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FINAL BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING
REPORTS STUDY AREA 23 AND 42 NTC ORLANDO FL
11/24/1999
HARDING LAWSON ASSOCIATES

Harding Lawson Associates



November 24, 1999

Southern Division Naval Facilities Engineering Command
P.O. Box 190010
2155 Eagle Dr.
North Charleston, SC 29419-9010

ATTN: Ms. Barbara Nwokike, Code 187300

Subject: **BRAC Environmental Site Screening Reports**
Study Areas 23 and 42
NTC, Orlando
Contract: N62467-89-D-0317

Dear Barbara:

Enclosed are two copies each of the final BRAC Environmental Site Screening Reports for Study Areas 23 and 42. These reports were approved by the BCT during the November OPT meeting in Orlando. We have also transmitted copies of the report to the normal distribution list for final documents.

Should you have any questions or need additional information, please call me at (904) 772-7688.

Very Truly Yours,

Harding Lawson Associates

A handwritten signature in cursive script that reads "Richard P. Allen".

Richard P. Allen
Project Technical Lead

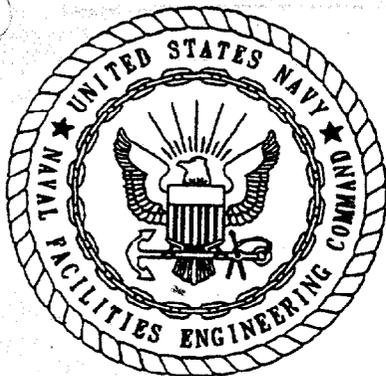
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Nancy Rodriguez, USEPA Region IV (2 copies)
David Grabka, FDEP (2 copies)
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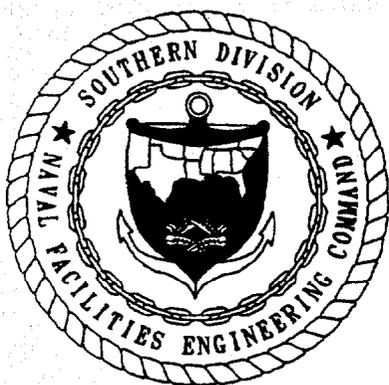


**BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE SCREENING REPORT
STUDY AREA 23**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

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

NOVEMBER 1999



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA 29418**

HLA

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Engineering and Environmental Services
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Tallahassee, Florida 32301 - (850) 656-1293

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**BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE SCREENING REPORT**

STUDY AREA 23

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Unit Identification Code: N65928

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

Prepared by:

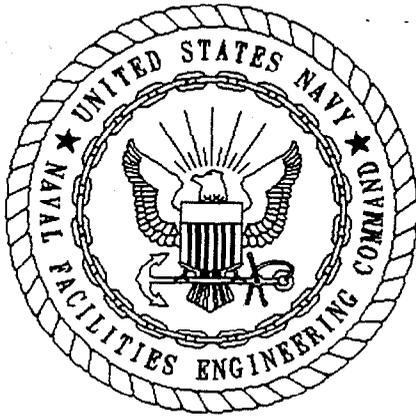
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Prepared for:

**Department of the Navy, Southern Division
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2155 Eagle Drive
North Charleston, South Carolina 29418**

Barbara Nwokike, Code 1873, Engineer-in-Charge

November 1999



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, Harding Lawson Associates, 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: November 23, 1999

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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Naval Training Center
Orlando, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CT	central tendency
DET	Environmental Detachment Charleston
DQO	data quality objective
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
GCMS/SIM	gas chromatograph mass spectroscopy/selective ion monitoring
HLA	Harding Lawson Associates
IA	immunoassay
IRA	interim remedial action
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
µg/l	micrograms per liter
NTU	nephelometric turbidity unit
OPT	Orlando Partnering Team
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyls
PEL	probable effects level
ppm	parts per million
PRE	Preliminary risk evaluation
RBC	risk-based concentration
RME	reasonable maximum exposure
SA	Study Area
SCTL	soil cleanup target level
TAL	target analyte list
TPH	total petroleum hydrocarbons
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank

1.0 STUDY AREA (SA) 23, FORMER OFFICER'S SWIMMING POOL COMPLEX (UNF-2)

This report contains information gathered during site screening activities conducted at SA 23. This site is located in the northeast corner of the McCoy Annex, approximately nine miles south of the Main Base at NTC, Orlando (Figure 1). Initial site screening investigations were completed between March and June 1995. One storm water and one sediment sample were collected during a storm event in September 1996. Additional surface soil sampling was completed in October and November 1997 and May 1998 due to Orlando Partnering Team (OPT) concerns about potential polynuclear aromatic hydrocarbons (PAHs) in surface soil. Proposed field activities were presented in the Site screening Plan (ABB Environmental Services, Inc. [ABB-ES], 1995). Site screening investigations resulted in the recommendation and implementation of a limited soil removal to eliminate potential exposure to certain PAHs in surface soil.

1.1 SA 23, BACKGROUND AND CONDITIONS. This section includes a brief background summary for SA 23. Further details can be found in the Site Screening Plan (ABB-ES, 1995).

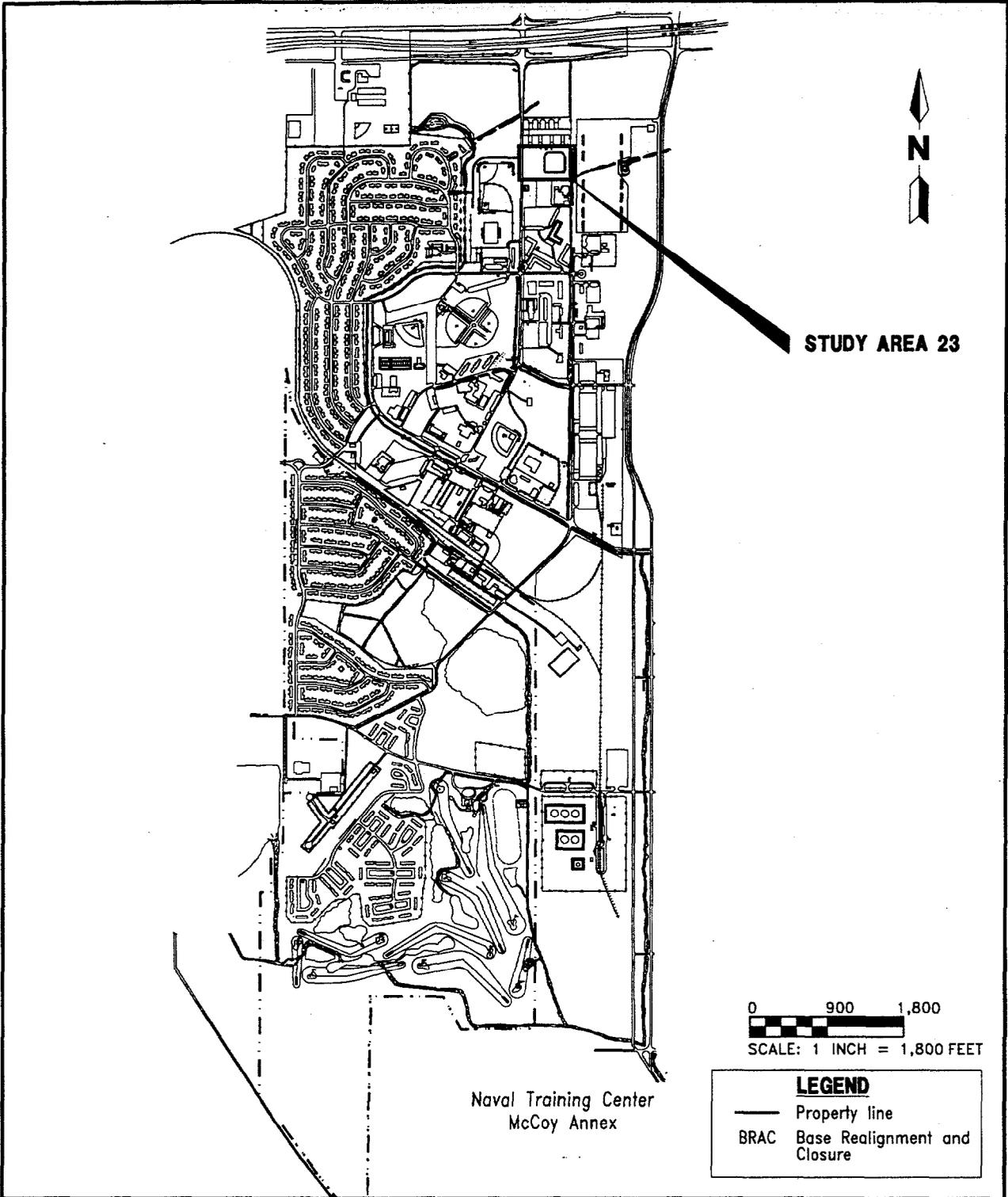
UNF-2 is a 7-acre parcel formerly occupied by the officer's pool house (Building 7119), swimming pool (Building 7120), and a football field (Figure 2). The facilities were constructed in the 1950's and demolished in the 1980's. A seven-foot high, raised earthen area covered with grass now exists on the site. The mound is probably composed of debris from the demolition of the pool house and the swimming pool. A metal fill pipe for a fuel oil underground storage tank (UST) extends from the top of the mound. A 12-inch diameter metal drain pipe extends from the base of the earthen area to the adjacent drainage ditch east of the mound.

1.2 SA 23, INVESTIGATION SUMMARY. The initial portion of the site screening investigation conducted in March through June 1995 consisted of a passive soil gas survey, geophysical surveys, surface and subsurface soil sampling, and the installation of two monitoring wells. Analytical results from one surface soil sample indicated the presence of some PAH compounds at concentrations exceeding both residential and industrial Soil Cleanup Target Levels (SCTLs). As a consequence, a storm water and sediment sample were collected adjacent to the surface soil sample in September 1996, and additional soil sampling and analysis was completed in October and November 1997 and May 1998.

1.2.1 Passive Soil Gas Survey (1995) The investigation of SA 23 included a passive soil-gas survey to detect any chemical contaminants present as a result of former site use.

The purpose of the passive soil-gas survey was to identify any areas with elevated concentrations of volatile and semivolatile organic compounds so that the investigation could be focused on a smaller area for confirmatory soil and groundwater sampling. The soil-gas samplers were deployed on 50-foot centers as presented on Figure 2.

1.2.2 Geophysical Surveys (1995) The purpose of the geophysical surveys was to delineate the extent of landfilling. The survey was completed with a vertical

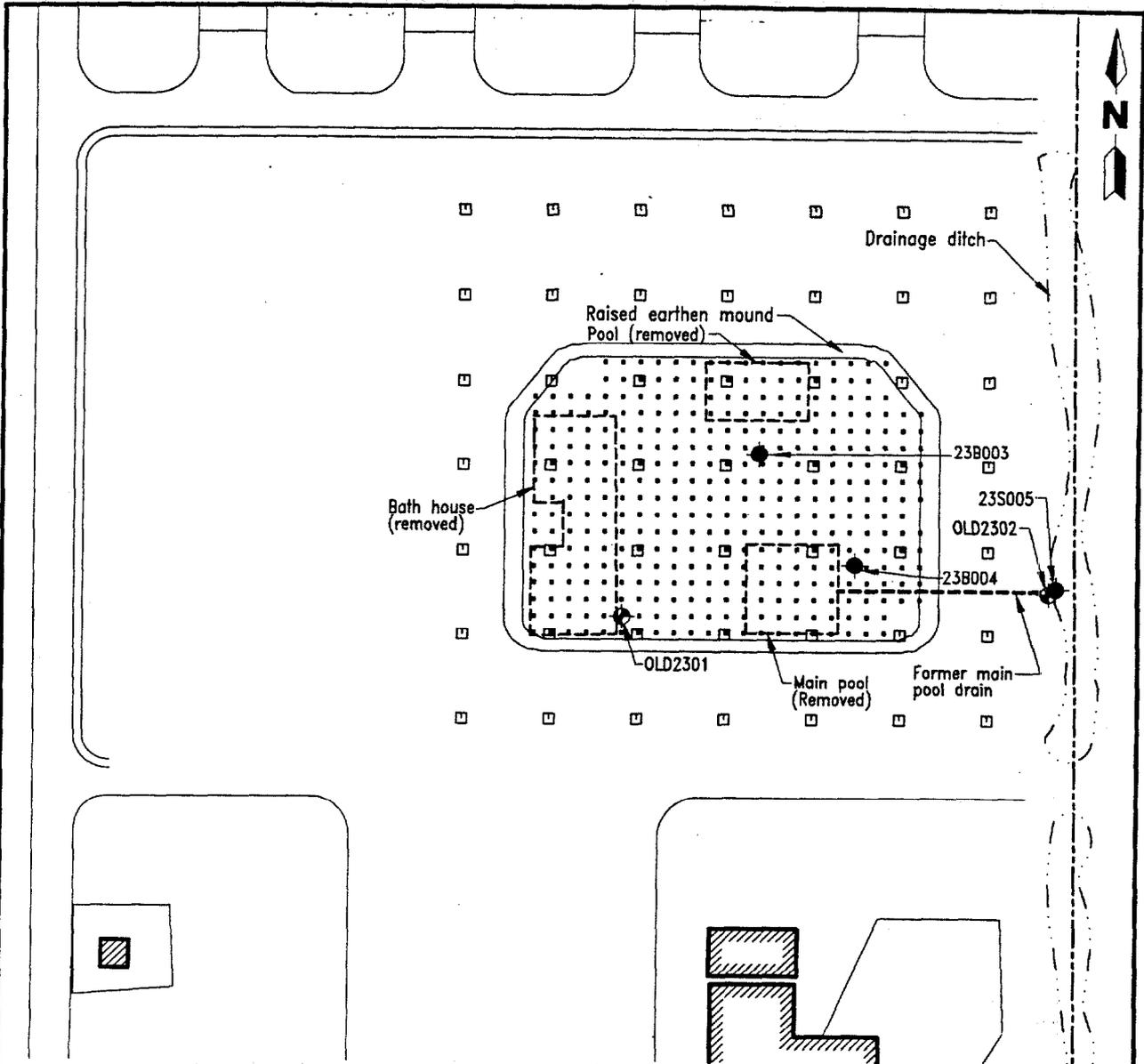


**FIGURE 1
STUDY AREA LOCATION**



**BRAC ENVIRONMENTAL
SITE SCREENING REPORT**

**STUDY AREA 23
NAVAL TRAINING CENTER
ORLANDO, FLORIDA**



LEGEND

- OLD2302 Soil boring (completed as monitoring well) location and designation
- 23S005 Soil boring (B) or surface soil (S) location and designation
- Soil gas point
- Geophysical grid survey node
- Property line
- BRAC Base Realignment and Closure

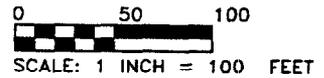


FIGURE 2
SURFACE SOIL, SOIL BORING AND MONITORING WELL, SOIL GAS, AND GEOPHYSICAL SURVEY LOCATIONS INITIAL SAMPLING (1995)



BRAC ENVIRONMENTAL SITE SCREENING REPORT STUDY AREA 23

NAVAL TRAINING CENTER ORLANDO, FLORIDA

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gradiometer (magnetometer) and terrain conductivity meter (Geonics EM31D). Measurements were taken on a 10- by 10-foot grid in the survey area (Figure 2). Ground penetrating radar (GPR) traverses were also completed along the same grid to further evaluate subsurface conditions.

1.2.3 Soil Boring Investigation and Monitoring Well Installation (1995) Three soil borings were completed in the mounded area (23B001, 23B003 and 23B004). The first (23B001) was completed as a monitoring well (OLD-23-01) and its location was biased toward an existing UST fill pipe. Locations for the other two soil borings were biased toward existing former structures including a wading pool and the 12-inch drain for the former main pool. Subsurface soil samples were collected at 10 to 12 feet below land surface (bls) in 23B001, 3.5 to 4 feet bls and 11 to 12 feet bls in 23B003, and 11 to 12 feet bls in 23B004. Flame ionization detector (FID) readings in soil for 23B001 varied from 50 to 140 parts per million (ppm) in the depth range of 6 to 12 feet bls. FID readings in 23B003 were 10 ppm at a depth of 3.5 feet bls, and 0 ppm at 11 to 12 feet bls. FID readings in soil in 23B004 were 10 ppm at 5 to 7.5 feet bls. A groundwater sample was also collected from OLD-23-01. FID readings during groundwater sampling of OLD-23-01 were 1,600 ppm.

A fourth soil boring (23B002) was completed as a monitoring well (OLD-23-02). The location for this boring was biased toward the end of the exposed drain for the former main pool. The boring was located approximately one foot south and two feet west of the end of the drain. A subsurface soil sample was collected at 4 to 6 feet bls. A groundwater sample was also collected from within the screened interval (2.5 feet to 12.5 feet bls). No FID deflections were noted during drilling and soil sampling activities in 23B002, although FID readings of 50 ppm were noted during groundwater sampling (23G00201). Soil boring logs and monitoring well installation details are presented in Appendix A.

A surface soil sample was collected near soil boring 23B002 from beneath the drain pipe on the east side of the mound (23S005). The term "surface soil" may not be appropriate in this instance, however, as the sample location is at the base of a drainage swale that only flows with surface runoff during the rainy season or during storm events.

All samples in SA 23 (1 surface soil, 5 subsurface soil, 2 groundwater) were submitted for full suite analyses excluding pesticides and polychlorinated biphenyls (PCBs) in accordance with United States Environmental Protection Agency (USEPA) Level IV data quality objectives. All samples were also analyzed for total recoverable hydrocarbon (TPH) and groundwater samples were analyzed for total suspended solids (TSS).

The Site Screening Plan (ABB-ES, 1995) specified collection of two subsurface soil samples from each soil boring location on the elevated mound. However, as no rubble zone was encountered during drilling operations, the number of subsurface soil samples collected was reduced to one at the three soil boring locations.

The UST at the southern end of the study area (Figure 2) was removed in the Spring of 1996 and approved for clean closure by the Florida Department of Environmental Protection in June 1996.

1.2.4 Sediment and Storm water Sampling (1996) Due to concerns concerning elevated PAH concentrations in sample 23S00501 and its proximity to the 12-inch diameter drain, the OPT directed Harding Lawson Associates (HLA, then ABB Environmental Services) to collect a sediment and storm water sample from the mouth of the drain during a storm event. Field observations indicated that the drain was the most likely source of PAH contamination, as rainwater infiltrating the mounded area flows to the drain pipe and from there to the drainage swale to the east. HLA sampled the storm water and sediment at the mouth of the drain during a storm on September 13, 1996.

