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FINAL BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING
REPORT STUDY AREA 10 NTC ORLANDO FL
7/1/1996
ABB ENVIRONMENTAL

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

00042

STUDY AREA 10

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Unit Identification Code: N65928

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

Prepared by:

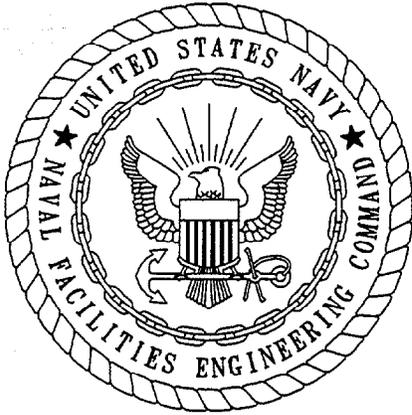
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Prepared for:

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Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29418**

Barbara Nwokike, Code 1873, Engineer-in-Charge

July 1996



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

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

DATE: July 17, 1996

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

NAME AND TITLE OF CERTIFYING OFFICIAL: Mark Salvetti
Project Technical Lead

(DFAR 252.227-7036)

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Naval Training Center
Orlando, Florida

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GLOSSARY

BRAC	Base Realignment and Closure
FDEP	Florida Department of Environmental Protection
FOST	Finding of Suitability to Transfer
GPR	ground-penetrating radar
IAS	initial assessment study
$\mu\text{g}/\ell$	micrograms per liter
OPT	Orlando Partnering Team
RBC	risk-based concentration

1.0 STUDY AREA 10, ALLEGED YARD-WASTE DISPOSAL AREA
(INITIAL ASSESSMENT STUDY [IAS] SITE 4)

This report contains information gathered as a result of site-screening activities conducted at Study Area 10. In the fall of 1995, after the review of site-screening results, the Orlando Partnership Team (OPT) determined that no further action was required at Study Area 10 and that the parcel was transferrable under the provisions of a Finding of Suitability to Lease or Finding of Suitability to Transfer (FOST).

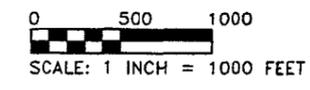
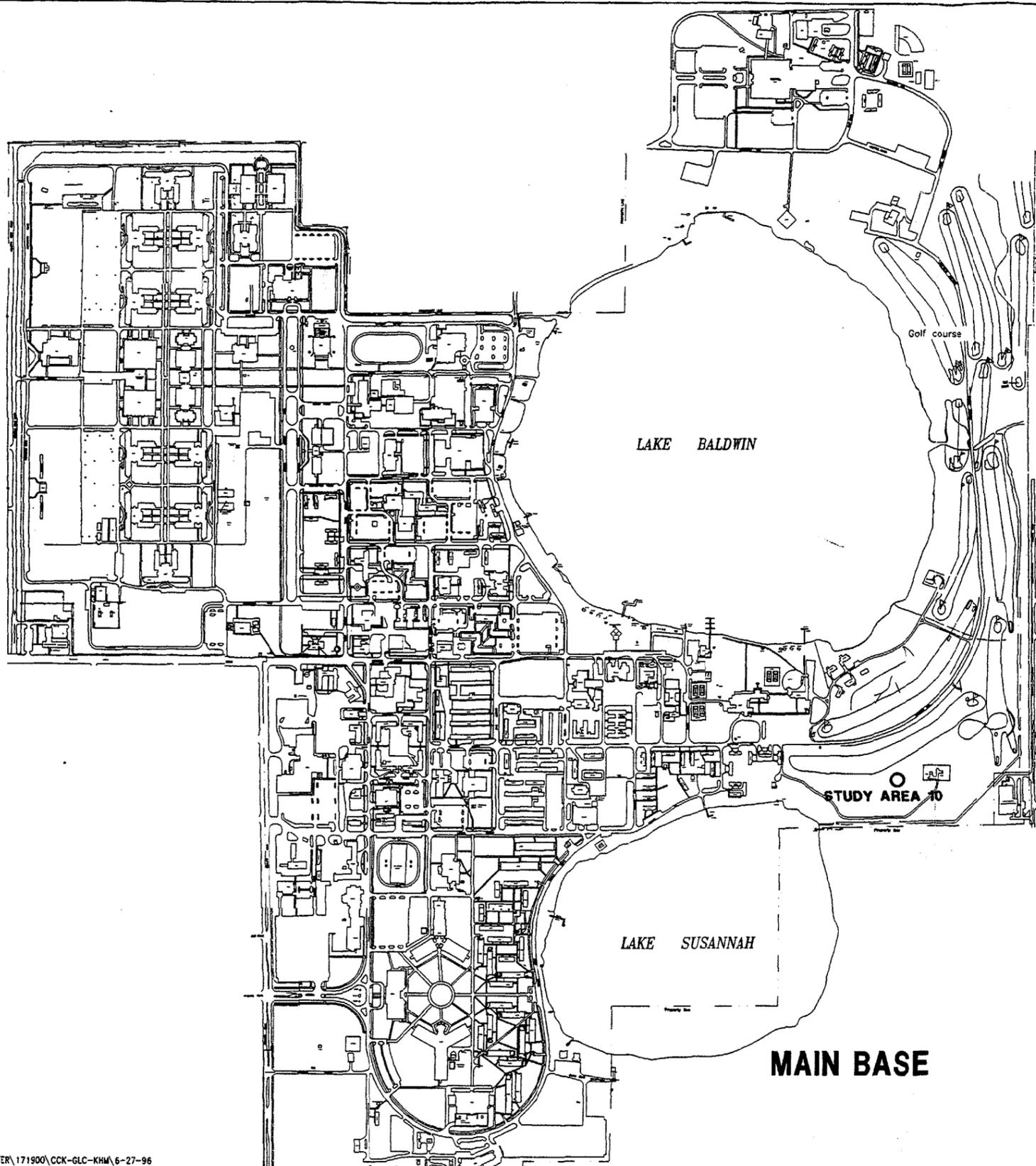
1.1 STUDY AREA 10, BACKGROUND AND CONDITIONS. Study Area 10 is located approximately 200 feet southwest of Magazine No. 123 in the southeastern part of the Main Base (Figures 1 and 2). The area was identified as an alleged 30-foot diameter by 9-foot deep yard-waste disposal pit in the IAS (C.C Johnson, 1985). Approximately 6,400 cubic feet of yard waste were reported to have been disposed of in this area from 1968 to 1969.

1.2 STUDY AREA 10, INVESTIGATION SUMMARY. During a review of aerial photographs, a 200-foot-by-200-foot target area within a tree-planted area southwest of Magazine No. 123 was identified as the most likely location to focus field screening methods.

1.2.1 Geophysical Surveys Magnetic gradient, terrain conductivity, and ground-penetrating (GPR) surveys were used in an attempt to confirm the location of the alleged disposal area. Magnetic gradient and terrain conductivity data points were obtained on 10-foot centers. GPR traverses were spaced at 20-foot intervals in the north-to-south and east-to-west directions. Magnetic and terrain conductivity anomalies were detected in the south-central region of the target area. GPR data did not confirm the presence of a backfilled disposal pit in the area of the magnetic and terrain conductivity anomalies. The results of the geophysical survey are presented in Appendix A.

1.2.2 Passive Soil Gas Survey Passive soil gas collectors were installed on 50-foot centers within the 200- by 200-foot target area to identify any areas with elevated concentrations of volatile organic compounds in the subsurface soil or groundwater. Results of the soil gas survey (Appendix B) did not conclusively identify subsurface contaminants within the target area.

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



SOURCE: ABB-ES 1994b.

