Study Area 16. Screening values were selected from available State and Federal guidance values as discussed below.

Surface Water Screening Values

The U.S. Environmental Protection Agency ([USEPA] 1986, 1988, 1991) has developed acute and chronic ambient water quality criteria (AWQC) for the protection of aquatic life. Acute AWQC are defined as the 1-hour concentrations not to be exceeded more than once every 3 years, and chronic AWQC are defined as the 4-day average concentration not to be exceeded more than once every 3 years. AWQC incorporate available toxicity data for sensitive fish species, aquatic invertebrates, amphibians, and aquatic plants. AWQC have not been established for a number of chemicals; the lowest observed effect concentrations cited by the USEPA (1986) were used for these chemicals, if available.

The Waste Management Division of the USEPA Region IV has established Chronic Freshwater Quality Screening Values (USEPA, 1992). In addition, the State of Florida has promulgated State Surface Water Quality Standards (Florida Administrative Code, Chapter 62-302, 1995).

These three sets of values, summarized in Table E-1, were considered as potential screening values; the lowest of the three values was conservatively selected as the screening value by which to evaluate surface water data.

The toxicity of a number of inorganic constituents has been shown to be correlated with water hardness, where toxicity increases as water hardness decreases. For these inorganic chemicals, the USEPA has established AWQC, which are presented as equations that incorporate site-specific water hardness. Both USEPA Region IV and the Florida Department of Environmental Protection have adopted these criteria as water quality screening values or standards. The arithmetic mean of the water hardness (as calcium carbonate [$CaCO_3$]) was used to derive site-specific screening criteria. The equations used to derive the criteria are presented in the following chart:

Chemical	Equation
Lead	chronic AWQC ($\mu g/\ell$) = $e^{[1.273(\ln H)-4.705]}$
Zinc	chronic AWQC ($\mu g/\ell$) = $e^{[0.8473(\ln H)+0.7614]}$

Notes: AWQC = ambient water quality criteria.
$\mu g/\ell$ = micrograms per liter.
e =
ln = natural log.
H = hardness (milligrams per liter as calcium carbonate).

The arithmetic mean water hardness for Study Area 16 was 30 milligrams per liter (mg/ℓ).

Sediment Screening Values

The USEPA has established or proposed sediment quality criteria for a limited number of organic chemicals (USEPA 1988, 1993a,b). The Waste Management Division of the USEPA Region IV has established sediment screening values for hazardous waste sites (USEPA Region IV, Waste Management Division, 1995). In addition, the State of Florida has developed Sediment Quality Guidelines (SQGs) (MacDonald, 1994). Toxic effect levels, which represent a threshold above which toxic effects might be expected to occur, were selected from this reference. The Ontario Ministry of Environment has published "Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario" (Persaud et al., 1992), in which lowest effect level values are presented for a number of chemicals. These values were derived largely from using data from the Great Lakes and other freshwater bodies and, therefore, also may be applicable as guidance values for the freshwater bodies at NTC, Orlando.

These four sets of sediment values, summarized in Table E-2, were considered as potential screening values; the lowest of the four values was conservatively selected as the screening value by which to evaluate sediment data from Study Area 16.

The toxicity of a number of organic constituents in sediments has been shown to correlate with the amount of organic carbon present in the sediments, with toxicity increasing as the organic carbon content decreases. For these chemicals, the USEPA presents SQGs in units of micrograms per gram (μg/g) organic carbon. The arithmetic mean of the total organic carbon was used to derive site-specific screening criteria. The criteria as presented in the guidance documents are summarized in the following chart:

Chemical	USEPA Sediment Quality Guideline
Dieldrin	11 μg/g OC (USEPA, 1988)
4,4'-DDT	0.828 μg/g OC (USEPA, 1988)
Aroclor-1260	19.5 μg/g OC (USEPA, 1988)
Acenaphthene	130 μg/g OC (USEPA, 1993a)
Fluoranthene	620 μg/g OC (USEPA, 1993b)
Phenanthrene	180 μg/g OC (USEPA, 1993c)

Notes: Value for Aroclor-1254 used for Aroclor-1260.
DDT = dichlorodiphenyltrichloroethane.
OC = organic carbon.
μg/g = micrograms per gram.
USEPA = U.S. Environmental Protection Agency.