1.2.5 Delineation of PAHs in Surface Soil (1997) Because the surface soil sample taken during the initial site screening investigation was determined to have concentrations of several PAHs at levels exceeding both residential and industrial SCTLs, the OPT instructed HLA to collect additional samples for analysis of PAHs, and complete a preliminary risk evaluation (PRE).

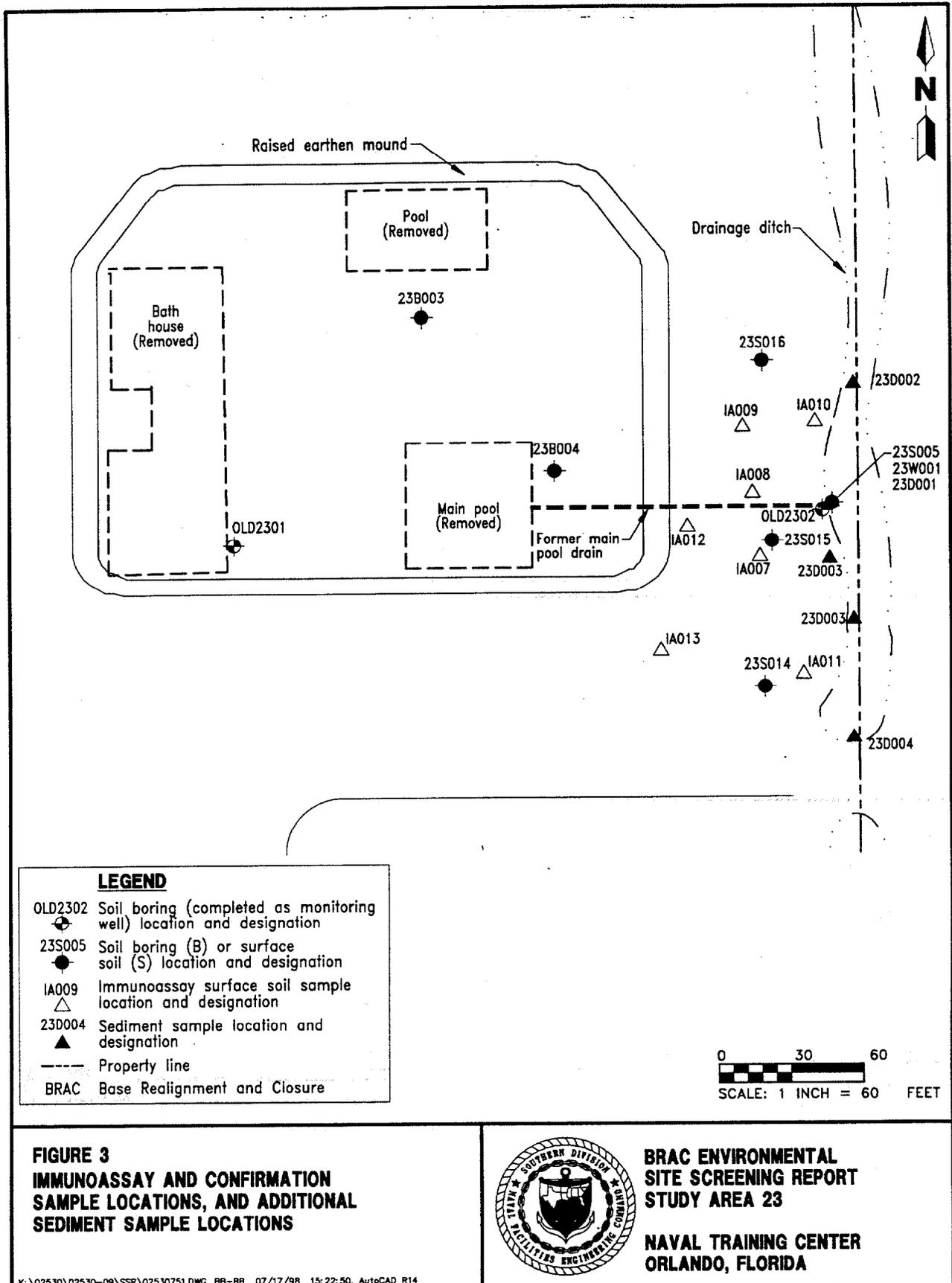
The surface soil sample with elevated PAHs, 23S00501, is located adjacent to monitoring well OLD2302 and directly below the mouth of the main pool drain where it exits along the western wall of a north-south drainage swale. The well is located two feet south and three feet west of the pool drain and somewhat upslope from the drainage swale. A 25-foot grid was established in the vicinity of the "hot spot" defined by surface soil sample 23S005 to determine if PAH contamination exists in the surface soils west of the swale. Sixteen soil samples, eight from the interval 0 to 1 foot bls and the remainder from 2 to 3 feet bls, were collected in October 1997 from 8 locations and analyzed in the field with immunoassay (IA) techniques (Figure 3).

Six confirmation samples from three locations were collected in November 1997 and submitted for laboratory analysis using EPA Method Modified 8270 (gas chromatograph mass spectroscopy/selective ion monitoring [GCMS/SIM]) (Figure 3). At each location, a sample was collected from the interval 0 to 1 foot bls, and a second was collected from the interval 1 to 2 feet bls.

1.2.6 Preliminary Risk Evaluation (April 1998) A PRE was completed by ABB-ES using surface soil data collected during the site screening investigation through November 1997.

1.2.7 Drainage Swale Sediment Sampling (May 1998) Following submittal of the PRE in April 1998, three additional samples were taken at the base of the drainage swale. One of the samples was located 50 feet downgradient (south) from Sample 23S00501, and the other two were located 50 and 100 feet upgradient (Figure 3). The samples were collected to determine if the contamination in Sample 23S00501 represented a hot spot or if the entire drainage swale was uniformly contaminated.

1.2.8 Interim Remedial Action - Limited Soil Removal (April and May, 1999) A limited soil removal was completed by the Environmental Detachment Charleston (DET) following data evaluation of data collected through May 1998. The purpose of the interim remedial action (IRA) was to remove soil with concentrations of contaminants that exceed the State's SCTLs so that the parcel would be suitable for residential reuse.



1.3 SA 23 RESULTS. The results of site screening investigations at SA 23 are discussed below. Analytical results from the surface soil, subsurface soil, and groundwater collected from SA 23 are presented as Summary of Positive Detections Tables in Appendix B, Tables B-1 to B-6. A complete set of analytical results for these media is presented in Appendix C. Exceedances of background or regulatory guidance concentrations (shaded on the Summary of Positive Detections Tables) are displayed in chem-boxes near their respective explorations on Figure 4.

1.3.1 Passive Soil Gas Surveys (1995) Passive soil-gas samples were analyzed on a gas chromatograph equipped with an electron capture detector for halogenated hydrocarbons and a flame ionization detector for petroleum hydrocarbons. All analytes were below the detection limit for the analysis. Additional information on the soil-gas survey results is included in Appendix D.

1.3.2 Geophysical Surveys (1995) The geophysical data (magnetometer and terrain conductivity) in the former swimming pool complex indicate the presence of a number of small geophysical anomalies which probably reflect distortions in the magnetic/conductivity values produced by demolition debris. GPR recordings along traverses completed across the study area clearly indicate the original grade for the former structure at a depth a seven to eight feet bls and are typical for landfilled demolition debris. HLA concludes from the geophysical data that the limits of the demolition debris are well-defined by the raised earthen area. Additional information on the geophysical survey is included as Appendix E.

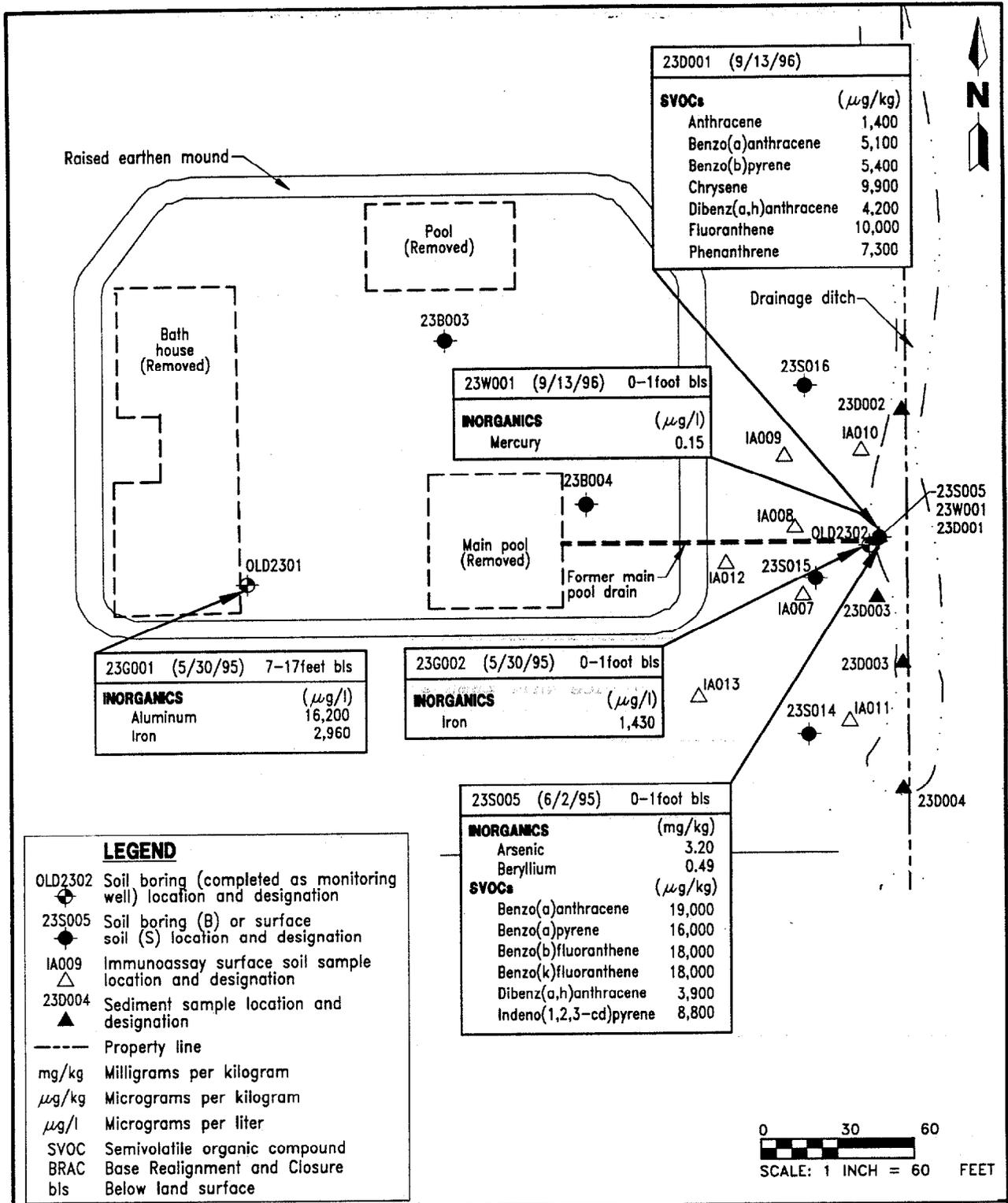
1.3.3 Soil Boring Investigation and Monitoring Well Installation (1995)

1.3.3.1 Surface Soil The surface soil sample collected from beneath the drain pipe in the drainage swale (23S00501) indicated significant PAH contamination (the total PAH concentration was 243,000 micrograms per kilogram ($\mu\text{g}/\text{kg}$), with the residential risk based concentrations (RBCs) and SCTLs exceeded for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene (Appendix B, Table B-1). Inorganics detected above background include chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, sodium, vanadium and zinc. There were no inorganic detections exceeding their respective residential RBCs and SCTLs, except for arsenic at a concentration of 3.2 milligrams per kilogram (mg/kg) which exceeded its residential carcinogenic RBC and SCTL of 0.43 and 0.7 mg/kg , respectively. The background screening value for arsenic is 1.9 mg/kg .

As stated earlier, the term surface soil for sample 23S00501 may be somewhat misleading, as the sample location is within the limits of a drainage swale that receives surface water runoff during the rainy season and storm events.

1.3.3.2 Subsurface Soil Detections in subsurface samples include volatile organics and inorganics (Appendix B, Table B-3). Volatile organic compounds detected include 2-butanone and acetone which are interpreted to be artifacts of the sampling and/or laboratory analytical process as they are unlikely to be present in the surface soil due to their high volatility. Inorganics detected above background include barium, copper, manganese, and sodium. There were no other inorganic detections that exceeded their respective residential RBCs.

1.3.3.3 Groundwater Detections in groundwater samples include a semivolatile organic compound and several inorganics (Appendix B, Table B-4). The bis(2-



**FIGURE 4
EXCEEDANCES OF SCREENING CRITERIA**



**BRAC ENVIRONMENTAL
SITE SCREENING REPORT
STUDY AREA 23**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

ethyl)hexylphthalate detection at 3 micrograms per liter ($\mu\text{g}/\ell$) is interpreted to be an artifact of the sampling and/or laboratory analytical process. Of the inorganic detections, concentrations of aluminum in sample 23G00101 and iron in samples 23G00101 and 23G00201 exceeded State of Florida secondary standards for a Class G-II aquifer.

Secondary standards have been established for Class G-I and G-II aquifers by the State of Florida, largely along Federal guidelines, to assure that groundwater meets at least minimum criteria for taste, odor, and color. Secondary standards were not established for human health, cancer risk, or ecological risk considerations, but, nonetheless, they are enforceable in the State of Florida.

A description of past site activities was included in Section 1.1. Based on records reviews and interviews, there have been no known site activities that may have contributed to the observed exceedances of secondary standards for aluminum and iron. Surface soil concentrations of these analytes did not exceed background screening concentrations. The samples collected in monitoring wells OLD-23-01 and OLD-23-02 were turbid to very turbid (from 100 nephelometric turbidity units [NTUs] to more than 200 NTUs) suggesting that suspended solids may have contributed to the observed secondary standard exceedances. There were no other target analyte list (TAL) metals exceedances, and groundwater parameters measured during sampling (pH, temperature, conductivity, and turbidity) were within normal limits). HLA concludes that the aluminum and iron exceeding secondary standards are naturally-occurring, are not related to past site activities, and do not pose a risk to human health or the environment.

1.3.4 Sediment and Storm Water Sampling (1996) The results of the sediment and storm water sampling are presented in Appendix B, Tables B-5 and B-6. The sediment sample (23D00101) had exceedances of eight PAHs, including benzo(a)pyrene, chrysene, and dibenz(a,h)anthracene, at concentrations more than 10 times the probable effects level (PEL) from the Florida Department of Environmental Protection (FDEP) Sediment Quality Assessment Guidelines. The sample location is identical to the location of surface soil sample 23S00501, which was collected when the drainage swale contained no water, as is most often the case with this drainage feature.

The storm water sample (23W00101), when compared with Florida surface water standards, only had one compound, mercury, at a concentration of $0.15\text{B } \mu\text{g}/\ell$, that exceeded the surface water screening criteria of $0.012 \mu\text{g}/\ell$. It is likely that suspended sediment is responsible for the elevated mercury concentration.

1.3.5 Delineation of PAHs in Surface Soil (1997) As stated earlier, 16 samples were analyzed from eight locations during the delineation by immunoassay techniques. Due to elevated PAH concentrations in the southwest corner of the initial grid, the sampling grid was extended 50 feet to the southwest. The results of the immunoassay testing are presented as total PAH concentrations in micrograms per kilogram on Table 1. Total PAH concentrations in the range of 350 to 20,000 $\mu\text{g}/\text{kg}$ were measured in the field.

In order to confirm the results of the IA delineation study, six surface soil samples from three locations were collected and submitted for laboratory analysis using EPA Method Modified 8270 (GCMS/SIM) (Figure 3). The results of the analyses are presented in Appendix B, Table B-2. Total PAH concentrations in the six samples ranged from no detections of any PAH compounds to $377 \mu\text{g}/\text{kg}$. No PAH compounds were detected at concentrations above screening criteria.

Table 1
PAH Concentrations from Immunoassay Testing

BRAC Environmental Site Screening Report
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Orlando, Florida

Location	0 to 1 foot bls*	2 to 3 feet bls*
23S006	440	20,000
23S007	8,000	50
23S008	1,300	400
23S009	380	350
23S010	800	800
23S011	500	500
23S012	500	500
23S013	500	500

*Concentrations of total PAHs are in micrograms per kilogram.

1.3.6 Preliminary Risk Evaluation (April 1998) The potential future reasonable maximum exposure (RME) residential risk from soil exposure results in an elevated risk level of 3×10^{-4} . The potential future residential risk posed from the central tendency (CT) was also at an elevated risk level of 6×10^{-5} . The risk range of 3×10^{-4} to 6×10^{-5} presented by the RME and CT scenarios are useful as information to provide perspective for the risk manager and compliance with USEPA risk assessment guidance.

The RME residential risk is driven by arsenic and five carcinogenic PAHs. A hot spot was determined at sample (23S00501) of SA 23, because all the PAH and arsenic maximum detected concentrations were detected at sample 23S00501. Remediation of the arsenic and the PAH contamination at sample location 23S00501 would lower the overall surface soil pathway risk to acceptable USEPA and FDEP risk levels. All detected concentrations (not including sample 23S00501) are below the USEPA and FDEP screening concentrations.

1.3.7 Drainage Swale Sediment Sampling (May 1998) Analytical results from the three drainage swale sediment samples (Figure 3) are presented in Appendix B, Table B-5. Sample 23D00301 contained a single PAH, benzo(a)pyrene, at a concentration of 120 $\mu\text{g}/\text{kg}$, slightly exceeding the State's residential SCTL for surface soil. The other two samples (23D00201 and 23D00401) had detections of several PAH compounds, but all detections were at concentrations well below screening criteria.

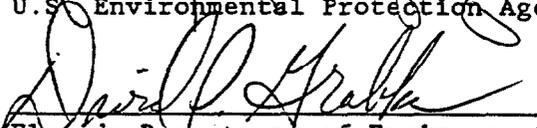
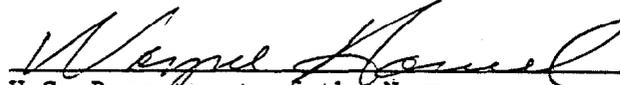
1.3.8 Interim Remedial Action - Limited Soil Removal (April and May 1999) Due to the elevated potential future RME residential risk from soil exposure (Subsection 1.3.6), a limited soil removal was completed by the Environmental Detachment Charleston (DET) in April and May, 1999 (Appendix F). The soil removal occurred at the mouth of the pool drain in the vicinity of samples 23S00501 and 23D00101. An area approximately five feet by five feet was excavated to a depth of six inches. The excavation had been planned for a depth of two feet, but a concrete splash block five feet wide by six feet long by six inches thick was encountered approximately six inches below grade. Due to the presence of the concrete block, the OPT determined that confirmation samples in

this instance would not be required. However, a soil sample was collected from the excavated materials and submitted for toxic characteristic leachate procedure (TCLP) metals in order to characterize the soils for disposal. No metals were detected during the TCLP analysis. The excavation was then backfilled with Florida certified clean fill to match the existing grade of the ditch. In addition, the end of the pool drain was plugged with concrete to prevent potential contaminants from exiting the drain from the raised mound.