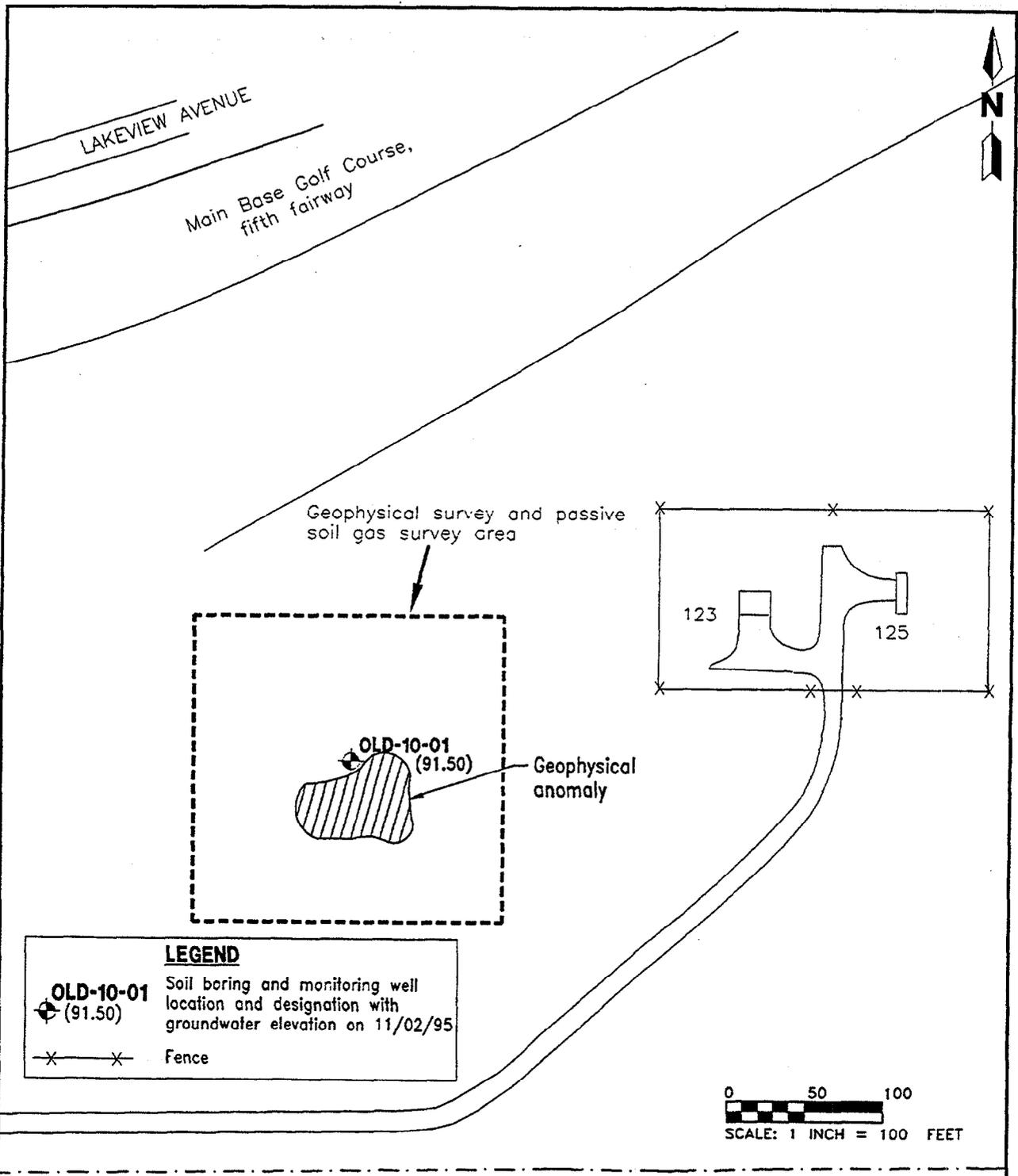
FIGURE 1
LOCATION OF STUDY AREA 10



**BASE REALIGNMENT AND
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SCREENING REPORT**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

00000007



LEGEND

OLD-10-01 (91.50) Soil boring and monitoring well location and designation with groundwater elevation on 11/02/95

Fence

SOURCE: ABB-ES, 1994b.

FIGURE 2
MONITORING WELL LOCATION, AND
GEOPHYSICAL SURVEY AND PASSIVE SOIL GAS
SURVEY LOCATIONS, STUDY AREA 10



BASE REALIGNMENT AND
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1.2.3 Soil Boring and Monitoring Well Investigation One groundwater monitoring well, OLD-10-01, was installed in the study area to evaluate the potential for subsurface chemical contaminants resulting from the disposal of materials other than yard waste. The monitoring well was situated hydraulically downgradient (northwest) of, and adjacent to, the identified geophysical anomaly.

The local hydraulic gradient was inferred to be to the northwest, toward Lake Baldwin, as determined at Study Area 9. One subsurface soil and one groundwater sample were submitted for full suite Contract Laboratory program target compound list and target analyte list laboratory analyses in accordance with U.S. Environmental Protection Agency Level IV data quality objectives. Appendix C presents the boring log and monitoring well installation diagram.

1.3 STUDY AREA 10, RESULTS. A summary of positive detections in soil and groundwater analytical results is presented in Appendix D (Tables D-1 and D-2). A complete set of soil and groundwater analytical results is presented in Appendix E.

1.3.1 Subsurface Soil Analytical Results Aluminum, barium, calcium, chromium, copper, lead, magnesium, and mercury were detected in subsurface soil above the background screening concentrations. However, none of the analytes detected exceeded the corresponding residential risk-based concentration (RBC).

Di-n-butylphthalate and acetone were also detected in the subsurface soil, but at concentrations well below the corresponding residential RBCs. Leachability-based soil cleanup goal values do not apply, as no organic compounds were present in groundwater above Florida Department of Environmental Protection (FDEP) groundwater guidance concentrations (see below).

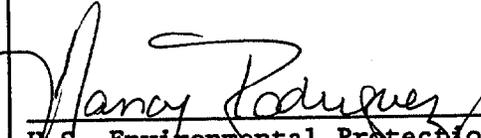
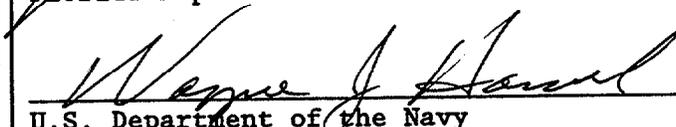
In summary, no significant levels of contaminants were detected by laboratory analyses conducted on the soil samples submitted.

1.3.2 Groundwater Analytical Results Surveyed groundwater elevations at Study Area 9 and Study Area 10 indicate that groundwater flow in this area of the Main Base may be toward the south. Monitoring well OLD-10-01 may, therefore, be located upgradient of the geophysical anomaly mapped at Study Area 10.

No organics were detected in the groundwater sample collected from OLD-10-01. Nickel (12.6B micrograms per liter [$\mu\text{g}/\ell$]) was detected above background, but below the FDEP groundwater primary standard and Federal maximum contaminant level of 100 $\mu\text{g}/\ell$.

1.4 STUDY AREA 10, CONCLUSIONS AND RECOMMENDATIONS. Geophysical and soil gas results are consistent with the description of the area found in the IAS (C.C. Johnson, 1985), i.e., a yard-waste burial site. Based upon the information available and evaluation of site-screening data for this site, ABB Environmental Services, Inc., recommends a reclassification of Study Area 10 from 7/Gray to 1/White and an FOST with no requirement for further evaluation.

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

<u>STUDY AREA 10</u>	
 _____ U.S. Environmental Protection Agency, Region IV	<u>7/24/96</u> _____ Date
 _____ Florida Department of Environmental Protection	<u>7/24/96</u> _____ Date
 _____ U.S. Department of the Navy	<u>7/24/96</u> _____ Date

REFERENCE

C.C. Johnson & Associates, Inc., 1985, Initial Assessment Study of NTC Orlando, Florida: prepared for Naval Energy and Environmental Support Activity Port Hueneme, California, September.

APPENDIX A
GEOPHYSICAL SURVEYS

TECHNICAL MEMORANDUM
GEOPHYSICAL SURVEYS
SITE-SCREENING INVESTIGATIONS
STUDY AREA 10

The following is a summary of the significant findings of the geophysical surveys, which took place between July 28 and August 23, 1994, at Naval Training Center, Orlando. Geophysical surveys took place at Study Area 10, the alleged Yard-Waste Disposal Area.

A discussion of the results follows.

Geophysical surveys at the alleged yard-waste disposal area included a magnetometer and terrain conductivity survey (with a 10-by-10-foot measurement grid), which was followed by a ground-penetrating radar survey (GPR). The purpose for the work was to determine the location of the disposal area.

Figures 22A and 22B show the approximate location of the geophysical grid. Figures 23, 24, and 25 present the vertical gradient (magnetic) contours, quadrature (conductivity) contours, and in phase (roughly equivalent to a metal detector) contours for the geophysical data. Superimposed over the magnetic contours (Figure 23) is the outline of an anomaly that may represent the location of the former disposal area, which is allegedly 30 feet in diameter and 8 or 9 feet deep. GPR data in this area did not define any zone within the study area that would corroborate the magnetic and terrain conductivity findings.

