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BASE REALIGNMENT AND CLOSURE ENVIRONMENTAL SITE SCREENING REPORT FOR
STUDY AREA 52 WITH TRANSMITTAL LETTER NTC ORLANDO FL
1/20/1999
HARDING LAWSON ASSOCIATES

Harding Lawson Associates

January 20, 1999



Commanding Officer
SOUTHNAVFACENGCOM
2155 Eagle Drive
North Charleston, SC 29419-9010

ATTN: Ms. Barbara Nwokike, Code 187300

Subject: **BRAC Environmental Site Screening Report
Study Area 52**

Dear Barbara:

Attached is the site screening report for Study Area 52. The report was revised from earlier submittals in that it has incorporated all of the groundwater monitoring data through September 1998.

If 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, appearing to read "Richard P. Allen".

Richard P. Allen
Project Technical Lead

Attachments (3)

cc: Wayne Hansel, Southern Division
Nancy Rodriguez, USEPA Region IV
David Grabka, FDEP
Lt. G. Whipple, NTC-Public Works Officer
Bob Cohose, BEI
Steve McCoy, Tetra Tech/NUS
Al Aikens, CH2M Hill
file



**BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE SCREENING REPORT
INTERIM REMEDIAL ACTION
STUDY AREA 52**

**NAVAL TRAINING CENTER
ORLANDO, FLORIDA**

Unit Identification Code: N65928

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

Prepared by:

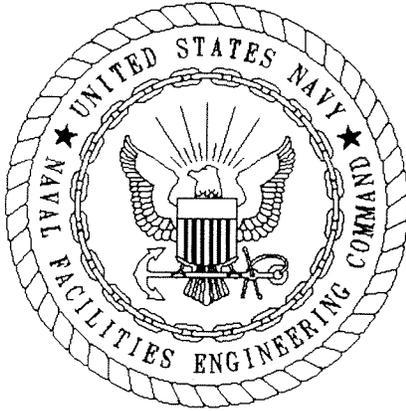
**Harding Lawson Associates
2590 Executive Center Circle, East
Tallahassee, Florida 32301**

Prepared for:

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

Barbara Nwokike, Code 1873, Engineer-in-Charge

January 1999



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, Harding Lawson Associates, 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: January 5, 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)

EXECUTIVE SUMMARY

Harding Lawson Associates (HLA), under contract to the Southern Division, Naval Facilities Engineering Command, has prepared this Site Screening Report for Study Area 52, located at the McCoy Annex, Naval Training Center, Orlando, Florida. This report was prepared under the Comprehensive Long-Term Environmental Action, Navy Contract No. N62467-89-D-0317 as Contract Task Order No. 107.

The objective of the site screening investigation was to locate and identify any compounds that may be present at concentrations in excess of screening criteria. Initial site screening activities detected pesticides in surface soil at two locations and in groundwater in two wells at concentrations exceeding screening criteria and maximum contaminant levels. These data prompted HLA to recommend additional sampling to delineate the nature and extent of the pesticide contamination in soil and groundwater.

Data from the additional sampling led the Orlando Partnering Team to initiate an interim remedial action (IRA), consisting of the removal and disposal of pesticide-contaminated soil above the water table, and the placement of clean fill in the excavation. Subsequently, HLA installed three permanent monitoring wells to monitor groundwater quality upgradient, downgradient, and within the zone of highest pesticide contamination, and implemented a groundwater monitoring program. Samples were collected quarterly for a period of 1 year. The results of the monitoring program indicate that pesticide contamination exists within the surficial aquifer in an isolated area of the site. Dieldrin was detected in the monitoring well (OLD-52-13) installed in the area of highest soil contamination at concentrations exceeding the Florida Department of Environmental Protection's groundwater cleanup target level (GCTL) during the first three sampling events. Although the concentration of dieldrin has decreased during the monitoring period from 5.6 micrograms per liter ($\mu\text{g}/\ell$) (initial value) to 0.08 $\mu\text{g}/\ell$ (most recent sample), the dieldrin concentration still exceeds the GCTL of 0.005 $\mu\text{g}/\ell$.

Since the IRA required the removal of at least the top 2 feet of pesticide-contaminated soil (up to 4 feet in some areas), the risk of dermal exposure from soil was eliminated for future residents of the area.

HLA has also concluded that pesticide-contaminated soils no longer threaten the shallow aquifer, but recommends that the groundwater monitoring program continues until the contaminant concentrations are below the GCTL for dieldrin for two successive quarters.

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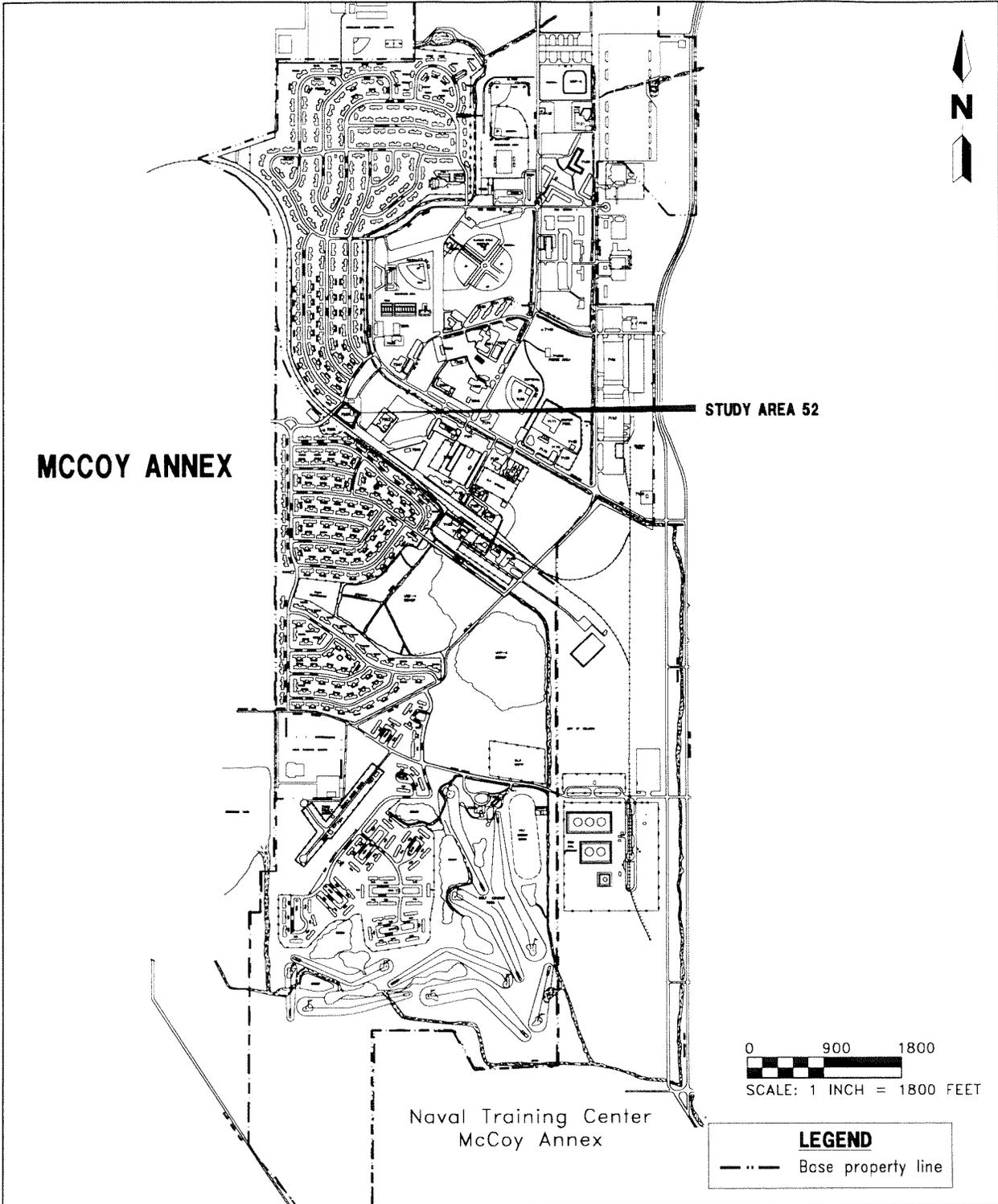
GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CLP	Contract Laboratory Program
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
FDEP	Florida Department of Environmental Protection
GCTL	groundwater cleanup target level
GPR	ground penetrating radar
HLA	Harding Lawson Associates
IA	immunoassay
IRA	interim remedial action
MAG	magnetometer
MCL	maximum contaminant level
$\mu\text{g}/\text{kg}$	micrograms per kilogram
$\mu\text{g}/\ell$	micrograms per liter
NTU	nephelometric turbidity units
OPT	Orlando Partnering Team
PCB	polychlorinated biphenyl
PVC	polyvinyl chloride
QC	quality control
ppm	parts per million
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
SCTL	soil cleanup target level
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDMD	time domain metal detector
TRPH	total recoverable petroleum hydrocarbons
TSS	total suspended solids
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 STUDY AREA 52, FORMER ENTOMOLOGY LAB, MCCOY ANNEX

1.1 INTRODUCTION. This report summarizes information gathered as a result of site screening activities conducted at Study Area 52 and interim actions taken to remove the source of the contamination. The initial phase of screening fieldwork began in March 1996. Because of exceedances of screening criteria for pesticides detected in both the soil and groundwater at that time, additional site screening was performed to determine the nature and extent of contamination. The additional site screening was followed by an interim remedial action (IRA), which consisted of the removal of contaminated soil. The IRA was completed in September 1997.

1.2 BACKGROUND AND CONDITIONS. Study Area 52 is located in the central part of McCoy Annex of Naval Training Center, Orlando (Figure 1-1). The focus of the site screening investigation in this Study Area was the area in the vicinity of former Building 7261. At one time Building 7261 was used as an entomology laboratory (ABB Environmental Services, Inc. [ABB-ES], 1995). Available drawings for Building 7261 indicate that it was built between 1956 and 1962 and was demolished in the early 1980s. A 1972 Master Plan for McCoy Annex indicates that the building was used for covered storage, and a 1973 drawing indicates that this building was the Maintenance Shop, 1,616 square feet in size, and was constructed with a concrete foundation, concrete floor, and wood walls. The building was located south of Building 7257.



**FIGURE 1-1
STUDY AREA LOCATION**



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2.0 INITIAL SITE SCREENING INVESTIGATION

The objective of the site screening program at Study Area 52 was to evaluate the nature and extent of potential contamination that may have resulted from the use of Building 7261 as an entomology laboratory. To accomplish this objective, geophysical surveys were conducted to locate potential demolition debris or other evidence of the former building, and soil and groundwater samples were collected from within or downgradient from potentially impacted areas and analyzed for various parameters. Proposed field activities were presented in the Site Screening Plan, Former Air Force Sites, Addendum 2 (ABB-ES, 1995).

2.1 FIELD PROGRAM. The initial site screening investigation conducted at Study Area 52 is described below.

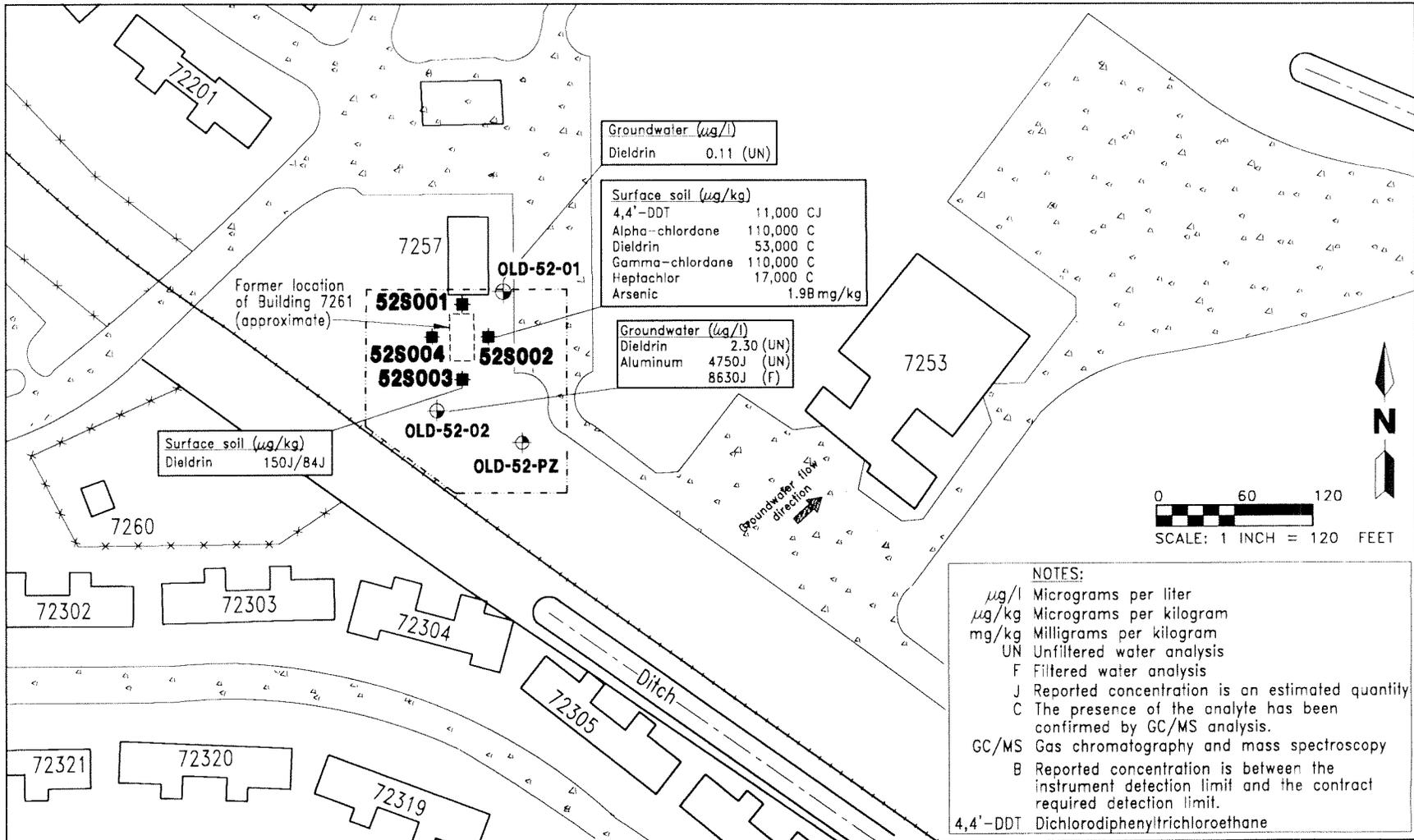
2.1.1 Geophysical Survey Prior to the start of the field program, Harding Lawson Associates (HLA) established an arbitrary grid coordinate system, as shown in Appendix A. The grid system was oriented along magnetic north and parallel to the north-south system of roads in the area. The grid consisted of a series of stakes and pin flags located within an area 150 by 100 feet, with nodes established at 10-foot intervals over the survey area with a cloth measuring tape and level. The geophysical survey was conducted at Study Area 52 on March 22, 1996. The various techniques included magnetometer (MAG), time domain metal detector (TDMD), and ground penetrating radar (GPR).

The magnetic method is a versatile geophysical technique used for locating buried debris by mapping local distortions in the earth's magnetic field produced by buried magnetic objects (steel and other magnetic materials). The MAG survey was conducted along a 10-foot measurement grid with traverses in a north-south orientation.

A TDMD survey was conducted along the established north-south traverses at 5-foot intervals. Data were acquired along each traverse at the rate of 0.66 readings per foot. The TDMD is designed to map buried conductive objects, such as metal tanks, drums, demolition debris, and utilities.

A GPR survey was completed to evaluate MAG/TDMD anomalies mapped during those investigations. The GPR technique is effective in mapping buried utilities and delineating the boundaries of buried waste materials or abandoned landfills. GPR profiles were developed along traverses 5 feet apart. The footprint of the former building was not located by geophysical surveys, nor was demolition debris identified. Appendix A presents the results of the geophysical survey.

2.1.2 Surface Soil Investigation Four surface soil samples (52S00101 through 52S00401) were collected in April 1996 in the area south of Building 7257 (i.e., near the former location of Building 7261). Sample locations were biased toward the north, east, south, and west sides of the former Building 7261, as determined from engineering drawings (Figure 2-1). Soil samples were collected using stainless steel hand tools and were submitted for Contract Laboratory Program (CLP) target compound list (TCL) semivolatle organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), total recoverable petroleum hydrocarbons (TRPH), and target analyte list (TAL) inorganic compounds analysis,



Groundwater ($\mu\text{g/l}$)
Dieldrin 0.11 (UN)

Surface soil ($\mu\text{g/kg}$)
4,4'-DDT 11,000 CJ
Alpha-chlordane 110,000 C
Dieldrin 53,000 C
Gamma-chlordane 110,000 C
Heptachlor 17,000 C
Arsenic 1.9B mg/kg

Groundwater ($\mu\text{g/l}$)
Dieldrin 2.30 (UN)
Aluminum 4750J (UN)
8630J (F)

Surface soil ($\mu\text{g/kg}$)
Dieldrin 150J/B4J

NOTES:
 $\mu\text{g/l}$ Micrograms per liter
 $\mu\text{g/kg}$ Micrograms per kilogram
 mg/kg Milligrams per kilogram
 UN Unfiltered water analysis
 F Filtered water analysis
 J Reported concentration is an estimated quantity
 C The presence of the analyte has been confirmed by GC/MS analysis.
 GC/MS Gas chromatography and mass spectroscopy
 B Reported concentration is between the instrument detection limit and the contract required detection limit.
 4,4'-DDT Dichlorodiphenyltrichloroethane

	Former building		OLD-52-01 Temporary monitoring well
	Railroad tracks		OLD-52-PZ Temporary piezometer
	Fence		52S001 Surface soil sample
	Limit of geophysical survey		

**FIGURE 2-1
SITE PLAN SAMPLE LOCATIONS AND
SCREENING RESULTS (SEPTEMBER 1996)**



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in accordance with U.S. Environmental Protection Agency (USEPA) Level IV data quality objectives (DQOs). Appropriate quality control (QC) samples were collected to support this sampling effort.