1.4 SA 23, CONCLUSIONS AND RECOMMENDATIONS. Based on the available information and site screening data, HLA has concluded that, following the IRA soil removal in the vicinity of surface soil sample 23S00501 and sediment sample 23D00101, there are no contaminants present in soil or groundwater at concentrations exceeding screening criteria.

HLA recommends that SA 23 be made eligible for transfer, and that the site be reclassified from 7/Grey to 4/Dark Green.

The undersigned members of the BRAC Cleanup Team concur with the findings and recommendations of the preceding investigation.

<u>Study Area 23</u>	
 _____ U.S. Environmental Protection Agency, Region IV	<u>11-17-99</u> Date
 _____ Florida Department of Environmental Protection	<u>11-17-99</u> Date
 _____ U.S. Department of the Navy	<u>11-17-99</u> Date

REFERENCES

- ABB Environmental Services, Inc. (ABB-ES). 1995. *Site Screening Plan, Groups I through IV Study Areas and Miscellaneous Additional Sites, Naval Training Center (NTC), Orlando, Florida*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina.
- ABB-ES. 1997. *Project Operations Plan for Site Investigations and Remedial Investigations, NTC, Orlando, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.
- ABB-ES. 1998. *Technical Memorandum, Focused Risk Assessment: SA 23 Surface Soil, NTC, Orlando, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina, April.

APPENDIX A

SOIL BORING LOGS, MONITORING WELL CONSTRUCTION DIAGRAMS, MONITORING WELL DEVELOPMENT FORMS, AND GROUNDWATER SAMPLING FIELD DATA SHEETS

Project: BRAC NTC, Group III Site Screening		Well ID: S.A. 23		Boring No.: OLD-23-01	
Client: SOUTHDIIVNAVFACENCOM				Job No.: CTO-107	
Contractor: GEOTEK			Date started: 05/14/95		Comptd: 05/14/95
Method: Hollow stem auger		Casing Size: 6.25"	Screen Int.: 10 ft.	Protection level: D	
Ground Elev.:		Type of OVM.: Porta FID	Total depth: 18Ft.	Dpth to ∇ 12.5 Ft.	
Logged by: M. Hawes		Well Development Date: PVC		Site:	

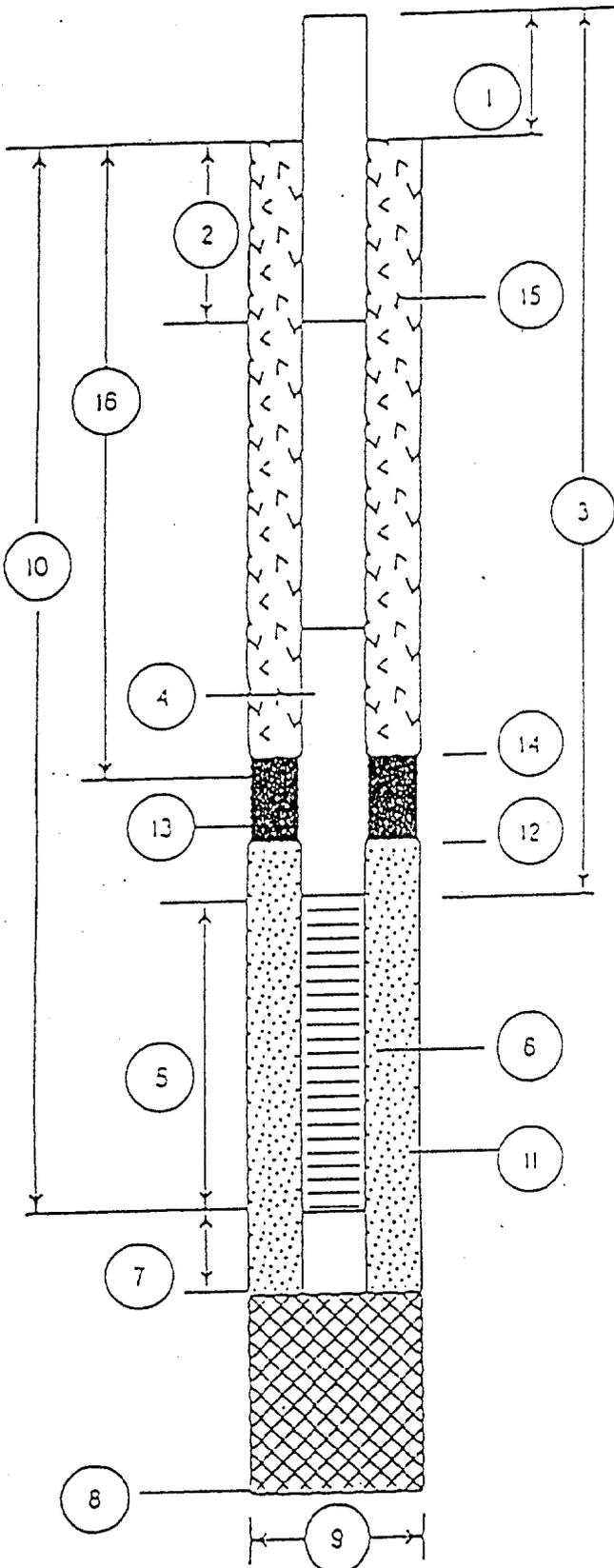
Depth Ft.	Sample ID (Depth) (Type)	Split Spoon Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.
0				QUARTZ SAND: Dark brown, silty, fine, moderate to good rounding, good sorting	[Diagonal Hatching]	SM	7,21
5		90%					24,28
			140				15,16
		70%					15,27
			50				6,10
							11,13
10	23B00101 (10-12')	85%	90				6,7
		80%					5,7
			50				4,5
		70%					5,4
			0				2,5
15		80%					6,19
			0	15,38			
		90%		50,35			
20							

DEPARTMENT OF THE NAVY
 SOUTHERN DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 CHARLESTON, SC.

WELL CONSTRUCTION DETAIL

WELL NUMBER: OLD-23-01

DATE OF INSTALLATION: 5/14/95



1. Height of Casing above ground: 0
2. Depth to first Coupling: 7'
Coupling Interval Depths: 10'
3. Total Length of Riser Pipe: 7'
4. Type of Riser Pipe: 2" ϕ Schedule 40 PVC
5. Length of Screen: 10'
6. Type of Screen: 2" ϕ schedule 40 PVC .010 slot screen
7. Length of Sump: 6"
8. Total Depth of Boring: 18'
9. Diameter of Boring: 6.25"
10. Depth to Bottom of Screen: 16.5'
11. Type of Screen Filter: 20/30 Silica Sand / 30/60 Silica Sand
Quantity Used: 640 lb Size: 50
12. Depth to Top of Filter: 3'
13. Type of Seal: Bentonite
Quantity Used: 50'
14. Depth to Top of Seal: ~~15'~~ 2'
15. Type of Grout: Portland Cement
Grout Mixture: _____
Method of Placement: _____
16. Tot. Depth of 6 in. Steel Casing: N/A

WELL DEVELOPMENT RECORD

Project: <i>SITE SCREENING S.A. 23 HTC ORLANDO</i>		Well Installation Date:		Project No. <i>CTD 107</i>	
Client: <i>SOUTHDIUNAVURK.BH.COM</i>		Well Development Date: <i>5/23/95</i>		Logged by: <i>GRITERS NUPPSON</i>	
Well/Site I.D.: <i>OLD-23-01</i>		Weather: <i>NOT RECORDED</i>		Start Date: <i>5/23/95</i>	
Volume of Drilling Fluid Lost (gal.) <i>N/A</i>		Volume of Water in Well and Filter Pack (gal.) <i>3.5</i>		Finish Date: <i>5/23/95</i>	
Installed Depth From Top of Well Casing to Bottom of Well:					
Initial Depth to Water (ft.) <i>10.28</i>			Initial Depth to Well Bottom: <i>16.61</i>		
Water Level during Initial Pumping/Purging (ft): <i>12.11</i>					
Water Level at Termination of Pumping/Purging (ft): <i>11.83</i>			Depth to well Bottom at termination of Pumping/Purging (ft.): <i>NOT RECORDED</i>		

BEGINNING OF WELL DEVELOPMENT

Time	Temp.	pH	Conductivity	Turbidity	Other	Approximate Pumping Rate (gal/min)
<i>14:53</i>	<i>22.1</i>	<i>5.00</i>	<i>86.0</i>	<i>79.5</i>	<i>59.9</i>	<i>.5</i>
<i>15:01</i>	<i>22.1</i>	<i>5.03</i>	<i>81.0</i>	<i>73.9</i>	<i>63</i>	<i>.5</i>
<i>15:09</i>	<i>21.9</i>	<i>5.03</i>	<i>95.0</i>	<i>>200</i>	<i>67</i>	<i>.5</i>
<i>15:19</i>	<i>21.9</i>	<i>5.19</i>	<i>90.0</i>	<i>193.4</i>	<i>72</i>	<i>.5</i>
<i>15:25</i>	<i>21.3</i>	<i>5.14</i>	<i>92.0</i>	<i>192.1</i>	<i>75</i>	<i>.5</i>
<i>15:32</i>	<i>22.3</i>	<i>5.12</i>	<i>94.0</i>	<i>104.8</i>	<i>78</i>	<i>.5</i>

END OF WELL DEVELOPMENT

NOTES: (Include physical character of removed water, type and size of pump, volume of water removed.)

USED PERISTALTIC PUMP SD # 889639. PUMPED ~ 80G.

Well Developer's Signature

Steve P. Gruter

OLD-23-01

GROUNDWATER SAMPLE FIELD DATA

Project: SITE SCREENING Point of Interest: SIA 23
 Project Number: CTO 107 Date: 5/30/95
 Sample Location ID: 2360010
 Time: Start: 16:10 End: 17:25 Signature of Sampler: GUETENS/BURNS

Water Level/Well Data

Well Depth 16.95 Ft. Measured Historical Top of Well Top of Protective Casing
 Well Riser Stick-up 0 Ft. (from ground) Protective 0 Ft. Casing/Well Difference
 Protective 0 Ft. Casing
 Depth to Water 10.65 Ft. Well Material: PVC SS Well Locked?: Yes No
 Well Dia. 2 inch 4 inch 6 inch Water Level Equip. Used: Elect. Cond. Probe Float Activated Press. Transducer
 Height of Water Column X 6.3 Ft. 16 Gal/A (2 in) 25 Gal/A (4 in) 1.5 Gal/A (8 in) Gal/A (in) Gal/A
 [3.5 Gal/Vol 14. Total Gal Purged] Well Integrity: Prot. Casing Secure Concrete Collar Intact Other
FLCW RADE 1 LPM Yes No

Equipment Documentation

Purging/Sampling Equipment Used: (/ If Used For)
 Purging Sampling
 Penstatic Pump Equipment ID _____
 Submersible Pump _____
 Bailer _____
 PVC/Silicon Tubing _____
 Teflon/Silicon Tubing _____
 Airm _____
 Hand Pump _____
 In-line Filter _____
 Press/Vac Filter _____

Decontamination Fluids Used: (/ All That Apply at Location)
 Methanol (100%)
 25% Methanol/75% ASTM Type II water
 Deionized Water
 Liquinox Solution
 Hexane
 HNO₃/D.I. Water Solution
 Potable Water
 None
 ALCONOX
 ISOMOPYL

Field Analysis Data

Ambient Air VOC 0 ppm Well Mouth 1600 ppm Field Data Collected In-line In Container Sample Observations: Turbid Clear Cloudy Colored Odor

Purge Data	4.0 Gal	6.5 Gal	9 Gal	11.5 Gal	14 Gal	
Temperature, Deg. C	<u>80.5</u>	<u>77.5</u>	<u>78.5</u>	<u>79.2</u>	<u>78.2</u>	<u>76.5</u>
pH, unns	<u>5.0</u>	<u>5.0</u>	<u>5.0</u>	<u>5.0</u>	<u>5.0</u>	<u>77.9</u>
Specific Conductivity (umhos/cm @ 25 Deg. C)	<u>150.</u>	<u>100.</u>	<u>130.</u>	<u>125.</u>	<u>125.</u>	<u>120.</u>
Oxidation-Reduction, -/+. mv						
Dissolved Oxygen, ppm	<u>7.200</u>	<u>7.200</u>	<u>7.200</u>	<u>7.200</u>	<u>7.200</u>	<u>7.200</u>
<u>TRABASTY</u>	<u>1615</u>	<u>1625</u>	<u>1635</u>	<u>1645</u>	<u>1655</u>	<u>1705</u>

Sample Collection Requirements (/ If Required at this Location)

Analytical Parameter	/ If Field Filtered	Preservation Method	Volume Required	/ If Sample Collected	Sample Bottle IDs
VOA	<input type="checkbox"/>	HCL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SVGA	<input type="checkbox"/>	AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pest/PCB	<input type="checkbox"/>	AC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inorganics	<input type="checkbox"/>	HNO ₃	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explosives	<input type="checkbox"/>	4C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TPH	<input type="checkbox"/>	H ₂ SO ₄	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TOC	<input type="checkbox"/>	H ₂ SO ₄	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nitrate	<input type="checkbox"/>	H ₂ SO ₄	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:
LOW-FLOW PURGE
FINAL NTU OFFSCALE

Project: BRAC NTC, Group III Site Screening		Well ID: S.A. 23		Boring No.: OLD-23-02	
Client: SOUTHDIVNAVFACENGCOM				Job No.: CT0-107	
Contractor: GEOTEK			Date started: 05/15/95		Compltd: 05/15/95
Method: Hollow stem auger		Casing Size: 6.25"	Screen Int.: 10 ft.	Protection level: D	
Ground Elev.:		Type of OVM.: Porta FID	Total depth: 14Ft.	Dpth to ∇ 5 Ft.	
Logged by: M. Hawes		Well Development Date: PVC		Site:	

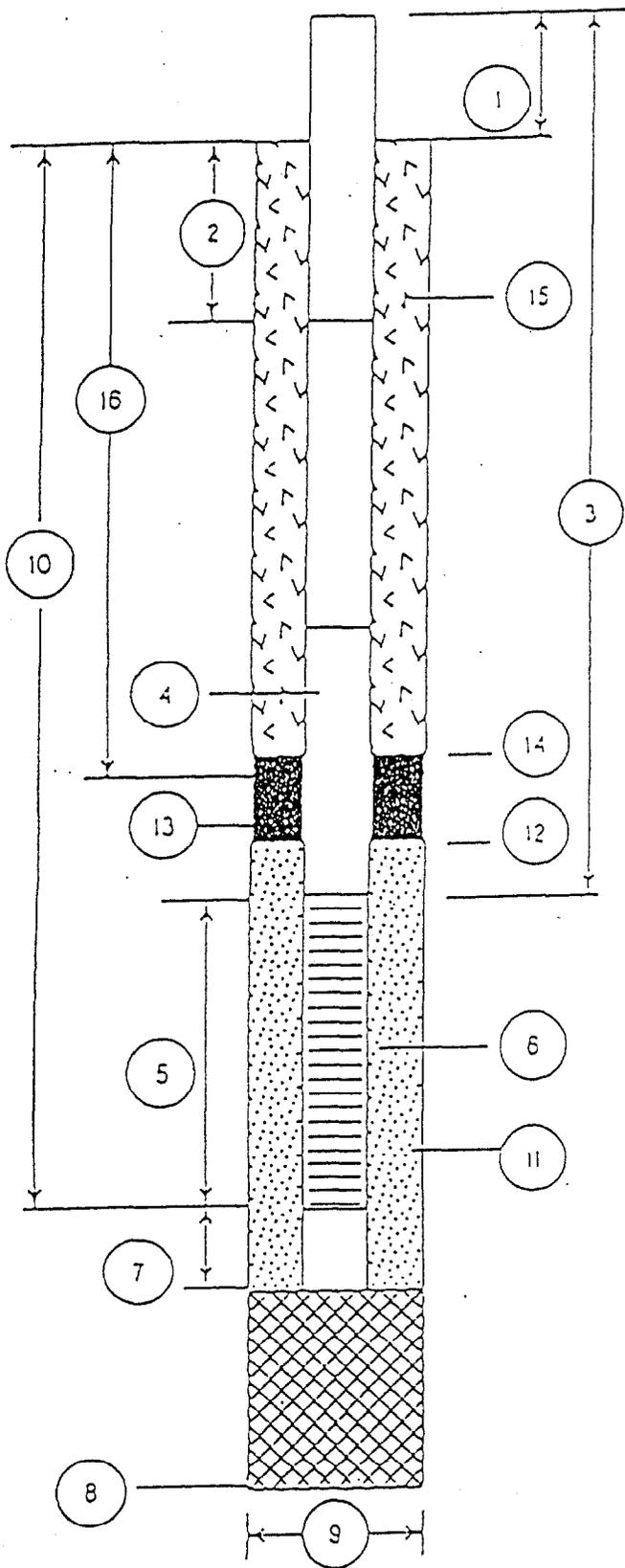
Depth Ft.	Sample ID (Depth) (Type)	Split Spoon Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.
0				QUARTZ SAND: Dark brown, silty, fine, covered by grass		SM	
5	23B00201 23B00201D (4-6')	90%	0	QUARTZ SAND: Tan, fine, silty			5,5
			0				4,4
		50%	0				1,1
			0				1,2
		70%	0				3,5
10			0				6,8
		80%	0				4,6
			0				8,10
		80%	0				10,8
			0				8,9

DEPARTMENT OF THE NAVY
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 NAVAL FACILITIES ENGINEERING COMMAND
 CHARLESTON, SC.