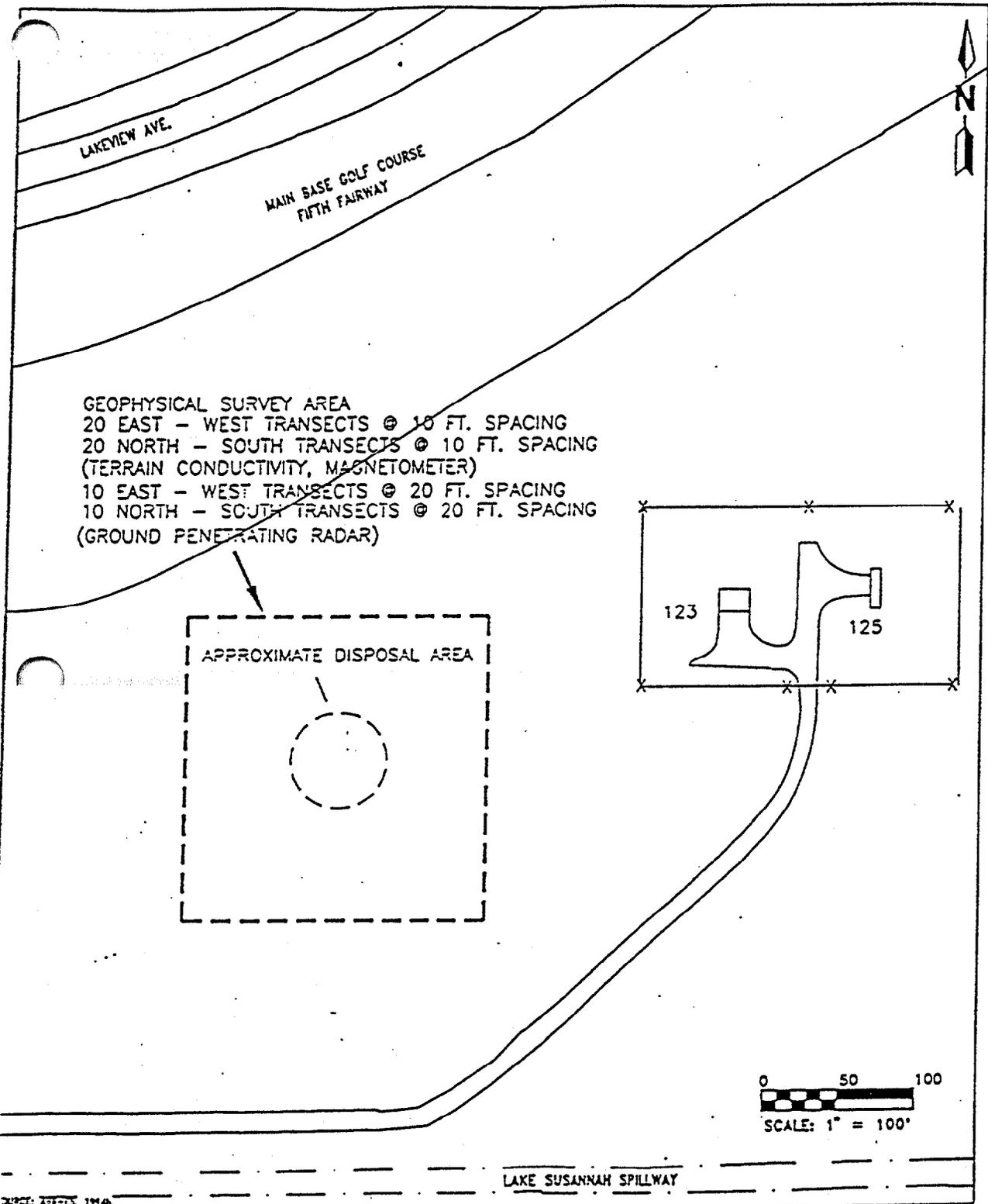


FIGURE 4-16
 PROPOSED GEOPHYSICAL SURVEY
 AREA IAS SITE 4, ALLEGED
 WASTE DISPOSAL AREA,
 STUDY AREA 10

TCMAIN/DRW/S-16-94



SITE SCREENING PLAN
 GROUP I STUDY AREAS

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Figure 22A

20 EAST - WEST TRANSECTS @ 10 FT. SP.
20 NORTH - SOUTH TRANSECTS @ 10 FT.
(TERRAIN CONDUCTIVITY, MAGNETOMETER)
10 EAST - WEST TRANSECTS @ 20 FT. SP.
10 NORTH - SOUTH TRANSECTS @ 20 FT.
(GROUND PENETRATING RADAR)

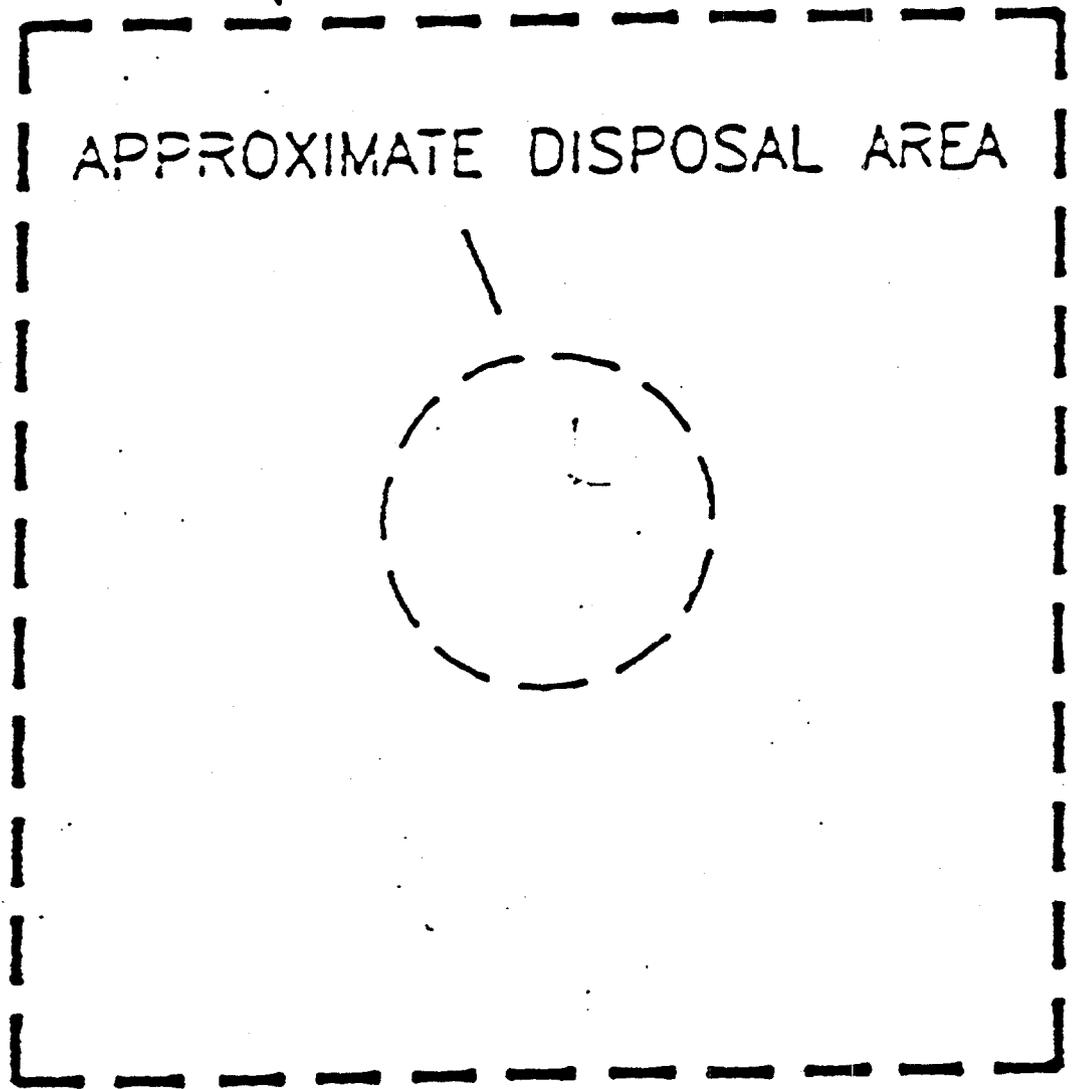


Figure 22B

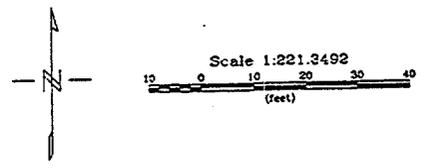
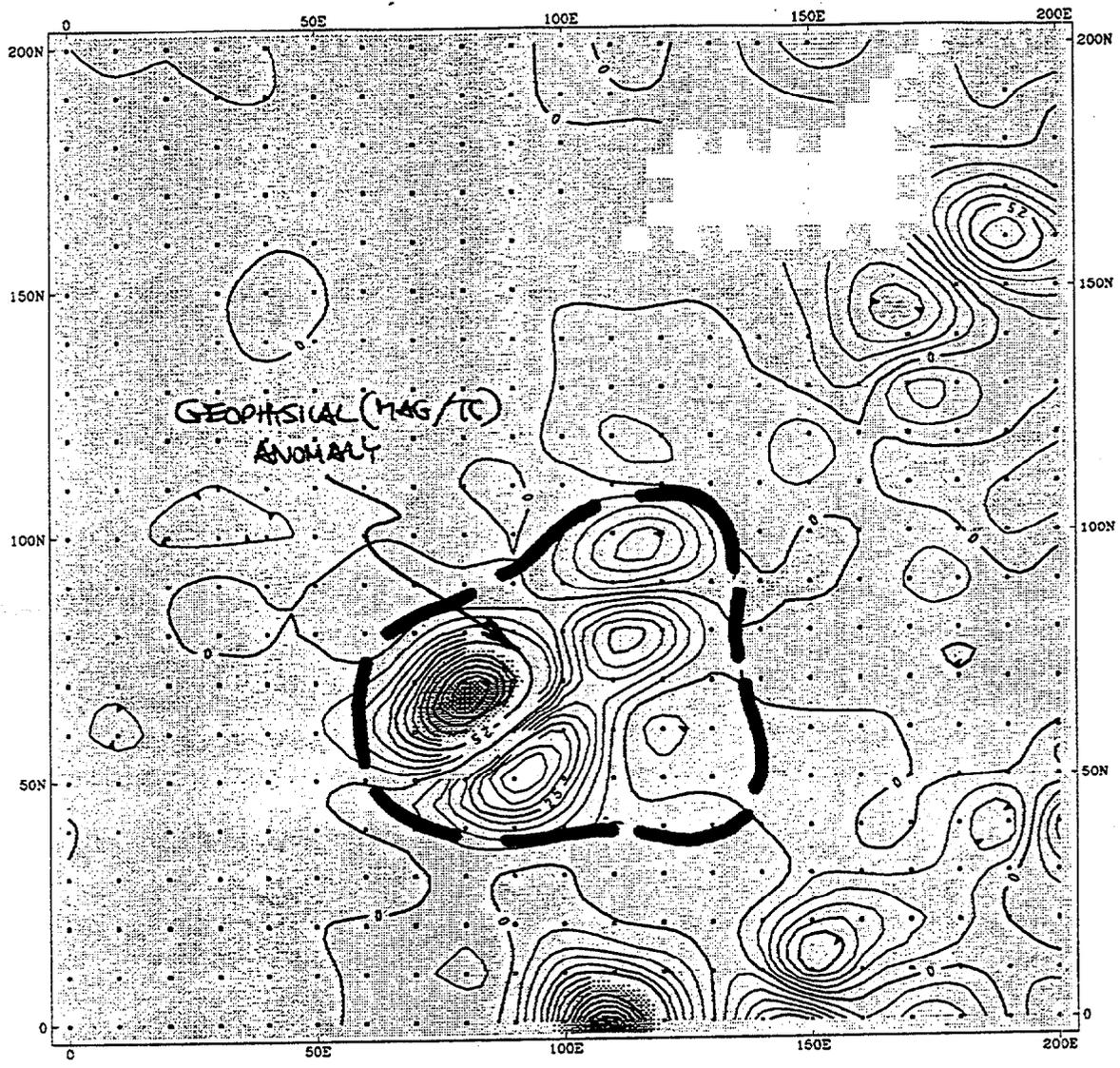