2.1.3 Groundwater Monitoring Well Installation and Sampling Two temporary monitoring wells were installed at locations OLD-52-01 and OLD-52-02 to enable groundwater sample collection. One temporary piezometer was also installed at location OLD-52-PZ. This piezometer and the two temporary wells were used to determine the groundwater flow direction. Well and piezometer locations are shown on Figure 2-1. Borings were completed using a hand auger to depths sufficient to install the temporary wells to intercept the water table. Slotted 2-inch-diameter polyvinyl chloride (PVC) well screen was lowered into each boring. The wells were then purged and sampled using the low-flow technique. Static water-level readings were taken in each well and piezometer. The well screens were withdrawn and the boreholes were backfilled with native soil following sample collection.

Depth to water in this Study Area was approximately 4 feet below land surface (bls). Based on evaluation of depth to water measurements in the two wells and one piezometer, the groundwater flow direction in the vicinity of Study Area 52 was to the northeast; therefore, well OLD-52-01 was downgradient of the former building location.

The wells and piezometer were screened with a flame ionization detector during installation and sampling, and two readings were noted. During installation of OLD-52-PZ, a reading of 2 parts per million (ppm) was recorded. Also, when well OLD-52-01 was opened to collect a groundwater sample, a reading of 1 ppm was recorded. These values are very low and do not indicate soil or groundwater contamination by volatile organic compounds (VOCs).

Both a filtered and an unfiltered groundwater sample were collected at each groundwater sampling location (for the sample identifier, "G" designates an unfiltered sample and "H" designates a filtered sample). Groundwater samples were submitted for CLP TCL VOCs, SVOCs, pesticides/PCBs, TRPH, TAL inorganics, and total suspended solids (TSS) analysis in accordance with USEPA Level III DQOs. The filtered groundwater samples were submitted for laboratory analysis of CLP TAL inorganics only. Appropriate QC samples were collected to support this sampling effort.

2.2 RESULTS. The results of initial site screening investigation activities at Study Area 52 are discussed below. The soil analytical results were evaluated by comparing their respective concentrations to (1) basewide soil background concentrations for McCoy Annex (inorganic compounds only); (2) Florida Department of Environmental Protection's soil cleanup target levels (SCTLs) for residential soil or (if applicable) leachability-based SCTLs; and (3) USEPA Region III risk-based concentrations (RBCs). Groundwater analytical results were compared to (1) basewide groundwater background concentrations (inorganic compounds only); (2) Florida groundwater cleanup target levels (GCTLs); (3) USEPA maximum contaminant levels (MCLs); and (4) USEPA Region III tap water RBCs. Following are the significant findings from this evaluation. The soil and groundwater analytical results are provided in Appendices B (Summary of Positive Detections) and C (Summary of Analytical Results). Only soil samples 52S00101 through 52S00401 and

groundwater samples 52G00101 and 52G00201 (and the filtered equivalents) are included in the initial site screening investigation discussion below.

2.2.1 Surface Soil SVOCs and PCBs were not detected in soil samples at concentrations exceeding screening values. 4,4'-Dichlorodiphenyltrichloroethane (DDT), alpha-chlordane, gamma-chlordane, dieldrin, and heptachlor were detected at concentrations above their respective screening values in at least one of two sample locations (Figure 2-1). Arsenic was detected at a concentration equal to the basewide background concentration and below the RBC for industrial soil.

4,4'-DDT, alpha-Chlordane, gamma-Chlordane, Dieldrin, and Heptachlor. 4,4'-DDT, alpha-chlordane, gamma-chlordane, dieldrin, and heptachlor were detected in one surface soil sample, 52S00201. Dieldrin was also detected in a second sample and its duplicate, 52S00301 and 52S00301D.

The concentration of 4,4'-DDT at location 52S00201 was 11,000 micrograms per kilogram ($\mu\text{g}/\text{kg}$). This exceeds the residential SCTL and RBC values, but is below the corresponding industrial SCTL (12,000 $\mu\text{g}/\text{kg}$) and industrial RBC (17,000 $\mu\text{g}/\text{kg}$). The reported concentrations of alpha-chlordane (110,000 $\mu\text{g}/\text{kg}$), gamma-chlordane (110,000 $\mu\text{g}/\text{kg}$), and heptachlor (17,000 $\mu\text{g}/\text{kg}$) at location 52S00201 exceed their respective SCTL and RBC for residential and industrial soils. Dieldrin was detected in groundwater above the GCTL; therefore, dieldrin concentrations in soil were compared to the leachability-based SCTL of 8 $\mu\text{g}/\text{kg}$. The concentration of dieldrin at location 52S00201 was well above its respective leachability-based SCTL. Dieldrin at locations 52S00101 and 52S00301 and their respective duplicates slightly exceeded the leachability-based SCTL.

Samples 52S002 and 52S003 were collected from the east and south sides of the former location of the entomology laboratory building. Analytical results from samples collected from the west and north sides of the former building reported no compounds above screening criteria.

2.2.2 Groundwater No VOCs or SVOCs were detected at concentrations exceeding screening criteria at either groundwater sample location. One pesticide, dieldrin, was detected at concentrations of 0.11 micrograms per liter ($\mu\text{g}/\ell$) and 2.3 $\mu\text{g}/\ell$ in wells OLD-52-01 and OLD-52-02, respectively, exceeding GCTLs and the RBC for tap water. Concentrations in the corresponding filtered samples were below applicable screening values. The presence of dieldrin in groundwater at Study Area 52 in unfiltered samples may be related to the presence of suspended particulates, rather than representing dissolved concentrations. The suspended particulates were likely present because the temporary wells had no sandpack.

The background concentration of one inorganic compound, aluminum, exceeded the background screening value in well OLD-52-02, but was well below the RBC for tap water. Aluminum concentrations detected at both well locations are the same order of magnitude as the basewide background aluminum concentration. The somewhat elevated aluminum concentrations may be related to suspended solids in the groundwater samples. Turbidity values noted during sampling of well OLD-52-02 remained relatively high (39.6 nephelometric turbidity units [NTUs] prior to sampling), and the reported TSS concentration from this location was 57 milligrams per liter.

3.0 ADDITIONAL SITE SCREENING INVESTIGATION

Based on the initial screening results, the Orlando Partnering Team (OPT) authorized additional investigations. The focus of the additional investigation was the vicinity of the former location of Building 7261. The purpose of the additional screening was to further evaluate the nature and extent of the chlorinated pesticides detected in surface soil and groundwater samples collected during the initial site screening investigation.

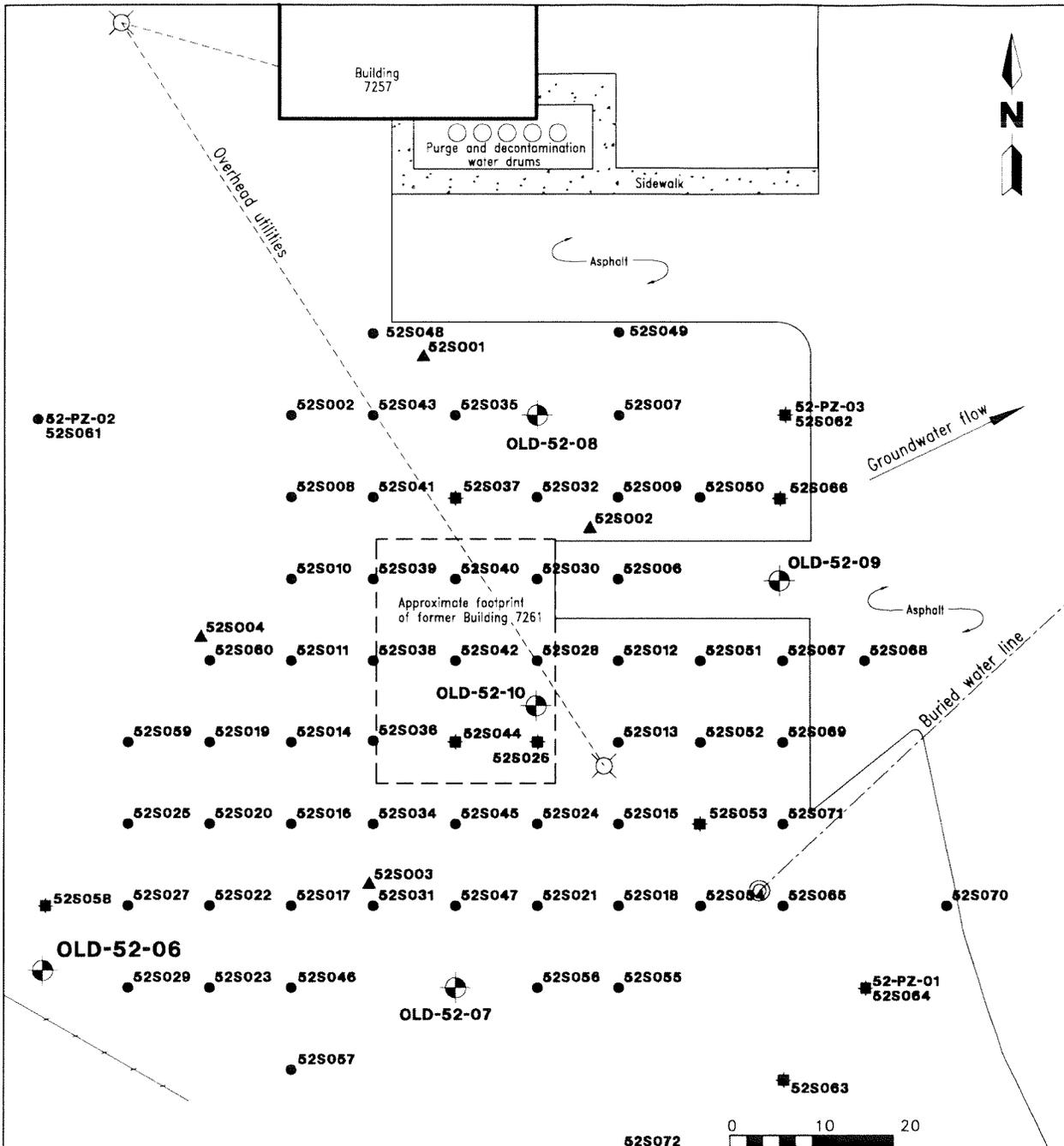
3.1 FIELD PROGRAM. The additional site screening investigation conducted at Study Area 52 occurred in December 1996 and is described below.

3.1.1 Immunoassay Soil Screening A sampling grid was established and expanded as necessary to delineate the nature and extent of pesticides in surface soil (Figure 3-1). Surface soil samples were collected from 0 to 1 foot bls, and analyzed in the field using immunoassay (IA) test methodology. A pesticide test kit capable of detecting chlordane and all structurally similar compounds (i.e., chlorinated pesticides in the Method 8080 list, except for 4,4'-DDT, 4,4'-dichlorodiphenyldichloroethane [DDD] and 4,4'-dichlorodiphenyldichloroethene [DDE]) was selected for this investigation. IA testing for DDT, DDD, and DDE was not the primary concern based on the magnitude of the previous detections at these locations. In addition, during the initial sampling, DDT was detected at both sample locations where the other pesticides were found and, therefore, was assumed to be present with the other compounds. The IA test kit was semiquantitative, in that it only provided a total concentration of the target compounds and did not quantify concentrations of individual compounds. The measured concentration was compared to three known colorimetric standards (300 $\mu\text{g}/\text{kg}$, 1,500 $\mu\text{g}/\text{kg}$, and 9,000 $\mu\text{g}/\text{kg}$) to determine the concentration range of the sample.

Three subsurface soil samples were collected and analyzed in the same manner as the surface soil samples to characterize the vertical extent of pesticides. Initially, a vertical delineation was to be performed in the center of the area with the highest pesticide concentrations. However, pesticide detections were more extensive than anticipated, and since many of the surface soil samples exceeded the highest (9,000 $\mu\text{g}/\text{kg}$) IA colorimetric standard, the area of highest pesticide concentrations was not defined. Instead, vertical delineation was performed at three locations in the center of Study Area 52. At two of these locations, IA measured total pesticides greater than 9,000 $\mu\text{g}/\text{kg}$, and soil samples were collected at 1-foot intervals to a depth of 4 feet bls. The third location had only one subsurface soil sample collected from 2 to 3 feet bls.

3.1.2 Confirmatory Soil Screening Ten of the 75 IA samples (13 percent) were split and submitted to a Florida certified laboratory for analysis of pesticides using USEPA Method 8080. Sample 52S04401 was collected from a location with elevated concentrations of chlorinated pesticides and was submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis for pesticides to determine if the soil should be considered a Resource Conservation and Recovery Act (RCRA) hazardous waste.

3.1.3 Groundwater Monitoring Well Installation and Sampling Three temporary observation wells (52-PZ-01, 52-PZ-02, 52-PZ-03) were installed to collect potentiometric surface elevation data. Groundwater elevation data indicated a



LEGEND	
	52S001 Surface soil sample location and designation from previous investigation, submitted to a laboratory
	OLD-52-03 Microwell location and designation
	52S062 Immunoassay soil sample location and designation where at least one sample was submitted for laboratory confirmation results
	52S072 Immunoassay soil sample location and designation

FIGURE 3-1
SITE PLAN SAMPLE LOCATIONS
(FEBRUARY 1997)

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northeast flow direction for the shallow portion of the surficial aquifer, confirming initial site screening investigation results.

"Microwell" technology was utilized to install five permanent groundwater monitoring wells (OLD-52-06 through OLD-52-10). All monitoring wells were constructed of ½-inch-diameter, PVC prepacked screen and riser. The monitoring wells were installed using a TerraProbeSM, a van-mounted drilling device. The monitoring wells were constructed with six feet of 0.010-inch slotted screen prepacked with 20/40 silica sand. The monitoring wells were installed to a depth that allowed the screen to straddle the water table. Microwell construction is illustrated on Figure 3-2.

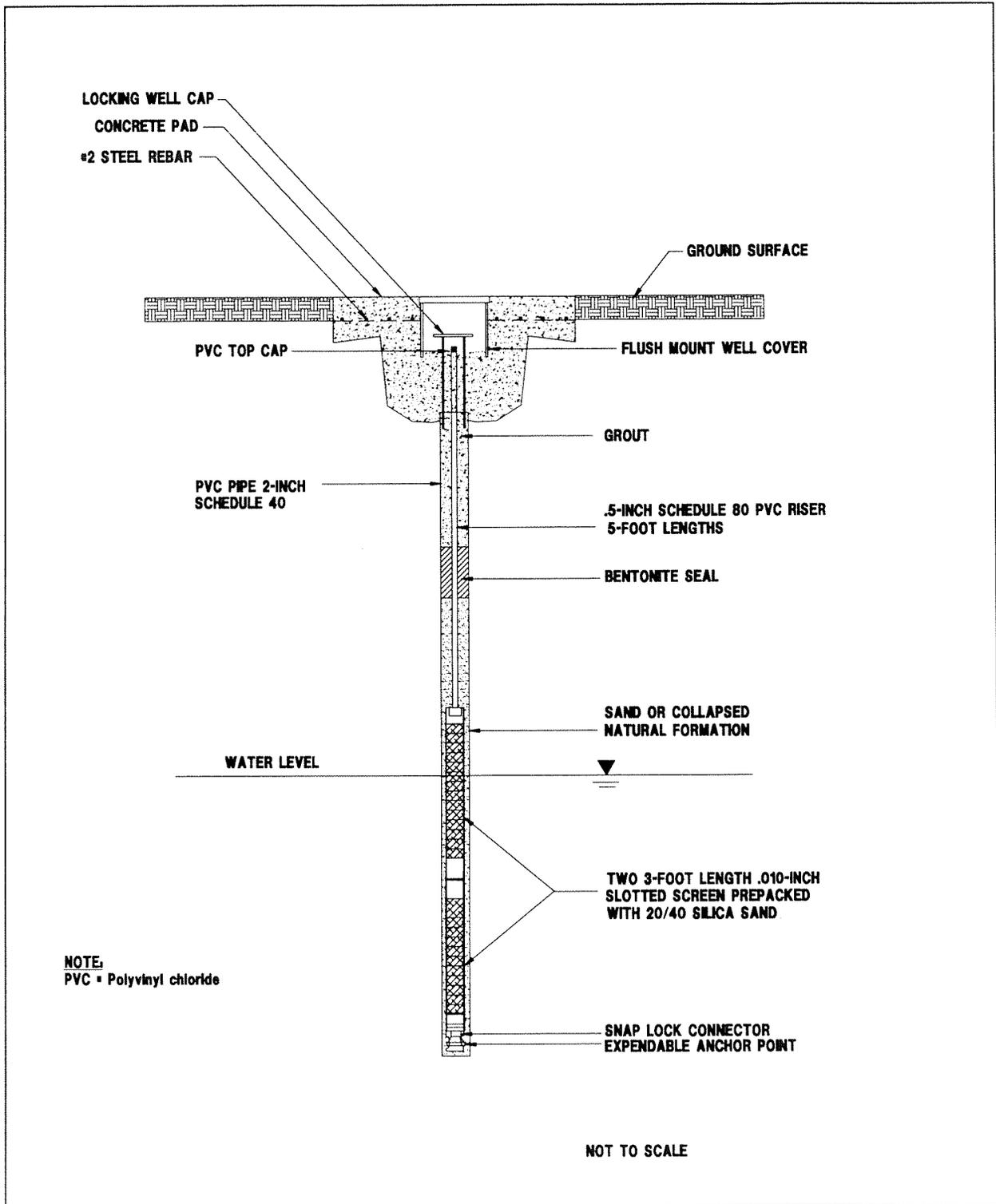
One microwell (OLD-52-10) was installed in the area believed to contain the highest concentrations of pesticides in surface soil determined from IA testing. The remaining four monitoring wells were positioned downgradient and upgradient of OLD-52-10 (Figure 3-1).