WELL CONSTRUCTION DETAIL

WELL NUMBER: OLD-23-02

DATE OF INSTALLATION: 5/15/95



1. Height of Casing above ground: 0
2. Depth to first Coupling: 3'
Coupling Interval Depths: 10'
3. Total Length of Riser Pipe: 3'
4. Type of Riser Pipe: 2" ϕ Schedule 40 PVC
5. Length of Screen: 10'
6. Type of Screen: 2" ϕ schedule 40 PVC .010 slot screen
7. Length of Sump: 6"
8. Total Depth of Boring: 14'
9. Diameter of Boring: 6.25"
10. Depth to Bottom of Screen: 12.5'
11. Type of Screen Filter: 20/30 Silica Sand
Quantity Used: 500 lb Size: 20/30
12. Depth to Top of Filter: 2'
13. Type of Seal: Bentonite
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

WELL DEVELOPMENT RECORD

Project: <i>SITE SCREENING S.A. 23</i> <i>HTC ORLANDO</i>		Well Installation Date:		Project No. <i>270107</i>	
Client: <i>SOUTH DUNAVALENG.COM</i>		Well Development Date: <i>5/23/95</i>		Logged by: <i>GRIGIENS</i> <i>HUFFMAN</i>	Checked by: <i>GBL</i>
Well/Site I.D.: <i>OLD - 23 - 02</i>		Weather: <i>NOT RECORDED</i>		Start Date: <i>5/23/95</i>	Finish Date: <i>5/23/95</i>
Volume of Drilling Fluid Lost (gal.) <i>N/A</i>		Volume of Water in Well and Filter Pack (gal.) <i>5.5</i>		Start Time: <i>13:13</i>	Finish Time: <i>15:06</i>
Installed Depth From Top of Well Casing to Bottom of Well:					
Initial Depth to Water (ft.) <i>3.25</i>			Initial Depth to Well Bottom: <i>13.18</i>		
Water Level during Initial Pumping/Purging (ft.): <i>5.20</i>					
Water Level at Termination of Pumping/Purging (ft.): <i>3.94</i>			Depth to well Bottom at termination of Pumping/Purging (ft.) <i>NOT RECORDED</i>		

BEGINNING OF WELL DEVELOPMENT

Time	Temp.	pH	Conductivity	Turbidity	Other	Approximate Pumping Rate (gal/min)
<i>14:26</i>	<i>21.9</i>	<i>5.29</i>	<i>112.</i>	<i>40.4</i>		<i>.5</i>
<i>14:36</i>	<i>22.5</i>	<i>5.31</i>	<i>110.</i>	<i>96.6</i>		<i>.5</i>
<i>14:40</i>	<i>21.8</i>	<i>5.28</i>	<i>110.</i>	<i>27.5</i>		<i>.5</i>
<i>14:46</i>	<i>21.8</i>	<i>5.25</i>	<i>110.</i>	<i>13.5</i>		<i>.5</i>
<i>14:54</i>	<i>23.2</i>	<i>5.20</i>	<i>110.</i>	<i>13.2</i>		<i>.5</i>
<i>15:06</i>	<i>23.1</i>	<i>5.25</i>	<i>110.</i>	<i>16.7</i>		<i>.5</i>

END OF WELL DEVELOPMENT

NOTES: (Include physical character of removed water, type and size of pump, volume of water removed.)

USED PERISTALTIC PUMP, PUMPED ~ 62 gallons.

Well Developer's Signature



04D-23-02

GROUNDWATER SAMPLE FIELD DATA

Project: SITE SCREENING Point of Interest: S.A. 23
 Project Number: CTO 107 Date: 5/30/95
 Sample Location ID: 23400201
 Time: Start: 15:48 End: 17:07 Signature of Sampler: KAWES

Water Level/Well Data

Well Depth 13.15 Ft. Measured Historical Top of Well Top of Protective Casing
 Well Riser Stick-up 0. Ft. (from ground) Protective 0. Ft. Casing/Well Difference
 Protective 0. Ft. Casing
 Depth to Water 3.61 Ft. Well Material: PVC SS Well Locked?: Yes No Well Dia. 2 inch 4 inch 6 inch Water Level Equip. Used: Elect. Cond. Probe Float Activated Press. Transducer
 Height of Water Column X 9.59 Ft. 1.5 Gal/A. (2 in) 4.5 Gal/A. (4 in) 1.5 Gal/A. (6 in) 3.5 Gal/A. (1 in) [5.2 Gal/Vol 6.0 Total Gal Purged] Well Integrity: Prot. Casing Secure Yes No Concrete Collar Intact Yes No Casing Yes No
FLOW RATE = 67 LPM

Equipment Documentation

Purging/Sampling Equipment Used: Purging Sampling
 Penstatic Pump Equipment ID
 Submersible Pump
 Bailer
 PVC/Silicon Tubing
 Teflon/Silicon Tubing
 Airm
 Hand Pump
 In-line Filter
 Press/Vac Filter
 Decontamination Fluids Used: All That Apply at Location
 Methanol (100%)
 25% Methanol/75% ASTM Type II water
 Deionized Water
 Liquinox Solution
 Hexane
 HNO₃/0.1. Water Solution
 Potable Water
 None
 SECOND
 ISOPROPYL

Field Analysis Data

Ambient Air VOC 0. ppm Well Mouth 50. ppm Field Data Collected In-line Turb Clear Cloudy
 In Container Colored Odor
 Sample Observations:

Purge Data	1.5 Gal.	3.0 Gal.	4.5 Gal.	6.0 Gal.	Gal.
Temperature, Deg. C	30.0	27.0	26.0	27.0	
pH, units	5.02	4.42	4.49	4.41	
Specific Conductivity (umhos/cm @ 25 Deg. C)	130.	127.	125.	122.	
Oxidation - Reduction, -mv					
Dissolved Oxygen, ppm	13.50	9.6	9.5	7.7	
<u>ALCALINITY</u>	<u>1663</u>	<u>1618</u>	<u>1631</u>	<u>1643</u>	

Sample Collection Requirements
 Required at this Location

Analytical Parameter	# Field Filtered	Preservation Method	Volume Required	# Sample Collected	Sample Bottle IDs
VOA		HCL			/ / / /
SVOA		ACC			/ / / /
Pest/PCB		ACC			/ / / /
Inorganics		HNO ₃			/ / / /
Explosives		4°C			/ / / /
TPH		H ₂ SO ₄			/ / / /
TOC		H ₂ SO ₄			/ / / /
Nitrate		H ₂ SO ₄			/ / / /

Notes: LOW-FLOW PURGE
5.16 L/MIN. FINAL HTU = 7.2

APPENDIX B

SUMMARY OF POSITIVE DETECTIONS TABLES

- Table B-1 Summary of Positive Detections in Surface Soil, Initial Screening (1995)
- Table B-2 Summary of Positive Detections in Surface Soil, Supplemental Screening (1997)
- Table B-3 Summary of Positive Detections in Subsurface Soil
- Table B-4 Summary of Positive Detections in Groundwater
- Table B-5 Summary of Positive Detections in Sediment
- Table B-6 Summary of Positive Detections in Storm Water

TABLE B-1

**SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
INITIAL SCREENING (1995)**

Appendix B

Table B-1. Summary of Positive Detections in Surface Soil Analytical Results
Initial Screening (1995), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando
Orlando, FL

Identifier	Background	SCTL for Residential Soil	RBC for Residential Soil	RBC for Industrial Soil	23S00501
Sampling Date					6/2/95
Feet bls					1
Volatile Organics, µg/kg					
Methylene chloride		16,000	8,500 c	760,000 c	6 J
Semivolatile Organics, µg/kg					
Acenaphthene		1,100,000	4,700,000 n	120,000,000 n	8,300
Anthracene		19,000,000	23,000,000 n	610,000,000 n	7,400
Benzo(a)anthracene		1,400	880 c	7,800 c	19,000
Benzo(a)pyrene		100	88 c	780 c	16,000
Benzo(b)fluoranthene		1,400	880 c	7,800 c	18,000
Benzo(g,h,i)perylene		2,300,000	2,300,000 n	61,000,000 n	8,700
Benzo(k)fluoranthene		15,000	8,800 c	78,000 c	18,000
Carbazole		53,000	32,000 c	290,000 c	7,600
Chrysene		140,000	88,000 c	780,000 c	20,000
Dibenz(a,h)anthracene		100	88 c	780 c	3,900 J
Dibenzofuran		270,000	310,000 n	8,200,000 n	3,200 J
Fluoranthene		2,800,000	3,100,000 n	82,000,000 n	38,000
Fluorene		2,100,000	3,100,000 n	82,000,000 n	6,600
Indeno(1,2,3-cd)pyrene		1,500	880 c	7,800 c	8,800
Naphthalene		1,000,000	3,100,000 n	82,000,000 n	3,300 J
Phenanthrene		1,900,000	2,300,000 n	61,000,000 n	34,000
Pyrene		2,200,000	2,300,000 n	61,000,000 n	23,000
Inorganics, mg/kg					
Aluminum	4,870	72,000	78000 n	1,000,000 n	5,750 J
Arsenic	1.9	0.8	0.43 /23 c/n	3.8 /610 c/n	3.2 B

Appendix B

Table B-1. Summary of Positive Detections in Surface Soil Analytical Results
Initial Screening (1995), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando
Orlando, FL

Identifier	Background	SCTL for Residential Soil	RBC for Residential Soil	RBC for Industrial Soil	23S00501
Sampling Date					6/2/95
Feet bls					1
Barium	21.6	105	5500 n	140,000 n	29 B
Beryllium	0.46	120	0.15 c	1.3 c	0.49 B
Cadmium	ND	75	39 n	1,000 n	3
Calcium	33,568	ND	1,000,000	1,000,000	9,780
Chromium	7.70	290	390 n	10,000 n	24.1
Cobalt	ND	4,700	4,700 n	120,000 n	1.4 B
Copper	2.6	105	3100 n	82,000 n	121
Iron	843	23,000	23000 n	610,000 n	7,960 J
Lead	21.3	500	400	400	231 J
Magnesium	381	ND	460,468	460,468	708 B
Manganese	10.8	1,600	1800 n	47,000 n	34.4
Mercury	0.05	3.7	23 n	610 n	1.1
Nickel	ND	105	1600 n	41,000 n	11.8 B
Sodium	ND	ND	1,000,000	1,000,000	74.2 B
Vanadium	4.9	15	550 n	14,000 n	17.8
Zinc	4.6	23,000	23000 n	610,000 n	1,980
General chemistry, mg/kg					
Total Petroleum Hydrocarbons	ND	ND	ND	ND	79.8

Appendix B
Table B-1. Summary of Positive Detections in Surface Soil Analytical Results
Initial Screening (1995), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

NOTES:

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

SCTL = Florida Department of Environmental Protection, Soil Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.

Values indicated are for direct exposure scenario. Value for chromium is for chromium (IV).

Value for mercury is for inorganic mercury.

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, sodium) screening values were derived based on recommended daily allowances.

RBC for benzo(g,h,i)perylene and phenanthrene are not available, value is based on pyrene.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

mg/kg = milligrams per kilogram.

n = noncarcinogenic effects.

c = carcinogenic effects.

ND = Not determined.

bls = below land surface

B = Reported concentration is between the instrument detection limit (IDL) and Contract Required Detection Limit (CRDL).

J = Reported concentration is an estimated quantity.

FDEP = Florida Department of Environmental Protection.

OSWER = Office of Solid Waste and Emergency Response.

USEPA = U.S. Environmental Protection Agency.

All inorganics results expressed in milligrams per kilogram (mg/kg) soil dry weight; organics in micrograms per kilogram ($\mu\text{g}/\text{kg}$) 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.

TABLE B-2

**SUMMARY OF POSITIVE DETECTIONS IN SURFACE SOIL
SUPPLEMENTAL SCREENING (1997)**

Appendix B

Table B-2. Summary of Positive Detections in Surface Soil Analytical Results
Supplemental Screening (1997), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Identifier	SCTL for	RBC for	RBC for Industrial	23S01401	23B01401D	23S01501	23B01501	23S01601	23B01601
	Residential Soil	Residential Soil	Soil	11/24/97	11/24/97	11/24/97	11/24/97	11/24/97	11/24/97
Sampling Date									
Sampling depth, ft bls				0-1	1-2	0-1	1-2	0-1	1-2
PAHs, µg/kg									
1-Methylnaphthalene	290,000	ND	ND						57
Acenaphthylene	1,100,000	2,300,000 n	61,000,000 n		46				120
Benzo(a)pyrene	100	88 c	780 c	4.9					
Chrysene	140,000	88,000 c	780,000 c	9.2	8.9	20			
Fluoranthene	2,800,000	3,100,000 n	82,000,000 n		4.1				
Pyrene	2,200,000	2,300,000 n	61,000,000 n	72	5.4	12		49	200

Appendix B
Table B-2: Summary of Positive Detections in Surface Soil Analytical Results
Supplemental Screening (1997), Study Area 23.

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

NOTES:

PAH = Polynuclear aromatic hydrocarbons.

SCTL = Florida Department of Environmental Protection, Soil Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.

Values indicated are for direct exposure scenario. Value for chromium is for chromium (IV).

Value for mercury is for inorganic mercury.

RBC = Risk-Based Concentration Table, USEPA Region III, October, 1995, R.L. Smith.

bls = below land surface.

µg/kg = micrograms per kilogram.

n = noncarcinogenic pathway.

c = carcinogenic pathway.

ND = Not determined.

USEPA = U.S. Environmental Protection Agency.

All analytical results expressed in micrograms per kilogram (µg/kg) soil dry weight.

Blank space indicates analyte/compound was not detected at the reporting limit.

TABLE B-3

SUMMARY OF POSITIVE DETECTIONS IN SUBSURFACE SOIL

Appendix B

Table B-3. Summary of Positive Detections in Subsurface Soil Analytical Results, Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Identifier	Background	SCTL for Residential Soil	RBC for Residential Soil	RBC for Industrial Soil	23B00101		23B00201		23B00201D		23B00301		23B00302	
					5/14/95	5/15/95	5/15/95	6/2/95	6/2/95					
Sampling Date														
Feet bls														
Volatile Organics, µg/kg														
2-Butanone		NA	470,000,000 n	1,000,000,000 n	5 J									
Acetone		NA	7,800,000 n	200,000,000 n	50		20		18		16		15	
Inorganics, mg/kg														
Aluminum	11,130	NA	78,000 n	1,000,000 n	1,000		3,210		2,260		4,110 J		3,320 J	
Arsenic	2.0	NA	0.43 /23 c/n	3.8 /610 c/n	0.53 B		0.68 J		0.71 B		0.44 B			
Barium	11.3	NA	5,500 n	140,000 n	1.1 J		3.1 J		2.1 J		13.9 B		1.1 B	
Beryllium	0.18	NA	0.15 c	1.3 c									0.11 B	
Calcium	321	NA	1,000,000	1,000,000	20.4 B		92 B		95.4 B		155 B		437 B	
Chromium	11.3	NA	390 n	10,000 n	1.9 B		3.5		2.4 B		5.6		5.2	
Cobalt	1.3	NA	4,700,000 n	120,000,000 n			0.75 B							
Copper	2.8	NA	3,100 n	82,000 n							3.9 B			
Iron	829	NA	23,000 n	610,000 n	222		647		529		124 J		142 J	
Lead	7.0	NA	400	400	1.6 J		1.9 J		3.7 J		5.6 J		2.5 J	
Magnesium	38.9	NA	460,468	460,468	10.7 B		41.5 B		17.5 B		18 B		9.9 B	
Manganese	0.69	NA	1,800 n	47,000 n	1.5 B		0.83 B		0.69 B		0.22 B			
Mercury	0.12	NA	23 n	610 n							0.09		0.04 B	
Sodium	ND	NA	1,000,000	1,000,000	8.5 B		6.2 B		4.4 B					
Vanadium	5.9	NA	550 n	14,000 n	0.91 B		2.5 B		1.5 B		1.8 B		2.9 B	
Zinc	0.66	NA	23,000 n	610,000 n							0.37 B			
General chemistry, mg/kg														
Total Petroleum Hydrocarbons		NA	ND	ND	19.4		11.3				33			

Appendix B

Table B-3. Summary of Positive Detections in Subsurface Soil Analytical Results, Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Identifier	Background	SCTL for Residential Soil	RBC for Residential Soil	RBC for Industrial Soil	23B00401
Sampling Date					6/2/95
Feet bls					11
Volatile Organics, µg/kg					
2-Butanone		NA	470,000,000 n	1,000,000,000 n	
Acetone		NA	7,800,000 n	200,000,000 n	57
Inorganics, mg/kg					
Aluminum	11,130	NA	78,000 n	1,000,000 n	7,450 J
Arsenic	2.0	NA	0.43 /23 c/n	3.8 /610 c/n	0.95 J
Barium	11.3	NA	5,500 n	140,000 n	0.96 B
Beryllium	0.18	NA	0.15 c	1.3 c	0.13 B
Calcium	321	NA	1,000,000	1,000,000	228 B
Chromium	11.3	NA	390 n	10,000 n	8.6
Cobalt	1.3	NA	4,700,000 n	120,000,000 n	
Copper	2.8	NA	3,100 n	82,000 n	
Iron	829	NA	23,000 n	610,000 n	791 J
Lead	7.0	NA	400	400	4.2 J
Magnesium	38.9	NA	460,468	460,468	11.5 B
Manganese	0.69	NA	1,800 n	47,000 n	0.29 B
Mercury	0.12	NA	23 n	610 n	0.07
Sodium	ND	NA	1,000,000	1,000,000	
Vanadium	5.9	NA	550 n	14,000 n	2.5 B
Zinc	0.66	NA	23,000 n	610,000 n	0.49 B
General chemistry, mg/kg					
Total Petroleum Hydrocarbons		NA	ND	ND	8.1

Appendix B
Table B-3. Summary of Positive Detections in Subsurface Soil Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

NOTES:

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

SCTL = Florida Department of Environmental Protection, Soil Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.

Values indicated are for direct exposure scenario. Value for chromium is for chromium (IV).

Value for mercury is for inorganic mercury.

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, sodium) screening values were derived based on recommended daily allowances.

$\mu\text{g}/\text{kg}$ = micrograms per kilogram.

mg/kg = milligrams per kilogram.

n = noncarcinogenic effects.

c = carcinogenic effects.

NA = Not applicable.

ND = Not determined.

b/s = below land surface.

OSWER = Office of Solid Waste and Emergency Response.

USEPA = U.S. Environmental Protection Agency.

B = Reported concentration is between the instrument detection limit and Contract Required Detection Limit.

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 ($\mu\text{g}/\text{kg}$) soil dry weight.

Blank space indicates analyte/compound was not detected at the reporting limit.