Figure 23

<p>NAVY CLEAN</p> <p>VERTICAL GRADIENT CONTOURS</p> <p>SA 10 - ALLEGED YARD WASTE DISPOSAL AREA</p> <p>SSP - GROUP 1 STUDY AREAS</p> <p>ABB ENVIRONMENTAL SERVICES, INC.</p>

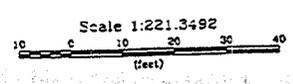
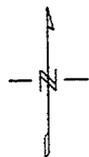
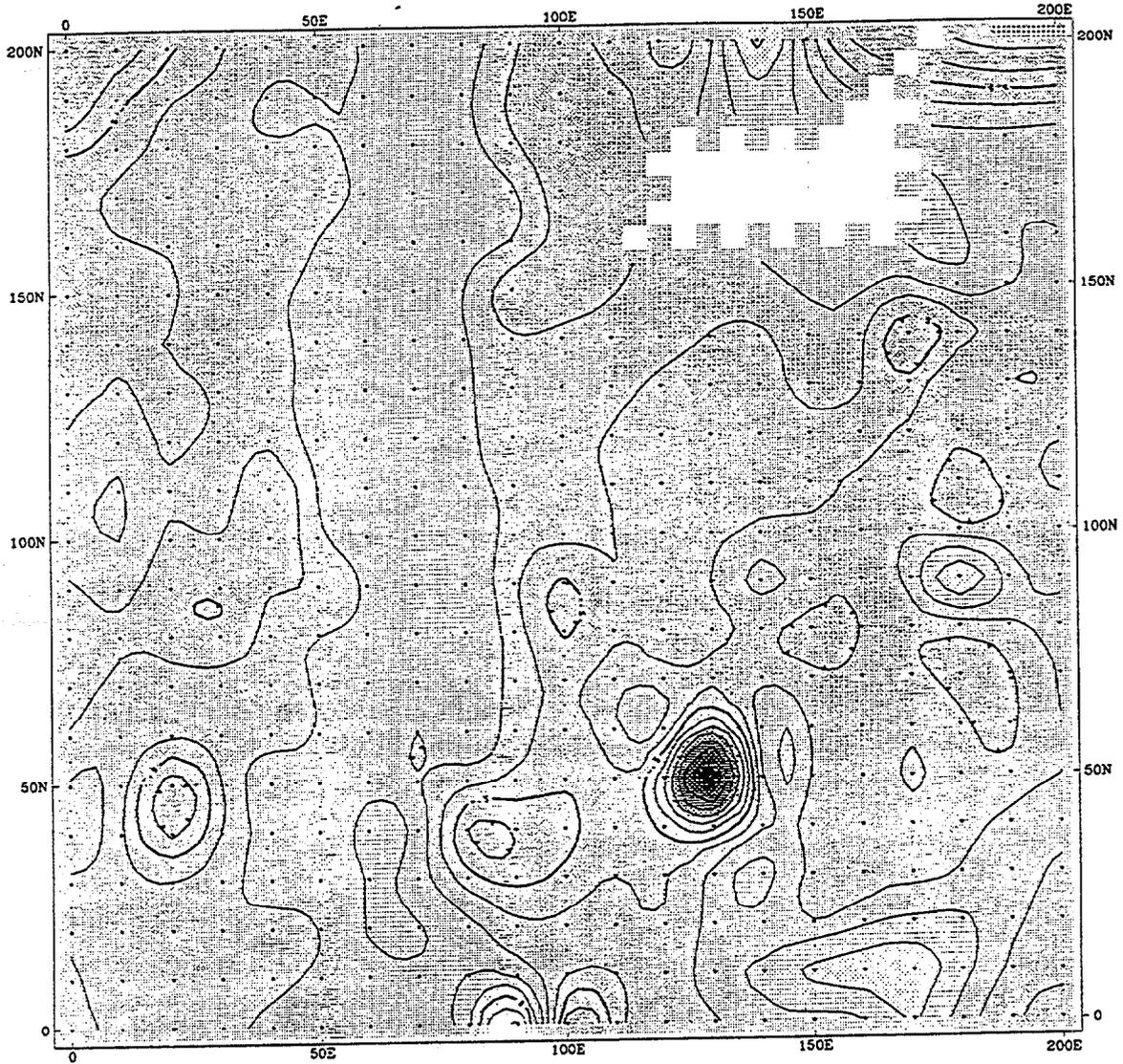


Figure 24

<p>NAVY CLEAN</p> <p>IN PHASE (TC) CONTOURS</p> <p>SA 10 - ALLEGED YARD WASTE DISPOSAL AREA</p> <p>SSP - GROUP 1 STUDY AREAS</p> <p>ABB ENVIRONMENTAL SERVICE, INC.</p>

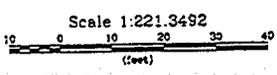
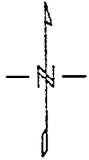
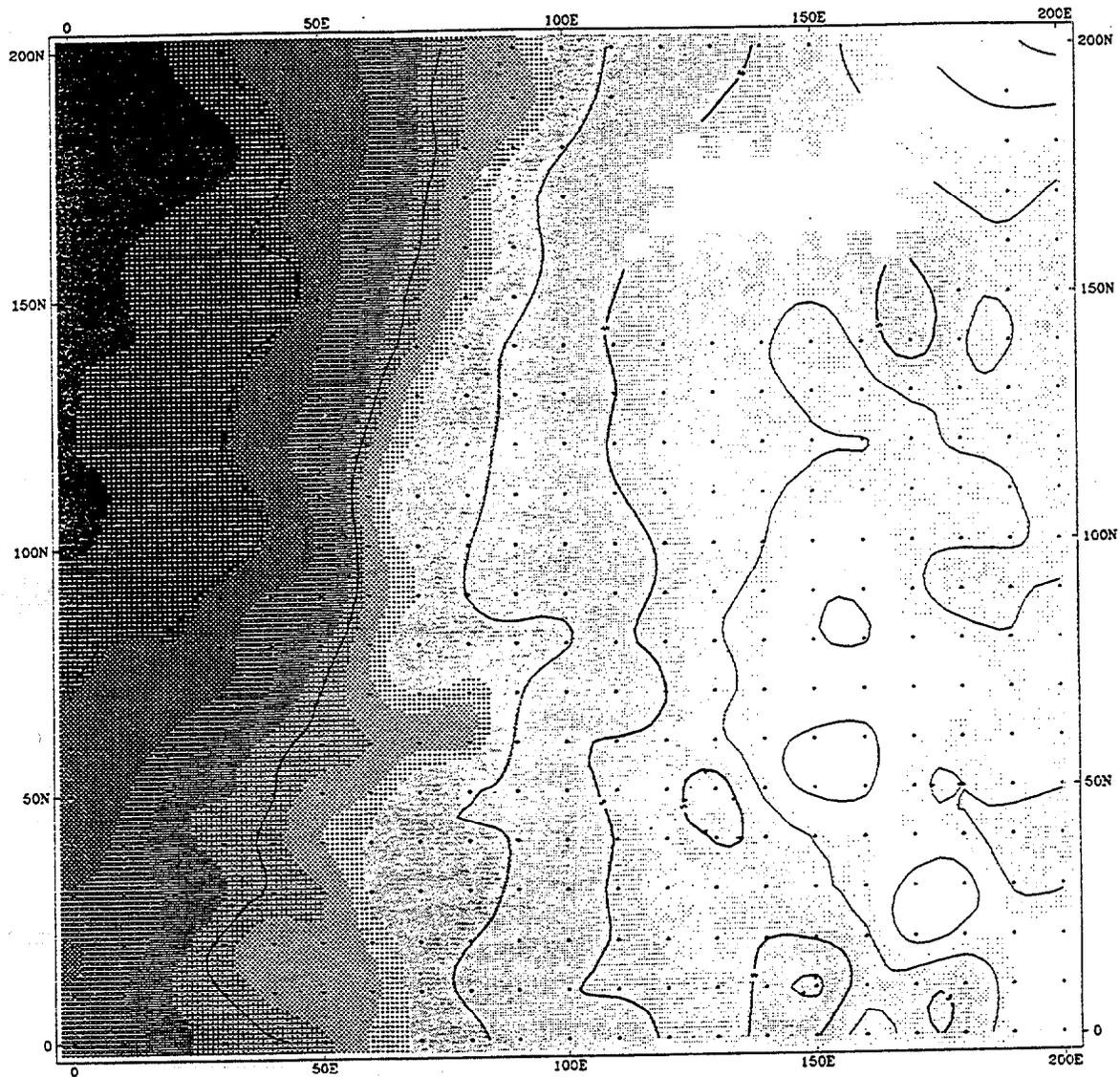


Figure 25

NAVY CLEAN
QUADRATURE (TC) CONTOURS
SA 10 - ALLEGED YARD WASTE DISPOSAL AREA
SSP - GROUP 1 STUDY AREAS
ABB ENVIRONMENTAL SERVICES, INC.

APPENDIX B

SOIL GAS SURVEY FINDINGS

FINAL REPORT ON THE FINDINGS OF
THE PETREX SOIL GAS SURVEYS
STUDY AREA 10
NAVAL TRAINING CENTER, ORLANDO, FLORIDA

1.0 Executive Summary

The information contained herein has been extracted from the Northeast Research Institute, LLC (NERI) report so that only information pertinent to Study Area 10 at Naval Training Center (NTC), Orlando is included. The complete report contains detailed information on quality assurance and quality control procedures, thermal desorption-mass spectrometry, and data tables. In addition, only those figures (Plates 1 through 4) relevant to Study Area 10 are included. This document may be obtained from ABB Environmental Services, Inc. (ABB-ES), Orlando, Florida.