Each monitoring well was developed and sampled using a low-flow purging technique to establish a low sample turbidity. Four of the five wells had final sample turbidities of less than 10 NTUs. The most upgradient well, OLD-52-06, had a final sample turbidity of 65.5 NTUs. Only unfiltered groundwater samples were collected, and all groundwater samples were submitted to a Florida certified laboratory for analysis of pesticides by USEPA Method 8080.

3.2 RESULTS. The results of the additional site screening investigation activities at Study Area 52 are discussed below. A summary of the chlorinated pesticide IA testing results for the 75 soil samples is presented in Appendix D. A comparison between the onsite IA soil results and the off-site confirmation soil analytical results is presented in Appendix E. The soil and groundwater analytical results for the pesticides analyses are provided in Appendices B (Summary of Positive Detections) and C (Summary of Analytical Results).

3.2.1 Immunoassay Soil Screening The results of the IA testing were used to generate a contour map (Figure 3-3) representing the estimated chlorinated pesticide concentrations in surface soil. As shown, there are several areas where the total chlorinated pesticide concentration in the surface soil is greater than the highest (9,000 µg/kg) colorimetric standard. The location of former Building 7261 appears to be the nucleus of the highest pesticide concentrations. Pesticide contamination extends to the north, east, and southeast of the former building location. Isolated samples with high chlorinated pesticide concentrations were also found southwest of the former building. These samples are contained within the boundaries of the asphalt road and driveway. Both soil samples located beneath the asphalt tested negative for pesticides by IA, including 52S00601, located near the center of the high pesticide detections.

The three subsurface locations chosen for vertical delineation were 52S026, 52S037, and 52S069 (Figure 3-1). Subsurface location 52S026 had 9,000 µg/kg total chlorinated pesticides at the interval 3 to 4 feet bls, just above the water table. Even though sample 52S03702 had a total chlorinated pesticide concentration of greater than 9,000 µg/kg from 1 to 2 feet bls, sample 52S03703, from 2 to 3 feet bls, did not detect any pesticides with IA testing. At sample location 52S069, moderate surface soil concentrations of total pesticides were



**FIGURE 3-2
 MICROWELL CONSTRUCTION DIAGRAM**



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detected (1,050 $\mu\text{g}/\text{kg}$), but subsurface samples were still analyzed from 2 to 3 feet bls to determine if pesticides were present at depth. No pesticides were detected in that sample (52S06902).

3.2.2 Evaluation of Confirmation Samples The 10 samples and duplicate submitted for confirmatory laboratory analysis were selected from samples with a wide range of field-screened total chlorinated pesticide concentrations to provide information on the overall quality of the field screening program.

Both the IA screening and off-site confirmatory results were evaluated using a "presence/absence" test, since the primary objective of the field screening program was to determine whether or not pesticides were present at concentrations above regulatory criteria. The screening value used for this evaluation was 70 $\mu\text{g}/\text{kg}$. This concentration was consistent with the detection limits of the IA kits and was also well below the industrial SCTL for dieldrin (300 $\mu\text{g}/\text{kg}$). This screening value was highly conservative, as it represents a total concentration of chlorinated pesticide compounds. It was unlikely that the pesticides present were only those with such low SCTLs, particularly since dieldrin concentrations as a percentage of total pesticides for all confirmation samples averaged only 19 percent (range 0 to 40 percent). As shown in Appendix E, the comparability of chlorinated pesticide IA testing and USEPA Method 8080 analytical results (total chlorinated pesticide compounds), when compared to the screening value of 70 $\mu\text{g}/\text{kg}$, was consistent for 9 out of 10 samples (90 percent). One false negative appeared in sample 52S03703. This false negative was borderline, considering the conservative screening value of 70 $\mu\text{g}/\text{kg}$ is very close to the actual chlorinated pesticide compounds total of 71 $\mu\text{g}/\text{kg}$. However, dieldrin (21 $\mu\text{g}/\text{kg}$) did exceed the leachability-based SCTL (8 $\mu\text{g}/\text{kg}$). No false positives occurred.

As dieldrin, heptachlor, gamma-chlordane, and 4,4'-DDE were detected in groundwater above the GCTLs, samples were compared to the leachability-based SCTLs for these pesticides. The leachability-based SCTL for gamma-chlordane (4,100 $\mu\text{g}/\text{kg}$) was higher than the residential SCTL (300 $\mu\text{g}/\text{kg}$); therefore, the residential SCTL for gamma-chlordane took precedence over the leachability-based SCTL.

As shown in Appendix B, 9 of the 11 soil samples (seven locations) submitted to the laboratory had exceedances of Florida residential SCTLs for one or more chlorinated pesticide compounds. The soil sample with the highest concentrations of pesticides was 52S05301, which exceeded the Florida industrial SCTLs for the compounds dieldrin, alpha-chlordane, 4,4'-DDT, and heptachlor epoxide by an order of magnitude or more.

Sample 52S04401 was submitted to a Florida certified laboratory for TCLP pesticide analysis. The sample was located in a portion of the site with the highest concentrations of pesticides, approximately 11 feet upgradient from monitoring well OLD-52-10. The TCLP pesticide analytical results indicated that the sample was not RCRA hazardous waste based on the toxicity characteristic. The nondetections of TCLP pesticide compounds in the TCLP extract for this sample appear to be consistent with the low solubility, high soil-water partition coefficients, and relative immobility of these compounds.

3.2.3 Groundwater As shown in Appendix B, pesticide detections were only found in one groundwater sample in the additional sampling investigation (52G01001).

Dieldrin, heptachlor, gamma-chlordane, 4,4'-DDE, and endrin ketone were all detected. The concentration of dieldrin, heptachlor, gamma-chlordane, and 4,4-DDE exceeded GCTLs, including the MCLs for heptachlor and chlordane. This groundwater sample (52G01001) had a field turbidity value of less than 3 NTUs, leading to the conclusion that suspended particulates in the sample were not a contributing factor to the observed pesticide concentrations.

As discussed previously in this chapter, groundwater flow was confirmed to flow in a northeast direction. Groundwater sample 52G00901 was collected just over 30 feet downgradient of 52G01001, and no pesticides were detected. It appears groundwater contamination is isolated to a relatively small area. This is likely due to the high retardation factor expected for these compounds.

4.0 INTERIM REMEDIAL ACTION

As described in Chapters 2.0 and 3.0, above, chlorinated pesticides were detected in soil and groundwater at concentrations exceeding screening criteria in the vicinity of the former location of Building 7261. The focus of the IRA was to excavate and properly dispose of the pesticide-contaminated soil that exceeded Florida's residential and leachability-based SCTLs.

4.1 FIELD PROGRAM. The Environmental Detachment Charleston was contracted by Southern Division, Naval Facilities Engineering Command to perform the IRA in September 1997 at Study Area 52. A comprehensive report of the activities performed by the Environmental Detachment Charleston is found in their completion report (U.S. Navy, 1997). The role of HLA during the IRA was for limited oversight and field surveying of the excavation and sample locations. A brief description of the IRA conducted at Study Area 52 is described below.

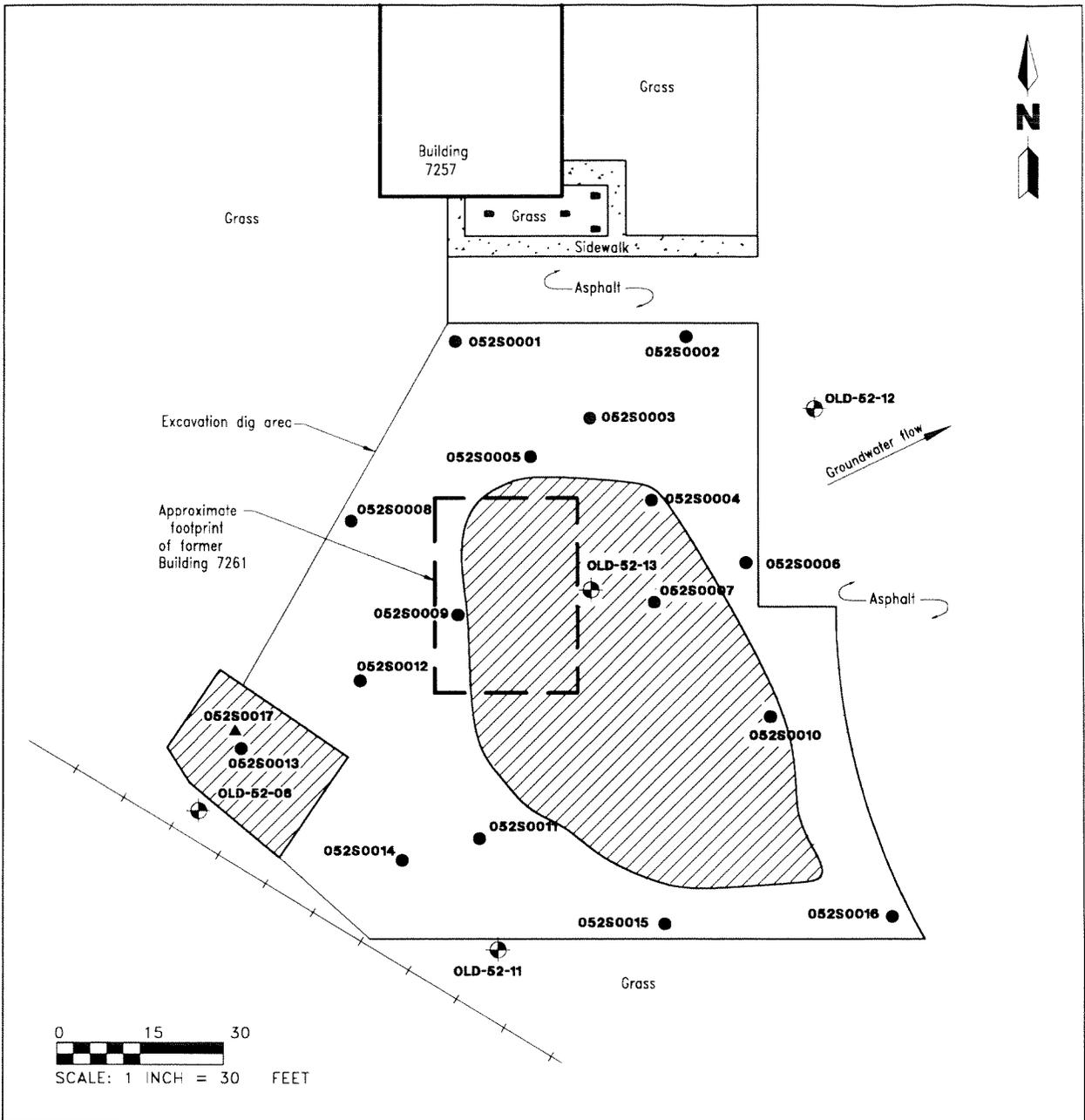
4.1.1 Soil Removal The Environmental Detachment Charleston was responsible for removing contaminated soil, determining the limits of the excavation, disposing of the soil in an approved manner, and backfilling the excavation with certified clean fill. The decision not to remove any soil below the water table was made by the OPT.

4.1.1.1 Soil Excavation The excavation area was approximately a 120-foot by 80-foot area bordered by an asphalt driveway to the north, an asphalt roadway to the east, an abandoned railway to the southwest, and grass to the west and south. The boundaries of the excavation area are shown on Figure 4-1. The excavation was approximately 2 feet deep around the perimeter and sloped down to approximately 4 feet in the center and in the southwest corner. More than 1,300 tons of soil were removed from the site. The soil was hauled by rail to the Michigan Disposal Waste Treatment Plant to be disposed of in an approved manner.

During the excavation, four out of five previously installed monitoring wells were abandoned because they were located within the area of excavation. The monitoring wells had been installed as microwells and consisted of ½-inch-diameter, PVC prepacked screen and riser. Monitoring well OLD-52-06 borders the southwest corner of the excavation and was not abandoned.

4.1.1.2 Immunoassay Soil Screening The soil excavation contractor used the same IA test kits as HLA had used during the previous IA screening at Study Area 52. The IA test kits were used to screen the soil for further pesticide delineation. The IA test kits were capable of detecting chlordane and all structurally similar compounds (i.e., chlorinated pesticides in the USEPA Method 8080 list, except for 4,4'-DDT, 4,4'-DDD and 4,4'-DDE). The IA test kits were semi-quantitative, in that they only provided a total concentration of the target compounds and did not quantify concentrations of individual compounds.

After removal of the upper 2 feet of soil, IA kits were used to test soil samples collected along the floor of the excavation to determine where additional soil needed to be removed. This process was repeated until either (1) sample concentrations were below the 600 µg/kg calibration standard used with the IA kits or (2) the excavation had reached the water table. Contaminated soil below the water table was not removed.



LEGEND	
▲ 052S001	A composite soil sample collected from the walls of the approximately 4-foot deep excavation
● OLD-52-11	Monitoring well location and designation
● 052S0001	Confirmatory soil sample and designation
+++++	Railroad line
	Area of excavation - approximately 4 feet deep
	Area of excavation - approximately 2 feet deep

FIGURE 4-1
SITE PLAN SAMPLE LOCATIONS
(NOVEMBER 1997)



BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE
SCREENING REPORT
STUDY AREA 52
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

K:\02530\02530-09\TEM\02530519.DWG, NAB 12/08/97 13:10:09, AutoCAD R12

4.1.1.3 Confirmatory Soil Screening Evidence of groundwater contamination was found in previous investigations. The leachability-based cleanup goals apply to the compounds dieldrin, heptachlor, and 4,4'-DDE because concentrations of these compounds were detected above Florida MCLs or GCTLs in previous groundwater sampling events.

Seventeen confirmatory samples were collected throughout the excavation (Figure 4-1). All confirmatory samples were submitted by the subcontractor to a Florida certified laboratory for analysis of pesticides using USEPA Method 8080. The confirmatory samples were used to verify target cleanup levels.

The first round of confirmatory sampling indicated an area of concern. Sample 052S0013 contained dieldrin at a concentration of 526 $\mu\text{g}/\text{kg}$, exceeding the leachability-based SCTL for dieldrin of 8 $\mu\text{g}/\text{kg}$ at 2 feet bls. A 20-foot by 30-foot area approximately 4 feet deep was excavated around sample 052S0013 in the southwest corner of the site. A sample was then collected as a composite from the walls surrounding the excavation.

4.1.1.4 Soil Disposal Excavated soil was hauled by truck and unloaded into rail cars. The soil was then hauled by rail to the Michigan Disposal Waste Treatment Plant to be disposed of in an approved manner.

4.1.1.5 Soil Filling and Grading When confirmatory sample analysis determined that the limits of the excavation above the water table did not exceed Florida SCTLs, the area was backfilled, compacted, graded, reseeded, and mulched with hay. The backfill material was Florida certified clean soil.

4.1.2 Groundwater Monitoring Well Installation and Sampling Three permanent shallow monitoring wells (OLD-52-11, OLD-52-12, and OLD-52-13) were installed after the IRA was completed. All three monitoring wells were screened to bracket the water table (Figure 4-1). OLD-52-13 was located in the vicinity of the former location of OLD-52-10 to ensure one well was located in the area where pesticides had previously been detected in groundwater prior to the IRA. Well OLD-52-12 was located downgradient (northeast) from OLD-52-13, and OLD-52-11 was located upgradient (southwest) from OLD-52-13.

Following monitoring well installation and development, the newly installed wells were purged to achieve maximum development of the filter pack and sampled using the low-flow technique. Samples were collected initially in October 1997 and approximately quarterly thereafter (February 1998, April 1998, and September 1998). All groundwater samples were submitted to a Florida certified laboratory for analysis of pesticides by USEPA Method 8080.

4.2 RESULTS. The results of the soil confirmatory sampling and the groundwater sampling are discussed below. The soil and groundwater analytical results are provided in Appendices B (Summary of Positive Detections) and C (Summary of Analytical Results).

4.2.1 Soil Contamination exceeding leachability-based SCTLs was found in 13 out of 17 samples collected for analysis. As stated previously, sample 052S0013 contained dieldrin above leachability-based SCTLs at 526 $\mu\text{g}/\text{kg}$ at 2 feet bls. After further excavating took place, a composite sample, 052S0017, collected from the walls surrounding the excavation, indicated that soil cleanup levels had been

met. Three remaining samples of concern contained levels of contamination exceeding SCTLs: 052S0005 (4,4'-DDD at 12,300 $\mu\text{g}/\text{kg}$, 4,4'-DDT at 93,000 $\mu\text{g}/\text{kg}$, and dieldrin at 13,900 $\mu\text{g}/\text{kg}$), 052S0007 (4,4'-DDT at 15,400 $\mu\text{g}/\text{kg}$), and 052S0010 (dieldrin at 56.1 $\mu\text{g}/\text{kg}$). However, those samples were taken at a depth approximately equal to the water table; therefore, excavating could not continue within the proposed statement of work. A split sample, 052I0001, exceeded leachability-based SCTLs for dieldrin with a concentration of 26.4 $\mu\text{g}/\text{kg}$, although the counterpart sample 052S0001 did not. In addition, the dieldrin leachability-based SCTL was slightly exceeded in samples 052S0003 (22.1 $\mu\text{g}/\text{kg}$), 052S0004 (10.6 $\mu\text{g}/\text{kg}$), 052S0011 (18.4 $\mu\text{g}/\text{kg}$), 052S0014 (20.9 $\mu\text{g}/\text{kg}$), and 052S0017 (8.09 $\mu\text{g}/\text{kg}$).