The arithmetic mean total organic carbon content for sediments measured at Study Area 16 was 13,077 mg/kg.

Table E-1
Surface Water Screening Values

BRAC Environmental Site Screening Report
Study Area 16
Naval Training Center
Orlando, Florida

Chemical	Surface Water Screening Value (μg/ℓ)			
	USEPA Ambient Water Quality Criteria[1]	Region IV Water Quality (Chronic)[2]	FDEP Class III Fresh Water Standards[3]	Surface Water Screening Value[4]
Volatile Organic Compounds				
Acetone	--	--	--	--
2-Methylphenol	--	--	--	--
4-Methylphenol	--	--	--	--
Phenol	[5]2,560	256	300	256
Toluene	[5]17,500	175	--	175
Inorganic Analytes				
Aluminum	[6]87	87	--	[6]87
Arsenic	[7]190	190	50	50
Barium	--	--	--	--
Beryllium	[5]5.3	0.53	0.13	0.13
Calcium	--	--	--	--
Iron	1,000	1,000	1,000	1,000
Lead	[8]0.7	[8]0.7	[8]0.7	[8]0.7
Magnesium	--	--	--	--
Manganese	--	--	--	--
Mercury	0.012	0.012	0.012	0.012
Potassium	--	--	--	--
Silver	0.12	0.012	0.07	0.012
Sodium	--	--	--	--
Zinc	[8]38	[8]38	[8]38	[8]38

[1] Federal Ambient Water Criteria, chronic values (USEPA, 1991; 1988).
[2] USEPA Region IV Waste Management Division Chronic Freshwater Quality Screening Values based on the Water Quality Standards Units Screening List (USEPA, 1992).
[3] Chapter 62-302. Florida Administrative Code, Surface Water Quality Standards; 1995.
[4] Surface Water Screening Value is the lowest of the available values.
[5] Values shown is a Lowest Observed Effect Concentration presented in USEPA 1986.
[6] Criterion is based on pH of 6.5 - 9 (USEPA, 1988).
[7] Screening value for trivalent species of arsenic.
[8] Hardness-dependent criterion. Average water hardness of 30 milligrams per liter calcium carbonate was used to calculate criteria for Study Area 16.

Notes: USEPA = U.S. Environmental Protection Agency.
FDEP = Florida Department of Environmental Protection.
-- = Surface Water Quality Criteria not available.
μg/ℓ = micrograms per liter.

Table E-2
Sediment Screening Values

BRAC Environmental Site Screening Report
Study Area 16
Naval Training Center
Orlando, Florida