In August and September 1994, ABB-ES subcontracted NERI to conduct a PETREX passive soil gas survey at NTC, Orlando. The purpose of this survey was to assist in site-screening activities to assess the environmental impact from past site use at Study Area 10, an alleged Former Yard-Waste Disposal Area. The area was screened for volatile and semivolatile organic compounds (VOCs and SVOCs) that may be present in the soil gas.

Benzene, toluene, and ethylbenzene and xylene(s) (BTEX), the cycloalkane/alkene petroleum hydrocarbons, and tetrachloroethene (PCE) were detected in soil gas at the study area. The distribution of the compound occurrences were mapped and potential source areas were identified. Low levels and limited occurrences for all compounds were identified at Study Area 10.

2.0 Introduction

In August and September 1994, ABB-ES subcontracted NERI under Subcontract No. SE4-09-027 to conduct a PETREX passive soil gas survey at NTC, Orlando. The purpose of this survey was to assist in site-screening activities to assess the environmental impact from past site use at Study Area 10. This area was screened for VOCs and SVOCs that may be present in the soil gas.

Study Area 10, located in the southeast corner of the NTC Complex, was used for a short time in the late 1960s to dispose of tree trimmings and grass clippings.

3.0 Objectives

The objectives of this soil gas survey were to

1. collect and report VOCs and SVOCs as constituents of the soil gas;
2. map the areal extent of the reported compounds in order to exhibit areas of potential subsurface contamination; and
3. attempt to determine the extent of potential source areas of the reported compounds in the subsurface.

4.0 Overview of the PETREX Technique

Each PETREX soil gas sampler consists of two or three activated charcoal adsorption elements (collectors) housed in a resealable glass container in an inert atmosphere.

Soil gas sample collection is performed by unsealing the sampler and exposing the collector to the soil gas of the subsurface environment at the base of a shallow borehole. Sample collection proceeds via free vapor diffusion through the opening of the uncapped sampler container. Following a controlled period of time, the sampler is retrieved from the borehole, resealed, and submitted for analysis.

One collector from each soil gas sampler is analyzed by thermal desorption and/or mass spectrometry (TD/MS). Selected second collectors may be analyzed by thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) for compound confirmation. At least 10 percent of samplers used in any project are three collector samplers. The third collector is used for setting instrument sensitivity prior to analysis.

Compounds are identified by comparison to standard reference spectra run on the same instrument. The mass spectral ion count of the appropriate indicator peak(s) for each compound or group of compounds is then plotted as relative response on a map and contoured using a variety of standard geostatistical analyses.

5.0 Scope of Work

A total of 26 PETREX soil gas samplers was utilized for this survey. At a majority of the sampler locations, a 2-inch diameter by 12-inch deep hole was excavated into the surface soil using a core shovel. After the sampler was lowered into the hole, the hole was backfilled with the soil plug taken from the shovel. Each sampler location was marked with a pin flag and ribbon flagging to help locate it during retrieval.

At the remaining sampler locations, located in asphalt, a 1 -inch diameter by 18-inch deep hole was excavated through the asphalt into the underlying soil using an electric rotary hammer drill equipped with a carbide-tipped bit. A 2-foot length of 18-gauge galvanized steel wire was attached to the sampler and the sampler was lowered into the borehole. A ball of aluminum foil was packed to within 1 inch of the surface and the last inch was filled with quick-setting cement.

Field procedures for this survey also included decontamination of the borehole equipment between sampler locations to prevent cross-contamination. The methods employed were as follows:

1. equipment (core shovel head and drill bit) was washed thoroughly with laboratory detergent and potable water using a nylon brush to remove particulate matter
2. equipment was rinsed thoroughly with deionized/organic-free water

3. equipment was rinsed with a 10 percent solution of pesticide-grade isopropanol
4. equipment was rinsed again with deionized and/or organic-free water and air-dried

Retrieval of samplers placed in soil entailed removing the soil plug from the hole and lifting out the sampler, which was then cleaned, sealed, and labeled with the sampler location number. Samplers placed beneath asphalt were retrieved by first chipping away the cement patch to expose the retrieval wire, then pulling gently on the wire to lift the sampler out of the borehole. The retrieval wire was removed from the sampler and the sampler was then cleaned, sealed and labeled.

6.0 Field Activities

Between August 15 and August 19, 1994, two NERI field geologists, assisted by ABB-ES personnel, conducted PETREX soil gas sampling onsite. A total of 26 PETREX samplers was placed onsite. The samplers were placed in approximate 50-foot square grids, as shown on Plate 1, Sample Locations Map.

Two sets of time calibration samplers were installed at three established sampling points in the study area. One set of these time calibration samplers was retrieved after 2 days and analyzed to check on the loading rate of VOCs onto the collectors. After reviewing the results from these time calibration samplers, it was determined to retrieve the second set of time calibration samplers after an additional 7 days of exposure in the field. Based on the results of these time calibration samplers, it was decided to retrieve all of the survey samplers after a further 7 days.

After an exposure period of approximately 14 to 16 days, the samplers were retrieved by an NERI field geologist between August 31 and September 2, 1994, and returned to NERI's Lakewood, Colorado, laboratory for analysis by TD/MS.

7.0 Discussion

The soil gas response levels discussed below are described as elevated and moderate relative to the entire data set. The ion count values that have been reported represent qualitative soil gas values that were evaluated relative to the other sampler locations.

Ion count values are the unit of measure generated by the mass spectrometer to illustrate the relative intensities associated with each of the reported compounds. These response levels do not represent an actual concentration of the reported compounds but are used to differentiate source areas from migration/dispersion pathways.

Study Area 10 was reportedly used for a short time in the late 1960s to dispose of tree trimmings and grass clippings from around the NTC site. It is unknown if any contaminants were also disposed of with this yard waste. Plate 1 displays the locations of the 26 samplers placed at Study Area 10.

Low levels and limited occurrences of BTEX, the cycloalkanes and-alkenes and PCE were identified north of the former disposal area located on Study Area 10. The levels detected for each of the compounds identified north of the disposal area are considered low and may or may not reflect detectable concentration levels in the subsurface; however, the petroleum hydrocarbons could not be reliably reported at sample locations 2, 3, 6, 7, 8, 9, 10, 11, 15, and 22 due to interference by terpenes. The distribution of BTEX, the cycloalkanes and-alkenes and PCE are shown on Plates 2 through 4.

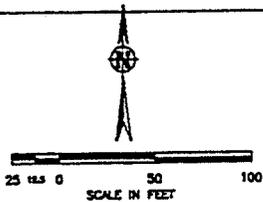
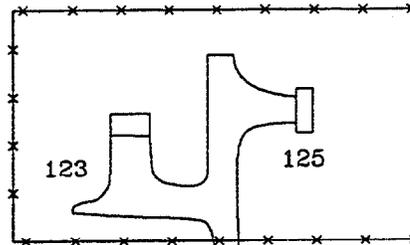
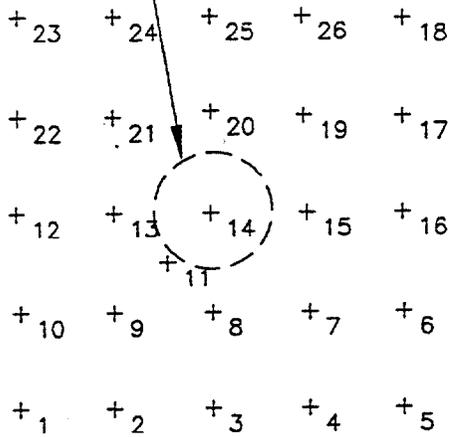
8.0 Conclusions

BTEX, the cycloalkane and-alkene petroleum hydrocarbons, and PCE were detected in soil gas. The distribution of the compound occurrences were mapped and potential source areas were identified. Low response levels were also detected at Site Study Area 8; however, VOCs were detected at a significant number of sample locations at this site.

Because soil gas emanation rates are site and chemical specific, the environmental significance of the soil gas response values must be determined relative to compound concentrations in subsurface soil and/or groundwater. Changes in soil gas response in orders of magnitude may be used to plan future investigative studies and to aid in characterizing the behavior (migration, attenuation) of the chemicals in the subsurface. The PETREX method is extremely sensitive and often detects compounds in the low part per billion to part per trillion range; therefore, areas depicted as background by the PETREX method generally do not represent environmentally significant contaminant levels in the subsurface.

Golf Course

Approximate Disposal Area



LEGEND	
Features:	
+ PETREX Sample Location	

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605 Perlet Street
Suite 100
Lakewood, Colorado 80215
(303) 238-0090

Drawn By: JCS	Project #: 2158E
Checked By:	Date: October 5, 1994
Project Manager: CAS	File Name: 215810_1.dwg

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Naval Training Center IAS Site 4, Study Area 10
Orlando, Florida

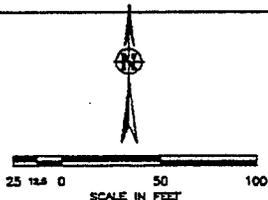
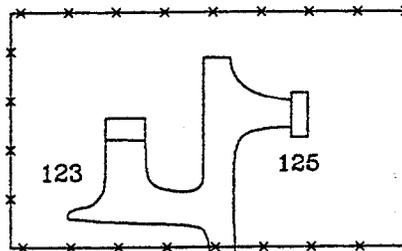
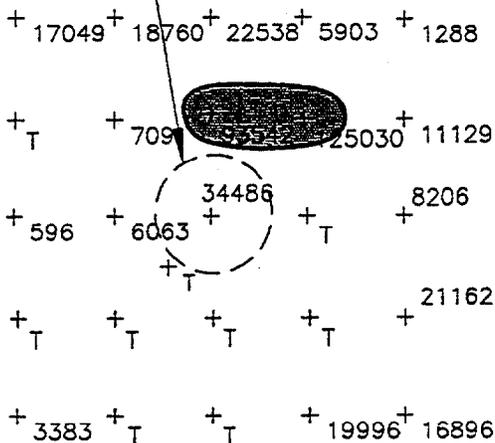


Sample Locations

Plate 1

Golf Course

Approximate Disposal Area



LEGEND	
Relative Response Values: ■ ≥ 50,000	Features: + PETREX Sample Location T Samples affected by terpenes. See text for explanation.