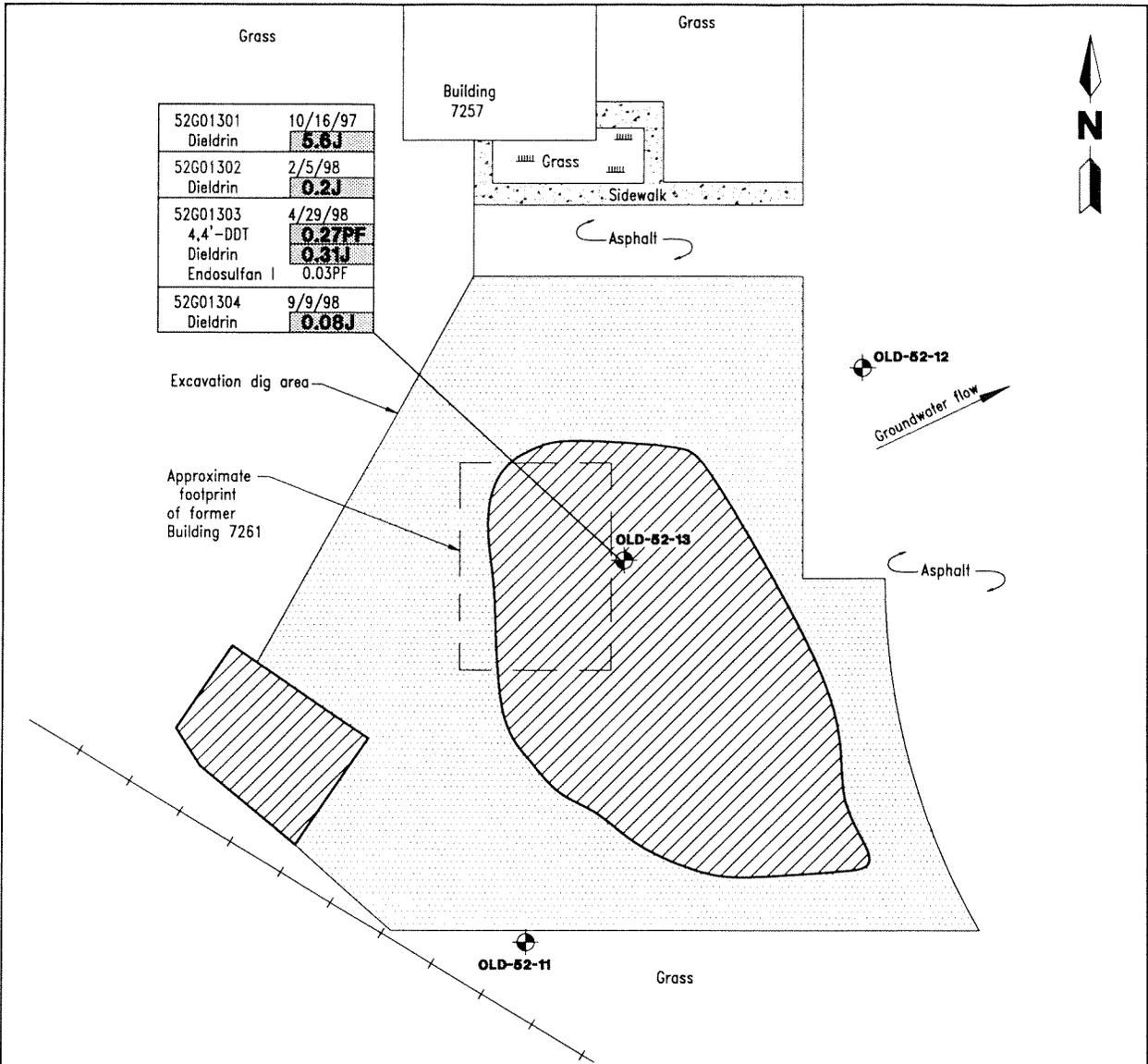
4.2.2 Groundwater A summary of the analytical results from each episode of groundwater monitoring is described below. A summary of the positive detections in groundwater is presented in Figure 4-2 and in Table B-3, Appendix B. The complete analytical results are provided in Appendix C.

October 1997. Dieldrin was detected in well OLD-52-13 (sample 52G01301) at a concentration of 5.6 $\mu\text{g}/\text{l}$, exceeding the GCTL of 0.005 $\mu\text{g}/\text{l}$. The sample was collected in the area that contained the greatest pesticide contamination prior to the IRA. Pesticide contamination was not detected in either the downgradient well (OLD-52-12) or the upgradient well (OLD-52-11).

February 1998. The concentration of dieldrin in well OLD-52-13 (sample 52G01302) decreased to 0.20 $\mu\text{g}/\text{l}$. No compounds were detected in the samples collected from wells OLD-52-11 or OLD-52-12.

April 1998. During the April sampling event, the concentration of dieldrin in well OLD-52-13 (sample 52G01303) increased slightly to 0.31 $\mu\text{g}/\text{l}$. One other compound, 4,4'-DDT, was detected at a concentration of 0.27 $\mu\text{g}/\text{l}$, versus a GCTL of 0.1 $\mu\text{g}/\text{l}$. No compounds were detected in the samples collected from wells OLD-52-11 or OLD-52-12.

September 1998. The only compound detected during the September event was dieldrin in well OLD-52-13 (sample 52G01304) at a concentration of 0.08 $\mu\text{g}/\text{l}$. No compounds were detected in the samples collected from wells OLD-52-11 or OLD-52-12.



LEGEND

- OLD-52-11 Monitoring well location and designation
- GCTL Groundwater cleanup target level
- PF Percent difference between original and confirmation analyses is greater than 50 percent
- DDT Dichlorodiphenyltrichloroethane
- Area of excavation - approximately 4 feet deep
- Area of excavation - approximately 2 feet deep
- J Estimated concentration
- Railroad line

NOTES:
 All concentrations are in micrograms per kilogram.
 Exceedances of GCTLs in chembox are bolded and shaded.

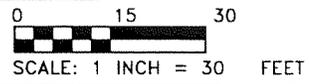


FIGURE 4-2
SUMMARY OF POSITIVE DETECTIONS
IN GROUNDWATER
FIRST YEAR OF GROUNDWATER MONITORING

BASE REALIGNMENT AND CLOSURE
ENVIRONMENTAL SITE
SCREENING REPORT
STUDY AREA 52
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS.

5.1.1 Soil In evaluating risk-based exposure from soil to future area residents, only the top 2 feet (surface soil) is used in the calculation. By removing at least the top 2 feet of pesticide-contaminated soil, the risk of dermal exposure from soil has been eliminated for future residents of the area. This has been accomplished at Study Area 52.

5.1.2 Groundwater The results of four quarterly sampling episodes indicate that the only contaminated groundwater at the site is isolated to the area where the highest soil contamination was found. The only compounds detected during the quarterly monitoring in wells OLD-53-11, OLD-52-12, and OLD-52-13 were in samples collected from monitoring well OLD-52-13. Dieldrin was detected at a concentration higher than its GCTL during all four sampling events. The only other compound detected was 4,4'-DDT during the May 1998 sampling event, at a concentration slightly higher than the State GCTL. The contaminant concentrations have shown a downward trend since groundwater monitoring began, suggesting that the goals of the IRA soil removal have been achieved.

5.2 RECOMMENDATIONS. HLA recommends that no further soil investigations be conducted at Study Area 52 since all appropriate remedial actions for the soil have been implemented.

Since the IRA required the removal of the upper 2 feet of pesticide-contaminated soil (up to 4 feet were removed in some areas), the risk of dermal exposure from soil was eliminated for future residents of the area. HLA has also concluded that pesticide-contaminated soils no longer threaten the shallow aquifer, but recommends that the groundwater monitoring program continue until contaminant concentrations decrease below guidance criteria for two successive quarters.

HLA concludes from the site screening investigations and IRA that Study Area 52 is not yet suitable for transfer, and recommends that a groundwater restriction in the surficial aquifer be imposed in an area within a radius of 50 feet from well OLD-52-13. HLA recommends that Study Area 52 remain classified 5/Yellow until the groundwater monitoring program demonstrates that contaminants are no longer present at concentrations exceeding GCTLs. This site is currently scheduled for reuse by the Greater Orlando Aviation Authority in an industrial scenario.

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

STUDY AREA 52

U.S. Environmental Protection Agency, Region IV

Date

Florida Department of Environmental Protection

Date

U.S. Department of the Navy

Date

REFERENCES

- ABB Environmental Services, Inc. 1995. *Site Screening Plan, Former Air Force Sites, Addendum 2, Naval Training Center, Orlando, Florida*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFAC-ENGCOM), North Charleston, South Carolina (December).
- U.S. Navy. 1997. *Completion Report: Interim Remedial Action for SA8, SA9, SA52, Naval Training Center, Orlando, Florida*. Prepared by Supervisor of Shipbuilding, Conversion and Repair, for SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).

APPENDIX A
GEOPHYSICAL SURVEY

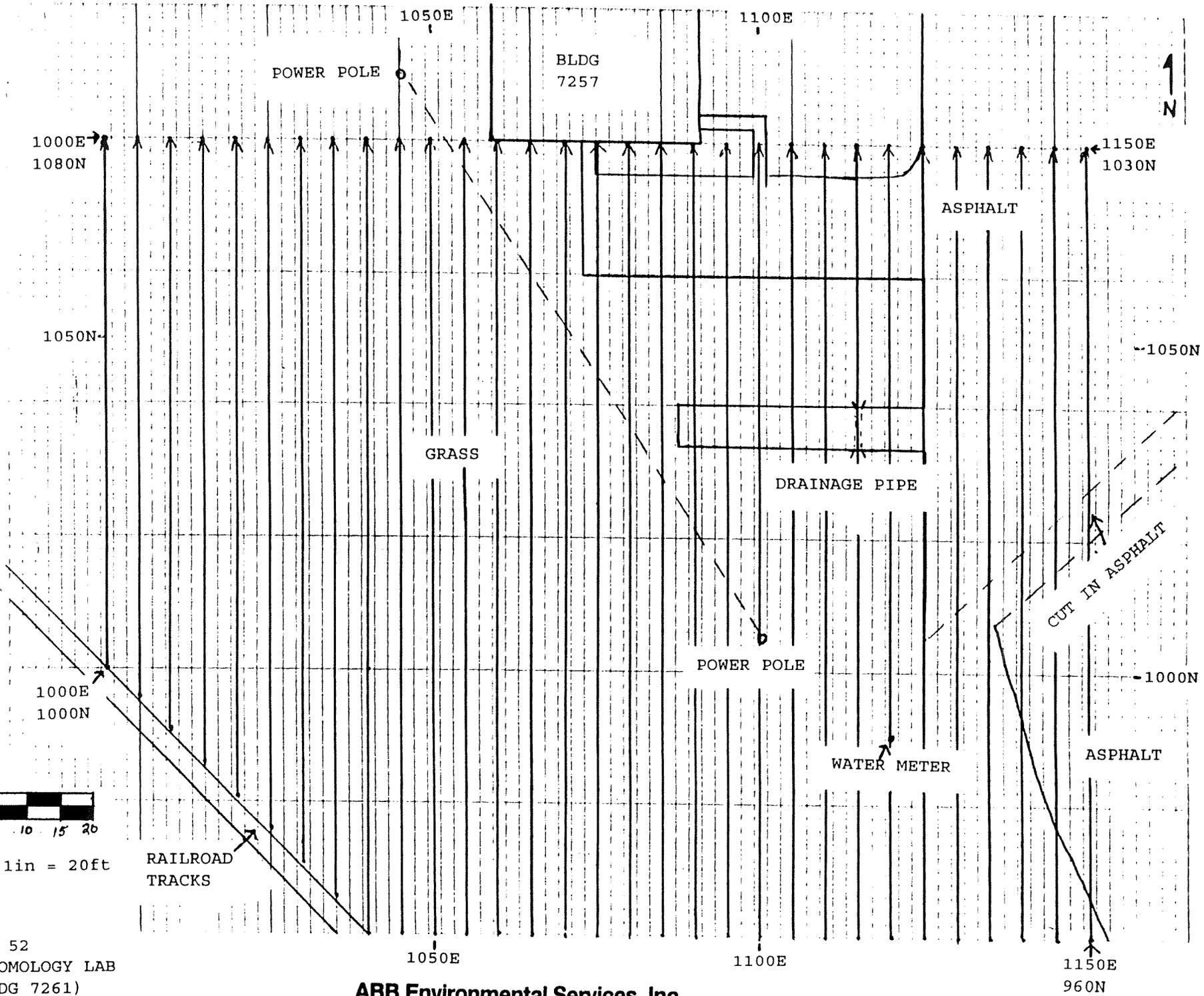


FIGURE 2
 STUDY AREA 52
 FORMER ENTOMOLOGY LAB
 (FORMER BLDG 7261)
 MCCOY ANNEX, NTC, ORLANDO

ABB Environmental Services, Inc.

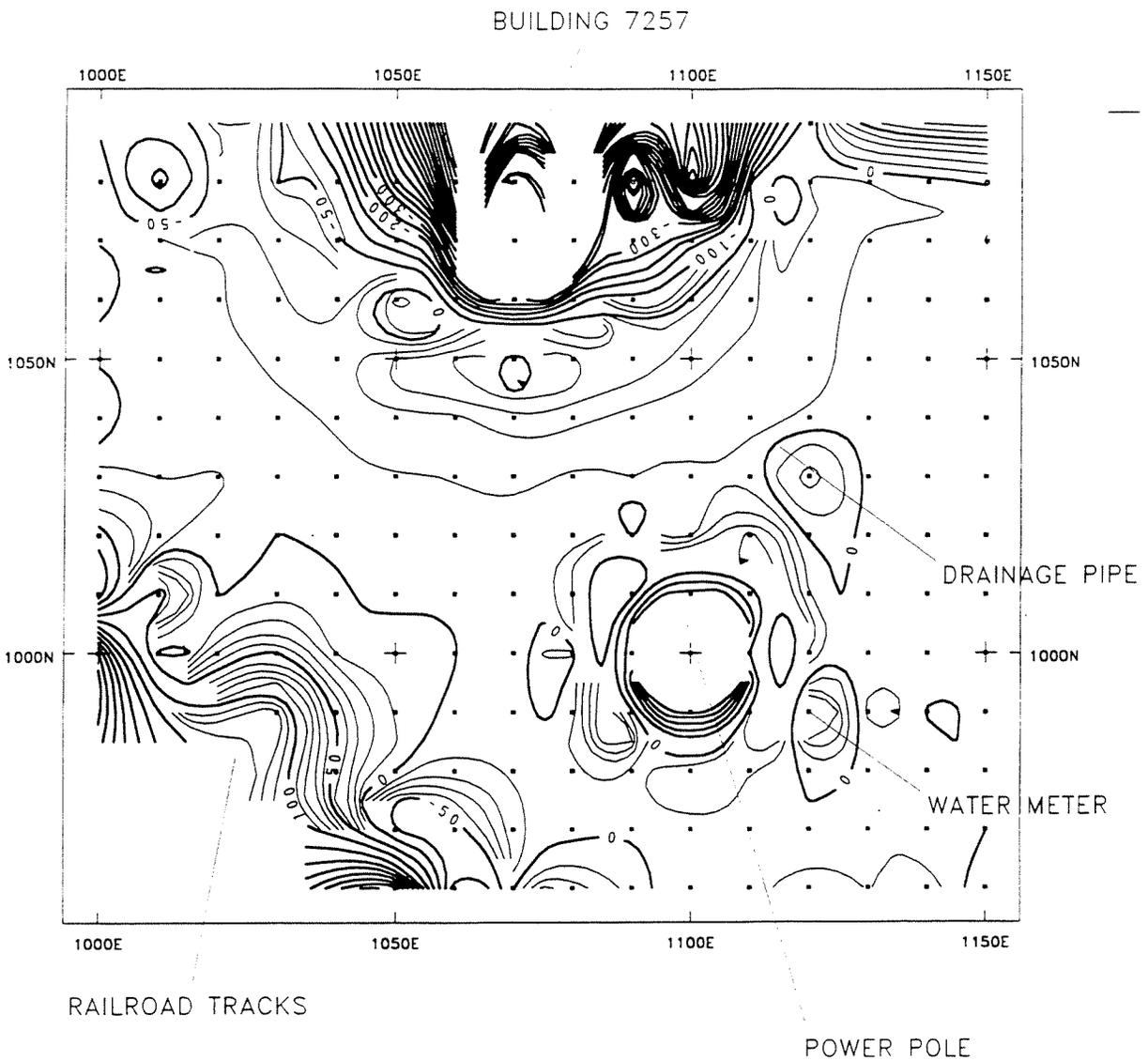
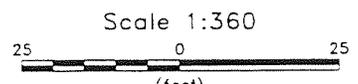


FIGURE 3



SOUTHERN DIVISION
VERTICAL GRADIENT CONTOURS
STUDY AREA 52
LRB ENVIRONMENTAL SERVICES, INC.

