N60508.AR.001053
NAS WHITING FIELD
5090.3a

REMEDIAL INVESTIGATION REPORT SITE 14, SHORT-TERM SANITARY LANDFILL NAS WHITING FIELD FL

10/1/1999

HARDING LAWSON ASSOCIATES

ID 00246

REMEDIAL INVESTIGATION REPORT

SITE 14, SHORT-TERM SANITARY LANDFILL

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Unit Identification Code: N60508

Contract No.: N62467-89-D-0317/116

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

Linda Martin, Code 1859, Engineer-in-Charge

October 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-0317/116 are complete and accurate and comply with all requirements of this contract.

DATE: October 26, 1999

NAME AND TITLE OF CERTIFYING OFFICIAL: Rao Angara
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Eric Blomberg, P.G.
Project Technical Lead

(DFAR 252.227-7036)

WHF-S14.RI
FGW.09.99

FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act (RCRA), and the Hazardous and Solid Waste Amendments of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities. The CERCLA and SARA acts form the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Naval Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adopted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages as follows:

- preliminary assessment (PA),
- site inspection (SI) (formerly the PA and SI steps were called the initial assessment study under the NACIP program),
- remedial investigation and feasibility study, and
- remedial design and remedial action.

The Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) manages and the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection (formerly Florida Department of Environmental Regulation) oversee the Navy environmental program at Naval Air Station (NAS) Whiting Field. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the CERCLA program at NAS Whiting Field should be addressed to Ms. Linda Martin, Code 1859, at (803) 743-5574.

EXECUTIVE SUMMARY

A remedial investigation and feasibility study (RI/FS) is being conducted at Naval Air Station (NAS) Whiting Field in Milton, Florida, by Southern Division, Naval Facilities Engineering Command as part of the Department of Defense Installation Restoration (IR) program. The IR program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations.

A phased approach was implemented to conduct the remedial investigation (RI). Phase I was completed in May 1992. The subsequent phases of the RI were designated as Phase IIA and Phase IIB. Fieldwork for Phase IIA was completed in March 1994. RI Phase IIB was completed in November 1996.

This RI report contains the results of assessment activities used to characterize site-specific chemicals detected in environmental media (soil gas, soil, and groundwater) at Site 14, Short-Term Sanitary Landfill at NAS Whiting Field. Data obtained from these activities were used to evaluate the nature and extent of contamination at the site and support feasibility studies (if required) and baseline risk assessments. Human health and ecological baseline risk assessments are included with the RI report.

The fieldwork conducted during the RI included the following tasks:

- soil gas survey,
- geophysical survey,
- test pit investigations,
- subsurface soil sampling,
- surface soil sampling,
- monitoring well installation,
- groundwater sampling, and
- hydrogeologic investigations.

Soil gas samples were analyzed for methane and other volatile organic compounds (VOCs). Soil and groundwater samples were analyzed for target compound list organic analytes, and target analyte list inorganic analytes.

- The soil at Site 14 is interbedded sand, silt, and clay ranging from very fine to medium gain size. An approximately 25-foot-thick clay layer was encountered at 74 feet below land surface in one monitoring well soil boring, but it is unknown if the layer is continuous throughout the site.

- The groundwater water table is located approximately 80 feet below ground surface at Site 14. The groundwater flow direction is to the southeast and likely discharges to Big Coldwater Creek east-southeast of the facility. The average horizontal seepage velocity for the southeast disposal area sites was approximately 27 feet per year.

- Interpretation of the geophysical survey suggested presence of two anomalies which were interpreted to be former disposal areas.

- Methane and total volatile organic compounds were detected at four of the 24 soil gas locations investigated. At these locations, methane accounted for 80 percent or greater of the total gas measurement. However, the occurrence of soil gas appears to be limited in areal extent and there is no evidence of off-site migration.

- Surface soil samples were reported to contain two VOCs (xylene and methylene chloride) and two semivolatile organic compounds (SVOCs) (chrysene and bis(2-ethylhexyl)phthalate. The concentrations detected did not exceed the U.S. Environmental Protection Agency (USEPA) Region III risk-based concentrations (RBCs) or the Florida soil cleanup target levels.

- Nine inorganic analytes (aluminum, arsenic, barium, cadmium, chromium, iron, manganese, potassium, and vanadium) were detected in surface soil samples at concentrations exceeding the background screening criteria. Aluminum, arsenic, beryllium, iron, and manganese were detected at concentrations that exceeded either the USEPA Region III RBCs or Florida soil cleanup target levels.

- Subsurface soil samples collected from test pits contained four VOCs (acetone, ethylbenzene, toluene, and xylenes) and three SVOCs (4-methylphenol, naphthalene, and bis(2-ethylhexyl)phthalate) at detectable concentrations. All reported concentrations were below the Florida soil cleanup target levels and USEPA Region III RBCs. Nineteen inorganic analytes were detected in the subsurface soil samples. However, only arsenic was detected at concentrations that exceeded the USEPA Region III RBCs for residential and industrial soil and Florida soil cleanup target levels for residential and industrial soil. The detected arsenic concentrations did not exceed the background screening value for the facility.

- The pH values reported for the groundwater samples at Site 14 were below the lower range of the Florida secondary drinking water standard of 6.5 standard units but were within the range observed in background samples collected at NAS Whiting Field.