NERI
 Northeast Research Institute LLC
 605 Parfet Street
 Suite 100
 Lakewood, Colorado 80215
 (303) 238-0090

Drawn By: JCS	Project #: 2158E
Checked By:	Date: October 5, 1994
Project Manager: CAS	File Name: 215810_2.dwg

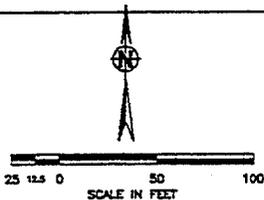
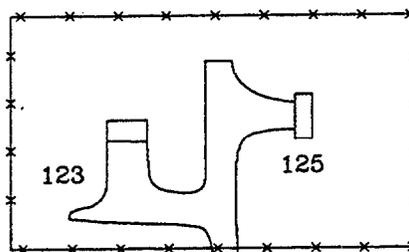
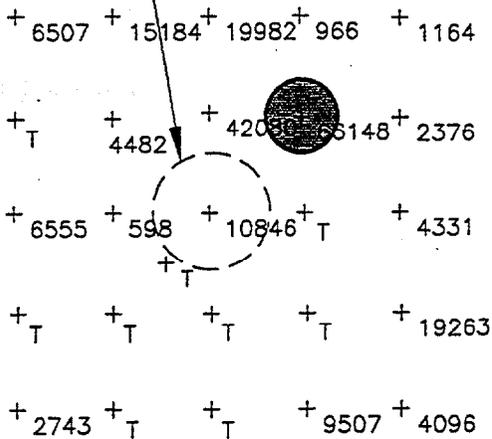
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 Orlando, Florida

Relative Response
 Benzene, Toluene,
 Ethylbenzene, Xylene(s)

Plate 2

Golf Course

Approximate Disposal Area



LEGEND	
Relative Response Values: ■ ≥ 50,000	Features: + PETREX Sample Location T Samples affected by terpenes. See text for explanation.



605 Parfet Street
Suite 100
Lakewood, Colorado 80215
(303) 238-0090

Drawn By: JCS	Project #: 2158E
Checked By:	Date: October 5, 1994
Project Manager: CAS	File Name: 215810_3.dwg

ABB Environmental Services, Inc.

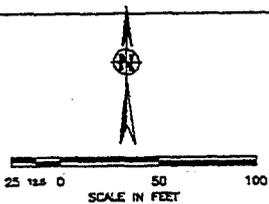
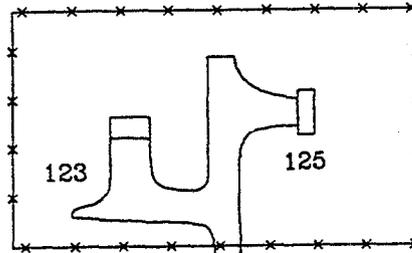
Naval Training Center IAS Site 4, Study Area 10
Orlando, Florida

Relative Response Cycloalkanes/Alkenes
Plate 3

Golf Course

Approximate Disposal Area

+ 1292 + ND + 498 + ND + ND
 + 2995 + ND + ND ● 1052 + ND
 + ND + ND + ND + 9495 + 5393
 + 8092
 + 5278 + 6762 + ND + ND + 1198
 + ND + 1673 + 5998 + 2402 + 2076



LEGEND	
Relative Response Values: ■ ≥ 10,000	Features: + PETREX Sample Location

NER
 Northeast Research Institute LLC
 605 Parfet Street
 Suite 100
 Lakewood, Colorado 80215
 (303) 238-0090

Drawn By: JCS	Project #: 2158E
Checked By:	Date: October 5, 1994
Project Manager: CAS	File Name: 215810_4.dwg

ABB Environmental Services, Inc.
 Naval Training Center IAS Site 4, Study Area 10
 Orlando, Florida

Relative Response
 Tetrachloroethene

Plate 4

APPENDIX C

BORING LOG AND MONITORING WELL INSTALLATION DIAGRAM

Project: BRAC NTC, Orlando, Group I, Site Screening		Well ID: OLD-10-01		Boring ID: 10B001	
Client: SOUTHNAVFACENCOM		Contractor: Groundwater Protection, Inc.		Job No.: CTO-107	
Northing: 1538338.89		Easting: 553989.33		Date started: 08/31/94	
Method: 4.25" Hollow stem auger		Casing dia.: 2 in.		Screened Int.: 3-13 ft. bis	
TOC elev.: 97.17 Ft.		Type of OVM.: Porta FID		Total dpth: 13.5Ft.	
ABB Rep.: S. Grietens		Well development date: 09/09/94		Dpth to ∇ 8.0* Ft.	
				Site: Study Area 10	

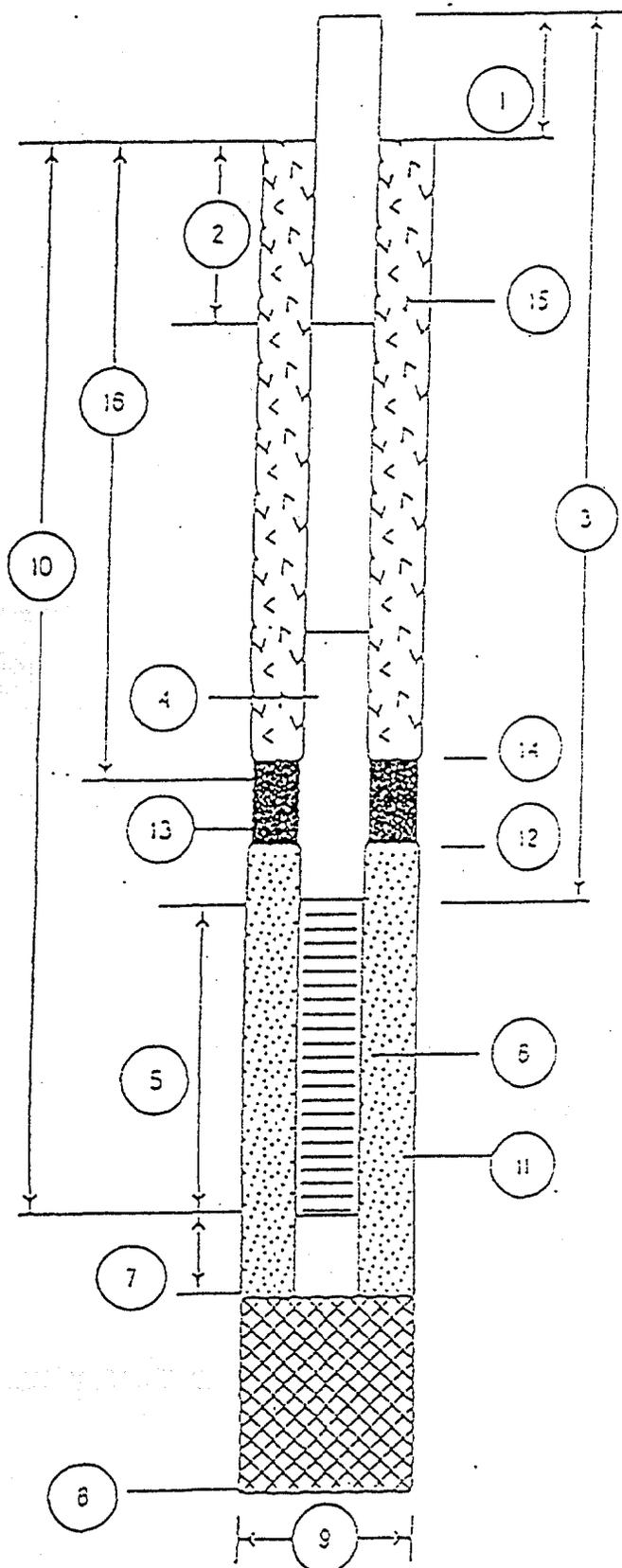
Depth Ft.	Laboratory Sample ID.	Sample Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.	Well diag.
0				QUARTZ SAND: Brown/dark brown, fine grained, good sorting, good rounding, good percent silts/clay, (30%), with trace organics.		SP	posthole	
0				QUARTZ SAND: Black, same as .5 to 3 feet.			posthole	
5	10B00101	95%		QUARTZ SAND: Dark brown/black, same as .5 to 3 feet, organic rich.			1,2,2,5	
10		95%					7,5,6,8	
15		95%					3,2,4,4	
20		100%					6,11,10,11	
5		100%					4,4,7,15	

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

WELL CONSTRUCTION DETAIL

WELL NUMBER: OLD-10-01

DATE OF INSTALLATION: 8/31/94



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: 13.5'
9. Diameter of Boring: 6.25"
10. Depth to Bottom of Screen: 13'
11. Type of Screen Filter: 20/30 Silica Sand
Quantity Used: 275 lb Size: _____
12. Depth to Top of Filter: 2'
13. Type of Seal: Bentonite
Quantity Used: 25 lb
14. Depth to Top of Seal: 1.5'
15. Type of Grout: Portland Cement
Grout Mixture:
Method of Placement: POURED
16. Tot. Depth of 6 in. Steel Casing: N/A