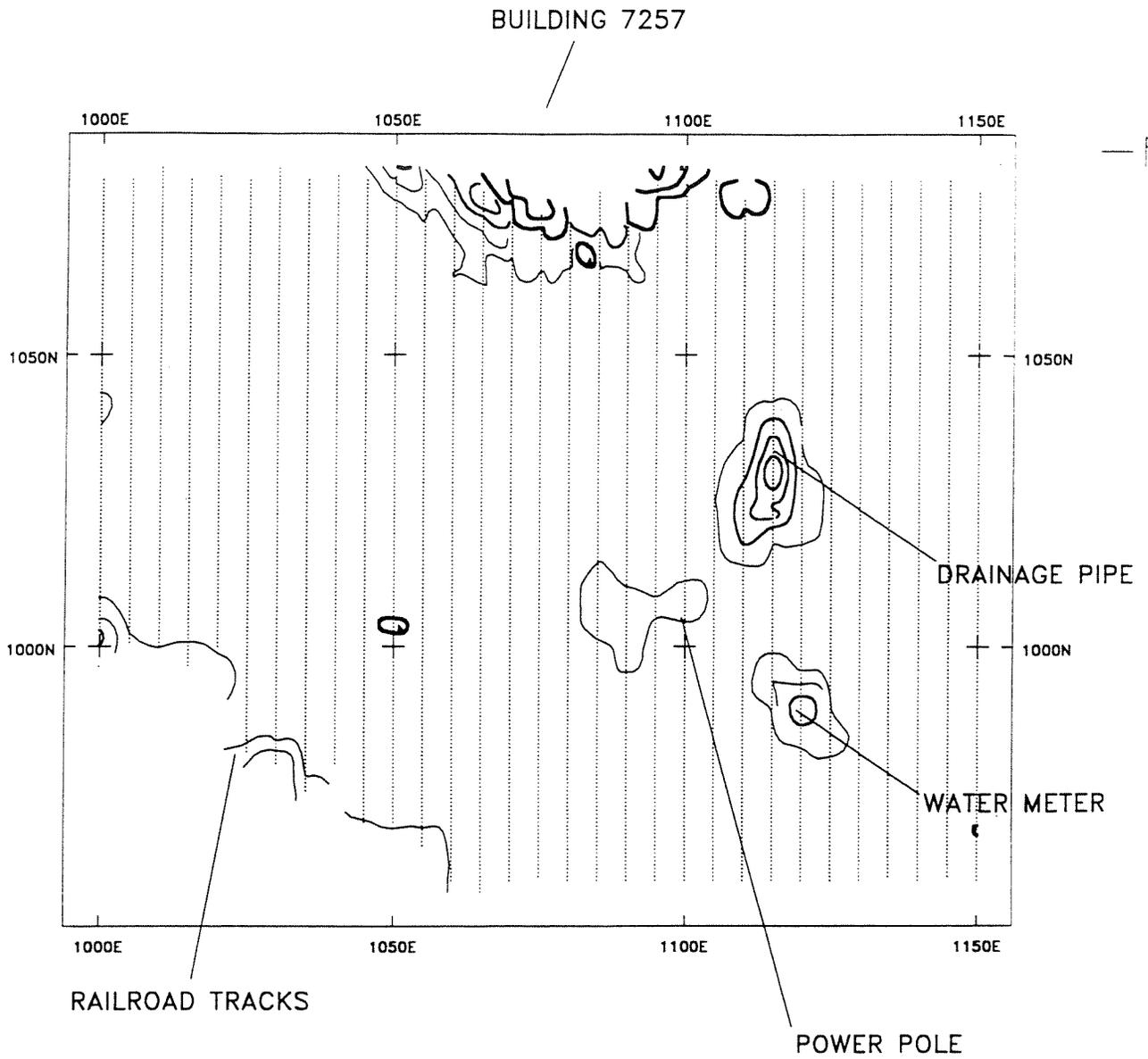
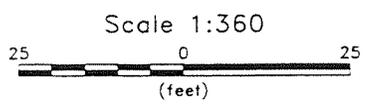


FIGURE 4



SOUTHERN DIVISION
TIME DOMAIN METAL DETECTOR CONTOURS STUDY AREA 52
ABB ENVIRONMENTAL SERVICES, INC.

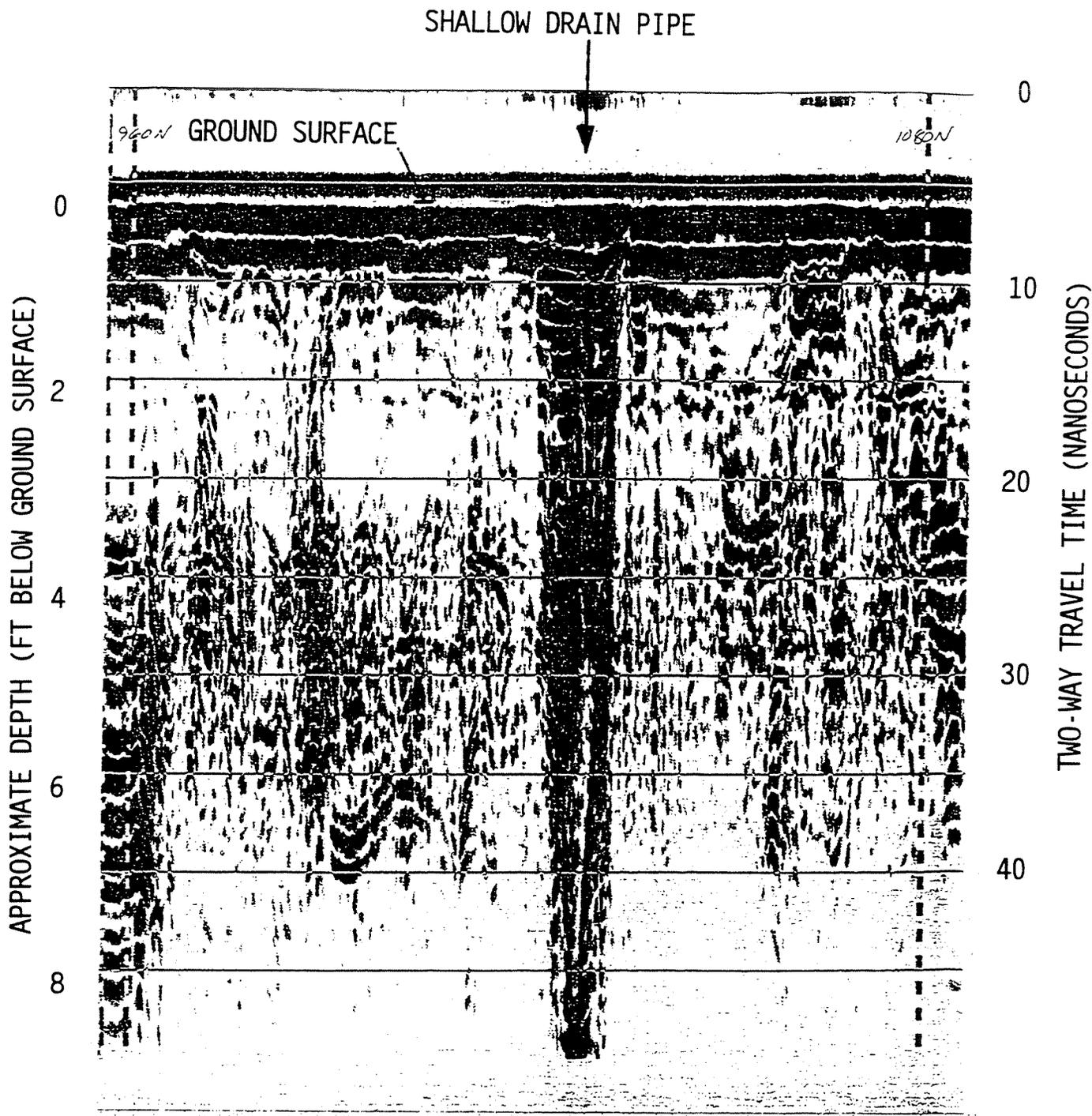


FIGURE 5

SOUTHERN DIVISION
GROUND PENETRATING RADAR TRAVERSE STUDY AREA 52
LINE 1115 EAST 960 NORTH TO 1080 NORTH
ABB ENVIRONMENTAL SERVICES, INC.

WATER MAIN (3.5 TO 4 FT BELOW GROUND SURFACE)

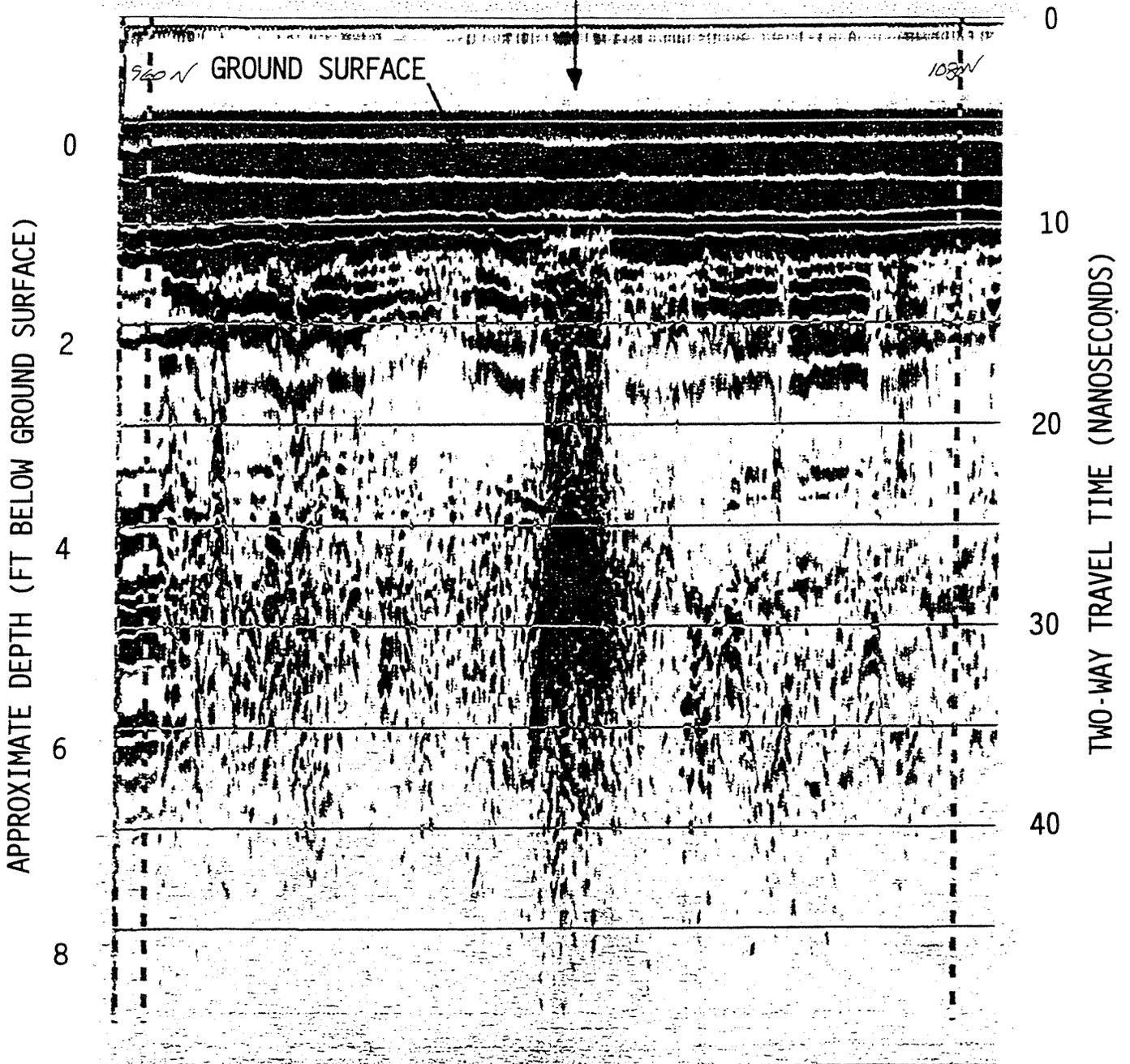


FIGURE 6

SOUTHERN DIVISION
GROUND PENETRATING RADAR TRAVERSE STUDY AREA 52
LINE 1150 EAST 960 NORTH TO 1080 NORTH
ABB ENVIRONMENTAL SERVICES, INC.

APPENDIX B

SUMMARY OF POSITIVE DETECTIONS IN SOIL AND GROUNDWATER

Appendix B
Table B-1. Summary of Positive Detections in Surface Soil Analytical Results
Initial Site Screening Investigation
Study Area 52

Naval Training Center, Orlando
Orlando, FL

Identifier Sampling Date Feet bls	Background	SCTL	RBC for Residential Soil		RBC for Industrial Soil		52S00101	52S00101D	52S00201	52S00301	52S00301D	52S00401
							19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
							0-1	0-1	0-1	0-1	0-1	0-1
Semivolatile Organics, µg/kg												
Benzo(a)anthracene		1,400	880 c	7,800 c					91 J			
Benzo(a)pyrene		100	88 c	780 c					99 J			
Benzo(b)fluoranthene		1,400	880 c	7,800 c			40 J		130 J			
Benzo(g,h,i)perylene		2,300,000	2,300,000 n	61,000,000 n					250 J			
Benzo(k)fluoranthene		15,000	8,800 c	78,000 c			39 J		92 J			
bis(2-Ethylhexyl)phthalate		75,000	46,000 c	410,000 c		160 J	150 J		73 J	43 J		
Butylbenzylphthalate		220,000	16,000,000 n	410,000,000 n		88 J	72 J					
Chrysene		140,000	88,000 c	780,000 c			42 J		120 J			
Diethylphthalate		640,000	63,000,000 n	1,000,000,000 c		56 J						
Fluoranthene		2,800,000	3,100,000 n	82,000,000 n		51 J	63 J		400			
Indeno(1,2,3-cd)pyrene		1,500	880 c	7,800 c					170 J			
Phenanthrene		1,900,000	2,300,000 n	61,000,000 n					74 J			
Pyrene		2,200,000	2,300,000 n	61,000,000 n			52 J					
Pesticides/PCBs, µg/kg												
4,4'-DDD		4,500	2,700 c	24,000 c							9.1 NJ	
4,4'-DDE		3,200	1,900 c	17,000 c		16	25		51 D	45 D	2.4 J	
4,4'-DDT		3,200	1,900 c	17,000 c		26 J	38 J	11,000 CJ	73 D	62 D		
alpha-Chlordane		3000	490 c	4,400 c		3.5 J	6.5 J	110,000 CD	140 DJ	14 J	6.4	
Aroclor-1260		600	83 c	740 c		84	96					
Dieldrin		70	40 c	360 c		9.9	15	53,000 C	150 DJ	84 DJ	3.5 J	
gamma-Chlordane		3000	490 c	4,400 c		3.1 J	6.6 J	110,000 CD	150 DJ	9.1 J	6.4 J	
Heptachlor		10	140 c	1,300 c				17,000 C	20			

Appendix B
 Table B-1. Summary of Positive Detections in Surface Soil Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	Background	SCTL	RBC for Residential Soil	RBC for Industrial Soil	52S00101	52S00101D	52S00201	52S00301	52S00301D	52S00401
Sampling Date					19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
Feet bls					0-1	0-1	0-1	0-1	0-1	0-1
Inorganics, mg/kg										
Aluminum	4,870	72,000	78,000 n	1,000,000 n	1,460 J	1,420 J	2,780	1,730	1,690	2,180
Arsenic	1.9	0.8	0.43 / 23 c/n	3.8 / 610 c/n	0.87 B	0.58 B	1.9 B	0.46 B	0.4 B	0.52 B
Barium	21.6	105	5,500 n	140,000 n	6.4 J	6.1 J	11.7 J	5.7 J	6.4 J	4.7 J
Beryllium	0.46	120	0.15 c	1.3 c			0.1 B	0.04 B	0.04 B	0.06 B
Cadmium	ND	75	39 n	1,000 n		0.51 B				
Calcium	33,568	ND	1,000,000	1,000,000	1,260	1,160	7,400 J	6,020 J	38,400 J	12,700 J
Chromium	7.7	290	390 n	10,000 n	3.2	3	7.3	2.8	3.9	3.3
Cobalt	ND	4,700	4,700 n	120,000 n	0.39 J	0.34 J	0.5 B			0.47 B
Copper	2.6	105	3,100 n	82,000 n	8.3	11.8	17.8	7.3	8.3	1.6 B
Iron	843	23,000	23,000 n	610,000 n	965 J	739 J	1,150	344	361	455
Lead	21.3	500	400	400	23.5	21.5	200	8.4	8.3	6
Magnesium	381	ND	460,468	460,468	80.8 B	74.3 B	120 B	75.2 B	229 B	106 B
Manganese	10.8	1,600	1,800 n	47,000 n	7.8	6.5	14.0 J	5.1 J	8.1 J	3.3 J
Mercury	0.05	3.7	23 n	610 n			0.2	0.1 B	0.08 B	0.05 B
Selenium	1.1	390	390 n	10,000 n					0.31 J	
Silver	ND	390	390 n	10,000 n			0.6 J	0.53 J	0.75 J	
Vanadium	4.9	15	550 n	14,000 n	1.8 B	1.4 B	2.8 J	1.6 J	2.7 J	2 J
Zinc	4.6	23,000	23,000 n	610,000 n	31.1 J	30.3 J	777 J	8.6 J		
General Chemistry, mg/kg										
Total Petroleum Hydrocarbons	ND	ND	ND	ND	6.1	7.6	40.5	13.6	11.1	7.4