TABLE B-4

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER

Appendix B

Table B-4. Summary of Positive Detections in Groundwater Analytical Results, Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Well Identifier						OLD-23-01	OLD-23-02
Identifier	Background	FDEPGCTL	FEDMCL	RBC for Tap Water		23G00101	23G00201
Sampling Date						5/30/95	5/30/95
Semivolatile Organics, µg/L							
bis(2-Ethylhexyl)phthalate		6 o	6	4.8 c			3 J
Inorganics, µg/L							
Aluminum	4,067	200 s	ND	37,000 n		16,200	439
Barium	31	2,000 p	2,000	2,600 n		12.2 J	11.2 J
Beryllium	ND	4 p	4	0.016 c		0.43 J	
Calcium	36,830	ND	ND	1,000,000		1,080 B	11,800
Chromium	8	100 p	100	180 n		26	
Iron	1,227	300 s	ND	11,000 n		2,960	1,430
Lead	4	15 p	15	15		10.1	
Magnesium	4,560	ND	ND	118,807		860 B	1,490 B
Manganese	17	50 s	ND	840 n		27.4	7.2 B
Mercury	0.12	2 p	2	11 n		0.7	
Potassium	5,400	ND	ND	297,016		1,120 J	461 J
Sodium	18,222	160,000 p	ND	396,022		9,600	5,320
Vanadium	21	49 st	ND	260 n		13.1 B	5.6 B
Zinc	4	5,000 s	ND	11,000 n		7.4 B	4.5 B
General chemistry, mg/L							
Total Suspended Solids		ND	ND	ND		3	1

Appendix B
Table B-4. Summary of Positive Detections in Groundwater Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

NOTES:

Groundwater background screening value is twice the average of detected concentrations for *inorganic analytes*.

FDEPGCTL = Florida Department of Environmental Protection, Groundwater Cleanup Target Levels, Chapter 62-785 FAC, April 30, 1998.

FEDMCL = Federal Maximum Contaminant Levels, Primary Drinking Water Regulations and Health Advisories, February 1996.

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.

s = secondary standard.

st = systemic toxicant.

p = primary standard.

o = organoleptic.

n = noncarcinogenic effects.

c = carcinogenic effects.

ND = Not determined.

USEPA = U.S. Environmental Protection Agency.

B = Reported concentration is between the instrument detection limit and the contract required detection limit.

J = Reported concentration is an estimated quantity.

µg/L = micrograms per liter.

mg/L = milligrams 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 B

Table B-5. Summary of Detections in Sediment Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center
Orlando, FL

Identifier	Sediment Screening Value		23D00101	23D00201	23D00301	23D00401
	NOEL	PEL	9/13/96	5/8/98	5/8/98	5/8/98
PAHs, µg/kg						
Anthracene	85	740	1,400			
Benzo(a)anthracene	160	1300	5,100		78	37
Benzo(a)pyrene	230	1700	5,400	4.9	120	58
Benzo(b)fluoranthene	ND	ND	6400		110	48
Benzo(g,h,i)perylene	ND	ND	6100		79	35
Benzo(k)fluoranthene	ND	ND	2300			25
Chrysene	220	1700	9,900		100	50
Dibenz(a,h)anthracene	31	320	4,200	5.2	13	23
Fluoranthene	380	3200	10,000	7.5	110	71
Indeno(1,2,3-cd)pyrene	ND	ND	5400		65	30
Phenanthrene	140	1200	7,300			
Pyrene	290	1900	9,100	8.3	160	90

NOTES:

PAH = Polynuclear aromatic hydrocarbons.
Sediment Screening Value is taken from Florida Department of Environmental Protection, Sediment Quality Assessment Guidelines (MacDonald, 1994).
NOEL = No observable effects level.
PEL = Probable effects level.
µg/kg = micrograms per kilogram.
ND = Not determined.
Bold/shaded values indicate exceedance of sediment screening value.

TABLE B-6

SUMMARY OF POSITIVE DETECTIONS IN STORM WATER

Appendix B
 Table B-6. Summary of Detections in Storm Water Analytical Results
 Study Area 23

BRAC Environmental Site Screening Report
 Naval Training Center
 Orlando, FL

Identifier	Florida Surface Water Standards	23W00101
Sampling Date		9/13/96
Volatile Organics, µg/L		
Acetone	ND	9 J
Inorganics, µg/L		
Aluminum	ND	209
Barium	ND	35.3 B
Calcium	ND	59000
Chromium	11	3.2 B
Cobalt	ND	4 B
Iron	1000	903
Lead	50 a	5.8
Magnesium	ND	2660 B
Manganese	ND	47.7
Mercury	0.012	0.15 B
Nickel	368	9.6 B
Potassium	ND	2660 B
Sodium	ND	4270 B
Vanadium	ND	5.2 B
Zinc	250	65.4

NOTES:

Chapter 62-302. Florida Administrative Code Surface Water Quality Standards; 1995
 a = Hardness dependent criterion. Average water hardness of 30 mg/L CaCO₃ was used to calculate criteria.
 µg/L = micrograms per liter.
 ND = Not determined
 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.

APPENDIX C

SUMMARY OF ANALYTICAL RESULTS

- Table C-1 Summary of Surface Soil Analytical Results, Initial Screening (1995)
- Table C-2 Summary of Surface Soil Analytical Results, Supplemental Screening (1997)
- Table C-3 Summary of Subsurface Soil Analytical Results
- Table C-4 Summary of Groundwater Analytical Results
- Table C-5 Summary of Sediment Analytical Results
- Table C-6 Summary of Storm Water Analytical Results

TABLE C-1

**SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
INITIAL SCREENING (1995)**

Appendix C

Table C-1. Summary of Surface Soil Analytical Results
Initial Screening (1995), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23S00501
Lab ID	G7730008
Sampling Date	2-Jun-95
Volatile organics, µg/kg	
1,1,1-Trichloroethane	18 U
1,1,2,2-Tetrachloroethane	18 U
1,1,2-Trichloroethane	18 U
1,1-Dichloroethane	18 U
1,1-Dichloroethene	18 U
1,2-Dichloroethane	18 U
1,2-Dichloroethene (total)	18 U
1,2-Dichloropropane	18 U
2-Butanone	18 U
2-Hexanone	18 U
4-Methyl-2-pentanone	18 U
Acetone	18 U
Benzene	18 U
Bromodichloromethane	18 U
Bromoform	18 U
Bromomethane	18 U
Carbon disulfide	18 U
Carbon tetrachloride	18 U
Chlorobenzene	18 U
Chloroethane	18 U
Chloroform	18 U
Chloromethane	18 U
cis-1,3-Dichloropropene	18 U
Dibromochloromethane	18 U
Ethylbenzene	18 U
Methylene chloride	6 J
Styrene	18 U
Tetrachloroethene	18 U
Toluene	18 U
trans-1,3-Dichloropropene	18 U
Trichloroethene	18 U
Vinyl chloride	18 U
Xylene (total)	18 U
Semivolatile organics, µg/kg	
1,2,4-Trichlorobenzene	6000 U
1,2-Dichlorobenzene	6000 U
1,3-Dichlorobenzene	6000 U
1,4-Dichlorobenzene	6000 U
2,2'-oxybis(1-Chloropropane)	6000 U
2,4,5-Trichlorophenol	15000 U
2,4,6-Trichlorophenol	6000 U
2,4-Dichlorophenol	6000 U
2,4-Dimethylphenol	6000 U
2,4-Dinitrophenol	15000 U
2,4-Dinitrotoluene	6000 U
2,6-Dinitrotoluene	6000 U
2-Chloronaphthalene	6000 U
2-Chlorophenol	6000 U
2-Methylnaphthalene	6000 U

Appendix C

Table C-1. Summary of Surface Soil Analytical Results
Initial Screening (1995), Study Area 23BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23S00501
Lab ID	G7730008
Sampling Date	2-Jun-95
2-Methylphenol	6000 U
2-Nitroaniline	15000 U
2-Nitrophenol	6000 U
3,3'-Dichlorobenzidine	6000 U
3-Nitroaniline	15000 U
4,6-Dinitro-2-methylphenol	15000 U
4-Bromophenyl-phenylether	6000 U
4-Chloro-3-methylphenol	6000 U
4-Chloroaniline	6000 U
4-Chlorophenyl-phenylether	6000 U
4-Methylphenol	6000 U
4-Nitroaniline	15000 U
4-Nitrophenol	15000 U
Acenaphthene	8300
Acenaphthylene	6000 U
Anthracene	7400
Benzo(a)anthracene	19000
Benzo(a)pyrene	16000
Benzo(b)fluoranthene	18000
Benzo(g,h,i)perylene	8700
Benzo(k)fluoranthene	18000
bis(2-Chloroethoxy)methane	6000 U
bis(2-Chloroethyl)ether	6000 U
bis(2-Ethylhexyl)phthalate	6000 U
Butylbenzylphthalate	6000 U
Carbazole	7600
Chrysene	20000
Di-n-butylphthalate	6000 U
Di-n-octylphthalate	6000 U
Dibenz(a,h)anthracene	3900 J
Dibenzofuran	3200 J
Diethylphthalate	6000 U
Dimethylphthalate	6000 U
Fluoranthene	38000
Fluorene	6600
Hexachlorobenzene	6000 U
Hexachlorobutadiene	6000 U
Hexachlorocyclopentadiene	6000 U
Hexachloroethane	6000 U
Indeno(1,2,3-cd)pyrene	8800
Isophorone	6000 U
N-Nitroso-di-n-propylamine	6000 U
N-Nitrosodiphenylamine (1)	6000 U
Naphthalene	3300 J
Nitrobenzene	6000 U
Pentachlorophenol	15000 U
Phenanthrene	34000
Phenol	6000 U
Pyrene	23000

Appendix C

Table C-1. Summary of Surface Soil Analytical Results
Initial Screening (1995), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23S00501
Lab ID	G7730008
Sampling Date	2-Jun-95
Inorganics, µg/kg	
Aluminum	5750 J
Antimony	10.3 U
Arsenic	3.2 B
Barium	29 B
Beryllium	0.49 B
Cadmium	3
Calcium	9780
Chromium	24.1
Cobalt	1.4 B
Copper	121
Iron	7960 J
Lead	231 J
Magnesium	708 B
Manganese	34.4
Mercury	1.1
Nickel	11.8 B
Potassium	155 U
Selenium	0.8 U
Silver	0.91 U
Sodium	74.2 B
Thallium	0.63 U
Vanadium	17.8
Zinc	1980
General Chemistry, mg/kg	
Total Petroleum Hydrocarbons	79.8

TABLE C-2

**SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
SUPPLEMENTAL SCREENING (1997)**

Appendix C

Table C-2. Summary of Surface Soil Analytical Results
Supplemental Screening (1997), Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

SampleID	23S01401	23B01401	23B01401D	23S01501	23B01501	23S01601	23B01601
LabID	A7K250140007	A7K250140008	A7K250140009	A7K250140010	A7K290104011	A7K250140012	A7K250140013
Sampling Date	11/24/97	11/24/97	11/24/97	11/24/97	11/26/97	11/24/97	11/24/97
1-Methylnaphthalene	40 U	40 U	40 U	40 U	39 U	41 U	57
2-Methylnaphthalene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Acenaphthene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Acenaphthylene	40 U	40 U	46	40 U	39 U	41 U	120
Anthracene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Benzo(a)anthracene	3.9 U	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Benzo(a)pyrene	4.9	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Benzo(b)fluoranthene	3.9 U	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Benzo(ghi)perylene	3.9 U	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Benzo(k)fluoranthene	2 U	2 U	2.1 U	2 U	2 U	2.1 U	2 U
Chrysene	9.2	4 U	8.9	20	3.9 U	4.1 U	3.9 U
Dibenz(a,h)anthracene	3.9 U	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Fluoranthene	3.9 U	4 U	4.1	3.9 U	3.9 U	4.1 U	3.9 U
Fluorene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Indeno(1,2,3-cd)pyrene	3.9 U	4 U	4 U	3.9 U	3.9 U	4.1 U	3.9 U
Naphthalene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Phenanthrene	40 U	40 U	40 U	40 U	39 U	41 U	40 U
Pyrene	72	4 U	5.4	12	3.9 U	49	200

TABLE C-3

SUMMARY OF ANALYTICAL RESULTS IN SUBSURFACE SOIL

Appendix C
Table C-3. Summary of Subsurface Soil Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23B00101	23B00201	23B00201D	23B00301	23B00302	23B00401
Lab ID	G7562005	G7583002	G7583003	G7730005	G7730006	G7730007
Sampling Date	14-May-95	15-May-95	15-May-95	2-Jun-95	2-Jun-95	2-Jun-95
Volatile organics, µg/kg						
1,1,1-Trichloroethane	12 U	12 U	13 U	11 U	13 U	13 U
1,1,2,2-Tetrachloroethane	12 U	12 U	13 U	11 U	13 U	13 U
1,1,2-Trichloroethane	12 U	12 U	13 U	11 U	13 U	13 U
1,1-Dichloroethane	12 U	12 U	13 U	11 U	13 U	13 U
1,1-Dichloroethene	12 U	12 U	13 U	11 U	13 U	13 U
1,2-Dichloroethane	12 U	12 U	13 U	11 U	13 U	13 U
1,2-Dichloroethene (total)	12 U	12 U	13 U	11 U	13 U	13 U
1,2-Dichloropropane	12 U	12 U	13 U	11 U	13 U	13 U
2-Butanone	5 J	12 U	13 U	11 U	13 U	13 U
2-Hexanone	12 U	12 U	13 U	11 U	13 U	13 U
4-Methyl-2-pentanone	12 U	12 U	13 U	11 U	13 U	13 U
Acetone	50	20	18	16	15	57
Benzene	12 U	12 U	13 U	11 U	13 U	13 U
Bromodichloromethane	12 U	12 U	13 U	11 U	13 U	13 U
Bromoform	12 U	12 U	13 U	11 U	13 U	13 U
Bromomethane	12 U	12 U	13 U	11 U	13 U	13 U
Carbon disulfide	12 U	12 U	13 U	11 U	13 U	13 U
Carbon tetrachloride	12 U	12 U	13 U	11 U	13 U	13 U
Chlorobenzene	12 U	12 U	13 U	11 U	13 U	13 U
Chloroethane	12 U	12 U	13 U	11 U	13 U	13 U
Chloroform	12 U	12 U	13 U	11 U	13 U	13 U
Chloromethane	12 U	12 U	13 U	11 U	13 U	13 U
cis-1,3-Dichloropropene	12 U	12 U	13 U	11 U	13 U	13 U
Dibromochloromethane	12 U	12 U	13 U	11 U	13 U	13 U
Ethylbenzene	12 U	12 U	13 U	11 U	13 U	13 U
Methylene chloride	12 U	12 U	13 U	11 U	13 U	13 U
Styrene	12 U	12 U	13 U	11 U	13 U	13 U
Tetrachloroethene	12 U	12 U	13 U	11 U	13 U	13 U
Toluene	12 U	12 U	13 U	11 U	13 U	13 U
trans-1,3-Dichloropropene	12 U	12 U	13 U	11 U	13 U	13 U
Trichloroethene	12 U	12 U	13 U	11 U	13 U	13 U
Vinyl chloride	12 U	12 U	13 U	11 U	13 U	13 U
Xylene (total)	12 U	12 U	13 U	11 U	13 U	13 U
Semivolatile organics, µg/kg						
1,2,4-Trichlorobenzene	390 U	400 U	410 U	370 U	390 U	410 U
1,2-Dichlorobenzene	390 U	400 U	410 U	370 U	390 U	410 U
1,3-Dichlorobenzene	390 U	400 U	410 U	370 U	390 U	410 U
1,4-Dichlorobenzene	390 U	400 U	410 U	370 U	390 U	410 U
2,2'-oxybis(1-Chloropropane)	390 U	400 U	410 U	370 U	390 U	410 U
2,4,5-Trichlorophenol	970 U	1000 U	1000 U	920 U	980 U	1000 U
2,4,6-Trichlorophenol	390 U	400 U	410 U	370 U	390 U	410 U
2,4-Dichlorophenol	390 U	400 U	410 U	370 U	390 U	410 U
2,4-Dimethylphenol	390 U	400 U	410 U	370 U	390 U	410 U
2,4-Dinitrophenol	970 U	1000 U	1000 U	920 U	980 U	1000 U
2,4-Dinitrotoluene	390 U	400 U	410 U	370 U	390 U	410 U
2,6-Dinitrotoluene	390 U	400 U	410 U	370 U	390 U	410 U
2-Chloronaphthalene	390 U	400 U	410 U	370 U	390 U	410 U
2-Chlorophenol	390 U	400 U	410 U	370 U	390 U	410 U
2-Methylnaphthalene	390 U	400 U	410 U	370 U	390 U	410 U
2-Methylphenol	390 U	400 U	410 U	370 U	390 U	410 U
2-Nitroaniline	970 U	1000 U	1000 U	920 U	980 U	1000 U