APPENDIX D

**SUMMARY OF DETECTIONS IN SOIL AND
GROUNDWATER ANALYTICAL RESULTS**

**Table D-1
Summary of Detections in Subsurface Soil Analytical Results, Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier:				10B00101	10B00101D
Sampling Date:	Background ¹ Screening	RBC ² for Residential Soil	RBC ² for Industrial Soil	31-Aug-94	31-Aug-94
Feet bls:				6	6
Volatile Organic Compounds ($\mu\text{g}/\text{kg}$)					
Acetone	-	7,800,000 n	200,000,000 n	18	-
Semivolatile Organic Compounds ($\mu\text{g}/\text{kg}$)					
Di-n-butylphthalate	560	7,800,000 n	200,000,000 n	580	640
Inorganic Analytes (mg/kg)					
Aluminum	2,119	78,000 n	1,000,000 n	3,910	3520
Barium	3.6	5,500 n	140,000 n	10.5 B	10 B
Calcium	115	1,000,000	1,000,000	1,860	362 B
Chromium	3.7	390 n	10,000 n	4.4	3.7
Copper	-	3,100 n	82,000 n	1.6 B	1.4 B
Iron	264	23,000 n	610,000 n	164 J	110 J
Lead	3.9	400	400	5.5	5
Magnesium	32.8	460,468	460,468	84.3 B	54.8 B
Manganese	2.1	1,800 n	47,000 n	1.1 B	0.69 B
Mercury	-	23 n	610 n	0.05	0.06
Vanadium	3.4	550 n	14,000 n	2 B	1.7 B

¹ The background screening value is twice the average of detected concentrations for inorganic analytes. For organic compounds, values are the mean of detected concentration, presented for comparison purposes only.

² RBC = Risk-Based Concentration Table, U.S. Environmental Protection Agency 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 (Office of Solid Waste and Emergency Response directive 9355.4-12). For essential nutrients (calcium, magnesium, potassium, and sodium) screening values were derived based on recommended daily allowances.

Notes: BRAC = Base Realignment and Closure.

bls = below land surface.

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

- = analyte/compound was not detected at reporting limit.

n = noncarcinogenic pathway.

mg/kg = milligrams per kilogram.

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

J = reported concentration is an estimated quantity.

All inorganic results expressed in mg/kg soil dry weight; organics in $\mu\text{g}/\text{kg}$ soil dry weight.

**Table D-2
Summary of Detections in Groundwater Analytical Results, Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Well ID:					OLD-10-01
Identifier:	Background ¹ Screening	FDEPG	FEDMCL	RBC ² for Tap Water	10G00101
Sampling Date:					14-Sep-94
Inorganic Analytes (µg/l)					
Aluminum	4,067	³ 200	ND	37,000 n	2,620
Barium	31.4	⁴ 2,000	2,000	2,600 n	21.9 B
Calcium	36,830	ND	ND	1,000,000	4,820 B
Chromium	7.8	⁴ 100	100	180 n	3.3 B
Iron	1,227	³ 300	ND	11,000 n	682
Lead	4	⁴ 15	15	15	0.86 B
Magnesium	4,560	ND	ND	118,807	3,310 B
Manganese	17	³ 50	ND	840 n	8.6 B
Nickel	-	⁴ 100	100	730 n	12.6 B
Potassium	5,400	ND	ND	297,016	3,350 B
Sodium	18,222	⁴ 160,000	ND	396,022	5,810

¹ Groundwater background screening value is twice the average of detected concentrations for inorganic analytes.

² RBC = Risk-Based Concentration Table, U.S. Environmental Protection Agency (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.

³ Secondary standard.

⁴ Primary standard.

Notes: BRAC = Base Realignment and Closure.

ID = Identification.

FDEPG = Florida Department of Environmental Protection, Groundwater Guidance Concentrations, June 1994.

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

µg/l = micrograms per liter

ND = not determined.

n = noncarcinogenic effects.

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

- = analyte/compound was not detected at the reporting limit.

APPENDIX E

SUMMARY OF ANALYTICAL RESULTS

**Table E-1
Summary of Soil Analytical Results
Target Compound List Volatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10B00101	10B00101D	10B00101DRE
	Sampling Date 31-Aug-94	31-Aug-94	31-Aug-94
1,1,1-Trichloroethane	12 U	12 U	12 U
1,1,2,2-Tetrachloroethane	12 U	12 U	12 U
1,1,2-Trichloroethane	12 U	12 U	12 U
1,1-Dichloroethane	12 U	12 U	12 U
1,1-Dichloroethene	12 U	12 U	12 U
1,2-Dichloroethane	12 U	12 U	12 U
1,2-Dichloroethene (total)	12 U	12 U	12 U
1,2-Dichloropropane	12 U	12 U	12 U
2-Butanone	12 U	12 U	12 U
2-Hexanone	12 U	12 U	12 U
4-Methyl-2-pentanone	12 U	12 U	12 U
Acetone	18	12 U	12 U
Benzene	12 U	12 U	12 U
Bromodichloromethane	12 U	12 U	12 U
Bromoform	12 U	12 U	12 U
Bromomethane	12 U	12 U	12 U
Carbon disulfide	12 U	12 U	12 U
Carbon tetrachloride	12 U	12 U	12 U
Chlorobenzene	12 U	12 U	12 U
Chloroethane	12 U	12 U	12 U
Chloroform	12 U	12 U	12 U
Chloromethane	12 U	12 U	12 U
cis-1,3-Dichloropropene	12 U	12 U	12 U
Dibromochloromethane	12 U	12 U	12 U
Ethylbenzene	12 U	12 U	12 U
Methylene chloride	12 U	12 U	12 U
Styrene	12 U	12 U	12 U
Tetrachloroethene	12 U	12 U	12 U
Toluene	12 U	12 U	12 U
trans-1,3-Dichloropropene	12 U	12 U	12 U
Trichloroethene	12 U	12 U	12 U
Vinyl chloride	12 U	12 U	12 U
Xylene (total)	12 U	12 U	12 U

Notes: Analytical results expressed in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

U = Compound not detected at the contract required quantitation limit (CRQL).

J = Reported concentration is an estimated quantity.

**Table E-2
Summary of Soil Analytical Results
Target Compound List Semivolatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10B00101 31-Aug-94	10B00101D 31-Aug-94
1,2,4-Trichlorobenzene	420 U	420 U
1,2-Dichlorobenzene	420 U	420 U
1,3-Dichlorobenzene	420 U	420 U
1,4-Dichlorobenzene	420 U	420 U
2,2'-oxybis(1-Chloropropane)	420 U	420 U
2,4,5-Trichlorophenol	1000 U	1000 U
2,4,6-Trichlorophenol	420 U	420 U
2,4-Dichlorophenol	420 U	420 U
2,4-Dimethylphenol	420 U	420 U
2,4-Dinitrophenol	1000 U	1000 U
2,4-Dinitrotoluene	420 U	420 U
2,6-Dinitrotoluene	420 U	420 U
2-Chloronaphthalene	420 U	420 U
2-Chlorophenol	420 U	420 U
2-Methylnaphthalene	420 U	420 U
2-Methylphenol	420 U	420 U
2-Nitroaniline	1000 U	1000 U
2-Nitrophenol	420 U	420 U
3,3'-Dichlorobenzidine	420 U	420 U
3-Nitroaniline	1000 U	1000 U
4,6-Dinitro-2-methylphenol	1000 U	1000 U
4-Bromophenyl-phenylether	420 U	420 U
4-Chloro-3-methylphenol	420 U	420 U
4-Chloroaniline	420 U	420 U
4-Chlorophenyl-phenylether	420 U	420 U
4-Methylphenol	420 U	420 U
4-Nitroaniline	1000 U	1000 U
4-Nitrophenol	1000 U	1000 U
Acenaphthene	420 U	420 U
Acenaphthylene	420 U	420 U
Anthracene	420 U	420 U
Benzo(a)anthracene	420 U	420 U
Benzo(a)pyrene	420 U	420 U
Benzo(b)fluoranthene	420 U	420 U
Benzo(g,h,i)perylene	420 U	420 U
Benzo(k)fluoranthene	420 U	420 U

See notes at end of table.

**Table E-2 (Continued)
Summary of Soil Analytical Results
Target Compound List Semivolatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10B00101	10B00101D
	Sampling Date 31-Aug-94	31-Aug-94
bis(2-Chloroethoxy)methane	420 U	420 U
bis(2-Chloroethyl)ether	420 U	420 U
bis(2-Ethylhexyl)phthalate	420 U	420 U
Butylbenzylphthalate	420 U	420 U
Carbazole	420 U	420 U
Chrysene	420 U	420 U
Di-n-butylphthalate	580	640
Di-n-octylphthalate	420 U	420 U
Dibenz(a,h)anthracene	420 U	420 U
Dibenzofuran	420 U	420 U
Diethylphthalate	420 U	420 U
Dimethylphthalate	420 U	420 U
Fluoranthene	420 U	420 U
Fluorene	420 U	420 U
Hexachlorobenzene	420 U	420 U
Hexachlorobutadiene	420 U	420 U
Hexachlorocyclopentadiene	420 U	420 U
Hexachloroethane	420 U	420 U
Indeno(1,2,3-cd)pyrene	420 U	420 U
Isophorone	420 U	420 U
N-Nitroso-di-n-propylamine	420 U	420 U
N-Nitrosodiphenylamine ¹	420 U	420 U
Naphthalene	420 U	420 U
Nitrobenzene	420 U	420 U
Pentachlorophenol	1000 U	1000 U
Phenanthrene	420 U	420 U
Phenol	420 U	420 U
Pyrene	420 U	420 U

¹ Cannot be separated from diphenylamine

Notes: Analytical results expressed in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

U = Compound not detected at the contract required quantitation limit (CRQL).

J = Reported concentration is an estimated quantity.