Appendix B
 Table B-2. Summary of Detections in Soil Analytical Results
 Supplemental Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	SCTL	RBC for Residential Soil	RBC for Industrial Soil	52S02604	52S03702	52S03703	52S04401	52S04401D	52S05301
Sampling Date				12/16/96	12/17/96	12/17/96	12/18/96	12/18/96	12/16/96
Depth, feet bls				3-4	1-2	2-3	0-1	0-1	0-1
Pesticides, µg/kg									
4,4'-DDD	4,500	2,700 c	24,000 c						
4,4'-DDE	3,200	1,900 c	17,000 c				350	270	
4,4'-DDT	3,200	1,900 c	17,000 c				940	710	130,000
Aldrin	60	38 c	340 c						
Chlordane (Total)	3,000	490 c	4,400 c	1,900	650	29	12,000	11,000	27,000
Dieldrin	70	40 c	360 c	1,400		21	13,000	12,000	5,600
Endosulfan I	410,000	470,000 n	12,000,000 n	1500	490		5,900	5,000	14,000
Endrin	21,000	23,000 n	610,000 n				430	370	
Endrin Ketone	ND	ND	ND	28			61	51	
Heptachlor	10	140 c	1,300 c		33				
Heptachlor Epoxide	100	70 c	630 c	81	34	21	440	400	1,100

Appendix B
 Table B-2. Summary of Detections in Soil Analytical Results
 Supplemental Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	SCTL	RBC for Residential Soil	RBC for Industrial Soil	52S05801	52S06201	52S06301	52S06401	52S06601	052S0001
Sampling Date				12/16/96	12/17/96	12/17/96	12/17/96	12/17/96	9/12/97
Depth, feet bls				0-1	0-1	0-1	0-1	0-1	2-2.5
Pesticides, µg/kg									
4,4'-DDD	4,500	2,700 c	24,000 c			24	23	54	
4,4'-DDE	3,200	1,900 c	17,000 c		57	90	158	870	
4,4'-DDT	3,200	1,900 c	17,000 c	21	40	254	900	470	
Aldrin	60	38 c	340 c						
Chlordane (Total)	3,000	490 c	4,400 c				670	660	5.2 J
Dieldrin	70	40 c	360 c		38	57	77	1,200	
Endosulfan I	410,000	470,000 n	12,000,000 n		24	88	296	157	
Endrin	21,000	23,000 n	610,000 n					11	
Endrin Ketone	ND	ND	ND						
Heptachlor	10	140 c	1,300 c						
Heptachlor Epoxide	100	70 c	630 c		14		20	33	

Appendix B
 Table B-2. Summary of Detections in Soil Analytical Results
 Supplemental Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	SCTL	RBC for Residential Soil	RBC for Industrial Soil	052I0001	052S0002	052S0003	052S0004	052S0005	052S0006
Sampling Date				9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97
Depth, feet bls				2-2.5	2-2.5	2-2.5	2-2.5	2-2.5	2-2.5
Pesticides, µg/kg									
4,4'-DDD	4,500	2,700 c	24,000 c				12.8	12,300 J	
4,4'-DDE	3,200	1,900 c	17,000 c				3.43		
4,4'-DDT	3,200	1,900 c	17,000 c		1.45		57.6 J	93,000	20.4
Aldrin	60	38 c	340 c		0.611				
Chlordane (Total)	3,000	490 c	4,400 c	56.1	9.47	69.2	88.1	99.9	
Dieldrin	70	40 c	360 c	26.4		22.1	10.6	13,900	
Endosulfan I	410,000	470,000 n	12,000,000 n						
Endrin	21,000	23,000 n	610,000 n	1.3 J			4.72		
Endrin Ketone	ND	ND	ND						
Heptachlor	10	140 c	1,300 c				0.851		
Heptachlor Epoxide	100	70 c	630 c			4.53	1.38		

Appendix B
 Table B-2. Summary of Detections in Soil Analytical Results
 Supplemental Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	SCTL	RBC for Residential Soil	RBC for Industrial Soil	052S0007	052S0008	052S0009	052S0010	052S0011	052S0012
Sampling Date				9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97
Depth, feet bls				3.5-4	2-2.5	2-2.5	3.5-4	2-2.5	2-2.5
Pesticides, µg/kg									
4,4'-DDD	4,500	2,700 c	24,000 c	1,500	4.65		20.3	7.33 J	
4,4'-DDE	3,200	1,900 c	17,000 c	215 J				54.3	
4,4'-DDT	3,200	1,900 c	17,000 c	15,400	3.44		10.3	88.2	14.3
Aldrin	60	38 c	340 c						
Chlordane (Total)	3,000	490 c	4,400 c	342	12.1 J		69.6	60.1	
Dieldrin	70	40 c	360 c		3.31	3.09	56.1	18.4	
Endosulfan I	410,000	470,000 n	12,000,000 n						
Endrin	21,000	23,000 n	610,000 n						
Endrin Ketone	ND	ND	ND						
Heptachlor	10	140 c	1,300 c						
Heptachlor Epoxide	100	70 c	630 c						

Appendix B
 Table B-2. Summary of Detections in Soil Analytical Results
 Supplemental Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Identifier	SCTL	RBC for Residential Soil	RBC for Industrial Soil	052S0013	052S0014	052S0015	052S0016	052S0016D	052S0017
Sampling Date				9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97
Depth, feet bls				2-2.5	2-2.5	2-2.5	2-2.5	2-2.5	2-2.5
Pesticides, µg/kg									
4,4'-DDD	4,500	2,700 c	24,000 c						8.03 J
4,4'-DDE	3,200	1,900 c	17,000 c		22.6				
4,4'-DDT	3,200	1,900 c	17,000 c		20.6				
Aldrin	60	38 c	340 c						5.36 J
Chlordane (Total)	3,000	490 c	4,400 c				6.29	15.7	
Dieldrin	70	40 c	360 c	526	20.9				8.09 J
Endosulfan I	410,000	470,000 n	12,000,000 n						
Endrin	21,000	23,000 n	610,000 n						
Endrin Ketone	ND	ND	ND						
Heptachlor	10	140 c	1,300 c						
Heptachlor Epoxide	100	70 c	630 c						

Appendix B
Tables B-1 and B-2. Notes for Summary of Positive Detections in
Surface Soil Analytical Results
Study Area 52

Naval Training Center, Orlando
Orlando, FL

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, potassium) 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.

µg/kg = micrograms per kilogram.

DDE = dichlorodiphenyldichloroethene.

mg/kg = milligrams per kilogram.

DDT = dichlorodiphenyltrichloroethane.

n = noncarcinogenic effects.

DDD = dichlorodiphenyldichloroethane.

c = carcinogenic effects.

ND = Not determined.

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

C = Indicates a pesticide identification has been confirmed utilizing GC/MS techniques.

D = Indicates the sample extract was diluted due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the sample are therefore increased by the dilution factor.

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 (µg/kg) soil dry weight.

Bold/shaded values indicate exceedance of regulatory guidance and background.

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

Appendix B
 Table B-3. Summary of Positive Detections in Groundwater Analytical Results
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Well ID						OLD-52-01		OLD-52-02		OLD-52-10
Identifier	Background	GCTL	FEDMCL	RBC for Tap Water		52G00101	52H00101	52G00201	52H00201	52G01001
Sampling Date						23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	26-Dec-97
Volatile organics, ug/L										
Chloromethane		2.7	ND	1.4 c		0.5 J	NA		NA	NA
Pesticides/PCBs, ug/L										
Dieldrin		0.005	ND	0.0042 c		0.11	NA	2.3 D	NA	7.2
Endosulfan I		42	ND	220 n						
Heptachlor		0.4	0.4	0.0023 c			NA		NA	0.6
gamma-Chlordane		2	2	0.052 c			NA		NA	0.9
4,4'-DDE		0.1	0.1	0.2 c			NA		NA	1.4
4,4'-DDT		0.1	0.1	0.2 c						
Endrin ketone		ND	ND	ND			NA		NA	0.9
Inorganics, ug/L										
Aluminum	4,067	200 s	ND	37,000 n			3,920 J	4,750 J	8,630 J	NA
Arsenic	5	50 p/c	50	0.045 /11 c/n					1.4 J	NA
Cadmium	5.6	5 p/c	5	18 n			2.7 J			NA
Calcium	36,830	ND	ND	1,000,000		20,900	21,200	19,200	18,800	NA
Chromium	7.8	100 p	100	180 n			6.7 B	7.1 B	13.7	NA
Copper	5.4	1,000 s/st	ND	1,500 n				3.1 B		NA
Iron	1,227	300 s	ND	11,000 n		79.4 J	251 J	202 J	304 J	NA
Magnesium	4,560	ND	ND	118,807		627 B	675 B	483 B	469 B	NA
Manganese	17	50 s/st	ND	180 n		5.8 B				NA
Mercury	0.12	2 p/st	2	11 n			0.12 J	0.09 J	0.25 J	NA
Selenium	9.7	50 p/st	50	180 n				2.9 B	5.7	NA
Sodium	18,222	160,000 p	ND	396,022		2,140 J	1,970 J	1,140 J	1,040 J	NA
Vanadium	20.6	49 mc/st	ND	260 n		4 B	6.1 B	4.5 B	8.2 B	NA
General Chemistry, mg/L										
Total Suspended Solids	ND	ND	ND	ND			NA	57	NA	NA

Appendix B
 Table B-3. Summary of Positive Detections in Groundwater Analytical Results
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Well ID						OLD-52-13	OLD-52-13	OLD-52-13	OLD-52-13
Identifier	Background	GCTL	FEDMCL	RBC for Tap Water		52G01301	52G01302	52G01303	52G01304
Sampling Date						16-Oct-97	5-Feb-98	29-Apr-98	9-Sep-98
Volatile organics, ug/L									
Chloromethane		2.7	ND	1.4 c		NA	NA	NA	NA
Pesticides/PCBs, ug/L									
Dieldrin		0.005	ND	0.0042 c		5.6 J	0.2 J	0.31 J	0.08 J
Endosulfan I		42	ND	220 n				0.03 PF	
Heptachlor		0.4	0.4	0.0023 c					
gamma-Chlordane		2	2	0.052 c					
4,4'-DDE		0.1	0.1	0.2 c					
4,4'-DDT		0.1	0.1	0.2 c				0.27 PF	
Endrin ketone		ND	ND	ND					
Inorganics, ug/L									
Aluminum	4,067	200 s	ND	37,000 n		NA	NA	NA	NA
Arsenic	5	50 p/c	50	0.045 /11 c/n		NA	NA	NA	NA
Cadmium	5.6	5 p/c	5	18 n		NA	NA	NA	NA
Calcium	36,830	ND	ND	1,000,000		NA	NA	NA	NA
Chromium	7.8	100 p	100	180 n		NA	NA	NA	NA
Copper	5.4	1,000 s/st	ND	1,500 n		NA	NA	NA	NA
Iron	1,227	300 s	ND	11,000 n		NA	NA	NA	NA
Magnesium	4,560	ND	ND	118,807		NA	NA	NA	NA
Manganese	17	50 s/st	ND	180 n		NA	NA	NA	NA
Mercury	0.12	2 p/st	2	11 n		NA	NA	NA	NA
Selenium	9.7	50 p/st	50	180 n		NA	NA	NA	NA
Sodium	18,222	160,000 p	ND	396,022		NA	NA	NA	NA
Vanadium	20.6	49 mc/st	ND	260 n		NA	NA	NA	NA
General Chemistry, mg/L									
Total Suspended Solids	ND	ND	ND	ND		NA	NA	NA	NA

Appendix B
Table B-3. Notes for Summary of Positive Detections in
Groundwater Analytical Results
Study Area 52

Naval Training Center, Orlando
Orlando, FL

NOTES:

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

GCTL = 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.

OLD-17-T24 is a temporary well installed during initial site screening. Sample collected from this well on 6/2/95
renamed to 17G024T1 to resolve conflict with sample taken at OLD-17-24 on 6/18/98.

s = secondary groundwater standard.

st = systemic toxicant

mc = based on minimum criteria

p = primary standard.

o = organoleptic.

n = noncarcinogenic effects.

c = carcinogen (GCTLs) or carcinogenic effects (RBCs).

ND = Not determined.

NA = Not analyzed.

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.

PF = The percent difference between the original and confirmation analyses is greater than 50%.

D = Reported concentrations if from a dilution/reanalysis.

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 C

SUMMARY OF ANALYTICAL RESULTS IN SOIL AND GROUNDWATER

Appendix C
 Table C-1. Summary of Soil Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52S00101	52S00101D	52S00201		52S00301		52S00301D		52S00401
Lab ID	MA785003	MA785004	MA790002	MA790002DL	MA790003	MA790003DL	MA790005	MA790005DL	MA790004
Sampling Date	19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
Semivolatile organics, µg/kg									
1,2,4-Trichlorobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
1,2-Dichlorobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
1,3-Dichlorobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
1,4-Dichlorobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,2'-oxybis(1-Chloropropane)	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,4,5-Trichlorophenol	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
2,4,6-Trichlorophenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,4-Dichlorophenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,4-Dimethylphenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,4-Dinitrophenol	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
2,4-Dinitrotoluene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2,6-Dinitrotoluene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2-Chloronaphthalene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2-Chlorophenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2-Methylnaphthalene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2-Methylphenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
2-Nitroaniline	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
2-Nitrophenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
3,3'-Dichlorobenzidine	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
3-Nitroaniline	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
4,6-Dinitro-2-methylphenol	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
4-Bromophenyl-phenylether	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
4-Chloro-3-methylphenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
4-Chloroaniline	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
4-Chlorophenyl-phenylether	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
4-Methylphenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
4-Nitroaniline	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
4-Nitrophenol	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
Acenaphthene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Acenaphthylene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Anthracene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Benzo(a)anthracene	380 U	370 U	91 J	NA	360 U	NA	360 U	NA	350 U
Benzo(a)pyrene	380 U	370 U	99 J	NA	360 U	NA	360 U	NA	350 U

Appendix C
 Table C-1. Summary of Soil Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52S00101	52S00101D	52S00201		52S00301		52S00301D		52S00401
Lab ID	MA785003	MA785004	MA790002	MA790002DL	MA790003	MA790003DL	MA790005	MA790005DL	MA790004
Sampling Date	19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
Benzo(b)fluoranthene	380 U	40 J	130 J	NA	360 U	NA	360 U	NA	350 U
Benzo(g,h,i)perylene	380 U	370 U	250 J	NA	360 U	NA	360 U	NA	350 U
Benzo(k)fluoranthene	380 U	39 J	92 J	NA	360 U	NA	360 U	NA	350 U
bis(2-Chloroethoxy)methane	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
bis(2-Chloroethyl)ether	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
bis(2-Ethylhexyl)phthalate	160 J	150 J	73 J	NA	43 J	NA	360 U	NA	350 U
Butylbenzylphthalate	88 J	72 J	360 U	NA	360 U	NA	360 U	NA	350 U
Carbazole	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Chrysene	380 U	42 J	120 J	NA	360 U	NA	360 U	NA	350 U
Di-n-butylphthalate	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Di-n-octylphthalate	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Dibenz(a,h)anthracene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Dibenzofuran	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Diethylphthalate	56 J	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Dimethylphthalate	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Fluoranthene	51 J	63 J	400	NA	360 U	NA	360 U	NA	350 U
Fluorene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Hexachlorobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Hexachlorobutadiene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Hexachlorocyclopentadiene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Hexachloroethane	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Indeno(1,2,3-cd)pyrene	380 U	370 U	170 J	NA	360 U	NA	360 U	NA	350 U
Isophorone	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
N-Nitroso-di-n-propylamine	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
N-Nitrosodiphenylamine (1)	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Naphthalene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Nitrobenzene	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Pentachlorophenol	960 U	920 U	900 U	NA	900 U	NA	900 U	NA	890 U
Phenanthrene	380 U	370 U	74 J	NA	360 U	NA	360 U	NA	350 U
Phenol	380 U	370 U	360 U	NA	360 U	NA	360 U	NA	350 U
Pyrene	380 U	52 J	360 U	NA	360 U	NA	360 U	NA	350 U

Appendix C
Table C-1. Summary of Soil Analytical Results
Initial Site Screening Investigation
Study Area 52

Naval Training Center, Orlando
Orlando, FL

Sample ID	52S00101	52S00101D	52S00201		52S00301		52S00301D		52S00401
Lab ID	MA785003	MA785004	MA790002	MA790002DL	MA790003	MA790003DL	MA790005	MA790005DL	MA790004
Sampling Date	19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
Pesticides/PCBs, µg/kg									
4,4'-DDD	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	9.1 NJ	35 UR	3.5 U
4,4'-DDE	16	25	3500 U	35000 UR	58 ER	51 D	56 ER	45 D	2.4 J
4,4'-DDT	26 J	38 J	11000 CJ	35000 UR	76 ER	73 D	67 ER	62 D	3.5 U
Aldrin	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
alpha-BHC	2 UJ	1.9 UJ	1800 UJ	18000 UR	1.8 UJ	18 UR	1.8 UJ	18 UR	1.8 U
alpha-Chlordane	3.5 J	6.5 J	100000 ER	110000 CD	130 ER	140 DJ	14 J	14 DR	6.4
Aroclor-1016	38 U	37 U	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
Aroclor-1221	77 U	74 U	72000 U	720000 UR	72 U	720 UR	72 U	720 UR	71 U
Aroclor-1232	38 U	37 U	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
Aroclor-1242	38 U	37 U	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
Aroclor-1248	38 U	37 U	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
Aroclor-1254	38 U	37 U	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
Aroclor-1260	84	96	35000 U	350000 UR	35 U	350 UR	35 U	350 UR	35 U
beta-BHC	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
delta-BHC	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
Dieldrin	9.9	15	53000 C	46000 DR	140 ER	150 DJ	89 ER	84 DJ	3.5 J
Endosulfan I	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
Endosulfan II	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	3.5 U	35 UR	3.5 U
Endosulfan sulfate	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	3.5 U	35 UR	3.5 U
Endrin	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	3.5 U	35 UR	3.5 U
Endrin aldehyde	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	3.5 U	35 UR	3.5 U
Endrin ketone	3.8 U	3.7 U	3500 U	35000 UR	3.5 U	35 UR	3.5 U	35 UR	3.5 U
gamma-BHC (Lindane)	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
gamma-Chlordane	3.1 J	6.6 J	120000 ER	110000 CD	150 ER	150 DJ	9.1 J	9.3 DR	6.4 J
Heptachlor	2 U	1.9 U	17000 C	18000 DR	20	20 DR	1.8 U	18 UR	1.8 U
Heptachlor epoxide	2 U	1.9 U	1800 U	18000 UR	1.8 U	18 UR	1.8 U	18 UR	1.8 U
Methoxychlor	20 U	19 U	18000 UJ	180000 UR	18 UJ	180 UR	18 UJ	180 UR	18 U
Toxaphene	200 U	190 U	180000 U	1800000 UR	180 U	1800 UR	180 U	1800 UR	180 U