Appendix C
Table C-3. Summary of Subsurface Soil Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23B00101	23B00201	23B00201D	23B00301	23B00302	23B00401
Lab ID	G7562005	G7583002	G7583003	G7730005	G7730006	G7730007
Sampling Date	14-May-95	15-May-95	15-May-95	2-Jun-95	2-Jun-95	2-Jun-95
2-Nitrophenol	390 U	400 U	410 U	370 U	390 U	410 U
3,3'-Dichlorobenzidine	390 U	400 U	410 U	370 U	390 U	410 U
3-Nitroaniline	970 U	1000 U	1000 U	920 U	980 U	1000 U
4,6-Dinitro-2-methylphenol	970 U	1000 U	1000 U	920 U	980 U	1000 U
4-Bromophenyl-phenylether	390 U	400 U	410 U	370 U	390 U	410 U
4-Chloro-3-methylphenol	390 U	400 U	410 U	370 U	390 U	410 U
4-Chloroaniline	390 U	400 U	410 U	370 U	390 U	410 U
4-Chlorophenyl-phenylether	390 U	400 U	410 U	370 U	390 U	410 U
4-Methylphenol	390 U	400 U	410 U	370 U	390 U	410 U
4-Nitroaniline	970 U	1000 U	1000 U	920 U	980 U	1000 U
4-Nitrophenol	970 U	1000 U	1000 U	920 U	980 U	1000 U
Acenaphthene	390 U	400 U	410 U	370 U	390 U	410 U
Acenaphthylene	390 U	400 U	410 U	370 U	390 U	410 U
Anthracene	390 U	400 U	410 U	370 U	390 U	410 U
Benzo(a)anthracene	390 U	400 U	410 U	370 U	390 U	410 U
Benzo(a)pyrene	390 U	400 U	410 U	370 U	390 U	410 U
Benzo(b)fluoranthene	390 U	400 U	410 U	370 U	390 U	410 U
Benzo(g,h,i)perylene	390 U	400 U	410 U	370 U	390 U	410 U
Benzo(k)fluoranthene	390 U	400 U	410 U	370 U	390 U	410 U
bis(2-Chloroethoxy)methane	390 U	400 U	410 U	370 U	390 U	410 U
bis(2-Chloroethyl)ether	390 U	400 U	410 U	370 U	390 U	410 U
bis(2-Ethylhexyl)phthalate	390 U	400 U	410 U	370 U	390 U	410 U
Butylbenzylphthalate	390 U	400 U	410 U	370 U	390 U	410 U
Carbazole	390 U	400 U	410 U	370 U	390 U	410 U
Chrysene	390 U	400 U	410 U	370 U	390 U	410 U
Di-n-butylphthalate	390 U	400 U	410 U	370 U	390 U	410 U
Di-n-octylphthalate	390 U	400 U	410 U	370 U	390 U	410 U
Dibenz(a,h)anthracene	390 U	400 U	410 U	370 U	390 U	410 U
Dibenzofuran	390 U	400 U	410 U	370 U	390 U	410 U
Diethylphthalate	390 U	400 U	410 U	370 U	390 U	410 U
Dimethylphthalate	390 U	400 U	410 U	370 U	390 U	410 U
Fluoranthene	390 U	400 U	410 U	370 U	390 U	410 U
Fluorene	390 U	400 U	410 U	370 U	390 U	410 U
Hexachlorobenzene	390 U	400 U	410 U	370 U	390 U	410 U
Hexachlorobutadiene	390 U	400 U	410 U	370 U	390 U	410 U
Hexachlorocyclopentadiene	390 U	400 U	410 U	370 U	390 U	410 U
Hexachloroethane	390 U	400 U	410 U	370 U	390 U	410 U
Indeno(1,2,3-cd)pyrene	390 U	400 U	410 U	370 U	390 U	410 U
Isophorone	390 U	400 U	410 U	370 U	390 U	410 U
N-Nitroso-di-n-propylamine	390 U	400 U	410 U	370 U	390 U	410 U
N-Nitrosodiphenylamine (1)	390 U	400 U	410 U	370 U	390 U	410 U
Naphthalene	390 U	400 U	410 U	370 U	390 U	410 U
Nitrobenzene	390 U	400 U	410 U	370 U	390 U	410 U
Pentachlorophenol	970 U	1000 U	1000 U	920 U	980 U	1000 U
Phenanthrene	390 U	400 U	410 U	370 U	390 U	410 U
Phenol	390 U	400 U	410 U	370 U	390 U	410 U
Pyrene	390 U	400 U	410 U	370 U	390 U	410 U
Inorganics, µg/kg						
Aluminum	1000	3210	2260	4110 J	3320 J	7450 J
Antimony	7 UJ	7.2 UJ	7.1 UJ	6.5 U	7.5 U	7.6 U
Arsenic	0.53 B	0.68 J	0.71 B	0.44 B	0.48 U	0.95 J
Barium	1.1 J	3.1 J	2.1 J	13.9 B	1.1 B	0.96 B

Appendix C
 Table C-3. Summary of Subsurface Soil Analytical Results
 Study Area 23

BRAC Environmental Site Screening Report
 Naval Training Center, Orlando

Sample ID	23B00101	23B00201	23B00201D	23B00301	23B00302	23B00401
Lab ID	G7562005	G7583002	G7583003	G7730005	G7730006	G7730007
Sampling Date	14-May-95	15-May-95	15-May-95	2-Jun-95	2-Jun-95	2-Jun-95
Beryllium	0.02 UJ	0.02 UJ	0.02 UJ	0.06 U	0.11 B	0.13 B
Cadmium	0.74 U	0.75 U	0.75 U	0.68 U	0.78 U	0.8 U
Calcium	20.4 B	92 B	95.4 B	155 B	437 B	228 B
Chromium	1.9 B	3.5	2.4 B	5.6	5.2	8.6
Cobalt	0.69 U	0.75 B	0.7 U	0.64 U	0.73 U	0.75 U
Copper	0.33 U	0.51 U	0.34 U	3.9 B	1.3 U	0.36 U
Iron	222	647	529	124 J	142 J	791 J
Lead	1.6 J	1.9 J	3.7 J	5.6 J	2.5 J	4.2 J
Magnesium	10.7 B	41.5 B	17.5 B	18 B	9.9 B	11.5 B
Manganese	1.5 B	0.83 B	0.69 B	0.22 B	0.18 U	0.29 B
Mercury	0.03 U	0.03 U	0.03 U	0.09	0.04 B	0.07
Nickel	3.4 U	3.4 U	3.4 U	3.1 U	3.6 U	3.7 U
Potassium	106 U	108 U	107 U	97.5 U	112 U	114 U
Selenium	0.55 U	0.56 U	0.55 U	0.5 U	0.58 U	0.59 U
Silver	0.62 U	0.63 U	0.63 U	0.57 U	0.66 U	0.67 U
Sodium	8.5 B	6.2 B	4.4 B	10.5 U	12.6 U	8.1 U
Thallium	0.43 U	0.44 U	0.44 UJ	0.4 U	0.46 U	0.47 U
Vanadium	0.91 B	2.5 B	1.5 B	1.8 B	2.9 B	2.5 B
Zinc	0.69 U	0.81 U	0.81 U	0.37 B	0.28 U	0.49 B
General Chemistry, mg/kg						
Total Petroleum Hydrocarbons	19.4	11.3	5.1 U	33	5 U	8.1

TABLE C-4

SUMMARY OF ANALYTICAL RESULTS IN GROUNDWATER

Appendix C
 Table C-4. Summary of Groundwater Analytical Results
 Study Area 23

BRAC Environmental Site Screening Report
 Naval Training Center, Orlando

Sample ID	23G00101	23G00201
Lab ID	G7705004	G7705003
Sampling Date	30-May-95	30-May-95
Volatile organics, µg/L		
1,1,1-Trichloroethane	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	1 U
1,1,2-Trichloroethane	1 U	1 U
1,1-Dichloroethane	1 U	1 U
1,1-Dichloroethene	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	1 U
1,2-Dibromoethane	1 U	1 U
1,2-Dichloroethane	1 U	1 U
1,2-Dichloropropane	1 U	1 U
2-Butanone	5 UR	5 UR
2-Hexanone	5 U	5 U
4-Methyl-2-pentanone	5 U	5 U
Acetone	8 UR	5 UR
Benzene	1 U	1 U
Bromochloromethane	1 U	1 U
Bromodichloromethane	1 U	1 U
Bromoform	1 U	1 U
Bromomethane	1 U	1 U
Carbon disulfide	1 U	1 U
Carbon tetrachloride	1 U	1 U
Chlorobenzene	1 U	1 U
Chloroethane	1 U	1 U
Chloroform	1 U	1 U
Chloromethane	1 U	1 U
cis-1,2-Dichloroethene	1 U	1 U
cis-1,3-Dichloropropene	1 U	1 U
Dibromochloromethane	1 U	1 U
Ethylbenzene	1 U	1 U
Methylene chloride	2 U	2 U
Styrene	1 U	1 U
Tetrachloroethene	1 U	1 U
Toluene	1 U	1 U
trans-1,2-Dichloroethene	1 U	1 U
trans-1,3-Dichloropropene	1 U	1 U
Trichloroethene	1 U	1 U
Vinyl chloride	1 U	1 U
Xylene (total)	1 U	1 U
Semivolatile organics, µg/L		
1,2,4-Trichlorobenzene	10 U	10 U
1,2-Dichlorobenzene	1 U	1 U
1,3-Dichlorobenzene	1 U	1 U
1,4-Dichlorobenzene	1 U	1 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 UJ	25 UJ
2,4-Dinitrotoluene	10 U	10 U
2,6-Dinitrotoluene	10 U	10 U
2-Chloronaphthalene	10 U	10 U

Appendix C
 Table C-4. Summary of Groundwater Analytical Results
 Study Area 23

BRAC Environmental Site Screening Report
 Naval Training Center, Orlando

Sample ID	23G00101	23G00201
Lab ID	G7705004	G7705003
Sampling Date	30-May-95	30-May-95
2-Chlorophenol	10 U	10 U
2-Methylnaphthalene	10 U	10 U
2-Methylphenol	10 U	10 U
2-Nitroaniline	25 U	25 U
2-Nitrophenol	10 U	10 U
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	0.2 U	0.2 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	1 U	2 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	1 U	1 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	1 U	1 U
Phenanthrene	10 U	10 U
Phenol	10 U	10 U
Pyrene	10 U	10 U
Inorganics, µg/L		

Appendix C

Table C-4. Summary of Groundwater Analytical Results
Study Area 23

BRAC Environmental Site Screening Report
Naval Training Center, Orlando

Sample ID	23G00101	23G00201
Lab ID	G7705004	G7705003
Sampling Date	30-May-95	30-May-95
Aluminum	16200	439
Antimony	2.5 U	2.5 U
Arsenic	1.9 UJ	1.9 UJ
Barium	12.2 J	11.2 J
Beryllium	0.43 J	0.1 UJ
Cadmium	3.1 U	3.1 U
Calcium	1080 B	11800
Chromium	26	3.1 U
Cobalt	2.9 UJ	2.9 UJ
Copper	4.3 U	1.7 U
Iron	2960	1430
Lead	10.1	1.5 U
Magnesium	860 B	1490 B
Manganese	27.4	7.2 B
Mercury	0.7	0.12 U
Nickel	14.2 U	14.2 U
Potassium	1120 J	461 J
Selenium	2.3 U	2.3 U
Silver	2.6 U	2.6 U
Sodium	9600	5320
Thallium	1.8 U	1.8 U
Vanadium	13.1 B	5.6 B
Zinc	7.4 B	4.5 B
General Chemistry, mg/L		
Total Petroleum Hydrocarbons	1 U	1 U
Total Suspended Solids	3	1

TABLE C-5
SUMMARY OF ANALYTICAL RESULTS IN SEDIMENT

Appendix C
 Table C-5. Summary of Sediment Analytical Results
 Study Area 23

Naval Training Center, Orlando
 Orlando, FL

Sample ID	23D00101	23D00201	23D00301	23D00401
Lab ID	MB819001	ABB090124	ABB090124	ABB090124
Sampling Date	9/13/96	5/8/98	5/8/98	5/8/98
Polyaromatic Hydrocarbons, µg/kg				
Acenaphthene	6100 U	48 U	56 U	49 U
Acenaphthylene	6100 U	48 U	56 U	49 U
Anthracene	1400	48 U	56 U	49 U
Benzo(a)anthracene	5100	4.7 U	78	37
Benzo(a)pyrene	5400	4.9	120	58
Benzo(b)fluoranthene	6400	4.7 U	110	48
Benzo(g,h,i)perylene	6100	4.7 U	79	35
Benzo(k)fluoranthene	2300	2.4 U	2.9 U	25
Chrysene	9900	4.7 U	100	50
Dibenz(a,h)anthracene	4200	5.2	13	23
Fluoranthene	10000	7.5	110	71
Fluorene	3000 U	48 U	56 U	49 U
Indeno(1,2,3-cd)pyrene	5400	4.7 U	65	30
1-Methylnaphthalene	N/A	48 U	56 U	49 U
2-Methylnaphthalene	N/A	48 U	56 U	49 U
Naphthalene	6100 U	48 U	56 U	49 U
Phenanthrene	7300	48 U	56 U	49 U
Pyrene	9100	8.3	160	90

TABLE C-6

SUMMARY OF ANALYTICAL RESULTS IN STORM WATER

Appendix C
 Table C-6. Summary of Storm Water Analytical Results
 Study Area 23

Naval Training Center, Orlando
 Orlando, FL

Sample ID	23W00101
Lab ID	MB818001
Sampling Date	9/13/96
Volatile organics, µg/L	
1,1,1-Trichloroethane	10 U
1,1,2,2-Tetrachloroethane	10 U
1,1,2-Trichloroethane	10 U
1,1-Dichloroethane	10 U
1,1-Dichloroethene	10 U
1,2-Dichloroethane	10 U
1,2-Dichloroethene (total)	10 U
1,2-Dichloropropane	10 U
2-Butanone	10 U
2-Hexanone	10 U
4-Methyl-2-pentanone	10 U
Acetone	9 J
Benzene	10 U
Bromodichloromethane	10 U
Bromoform	10 U
Bromomethane	10 U
Carbon disulfide	10 U
Carbon tetrachloride	10 U
Chlorobenzene	10 U
Chloroethane	10 U
Chloroform	10 U
Chloromethane	10 U
cis-1,3-Dichloropropene	10 U
Dibromochloromethane	10 U
Ethylbenzene	10 U
Methylene chloride	10 U
Styrene	10 U
Tetrachloroethene	10 U
Toluene	10 U
trans-1,3-Dichloropropene	10 U
Trichloroethene	10 U
Vinyl chloride	10 U
Xylene (total)	10 U
Semivolatile organics, µg/L	
1,2,4-Trichlorobenzene	10 U
1,2-Dichlorobenzene	10 U
1,3-Dichlorobenzene	10 U
1,4-Dichlorobenzene	10 U
2,2'-oxybis(1-Chloropropane)	10 U
2,4,5-Trichlorophenol	25 U
2,4,6-Trichlorophenol	10 U
2,4-Dichlorophenol	10 U
2,4-Dimethylphenol	10 U
2,4-Dinitrophenol	25 U
2,4-Dinitrotoluene	10 U
2,6-Dinitrotoluene	10 U
2-Chloronaphthalene	10 U
2-Chlorophenol	10 U
2-Methylnaphthalene	10 U
2-Methylphenol	10 U
2-Nitroaniline	25 U
2-Nitrophenol	10 U

Appendix C
Table C-6. Summary of Storm Water Analytical Results
Study Area 23

Naval Training Center, Orlando
Orlando, FL

Sample ID	23W00101
Lab ID	MB818001
Sampling Date	9/13/96
3,3'-Dichlorobenzidine	10 U
3-Nitroaniline	25 U
4,6-Dinitro-2-methylphenol	25 U
4-Bromophenyl-phenylether	10 U
4-Chloro-3-methylphenol	10 U
4-Chloroaniline	10 U
4-Chlorophenyl-phenylether	10 U
4-Methylphenol	10 U
4-Nitroaniline	25 U
4-Nitrophenol	25 U
Acenaphthene	10 U
Acenaphthylene	10 U
Anthracene	10 U
Benzo(a)anthracene	10 U
Benzo(a)pyrene	10 U
Benzo(b)fluoranthene	10 U
Benzo(g,h,i)perylene	10 U
Benzo(k)fluoranthene	10 U
bis(2-Chloroethoxy)methane	10 U
bis(2-Chloroethyl)ether	10 U
bis(2-Ethylhexyl)phthalate	10 U
Butylbenzylphthalate	10 U
Carbazole	10 U
Chrysene	10 U
Di-n-butylphthalate	10 U
Di-n-octylphthalate	10 U
Dibenz(a,h)anthracene	10 U
Dibenzofuran	10 U
Diethylphthalate	10 U
Dimethylphthalate	10 U
Fluoranthene	10 U
Fluorene	10 U
Hexachlorobenzene	10 U
Hexachlorobutadiene	10 U
Hexachlorocyclopentadiene	10 U
Hexachloroethane	10 U
Indeno(1,2,3-cd)pyrene	10 U
Isophorone	10 U
N-Nitroso-di-n-propylamine	10 U
N-Nitrosodiphenylamine (1)	10 U
Naphthalene	10 U
Nitrobenzene	10 U
Pentachlorophenol	25 U
Phenanthrene	10 U
Phenol	10 U
Pyrene	10 U
Pesticides/PCBs, µg/L	
4,4'-DDD	0.1 UJ
4,4'-DDE	0.1 UJ
4,4'-DDT	0.1 UJ
Aldrin	0.05 UJ
alpha-BHC	0.05 UJ
alpha-Chlordane	0.05 UJ

Appendix C
 Table C-6. Summary of Storm Water Analytical Results
 Study Area 23

Naval Training Center, Orlando
 Orlando, FL

Sample ID	23W00101
Lab ID	MB818001
Sampling Date	9/13/96
Aroclor-1016	0.5 UJ
Aroclor-1221	0.5 UJ
Aroclor-1232	0.5 UJ
Aroclor-1242	0.5 UJ
Aroclor-1248	0.5 UJ
Aroclor-1254	0.5 UJ
Aroclor-1260	0.5 UJ
beta-BHC	0.05 UJ
delta-BHC	0.05 UJ
Dieldrin	0.1 UJ
Endosulfan I	0.05 UJ
Endosulfan II	0.1 UJ
Endosulfan sulfate	0.1 UJ
Endrin	0.1 UJ
Endrin aldehyde	0.1 UJ
Endrin ketone	0.1 UJ
gamma-BHC (Lindane)	0.05 UJ
gamma-Chlordane	0.05 UJ
Heptachlor	0.05 UJ
Heptachlor epoxide	0.05 UJ
Methoxychlor	0.5 UJ
Toxaphene	5 UJ
Inorganics, µg/L	
Aluminum	209
Antimony	15 U
Arsenic	1 U
Barium	35.3 B
Beryllium	0.13 UJ
Cadmium	3.3 U
Calcium	59000
Chromium	3.2 B
Cobalt	4 B
Copper	16.4 U
Iron	903
Lead	5.8
Magnesium	2660 B
Manganese	47.7
Mercury	0.15 B
Nickel	9.6 B
Potassium	2660 B
Selenium	6 U
Silver	2.2 U
Sodium	4270 B
Thallium	0.86 UJ
Vanadium	5.2 B
Zinc	65.4

Notes for Summary of Analytical Results Tables
Study Area 23

Naval Training Center, Orlando
Orlando Florida

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

Units:

mg/kg milligram per kilogram
µg/kg microgram per kilogram
mg/L milligram per liter
µg/L microgram per liter

The following standard analytical data qualifiers have the following definitions:

- U The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit
The number preceding the U qualifier is 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.
- 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 during data validation because of serious deficiencies in meeting quality control criteria.
- B For inorganics only, reported concentration is between the instrument detection limit and the contract required detection limit.
- N/A Not analyzed.

APPENDIX D

PASSIVE SOIL GAS SURVEY ANALYTICAL RESULTS

FINAL DRAFT

FINAL REPORT ON THE FINDINGS OF PASSIVE SOIL GAS SURVEYS

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 23 at NTC, Orlando is included. The complete report contains detailed information on quality assurance and quality control (QA/QC) and 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. Forty nine passive soil gas samples were collected from Study Area 23 (not including QA/QC samples) 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.

Levels of petroleum hydrocarbons were below their respective reporting limits in all samples within the survey area. This was also true for chlorinated hydrocarbon compounds.