**Table E-3
Summary of Soil Analytical Results
Target Compound List Pesticides/PCBs
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10B00101	10B00101D
	Sampling Date 31-Aug-94	31-Aug-94
4,4'-DDD	4.1 U	4.1 U
4,4'-DDE	4.1 U	4.1 U
4,4'-DDT	4.1 U	4.1 U
Aldrin	2.1 U	2.1 U
alpha-BHC	2.1 U	2.1 U
alpha-Chlordane	2.1 U	2.1 U
Aroclor-1016	41 U	41 U
Aroclor-1221	84 U	84 U
Aroclor-1232	41 U	41 U
Aroclor-1242	41 U	41 U
Aroclor-1248	41 U	41 U
Aroclor-1254	41 U	41 U
Aroclor-1260	41 U	41 U
beta-BHC	2.1 U	2.1 U
delta-BHC	2.1 U	2.1 U
Dieldrin	4.1 U	4.1 U
Endosulfan I	2.1 U	2.1 U
Endosulfan II	4.1 U	4.1 U
Endosulfan sulfate	4.1 U	4.1 U
Endrin	4.1 U	4.1 U
Endrin aldehyde	4.1 U	4.1 U
Endrin ketone	4.1 U	4.1 U
gamma-BHC (Lindane)	2.1 U	2.1 U
gamma-Chlordane	2.1 U	2.1 U
Heptachlor	2.1 U	2.1 U
Heptachlor epoxide	2.1 U	2.1 U
Methoxychlor	21 U	21 U
Toxaphene	210 U	210 U

Notes: Analytical results expressed in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

U = Compound not detected at the contract required quantitation limit (CRQL).

J = Reported concentration is an estimated quantity.

**Table E-4
Summary of Soil Analytical Results
Herbicides - Method 8150
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10B00101	10B00101D
	Sampling Date	31-Aug-94
2,4,5-T	25 U	25 U
2,4-D	120 U	120 U
2,4-DB	120 U	120 U
2,4-DP (Dichloroprop)	120 U	120 U
Dalapon	250 U	250 U
Dicamba	25 U	25 U
Dinoseb	25 U	25 U
MCPA	25000 U	16000 U
MCPP	12000 U	12000 U
Silvex (2,4,5-TP)	25 U	25 U

Notes: Analytical results expressed in micrograms per kilogram ($\mu\text{g}/\text{kg}$).

U = Compound not detected at the quantitation limit (QL).

J = Reported concentration is an estimated quantity.

Table E-5
Summary of Soil Analytical Results
Target Analyte List Metals
Study Area 10

BRAC Environmental Site-Screening Report
 Naval Training Center
 Orlando, Florida

Identifier	10B00101	10B00101D
Sampling Date	31-Aug-94	31-Aug-94
Aluminum	3910	3520
Antimony	4.9 U	4.9 U
Arsenic	1 U	1 U
Barium	10.5 B	10 B
Beryllium	0.05 UJ	0.05 UJ
Cadmium	0.73 U	0.73 U
Calcium	1860	362 B
Chromium	4.4	3.7
Cobalt	0.75 U	0.75 U
Copper	1.6 B	1.4 B
Iron	164 J	110 J
Lead	5.5	5
Magnesium	84.3 B	54.8 B
Manganese	1.1 B	0.69 B
Mercury	0.05	0.06
Nickel	2.3 U	2.3 U
Potassium	75.4 U	75.4 U
Selenium	0.88 U	0.65 U
Silver	0.65 U	0.65 U
Sodium	5 U	3.9 U
Thallium	0.32 U	0.32 U
Vanadium	2 B	1.7 B
Zinc	1.4 U	1.4 U

Notes: Analytical results expressed in milligrams per kilogram (mg/kg).

U = Analyte not detected at the reporting limit.

B = Reported concentration is between the instrument detection limit (IDL) and the contract required detection limit (CRDL).

J = Reported concentration is an estimated quantity

**Table E-6
Summary of Groundwater Analytical Results
Low Detection Limit List Volatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10G00101
	Sampling Date
	14-Sep-94
1,1,1-Trichloroethane	1 U
1,1,2,2-Tetrachloroethane	1 U
1,1,2-Trichloroethane	1 U
1,1-Dichloroethane	1 U
1,1-Dichloroethene	1 U
1,2-Dibromo-3-chloropropane	1 U
1,2-Dibromoethane	1 U
1,2-Dichlorobenzene	1 U
1,2-Dichloroethane	1 U
1,2-Dichloropropane	1 U
1,3-Dichlorobenzene	1 U
1,4-Dichlorobenzene	1 U
2-Butanone	R
2-Hexanone	R
4-Methyl-2-pentanone	5 U
Acetone	R
Benzene	1 U
Bromochloromethane	1 U
Bromodichloromethane	1 U
Bromoform	1 U
Bromomethane	1 U
Carbon disulfide	0.5 UJ
Carbon tetrachloride	1 U
Chlorobenzene	1 U
Chloroethane	1 U
Chloroform	1 U
Chloromethane	1 U
cis-1,2-Dichloroethene	1 U
cis-1,3-Dichloropropene	1 U
Dibromochloromethane	1 U
Ethylbenzene	1 U
Methylene chloride	1 U
Styrene	1 U
Tetrachloroethene	1 U
Toluene	1 U
trans-1,2-Dichloroethene	1 U
See notes at end of table.	

Table E-6 (Continued)
Summary of Groundwater Analytical Results
Low Detection Limit List Volatile Organics
Study Area 10

BRAC Environmental Site-Screening Report
 Naval Training Center
 Orlando, Florida

Identifier	10G00101
Sampling Date	14-Sep-94
trans-1,3-Dichloropropene	1 U
Trichloroethene	1 U
Vinyl chloride	1 U
Xylene (total)	1 U
Notes: Analytical results expressed in micrograms per liter ($\mu\text{g}/\text{l}$). U = Compound not detected at the contract required quantitation limit (CRQL). J = Reported concentration is an estimated quantity. R = Data rejected during data validation	

**Table E-7
Summary of Groundwater Analytical Results
Target Compound List Semivolatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10G00101
Sampling Date	14-Sep-94
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
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	1 UJ
Benzo(b)fluoranthene	10 U
Benzo(g,h,i)perylene	10 U
Benzo(k)fluoranthene	10 U
See notes at end of table.	

**Table E-7 (Continued)
Summary of Groundwater Analytical Results
Target Compound List Semivolatile Organics
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10G00101
Sampling Date	14-Sep-94
bis(2-Chloroethoxy)methane	10 U
bis(2-Chloroethyl)ether	10 U
bis(2-Ethylhexyl)phthalate	1 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	1 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	1 U
Phenanthrene	10 U
Phenol	10 U
Pyrene	10 U

¹ Cannot be separated from diphenylamine

Notes: Analytical results expressed in micrograms per liter ($\mu\text{g}/\text{L}$).

Low detection limit analytical results indicated for Benzo(a)pyrene were obtained using High Pressure Liquid Chromatography, Method 8310(MOD).

Low detection limit analytical results indicated for bis(2-Ethylhexyl)phthalate, hexachlorobenzene, and pentachlorophenol were obtained using Selective Ion Monitoring chromatography.

U = Compound not detected at the contract required quantitation limit (CRQL).

J = Reported concentration is an estimated quantity.

Table E-8
Summary of Groundwater Analytical Results
Target Compound List Pesticides/PCBs
Study Area 10

BRAC Environmental Site-Screening Report
 Naval Training Center
 Orlando, Florida

Identifier	10G00101
Sampling Date	19-Sep-94
4,4'-DDD	0.1 U
4,4'-DDE	0.1 U
4,4'-DDT	0.1 U
Aldrin	0.05 U
alpha-BHC	0.05 U
alpha-Chlordane	0.05 U
Aroclor-1016	0.5 U
Aroclor-1221	0.5 U
Aroclor-1232	0.5 U
Aroclor-1242	0.5 U
Aroclor-1248	0.5 U
Aroclor-1254	0.5 U
Aroclor-1260	0.5 U
beta-BHC	0.05 U
delta-BHC	0.05 U
Dieldrin	0.1 U
Endosulfan I	0.05 U
Endosulfan II	0.1 U
Endosulfan sulfate	0.1 U
Endrin	0.1 U
Endrin aldehyde	0.1 U
Endrin ketone	0.1 U
gamma-BHC (Lindane)	0.05 U
gamma-Chlordane	0.05 U
Heptachlor	0.05 U
Heptachlor epoxide	0.05 U
Methoxychlor	0.5 U
Toxaphene	5 U

Notes: Analytical results expressed in micrograms per liter ($\mu\text{g}/\text{L}$).

U = Compound not detected at the contract required quantitation limit (CRQL).

J = Reported concentration is an estimated quantity.

**Table E-9
Summary of Groundwater Analytical Results
Target Analyte List Metals
Study Area 10**

BRAC Environmental Site-Screening Report
Naval Training Center
Orlando, Florida

Identifier	10G00101
Sampling Date	14-Sep-94
Aluminum	2620
Antimony	1.2 UJ
Arsenic	1.9 U
Barium	21.9 B
Beryllium	0.21 UJ
Cadmium	2.9 U
Calcium	4820 B
Chromium	3.3 B
Cobalt	3 U
Copper	1.7 U
Iron	682
Lead	0.86 B
Magnesium	3310 B
Manganese	8.6 B
Mercury	0.06 U
Nickel	12.6 B
Potassium	3350 B
Selenium	2 UJ
Silver	2.6 U
Sodium	5810
Thallium	1.3 U
Vanadium	4.7 U
Zinc	10.4 U

Notes: Analytical results expressed in micrograms per liter ($\mu\text{g}/\text{l}$).

U = Analyte not detected at the reporting limit.

B = Reported concentration is between the instrument detection limit (IDL) and the contract required detection limit (CRDL).

J = Reported concentration is an estimated quantity.