Appendix C
 Table C-1. Summary of Soil Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52S00101	52S00101D	52S00201		52S00301		52S00301D		52S00401
Lab ID	MA785003	MA785004	MA790002	MA790002DL	MA790003	MA790003DL	MA790005	MA790005DL	MA790004
Sampling Date	19-Apr-96	19-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96	22-Apr-96
Inorganics, mg/kg									
Aluminum	1460 J	1420 J	2780	NA	1730	NA	1690	NA	2180
Antimony	2.5 U	2.4 U	2.3 U	NA	2.3 U	NA	2.3 U	NA	2.3 U
Arsenic	0.87 B	0.58 B	1.9 B	NA	0.46 B	NA	0.4 B	NA	0.52 B
Barium	6.4 J	6.1 J	11.7 J	NA	5.7 J	NA	6.4 J	NA	4.7 J
Beryllium	0.03 U	0.03 U	0.05 B	NA	0.04 B	NA	0.04 B	NA	0.06 B
Cadmium	0.42 U	0.51 B	1.3 U	NA	0.39 U	NA	0.39 U	NA	0.38 U
Calcium	1260	1160	7400 J	NA	6020 J	NA	38400 J	NA	12700 J
Chromium	3.2	3	7.3	NA	2.8	NA	3.9	NA	3.3
Cobalt	0.39 J	0.34 J	0.53 B	NA	0.32 U	NA	0.32 U	NA	0.47 B
Copper	8.3	11.8	17.8	NA	7.3	NA	8.3	NA	1.6 B
Iron	965 J	739 J	1150	NA	344	NA	361	NA	455
Lead	23.5	21.5	200	NA	8.4	NA	8.3	NA	6
Magnesium	80.8 B	74.3 B	120 B	NA	75.2 B	NA	229 B	NA	106 B
Manganese	7.8	6.5	14 J	NA	5.1 J	NA	8.1 J	NA	3.3 J
Mercury	0.06 U	0.05 U	0.19	NA	0.1 B	NA	0.08 B	NA	0.05 B
Nickel	1.8 U	1.7 U	1.7 U	NA	1.6 U	NA	1.6 U	NA	1.6 U
Potassium	177 U	170 U	165 U	NA	164 U	NA	164 U	NA	163 U
Selenium	0.3 U	0.29 U	0.28 U	NA	0.28 U	NA	0.31 J	NA	0.28 U
Silver	0.51 UR	0.49 UR	0.58 J	NA	0.53 J	NA	0.75 J	NA	0.47 UJ
Sodium	45.4 U	80.6 U	49.5 U	NA	36.4 U	NA	38.4 U	NA	27.3 U
Thallium	0.2 UJ	0.19 UJ	0.18 U	NA	0.18 U	NA	0.18 U	NA	0.18 U
Vanadium	1.8 B	1.4 B	2.8 J	NA	1.6 J	NA	2.7 J	NA	2 J
Zinc	31.1 J	30.3 J	777 J	NA	8.6 J	NA	9.7 U	NA	3.7 U
General Chemistry, mg/kg									
Total Petroleum Hydrocarbons	6.1	7.6	40.5	NA	13.6	NA	11.1	NA	7.4

Appendix C
 Table C-2. Summary of Soil Analytical Results
 Confirmation Samples - Pesticides
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52S02604	52S05801	52S06201	52S05301	52S06301	52S06401	52S06601	52S03702	52S03703	52S04401	52S04401D
Lab ID	J9601953-01	J9601953-03	J9601953-04	J9601953-02	J9601953-05	J9601953-06	J9601953-07	J9601953-09	J9601953-10	J9601953-11	J9601953-12
Sampling Date	16-Dec-96	16-Dec-96	16-Dec-96	16-Dec-96	17-Dec-96						
Pesticides, µg/kg											
4,4'-DDD	10 U	10 U	10 U	1200 U	10 U	23	54	10 U	10 U	10 U	10 U
4,4'-DDE	10 U	10 U	57	1000 U	90	158	870	10 U	10 U	350	270
4,4'-DDT	20 U	21	40	130000	254	900	470	10 U	10 U	940	710
Aldrin	20 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	80 U	70 U
alpha-Chlordane	1900	10 U	40 U	27000	180 U	670	660	650	29	12000	11000
gamma-Chlordane	1500 U	10 U	20 U	1400 U	130 U	300 U	160 U	420 U	30 U	5600 U	4700 U
Chlordane (Total)	NQ										
alpha-BHC	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
beta-BHC	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
delta-BHC	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dieldrin	1400	10 U	38	5600	57	77	1200	10 U	21	13000	12000
Endosulfan I	1500	10 U	24	14000	88	296	157	490	10 U	5900	5000
Endosulfan II	20 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endosulfan sulfate	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Endrin	30 U	10 U	10 U	1000 U	10 U	90	11	10 U	10 U	430	370
Endrin aldehyde	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	60 U	40 U
Endrin ketone	28	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	61	51
gamma-BHC (Lindane)	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Heptachlor	10 U	10 U	10 U	1000 U	10 U	10 U	10 U	33	10 U	10 U	20 U
Heptachlor epoxide	81	10 U	14	1100	10 U	20	33	34	21	440	400
Methoxychlor	20 U	20 U	20 U	2000 U	20 U	20 U	20 U	20 U	20 U	40 U	50 U
Toxaphene	6000 U	300 U	350 U	15000 U	390 U	3000 U	2100 U	6000 U	300 U	30000 U	30000 U

Appendix C
 Table C-2. Summary of Soil Analytical Results
 Confirmation Samples - Pesticides
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	052S0001	052I0001	052S0002	052S0003	052S0004	052S0005	052S0006	052S0007	052S0008	052S0009	052S0010
Lab ID	9709316-01	9709316-02	9709316-03	9709316-04	9709316-05	9709316-06	9709316-07	9709316-08	9709316-09	9709316-10	9709316-11
Sampling Date	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97
Pesticides, µg/kg											
4,4'-DDD	1.3 U	1.3 U	1.3 U	6.6 U	12.8	12300 J	6.6 U	1500	4.65	2.6 U	20.3
4,4'-DDE	1.3 U	1.3 U	1.3 U	6.6 U	3.43	133 U	6.6 U	215 J	2.6 U	2.6 U	6.6 U
4,4'-DDT	1.3 U	1.3 U	1.45	6.6 U	57.6 J	93000	20.4	15400	3.44	2.6 U	10.3
Aldrin	0.7 U	0.7 U	0.6 J	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
alpha-Chlordane	NQ										
gamma-Chlordane	NQ										
Chlordane (Total)	5.2 J	56.1	9.47	69.2	88.1	99.9	41.5 U	342	12.1 J	16.5 U	69.6
alpha-BHC	0.7 U	0.7 U	0.7 U	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
beta-BHC	0.7 U	0.7 U	0.7 U	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
delta-BHC	0.7 U	0.7 U	0.7 U	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
Dieldrin	1.3 U	26.4	1.3 U	22.1	10.6	13900	6.6 U	6600 U	3.31	3.09 J	56.1
Endosulfan I	0.7 U	0.7 U	0.7 U	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
Endosulfan II	1.3 U	1.3 U	1.3 U	6.6 U	1.3 U	133 U	6.6 U	330 U	2.6 U	2.6 U	6.6 U
Endosulfan sulfate	1.3 U	1.3 U	1.3 U	6.6 U	1.3 U	133 U	6.6 U	330 U	2.6 U	2.6 U	6.6 U
Endrin	1.3 U	1.3 J	1.3 U	6.6 U	4.72	133 U	6.6 U	330 U	2.6 U	2.6 U	6.6 U
Endrin aldehyde	1.3 U	1.3 U	1.3 U	6.6 U	1.3 U	133 U	6.6 U	330 U	2.6 U	2.6 U	6.6 U
Endrin ketone	NQ										
gamma-BHC (Lindane)	0.7 U	0.7 U	0.7 U	3.3 U	0.7 U	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
Heptachlor	0.7 U	0.7 U	0.7 U	3.3 U	0.851	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
Heptachlor epoxide	0.7 U	0.7 U	0.7 U	4.53	1.38	66 U	3.3 U	165 U	1.3 U	1.3 U	3.3 U
Methoxychlor	6.7 U	6.7 U	6.7 U	33 U	6.7 U	664 U	33 U	1650 U	13.3 U	13 U	33 U
Toxaphene	33 U	33 U	33 U	166 U	33 U	3320 U	166 U	8250 U	66 U	66 U	166 U

Appendix C
 Table C-2. Summary of Soil Analytical Results
 Confirmation Samples - Pesticides
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	052S0011	052S0012	052S0013	052S0014	052S0015	052S0016	052S0016D	052S0017
Lab ID	9709316-12	9709316-13	9709316-14	9709316-15	9709316-16	9709316-17	9709316-18	9709676-01
Sampling Date	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97	9/12/97
Pesticides, µg/kg								
4,4'-DDD	7.33 J	6.6 U	133 U	6.6 U	6.6 U	1.3 U	2.7 U	8.03 J
4,4'-DDE	54.3	2.7 U	133 U	22.6	6.6 U	1.3 U	2.7 U	13 U
4,4'-DDT	88.2	14.3	133 U	20.6	6.6 U	1.3 U	2.7 U	13 U
Aldrin	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	5.36 J
alpha-Chlordane	NQ							
gamma-Chlordane	NQ							
Chlordane (Total)	60.1	16.7 U	833 U	8.3 U	41.5 U	6.29 J	15.7 J	81.3 U
alpha-BHC	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	65 U
beta-BHC	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	65 U
delta-BHC	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	65 U
Dieldrin	18.4	2.7 U	526	20.9	6.6 U	1.3 U	2.7 U	8.09 J
Endosulfan I	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	6.5 U
Endosulfan II	13 U	2.7 U	133 U	6.6 U	6.6 U	1.3 U	2.7 U	13 U
Endosulfan sulfate	13 U	2.7 U	133 U	6.6 U	6.6 U	1.3 U	2.7 U	13 U
Endrin	13 U	2.7 U	133 U	6.6 U	6.6 U	1.3 U	2.7 U	13 U
Endrin aldehyde	13 U	2.7 U	133 U	6.6 U	6.6 U	1.3 U	2.7 U	13 U
Endrin ketone	NQ							
gamma-BHC (Lindane)	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	65 U
Heptachlor	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	6.5 U
Heptachlor epoxide	6.7 U	1.3 U	66.6 U	3.3 U	3.3 U	0.7 U	1.3 U	6.5 U
Methoxychlor	67 U	13.3 U	666 U	33 U	33 U	6.7 U	13.3 U	65 U
Toxaphene	333 U	66 U	3330 U	166 U	166 U	33 U	66 U	325 U

Appendix C
 Table C-3. Summary of Groundwater Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00101	52H00101	52G00201		52H00201
Lab ID	MA801003	MA801004	MA801005	MA801005DL	MA801006
Sampling Date	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96
Volatile organics, µg/L					
1,1,1-Trichloroethane	1 U	NA	1 U	NA	NA
1,1,2,2-Tetrachloroethane	1 U	NA	1 U	NA	NA
1,1,2-Trichloroethane	1 U	NA	1 U	NA	NA
1,1-Dichloroethane	1 U	NA	1 U	NA	NA
1,1-Dichloroethene	1 U	NA	1 U	NA	NA
1,2-Dibromo-3-chloropropane	1 U	NA	1 U	NA	NA
1,2-Dibromoethane	1 U	NA	1 U	NA	NA
1,2-Dichloroethane	1 U	NA	1 U	NA	NA
1,2-Dichloropropane	1 U	NA	1 U	NA	NA
2-Butanone	5 UR	NA	5 UR	NA	NA
2-Hexanone	5 U	NA	5 U	NA	NA
4-Methyl-2-pentanone	5 U	NA	5 U	NA	NA
Acetone	3 R	NA	3 R	NA	NA
Benzene	1 U	NA	1 U	NA	NA
Bromochloromethane	1 U	NA	1 U	NA	NA
Bromodichloromethane	1 U	NA	1 U	NA	NA
Bromoform	1 U	NA	1 U	NA	NA
Bromomethane	1 U	NA	1 U	NA	NA
Carbon disulfide	1 U	NA	1 U	NA	NA
Carbon tetrachloride	1 U	NA	1 U	NA	NA
Chlorobenzene	1 U	NA	1 U	NA	NA
Chloroethane	1 U	NA	1 U	NA	NA
Chloroform	1 U	NA	1 U	NA	NA
Chloromethane	0.5 J	NA	1 U	NA	NA
cis-1,2-Dichloroethene	1 U	NA	1 U	NA	NA
cis-1,3-Dichloropropene	1 U	NA	1 U	NA	NA
Dibromochloromethane	1 U	NA	1 U	NA	NA
Ethylbenzene	1 U	NA	1 U	NA	NA
Methylene chloride	2 U	NA	2 U	NA	NA
Styrene	1 U	NA	1 U	NA	NA
Tetrachloroethene	1 U	NA	1 U	NA	NA
Toluene	1 U	NA	1 U	NA	NA
trans-1,2-Dichloroethene	1 U	NA	1 U	NA	NA

Appendix C
 Table C-3. Summary of Groundwater Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00101	52H00101	52G00201		52H00201
Lab ID	MA801003	MA801004	MA801005	MA801005DL	MA801006
Sampling Date	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96
trans-1,3-Dichloropropene	1 U	NA	1 U	NA	NA
Trichloroethene	1 U	NA	1 U	NA	NA
Vinyl chloride	1 U	NA	1 U	NA	NA
Xylene (total)	1 U	NA	1 U	NA	NA
Semivolatile organics, µg/L					
1,2,4-Trichlorobenzene	10 U	NA	10 U	NA	NA
1,2-Dichlorobenzene	1 U	NA	1 U	NA	NA
1,3-Dichlorobenzene	1 U	NA	1 U	NA	NA
1,4-Dichlorobenzene	1 U	NA	1 U	NA	NA
2,2'-oxybis(1-Chloropropane)	10 U	NA	10 U	NA	NA
2,4,5-Trichlorophenol	25 U	NA	25 U	NA	NA
2,4,6-Trichlorophenol	10 U	NA	10 U	NA	NA
2,4-Dichlorophenol	10 U	NA	10 U	NA	NA
2,4-Dimethylphenol	10 U	NA	10 U	NA	NA
2,4-Dinitrophenol	25 U	NA	25 U	NA	NA
2,4-Dinitrotoluene	10 U	NA	10 U	NA	NA
2,6-Dinitrotoluene	10 U	NA	10 U	NA	NA
2-Chloronaphthalene	10 U	NA	10 U	NA	NA
2-Chlorophenol	10 U	NA	10 U	NA	NA
2-Methylnaphthalene	10 U	NA	10 U	NA	NA
2-Methylphenol	10 U	NA	10 U	NA	NA
2-Nitroaniline	25 U	NA	25 U	NA	NA
2-Nitrophenol	10 U	NA	10 U	NA	NA
3,3'-Dichlorobenzidine	10 U	NA	10 U	NA	NA
3-Nitroaniline	25 U	NA	25 U	NA	NA
4,6-Dinitro-2-methylphenol	25 U	NA	25 U	NA	NA
4-Bromophenyl-phenylether	10 U	NA	10 U	NA	NA
4-Chloro-3-methylphenol	10 U	NA	10 U	NA	NA
4-Chloroaniline	10 U	NA	10 U	NA	NA
4-Chlorophenyl-phenylether	10 U	NA	10 U	NA	NA
4-Methylphenol	10 U	NA	10 U	NA	NA
4-Nitroaniline	25 U	NA	25 U	NA	NA
4-Nitrophenol	25 U	NA	25 U	NA	NA
Acenaphthene	10 U	NA	10 U	NA	NA

Appendix C
 Table C-3. Summary of Groundwater Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00101	52H00101	52G00201		52H00201
Lab ID	MA801003	MA801004	MA801005	MA801005DL	MA801006
Sampling Date	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96
Acenaphthylene	10 U	NA	10 U	NA	NA
Anthracene	10 U	NA	10 U	NA	NA
Benzo(a)anthracene	10 U	NA	10 U	NA	NA
Benzo(a)pyrene	10 U	NA	10 U	NA	NA
Benzo(b)fluoranthene	10 U	NA	10 U	NA	NA
Benzo(g,h,i)perylene	10 U	NA	10 U	NA	NA
Benzo(k)fluoranthene	10 U	NA	10 U	NA	NA
bis(2-Chloroethoxy)methane	10 U	NA	10 U	NA	NA
bis(2-Chloroethyl)ether	10 U	NA	10 U	NA	NA
bis(2-Ethylhexyl)phthalate	10 U	NA	10 U	NA	NA
Butylbenzylphthalate	10 U	NA	10 U	NA	NA
Carbazole	10 U	NA	10 U	NA	NA
Chrysene	10 U	NA	10 U	NA	NA
Di-n-butylphthalate	10 U	NA	10 U	NA	NA
Di-n-octylphthalate	10 U	NA	10 U	NA	NA
Dibenz(a,h)anthracene	10 U	NA	10 U	NA	NA
Dibenzofuran	10 U	NA	10 U	NA	NA
Diethylphthalate	10 U	NA	10 U	NA	NA
Dimethylphthalate	10 U	NA	10 U	NA	NA
Fluoranthene	10 U	NA	10 U	NA	NA
Fluorene	10 U	NA	10 U	NA	NA
Hexachlorobenzene	10 U	NA	10 U	NA	NA
Hexachlorobutadiene	10 U	NA	10 U	NA	NA
Hexachlorocyclopentadiene	10 U	NA	10 U	NA	NA
Hexachloroethane	10 U	NA	10 U	NA	NA
Indeno(1,2,3-cd)pyrene	10 U	NA	10 U	NA	NA
Isophorone	10 U	NA	10 U	NA	NA
N-Nitroso-di-n-propylamine	10 U	NA	10 U	NA	NA
N-Nitrosodiphenylamine (1)	10 U	NA	10 U	NA	NA
Naphthalene	10 U	NA	10 U	NA	NA
Nitrobenzene	10 U	NA	10 U	NA	NA
Pentachlorophenol	25 U	NA	25 U	NA	NA
Phenanthrene	10 U	NA	10 U	NA	NA
Phenol	10 U	NA	10 U	NA	NA