2.0 INTRODUCTION

ABB-ES contracted TARGET to perform a passive soil gas survey of Study Area 23 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.

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 3 feet, but varying at some locations to as much as 10 feet, due to the presence of an elevated mound, which reportedly contained demolition materials from a former swimming pool complex. The field phase of the survey was conducted on April 18-23, 26, and May 1, 1995.

3.0 SAMPLE COLLECTION AND ANALYSIS

Forty nine passive soil gas samples were collected from the survey area at depths of 2 to 3 feet at the locations shown on Figure D-1, Sample Locations.

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

FINAL DRAFT

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" 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

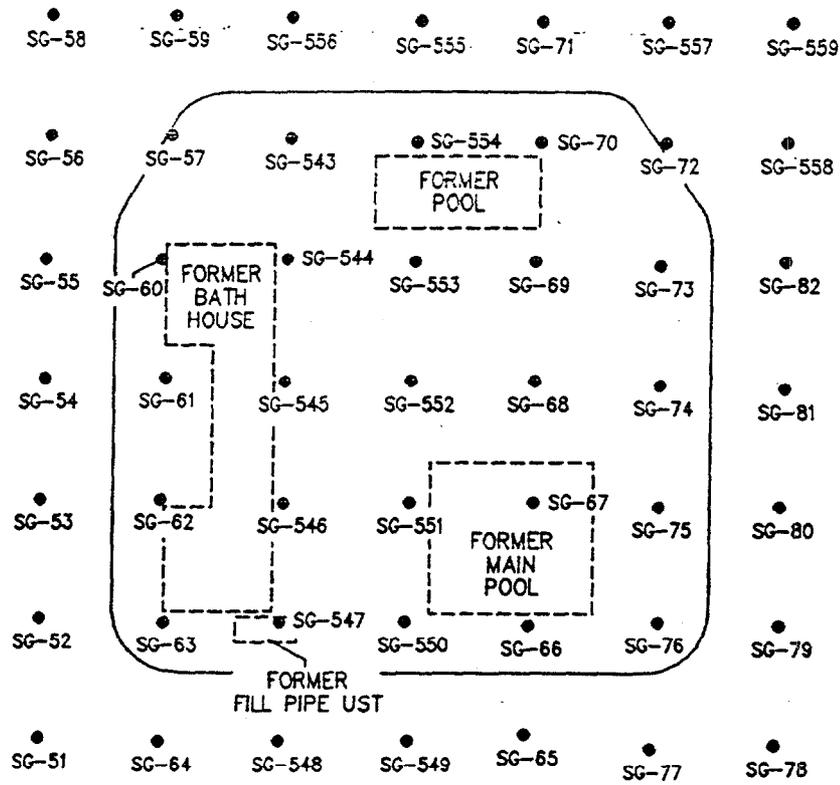
All analyte concentrations for all samples were below their respective reporting limits.

5.0 CONCLUSIONS

Petroleum or chlorinated hydrocarbon contamination was not evident in the shallow subsurface of Study Area 23.



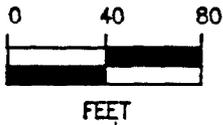
FORMER
FOOTBALL FIELD



ASPHALT

7126

7121



FEET

● SOIL GAS SAMPLE LOCATION



TARGET ENVIRONMENTAL SERVICES, INC.

FIGURE D-1. Sample Locations

STUDY AREA 23
NAVAL TRAINING CENTER, ORLANDO
ORLANDO, FLORIDA

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

APPENDIX E
GEOPHYSICAL SURVEYS

FINAL DRAFT

TECHNICAL MEMORANDUM GEOPHYSICAL SURVEYS

The following is a summary of the significant findings of the geophysical surveys which took place between March 3 and April 14, 1995 at NTC, Orlando. Geophysical surveys took place at Study Area (SA) 23 (Figure E-1). The geophysical surveys were conducted to evaluate potential subsurface debris disposal, and to aid in clearing utilities for the subsurface investigations. The techniques used were magnetometry, terrain conductivity (TC) and ground penetrating radar (GPR).

The magnetic method is a versatile geophysical technique used for evaluating shallow geologic structures and for locating buried manmade objects and buried debris by mapping local distortions in the earth's magnetic field produced by buried magnetic objects (steel and other magnetic materials). Vertical gradient measurements of the earth's magnetic field are often taken during environmental magnetic surveys, as they are more sensitive to the presence of near-surface metal objects than total field values alone.

Terrain conductivity surveys, also referred to as EMI (electromagnetic induction) surveys, have traditionally been used in mineral exploration for tracing conductive ore bodies (i.e., massive sulfides). More recently, conductivity surveys have been used in environmental studies for mapping buried debris and former structures, and for tracing conductive contaminant plumes in groundwater. TC instruments record two parameters, the quadrature phase and the in-phase components of an induced magnetic field. The quadrature phase component is a measure of the ground conductivity value expressed in millimhos per meter. The in-phase component is significantly more sensitive to metallic objects and is useful for looking for buried tanks and drums and other man-made objects.

The GPR technique uses high frequency radio waves to determine the presence of subsurface objects and structures. The radio wave energy is reflected from surfaces where there is a contrast in the electrical properties of subsurface materials, such as naturally occurring geologic horizons or manmade objects (e.g., buried utilities, tanks, drums). Typical applications for GPR include mapping buried utilities, and delineating the boundaries of buried hazardous waste materials and abandoned landfills.

Following is a discussion of the results of this investigation.

SA 23 - FORMER OFFICERS' SWIMMING POOL COMPLEX (UNF-2)

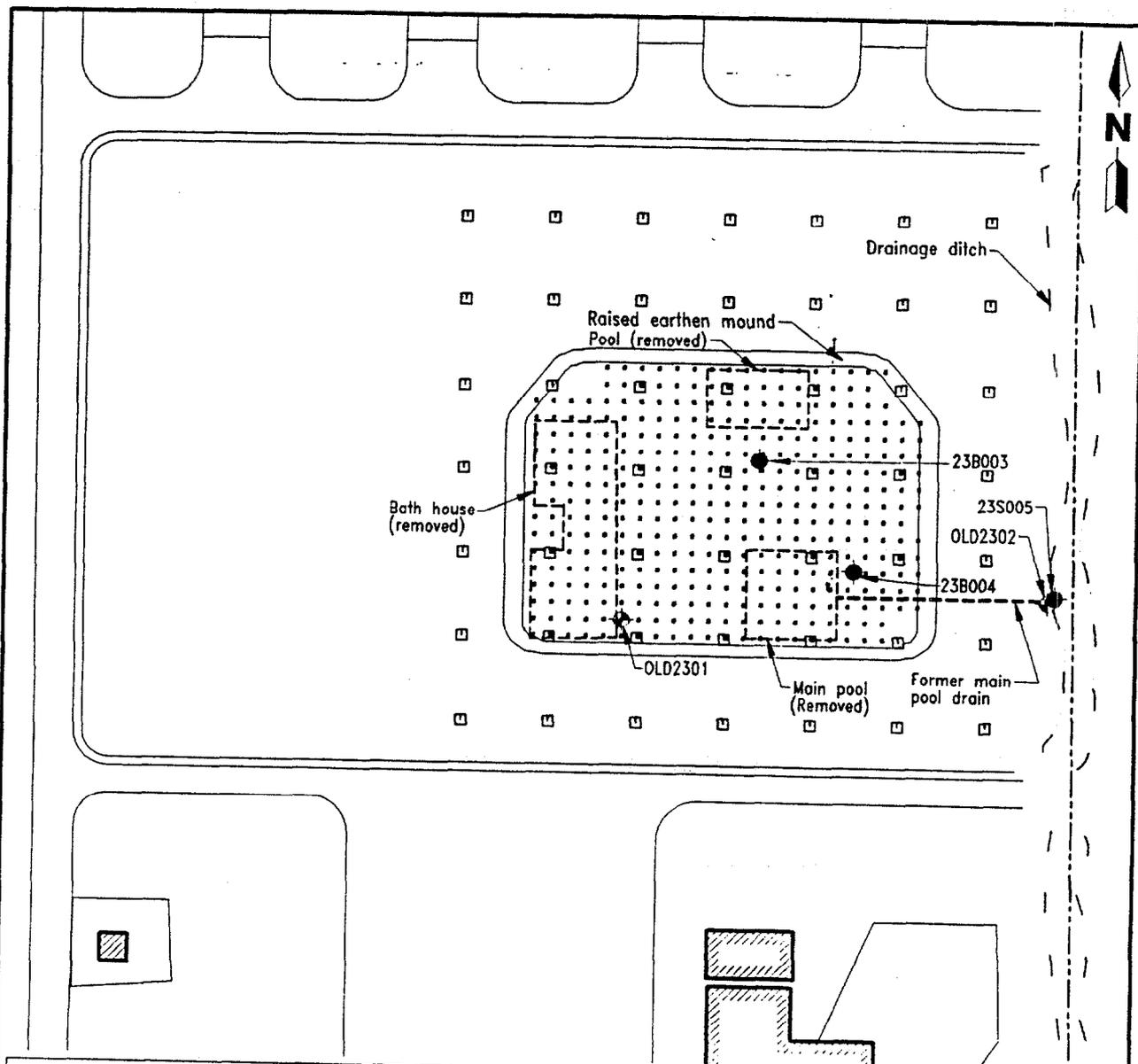
A geophysical survey was completed in the former swimming pool complex (Figure E-1). The area is now comprised of a 7-foot high, raised earthen area covered with grass. The mound probably is comprised of construction debris from the demolition of the pool house and the swimming pool. The purpose for conducting geophysical surveys was to delineate the extent of landfilling of demolition debris. The survey area is 220 feet long (east to west) by 150 feet wide (north to south), or approximately 3/4 acres. A geophysical survey grid with an arbitrary origin and oriented approximately true north was established. A magnetometer and TC survey were completed concurrently, with a total of 372 data points acquired on a 10-foot by 10-foot measurement grid with each instrument. Contour data is presented as Figures E-2 through E-4. Figure E-2 presents the vertical magnetic gradient contours, and Figures E-3 and E-4 present the

FINAL DRAFT

quadrature (conductivity) and inphase (equivalent to a metal detector) contours of the magnetic field induced by the transmitter of the TC instrument. The data indicate the presence of a number of small geophysical anomalies, which probably reflect distortions in the magnetic/conductivity values produced by demolition debris. One prominent anomaly is located near the fill pipe for an UST at grid coordinates X=1000 east, Y=1000 north. That UST was removed in the Spring of 1996 and approved for clean closure by the Florida Department of Environmental Protection in June 1996.

GPR traverses completed across the study area clearly indicate the original grade for the former structure at a depth a 7 to 8 feet bls. The data are also typical for landfilled demolition debris, although there are no mappable features of interest in the data.

HLA concludes from these data that the limits of the demolition debris are well-defined by the raised earthen area.



LEGEND

- ⊕ OLD2302 Soil boring (completed as monitoring well) location and designation
- 23S005 Soil boring (B) or surface soil (S) location and designation
- Soil gas point
- Geophysical grid survey node
- Property line
- BRAC Base Realignment and Closure

0 50 100
SCALE: 1 INCH = 100 FEET

FIGURE E-1
SURFACE SOIL, SOIL BORING AND MONITORING WELL, SOIL GAS, AND GEOPHYSICAL SURVEY LOCATIONS INITIAL SAMPLING (1995)



BRAC ENVIRONMENTAL SITE SCREENING REPORT STUDY AREA 23
NAVAL TRAINING CENTER ORLANDO, FLORIDA

K:\02530\02530-09\SSR\02530750.DWG, BB-BB 07/17/98 15:29:10, AutoCAD R14

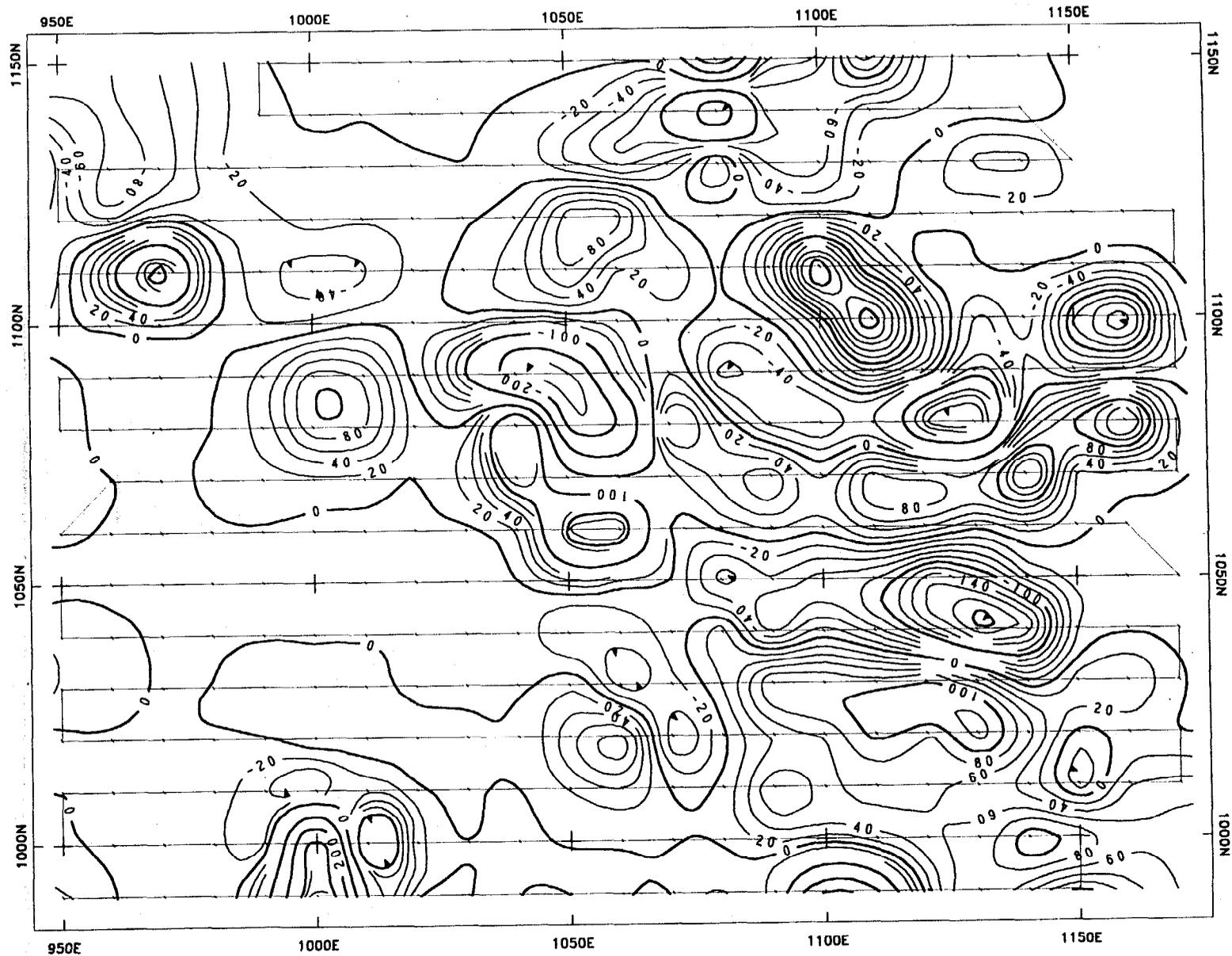


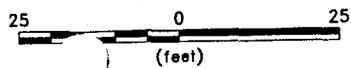
FIGURE E-2

SOUTHERN DIVISION

VERTICAL MAGNETIC GRADIENT CONTOURS
 GEOPHYSICAL SURVEY
 STUDY AREA 23

ABB ENVIRONMENTAL SERVICE

Scale 1:360



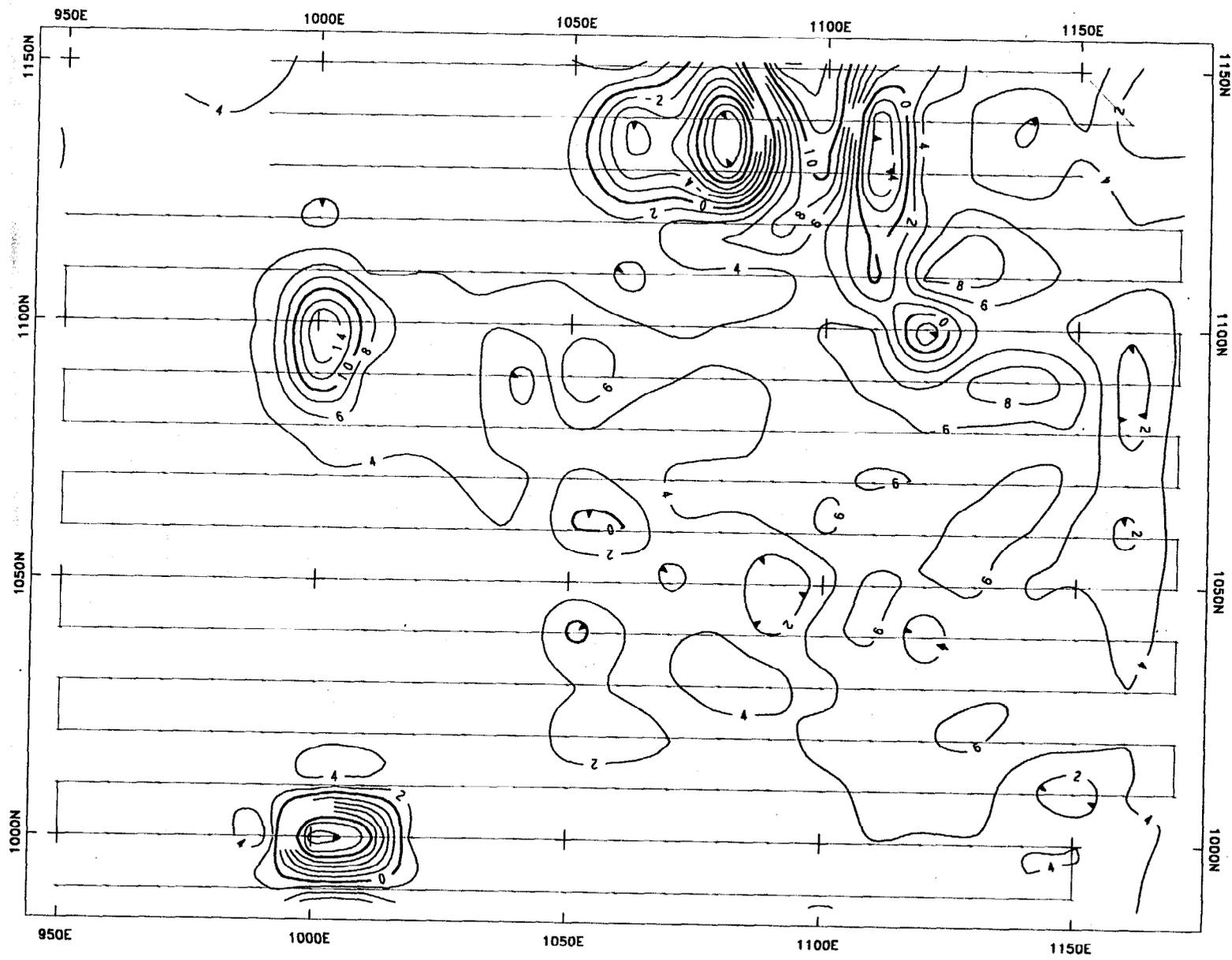
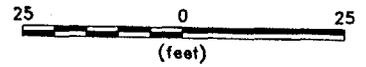


FIGURE E-3

SOUTHERN DIVISION
QUADRATURE (CONDUCTIVITY) CONTOURS
GEOPHYSICAL SURVEY
STUDY AREA 23
ABB ENVIRONMENTAL SERVICES, INC.