Chemical	Sediment Screening Value (mg/kg for inorganics, µg/kg for organics)				
	USEPA SQG[1]	Region IV SQG[2]	FDEP SQAG (TEL)[3]	Ontario SQG (LEL)[4]	Screening Value[5]
Volatile Organic Compounds					
2-Butanone	--	--	--	--	--
1,2-Dichloroethene (total)	--	--	--	--	--
4,4'-DDD	[6,7]11				
	[6,7]11	3.[6]3	2.07	5	2.07
4,4'-DDT	[7]11	3.3	1.19	8	1.19
Acenaphthene	1,700[7]	330	6.71	--	6.71
Acetone	--	--	--	--	--
alpha-Chlordane	--	1.7	2.26	7	1.7
Anthracene	--	330	46.9	--	46.9
Aroclor-1260	[7]260	33	21.6	5	5
Benzo(a)anthracene	--	330	74.8	--	74.8
Benzo(b)fluoranthene	--	665	--	--	655
Benzo(k)fluoranthene	--	655	--	--	655
bis(2-Ethylhexyl)phthalate	--	182	182	--	182
Chrysene	--	330	108	--	108
Dibenz(a,h)anthracene	--	330	6.22	--	6.22
Dieldrin	[7]140	3.3	0.715	2	0.715
Fluoranthene	[7]4,100	330	113	--	113
Fluorene	--	330	21.2	--	21.2
gamma-Chlordane	--	1.7	2.26	7	1.7
Phenanthrene	[7]2,400	330	86.7	--	86.7
Pyrene	--	330	153	--	153
Inorganic Analytes					
Aluminum	--	--	--	--	--
Arsenic	--	8	7.24	6	6
Barium	--	--	--	--	--
Beryllium	--	--	--	--	--
Cadmium	--	1	0.676	0.6	0.6
Calcium	--	--	--	--	--
Chromium	--	33	52.3	26	26
Cobalt	--	--	--	50	50
Copper	--	28	18.7	16	16
Iron	--	--	--	20,000	20,000
Lead	--	21	30.2	31	21
Magnesium	--	--	--	--	--

See notes at end of table.

Table E-2 (Continued)
Sediment Screening Values

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Chemical	Sediment Screening Value (mg/kg for inorganics, μg/kg for organics)				
	USEPA SQG[1]	Region IV SQG[2]	FDEP SQAG (TEL)[3]	Ontario SQG (LEL)[4]	Screening Value[5]
Inorganic Analytes (Continued)					
Manganese	--	--	--	460	460
Mercury	--	0.1	0.13	0.2	0.1
Sodium	--	--	--	--	--
Vanadium	--	--	--	--	--
Zinc	--	68	124	120	68

[1] USEPA, 1993a,b, Sediment Quality Criteria for the Protection of Benthic Organisms. Office of Water, Office of Research and Development, and Office of Science and Technology, Health and Ecological Criteria Division, Washington, DC. Documents for Fluoranthene (USEPA-822-R-93-012) and Phenanthrene (USEPA-822-R-93-014). If a 1993 document does not exist, available values from the following reference were used:
USEPA, 1988, Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Contaminants, Office of Water, Regulations and Standards, Criteria and Standards Division, Washington, DC. May, 1988. SCD# 17.
[2] USEPA (Region IV), 1995, Ecological Screening Values. Ecological Risk Assessment, Bulletin No. 2, November 1995 Draft Supplemental Guidance to risk assessment guidance for Superfund: Region IV Bulletins. Waste Management Division, Atlanta, Georgia.
[3] MacDonald, 1994, Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1 - Development and Evaluation of Sediment Quality Assessment Guidelines: Prepared by MacDonald Environmental Sciences Ltd., Ladysmith, BC for Florida Department of Environmental Protection, Tallahassee, Florida.
[4] Persaud et al., 1992, Guidelines of the Protection and Management of Aquatic Sediment Quality in Ontario, Ontario Ministry of the Environment, Water Resources Branch, June 1992, reprinted August 1992. ISBN 0-7729-9248-7.
[5] Sediment Screening Value is the lowest of the available values.
[6] Value for DDT used for DDD and DDE.
[7] USEPA (1993) and USEPA (1988) present SQGs in units of μg/g organic carbon (OC). The average total OC concentration of 13,077 mg/kg (i.e., 1.3%) was used to calculate SQGs for Study Area 16.

Notes: mg/kg = milligrams per kilogram.
μg/kg = micrograms per kilogram.
USEPA = U.S. Environmental Protection Agency.
SQG = Sediment Quality Guidelines.
FDEP = Florida Department of Environmental Protection.
SQAG = Sediment Quality Assessment Guidelines.
TEL = Toxic Effect Level.
LEL = Lowest Effect Level (Persaud et al. 1992).
-- = Sediment quality guidelines not available or analyte/compound not detected at the reporting limit.
DDT = dichlorodiphenyltrichloroethane.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.