Appendix C
 Table C-3. Summary of Groundwater Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00101	52H00101	52G00201		52H00201
Lab ID	MA801003	MA801004	MA801005	MA801005DL	MA801006
Sampling Date	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96
Pyrene	10 U	NA	10 U	NA	NA
Pesticides/PCBs, µg/L					
4,4'-DDD	0.1 U	NA	0.1 U	1 UR	NA
4,4'-DDE	0.1 U	NA	0.1 U	1 UR	NA
4,4'-DDT	0.1 U	NA	0.1 U	1 UR	NA
Aldrin	0.05 U	NA	0.05 U	0.5 UR	NA
alpha-BHC	0.05 UJ	NA	0.05 UJ	0.5 UR	NA
alpha-Chlordane	0.05 U	NA	0.05 U	0.5 UR	NA
Aroclor-1016	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1221	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1232	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1242	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1248	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1254	0.5 U	NA	0.5 U	5 UR	NA
Aroclor-1260	0.5 U	NA	0.5 U	5 UR	NA
beta-BHC	0.05 U	NA	0.05 U	0.5 UR	NA
delta-BHC	0.05 U	NA	0.05 U	0.5 UR	NA
Dieldrin	0.11	NA	2 ER	2.3 D	NA
Endosulfan I	0.05 U	NA	0.05 U	0.5 UR	NA
Endosulfan II	0.1 U	NA	0.1 U	1 UR	NA
Endosulfan sulfate	0.1 U	NA	0.1 U	1 UR	NA
Endrin	0.1 U	NA	0.1 U	1 UR	NA
Endrin aldehyde	0.1 U	NA	0.1 U	1 UR	NA
Endrin ketone	0.1 U	NA	0.1 U	1 UR	NA
gamma-BHC (Lindane)	0.05 U	NA	0.05 U	0.5 UR	NA
gamma-Chlordane	0.05 U	NA	0.05 U	0.5 UR	NA
Heptachlor	0.05 U	NA	0.05 U	0.5 UR	NA
Heptachlor epoxide	0.05 U	NA	0.05 U	0.5 UR	NA
Methoxychlor	0.5 UJ	NA	0.5 UJ	5 UR	NA
Toxaphene	5 U	NA	5 U	50 UR	NA

Appendix C
 Table C-3. Summary of Groundwater Analytical Results
 Initial Site Screening Investigation
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00101	52H00101	52G00201		52H00201
Lab ID	MA801003	MA801004	MA801005	MA801005DL	MA801006
Sampling Date	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96	23-Apr-96
Inorganics, µg/L					
Aluminum	195 U	3920 J	4750 J	NA	8630 J
Antimony	2.4 R	2 R	2 R	NA	1.1 UR
Arsenic	1.3 UJ	1.3 UJ	1.3 UJ	NA	1.4 J
Barium	7.2 U	8 U	4.7 U	NA	4.7 U
Beryllium	0.15 U	0.15 U	0.15 U	NA	0.15 U
Cadmium	1.8 UJ	2.7 J	1.8 UJ	NA	1.8 UJ
Calcium	20900	21200	19200	NA	18800
Chromium	2.2 U	6.7 B	7.1 B	NA	13.7
Cobalt	1.5 U	1.5 U	1.5 U	NA	1.5 U
Copper	2 U	2 U	3.1 B	NA	2 U
Iron	79.4 J	251 J	202 J	NA	304 J
Lead	1.2 U	3.5 U	2.2 U	NA	2.5 U
Magnesium	627 B	675 B	483 B	NA	469 B
Manganese	5.8 B	5.2 U	3.4 U	NA	3.2 U
Mercury	0.07 UJ	0.12 J	0.09 J	NA	0.25 J
Nickel	7.7 U	7.7 U	7.7 U	NA	7.7 U
Potassium	767 U	767 U	767 U	NA	767 U
Selenium	1.3 U	1.3 U	2.9 B	NA	5.7
Silver	2.2 UR	2.2 UR	2.2 UR	NA	2.2 UR
Sodium	2140 J	1970 J	1140 J	NA	1040 J
Thallium	0.86 U	0.86 UJ	0.86 U	NA	0.86 U
Vanadium	4 B	6.1 B	4.5 B	NA	8.2 B
Zinc	5.2 U	9 U	4.2 U	NA	4.3 U
General Chemistry, mg/L					
Total Petroleum Hydrocarbons	NA	NA	0.05 U	NA	NA
Total Suspended Solids	4 U	NA	57	NA	NA

Appendix C
 Table C-4. Summary of Groundwater Analytical Results
 Supplemental Sampling - Pesticides
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G00601	52G00701	52G00801	52G00801D	52G00901	52G01001	52G01101	52G01102	52G01103	52G01104	52G01201	
Lab ID	J9601992-02	J9601992-05	J9601992-03	J9601992-04	J9601992-06	J9601992-01	S775908*1				S775908*2	
Sampling Date	26-Dec-97	26-Dec-97	26-Dec-97	26-Dec-97	26-Dec-97	26-Dec-97	10/16/97	2/5/98	4/29/98	9/9/98	10/16/97	
Pesticides/PCBs, µg/l												
4,4'-DDD	0.04 U	1 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
4,4'-DDE	0.04 U	1.4	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
4,4'-DDT	0.04 U	0.7 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Aldrin	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
alpha-BHC	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
alpha-Chlordane	0.04 U	1 U	NQ	0.025 U	0.025 U	0.25 U	NQ					
Aroclor-1016	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
Aroclor-1221	NA	NA	NA	NA	NA	NA	2 U	NA	NA	NA	NA	2 U
Aroclor-1232	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
Aroclor-1242	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
Aroclor-1248	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
Aroclor-1254	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
Aroclor-1260	NA	NA	NA	NA	NA	NA	1 U	NA	NA	NA	NA	1 U
beta-BHC	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
Chlordane (total)	NA	NA	NA	NA	NA	NA	0.5 U	NA	NA	NA	NA	0.5 U
delta-BHC	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
Dieldrin	0.04 U	7.2	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Endosulfan I	0.04 U	0.5 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
Endosulfan II	0.04 U	0.4 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Endosulfan sulfate	0.04 U	0.4 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Endrin	0.04 U	1 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Endrin aldehyde	0.04 U	0.4 U	0.1 U	0.05 U	0.05 U	0.5 U	0.1 U					
Endrin ketone	0.04 U	0.9	NA	0.05 U	0.05 U	0.5 U	NA U					
gamma-BHC (Lindane)	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
gamma-Chlordane	0.04 U	0.9	NQ	0.025 U	0.025 U	0.25 U	NQ					
Heptachlor	0.04 U	0.6	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
Heptachlor epoxide	0.04 U	0.4 U	0.05 U	0.025 U	0.025 U	0.25 U	0.05 U					
Methoxychlor	0.1 U	1 U	0.5 U	0.25 U	0.25 U	2.5 U	0.5 U					
Toxaphene	1 U	1 U	1 U	1 U	1 U	1 U	10 U	5 U	1.2 U	1.2 U	12 U	5 U

Appendix C
 Table C-4. Summary of Groundwater Analytical Results
 Supplemental Sampling - Pesticides
 Study Area 52

Naval Training Center, Orlando
 Orlando, FL

Sample ID	52G01202	52G01203	52G01204	52G01301	52G01302	52G01303	52G01304
Lab ID				S775908*3			
Sampling Date	2/5/98	4/29/98	9/9/98	10/16/97	2/5/98	4/29/98	9/9/98
Pesticides/PCBs, µg/l							
4,4'-DDD	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
4,4'-DDE	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
4,4'-DDT	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.27 PF	0.27 U
Aldrin	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
alpha-BHC	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
alpha-Chlordane	0.025 U	0.025 U	0.025 U	NQ	0.025 U	0.025 U	0.025 U
Aroclor-1016	NA	NA	NA	25 U	NA	NA	NA
Aroclor-1221	NA	NA	NA	50 U	NA	NA	NA
Aroclor-1232	NA	NA	NA	25 U	NA	NA	NA
Aroclor-1242	NA	NA	NA	25 U	NA	NA	NA
Aroclor-1248	NA	NA	NA	25 U	NA	NA	NA
Aroclor-1254	NA	NA	NA	25 U	NA	NA	NA
Aroclor-1260	NA	NA	NA	25 U	NA	NA	NA
beta-BHC	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
Chlordane (total)	NA	NA	NA	12 U	NA	NA	NA
delta-BHC	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
Dieldrin	0.05 U	0.05 U	0.05 U	5.6 P	0.2	0.31	0.08
Endosulfan I	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.03 PF	0.03 U
Endosulfan II	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
Endosulfan sulfate	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
Endrin	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
Endrin aldehyde	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	0.05 U	0.05 U
Endrin ketone	0.05 U	0.05 U	0.05 U	NA	0.05 U	0.05 U	0.05 U
gamma-BHC (Lindane)	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
gamma-Chlordane	0.025 U	0.025 U	0.025 U	NQ	0.025 U	0.025 U	0.025 U
Heptachlor	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
Heptachlor epoxide	0.025 U	0.025 U	0.025 U	1.2 U	0.025 U	0.025 U	0.025 U
Methoxychlor	0.25 U	0.25 U	0.25 U	12 U	0.25 U	0.25 U	0.25 U
Toxaphene	1.2 U	1.2 U	1.2 U	120 U	1.2 U	1.2 U	1.2 U

Appendix C
Notes for Summary of Analytical Results Tables
Study Area 52

Naval Training Center, Orlando
Orlando Florida

NA = Identified parameter not analyzed.
NQ = Identified parameter not quantified or reported by the laboratory.
Sample ID = Sample Identifier
Lab ID = Laboratory identifier

Units:

mg/kg = milligram per kilogram
 $\mu\text{g}/\text{kg}$ = microgram per kilogram
mg/L = milligram per liter
 $\mu\text{g}/\text{L}$ = microgram per liter

The following standard validation qualifiers have the following definitions:

- B The inorganic analyte was positively identified and the associated numerical value is an estimated concentration because the detection was below the contract required detection limit (CRDL) and above the instrument detection limit.
- C The presence of this compound has been confirmed by GC/MS analysis.
- D The reported value for the compound has been quantified at a secondary dilution factor. This value typically is used in favor of E qualified values. When this applies, the E qualifier are flagged ER; D qualified values that are rejected in favor of the original results are flagged DR.
- E The reported value for the compound exceeds the linear calibration range for that compound. Therefore, the sample have been reanalyzed at an appropriate dilution (sample identifiers ending in DL).
- J The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.
- NJ Presumptive presence of the compound at an estimated concentration
- PF The percent difference between the original and confirmation analyses is greater than 50%.
- R The sample results are rejected during data validation because of serious deficiencies in meeting quality control criteria.
- 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.
- 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.

APPENDIX D

IMMUNOASSAY RESULTS, ADDITIONAL SITE SCREENING

Table D-1
Immunoassay Screening Results
Total Chlorinated Pesticides
Study Area 52

Naval Training Center, Orlando
Orlando, FL

SAMPLE ID	EASTING	NORTHING	DEPTH (feet bls)	TOTAL PESTICIDES (ug/kg)	DUPLICATE (ug/kg)
52S00501	1960	2000	0-1	90	175
52S00601	2000	1980	0-1	0	
52S00701	2000	2000	0-1	1700	
52S00801	1960	1990	0-1	50	
52S00901	2000	1990	0-1	>9000	
52S01001	1960	1980	0-1	110	
52S01101	1960	1970	0-1	100	
52S01201	2000	1970	0-1	>9000	
52S01301	2000	1960	0-1	4800	
52S01401	1960	1960	0-1	20	
52S01501	2000	1950	0-1	1000	
52S01601	1960	1950	0-1	>9000	>9000
52S01701	1960	1940	0-1	50	
52S01801	2000	1940	0-1	2000	
52S01901	1950	1960	0-1	>9000	
52S02001	1950	1950	0-1	225	
52S02101	1990	1940	0-1	2050	
52S02201	1950	1940	0-1	100	
52S02301	1950	1930	0-1	175	
52S02401	1990	1950	0-1	>9000	
52S02501	1940	1950	0-1	25	
52S02601	1990	1960	0-1	>9000	
52S02602	1990	1960	1-2	3700	
52S02603	1990	1960	2-3	7100	
52S02604	1990	1960	3-4	9000	
52S02701	1940	1940	0-1	>9000	
52S02801	1990	1970	0-1	>9000	
52S02901	1940	1930	0-1	0	>9000
52S03001	1990	1980	0-1	7800	
52S03101	1970	1940	0-1	125	
52S03201	1990	1990	0-1	7300	
52S03301	1990	2000	0-1	250	
52S03401	1970	1950	0-1	10	
52S03501	1980	2000	0-1	225	
52S03601	1970	1960	0-1	5050	
52S03701	1980	1990	0-1	>9000	
52S03702	1980	1990	1-2	>9000	
52S03703	1980	1990	2-3	0	
52S03704	1980	1990	3-4	0	
52S03801	1970	1970	0-1	2450	
52S03901	1970	1980	0-1	1750	
52S04001	1980	1980	0-1	2450	
52S04101	1970	1990	0-1	>9000	
52S04201	1980	1970	0-1	7000	
52S04301	1970	2000	0-1	1750	
52S04401	1980	1960	0-1	>9000	>9000
52S04501	1980	1950	0-1	7500	
52S04601	1960	1930	0-1	2800	
52S04701	1980	1940	0-1	0	0

Table D-1
Immunoassay Screening Results
Total Chlorinated Pesticides
Study Area 52

Naval Training Center, Orlando
Orlando, FL

SAMPLE ID	EASTING	NORTHING	DEPTH (feet bis)	TOTAL PESTICIDES (ug/kg)	DUPLICATE (ug/kg)
52S04801	1970	2010	0-1	175	
52S04901	2000	2010	0-1	225	
52S05001	2010	1990	0-1	1950	
52S05101	2010	1970	0-1	>9000	
52S05201	2010	1960	0-1	>9000	
52S05301	2010	1950	0-1	>9000	
52S05401	2010	1940	0-1	6700	
52S05501	2000	1930	0-1	>9000	
52S05601	1990	1930	0-1	125	
52S05701	1960	1920	0-1	2200	
52S05801	1930	1940	0-1	0	
52S05901	1940	1960	0-1	150	
52S06001	1950	1970	0-1	0	
52S06101	1930	2000	0-1	50	
52S06201	2020	2000	0-1	475	
52S06301	2020	1920	0-1	875	
52S06401	2030	1930	0-1	1775	
52S06501	2020	1940	0-1	1225	
52S06601	2020	1990	0-1	3400	
52S06701	2020	1970	0-1	1400	
52S06801	2030	1970	0-1	0	
52S06901	2020	1960	0-1	1050	
52S06902	2020	1960	2-3	0	
52S07001	2040	1940	0-1	0	
52S07101	2020	1950	0-1	900	
52S07201	2000	1910	0-1	0	

NOTES:
All analytical results expressed in micrograms per kilogram (ug/kg) soil dry weight.
bis = below level surface.
Total pesticides include Chlordane and structurally similar compounds.

APPENDIX E

**COMPARISON OF ONSITE IMMUNOASSAY
AND OFF-SITE ANALYTICAL RESULTS
ADDITIONAL SITE SCREENING**

Table E-1
 Comparison of Onsite and Offsite Analytical Results (Immunoassay Versus Method 8080)
 Total Chlorinated Pesticides
 Study Area 52

Naval Training Center
 Orlando, Florida

Sample ID	Total Chlorinated Pesticides (excluding DDT, DDD, and DDE)		Remarks
	Onsite Immunoassay Results	Offsite 8080 Confirmation Results	
52S02604	9,000	4,909	Are both Immunoassay and 8080 results above or below the screening value (70 ug/kg) for the split sample?
52S03702	> 9,000	1,207	YES
52S03703	0	71	YES
52S04401	> 9,000	31,831	NO
52S04401D	> 9,000	28,821	YES
52S05301	> 9,000	47,700	YES
52S05801	0	0	YES
52S06201	475	76	YES
52S06301	875	145	YES
52S06401	1,775	1,063	YES
52S06601	3,400	2,061	YES

All results expressed in micrograms per kilogram (mg/kg) soil dry weight.
 Shaded entry indicates a false negative.

APPENDIX F

PHOTOGRAPHIC RECORD OF INTERIM REMEDIAL ACTION



Photograph 1: Truck unloading contaminated soil into rail cars.



Photograph 2: Truck unloading contaminated soil into rail cars.



Photograph 3: SA 52, facing east during soil excavation.



Photograph 4: SA 52, facing east during soil excavation.



Photograph 5: SA 52, facing northeast during soil excavation.



Photograph 6: SA 52, facing south during soil excavation.