Scale 1:360



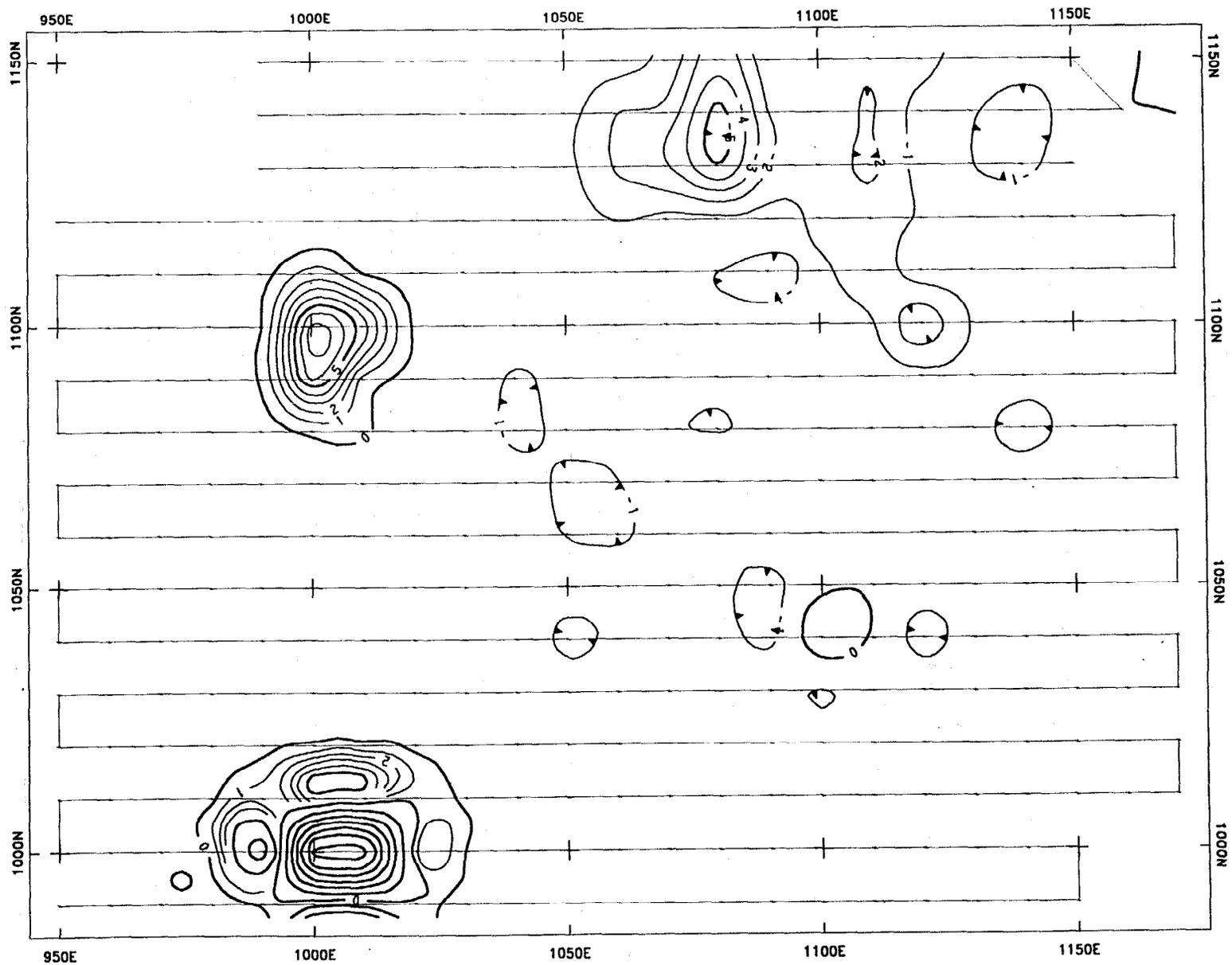
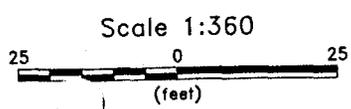


FIGURE E-4

SOUTHERN DIVISION
INPHASE (CONDUCTIVITY) CONTOURS GEOPHYSICAL SURVEY STUDY AREA 23
ABB ENVIRONMENTAL SERVICES, INC.



APPENDIX F

**COMPLETION REPORT, INTERIM REMEDIAL ACTION
ENVIRONMENTAL DETACHMENT CHARLESTON
STUDY AREA 23**

STUDY AREA 23

1. INTRODUCTION

1.1 STUDY AREA 23

SA 23 is located in the northeast corner of the McCoy Annex (Figure 1). The SA includes a former swimming pool and pool house which were demolished in the 1980's. A seven foot high, raised earthen area covered with grass now exists on the site. A twelve inch diameter metal drain pipe extends from the base of the earthen area to the adjacent drainage ditch east of the mound (Figure 2).

1.2 SA 23 INTERIM REMEDIAL ACTION

SOUTHDIV tasked the DET to perform an IRA for this site. The objective of the IRA was to excavate and dispose of soil contaminated with PAHs.

1.2.1 SA 23 Interim Remedial Action Execution Summary

The execution of this IRA consisted of excavating an area approximately 5' x 5' to a depth of 2' at HLA sample location 23S005 (Figure 3). Soil removed from the site was characterized as non-hazardous and was sent to a treatment facility for incineration.

2.0 INTERIM REMEDIAL ACTION EXECUTION

2.1 ACTIONS PERFORMED BY THE INTERIM REMEDIAL ACTION WORK PLAN

Actions performed are listed below

- Collection of a waste characterization sample
- Excavation and disposal of an area approximately 5' x 5' to a depth of 6 inches
- Sealed off drainage pipe by plugging/filling end with concrete

2.2 OBSERVATIONS NOTES

2.2.1 Soil Conditions

From ground surface to the bottom of the excavation the soil was dark silty sand.

2.3 PLAN MODIFICATIONS AND JUSTIFICATION

The interim remedial action work plan specified the removal of soil to a depth of 2' at sample point 23S005. However, upon the start of excavation it was discovered that a concrete splash block (6' x 5' x 6 inches thick) existed. The Orlando Partnering Team (OPT) instructed the DET to excavate and dispose of the soil atop the splash block.

3.0 INTERIM REMEDIAL ACTION OUTCOME

3.1 SITE CONDITIONS FOLLOWING COMPLETION OF WORK

Following completion of work, the DET had removed 1 ton of PAH contaminated soil. The drainage pipe was plugged and the ditch was graded to surrounding area. Site photographs are included in Appendix C1.

4.0 SAMPLING

4.1 CONFIRMATION SAMPLING

Confirmation sampling was not required to be taken.

4.2 WASTE CHARACTERIZATION SAMPLING

Waste characterization sample S23005 was taken and analyzed for TCLP metals. See appendix C2 for sampling documentation.

5.0 WASTE GENERATION

5.1 Non-Hazardous Waste

One ton of non-hazardous PAH contaminated soil was disposed of to a permitted treatment, storage and disposal facility. Waste Manifests are in appendix C3.

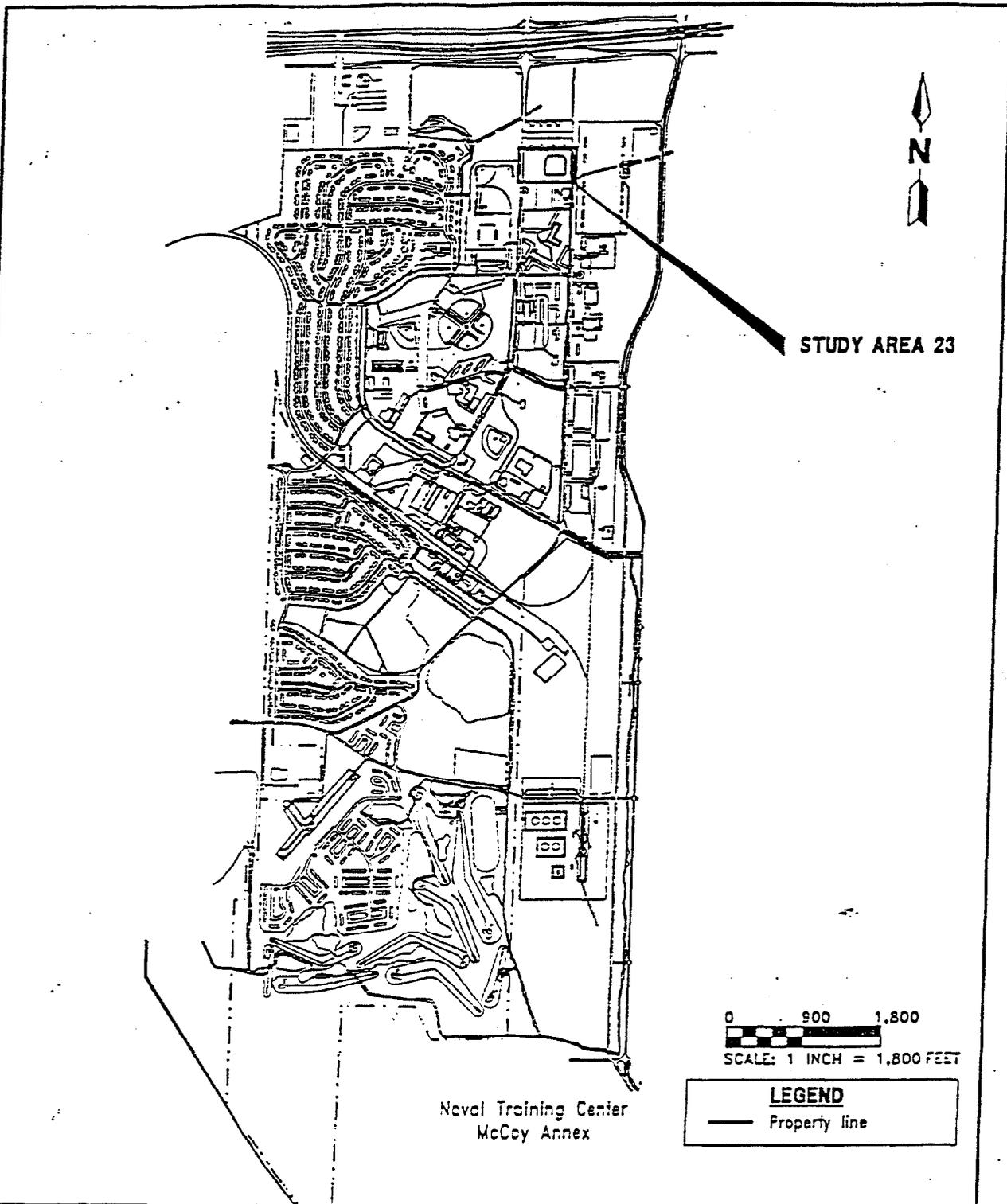


FIGURE 1
STUDY AREA LOCATION



BASE REALIGNMENT AND CLOSURE
WORK PLAN FOR INTERIM REMEDIAL
ACTION, STUDY AREA 23

NAVAL TRAINING CENTER
ORLANDO, FLORIDA

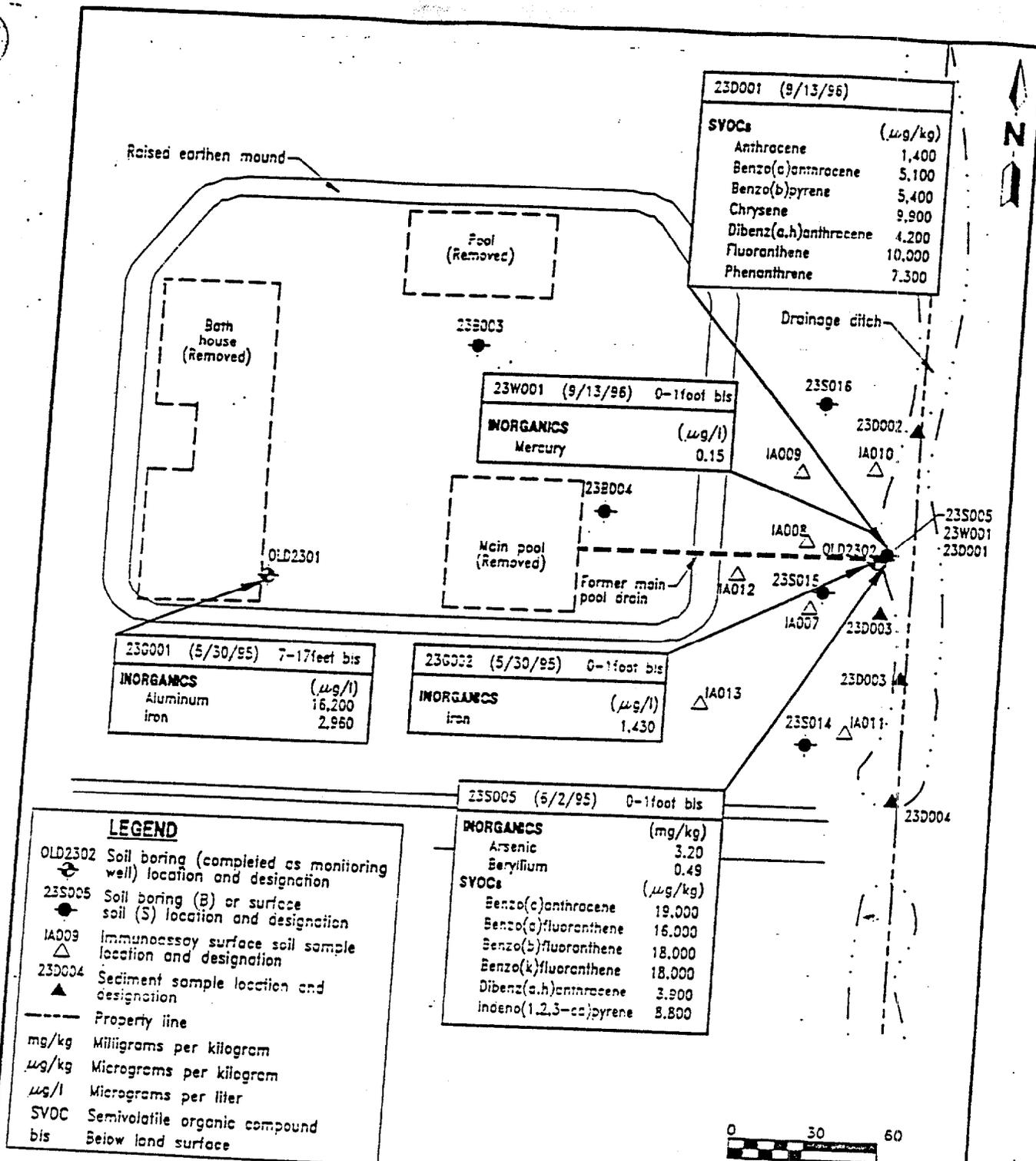
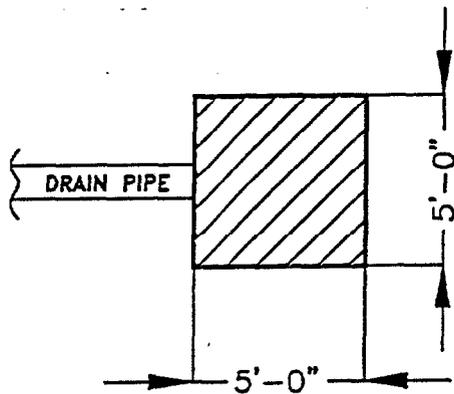


FIGURE 4
EXCEEDANCES OF SCREENING CRITERIA



BASE REALIGNMENT AND CLOSURE
WORK PLAN FOR INTERIM REMEDIAL
ACTION, STUDY AREA 23

NAVAL TRAINING CENTER
ORLANDO, FLORIDA



LEGEND



EXCAVATED TO 6 INCHES DEEP



ENVIRONMENTAL DETACHMENT CHARLESTON

1899 NORTH HOBSON AVENUE - BUILDING 30

NORTH CHARLESTON, SOUTH CAROLINA 29405-2105

FIGURE 3

MCCOY ANNEX ORLANDO SA 23

EXCAVATION BOUNDARIES

DATE:

22 JULY 1999

PREPARED BY:

A. J. MOYER

REV

-

SCALE: NONE

SHEET: -



SITE AFTER EXCAVATION WITH DRAIN PIPE CEMENT FORMS



SITE AFTER EXCAVATION LOOKING DOWN

WASTE CHARACTERIZATION

ENCO LABORATORIES

REPORT # : OR6327A

DATE REPORTED: April 30, 1999

PROJECT NAME : NTC-Orlando

PAGE 8 OF 13

RESULTS OF ANALYSIS

<u>TCLP METALS</u>	<u>METHOD</u>	<u>SA-23005</u>	<u>Units</u>
TCLP Arsenic Date Analyzed	1311/7060	0.050 U 04/23/99	mg/L
TCLP Barium Date Analyzed	1311/7080	2.0 U 04/23/99	mg/L
TCLP Cadmium Date Analyzed	1311/7130	0.10 U 04/23/99	mg/L
TCLP Chromium Date Analyzed	1311/7190	0.50 U 04/23/99	mg/L
TCLP Lead Date Analyzed	1311/7420	0.50 U 04/23/99	mg/L
TCLP Mercury Date Analyzed	1311/7470	0.0050 U 04/26/99	mg/L
TCLP Selenium Date Analyzed	1311/7740	0.050 U 04/25/99	mg/L
TCLP Silver Date Analyzed	1311/7760	0.20 U 04/23/99	mg/L

Compound was analyzed for but not detected to the level shown.