- Carbon disulfide was the only organic compound detected in the Phase IIB groundwater samples collected at Site 14. The detected concentration did not exceed the Federal maximum contaminant levels (MCLs) or the Florida groundwater cleanup target levels. Nine inorganic analytes were detected in groundwater samples. None of the analytes were detected at concentrations above the USEPA MCLs or the Florida groundwater cleanup target levels.

- Human health chemicals of potential concern (CPCs) identified at Site 14 include aluminum, arsenic, iron, manganese, and vanadium in surface soil, and arsenic in groundwater. No human health CPCs were identified for subsurface soil; therefore, no additional evaluations were performed.

- The human health CPCs detected in surface soil and groundwater are not likely to pose unacceptable carcinogenic risks to the receptors

evaluated based on evaluation of the samples using USEPA guidelines and target risk range.

- The total excess lifetime cancer risk (ELCR) of 1×10^{-5} at Site 14, associated with exposure to soil by a hypothetical future resident, exceeds Florida's target risk level of concern 1×10^{-6} due to arsenic. However, it should be noted that concentrations of arsenic detected in NAS Whiting Field background samples exceeded Florida residential soil cleanup goals and may result in an unacceptable carcinogenic risk. It is likely that naturally occurring arsenic contributes to the Florida Department of Environmental Protection (FDEP) target risk-level exceedance.

- The total ELCR of 1×10^{-5} at Site 14, associated with ingestion of groundwater by hypothetical future resident, exceeds Florida's target risk level of concern due to arsenic. Additionally, it should be noted that the EPC for arsenic is an order of magnitude less than the Federal drinking water standard and Florida groundwater cleanup target level.

- The surface soil, subsurface soil, and groundwater noncancer risks are below USEPA and FDEP target levels for all potential current and hypothetical future receptors.

- Ecological chemicals of potential concern (ECPCs) in surface soil include one VOC, methylene chloride; two SVOCs, chrysene and bis(2-ethylhexyl)pyrene; and three inorganic analytes, aluminum, manganese, and vanadium.

- The results of the ecological risk assessment suggest that risks are not predicted for terrestrial wildlife resulting from exposure to ECPCs in the surface soils; therefore, reduction in the survivability, growth, and reproduction of wildlife receptor populations at Site 14 are not expected to occur.

- Reduction in terrestrial plant and soil invertebrate biomass used as forage material was evaluated by comparing exposure concentrations for surface soil with toxicity benchmarks. Based on this comparison, plants exposed to reasonable maximum exposure (RME) and central tendency concentrations of aluminum and vanadium in surface soil may be adversely affected in the area of the landfill. However, it is unlikely that plant biomass or plant cover availability would be reduced over the entire area of Site 14 such that small mammal and bird populations would be affected. Similarly, soil invertebrate biomass is not expected to be reduced because RME concentrations of all ECPCs were well below available invertebrate toxicity benchmark values.

Based on the interpretation of findings from the RI activities, a focused feasibility study is proposed for Site 14, Short-Term Sanitary Landfill to address the presence of arsenic and vanadium in surface soil.

Although groundwater analytical results, summaries, and conclusions are included in this RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Facilitywide Groundwater). Therefore, chemicals in the groundwater that pose a threat to human and ecological receptors will be evaluated as part of the Site 40 RI/FS. The Site 40 assessment will supersede the evaluation presented in this report.

TABLE OF CONTENTS

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Chapter	Title	Page No.
1.0	INTRODUCTION	1-1
1.1	PURPOSE OF THE RI/FS	1-1
1.2	SITE DESCRIPTION	1-1
1.3	REGULATORY SETTING	1-4
1.4	REPORT ORGANIZATION	1-4
2.0	PREVIOUS INVESTIGATIONS	2-1
2.1	INITIAL ASSESSMENT STUDY (IAS)	2-1
2.2	VERIFICATION STUDY	2-1
3.0	FIELD INVESTIGATIVE METHODS	3-1
3.1	GEOPHYSICAL SURVEY	3-1
3.2	SOIL GAS SURVEY FOR METHANE	3-2
3.3	SURFACE SOIL ASSESSMENT	3-2
3.4	SUBSURFACE SOIL ASSESSMENT	3-5
3.4.1	PCPT Investigation	3-5
3.4.2	Split-Spoon Sampling	3-7
3.4.3	Test Pitting	3-7
3.5	GROUNDWATER ASSESSMENT	3-7
3.6	HYDROGEOLOGIC ASSESSMENT	3-8
4.0	SITE-SPECIFIC DATA QUALITY ASSESSMENT	4-1
4.1	ANALYTICAL PROGRAM	4-1
4.2	DATA REVIEW	4-1
4.2.1	Precision	4-2
4.2.2	Accuracy	4-2
4.2.3	Representativeness	4-6
4.2.4	Comparability	4-9
4.2.5	Completeness	4-9
4.3	SUMMARY	4-9
5.0	INVESTIGATIVE RESULTS	5-1
5.1	GEOLOGIC ASSESSMENT	5-1
5.2	HYDROGEOLOGIC ASSESSMENT	5-1
5.3	GEOPHYSICAL SURVEY ASSESSMENT	5-21
5.4	SOIL GAS ASSESSMENT	5-22
5.5	SURFACE SOIL ASSESSMENT	5-22
5.6	SUBSURFACE SOIL ASSESSMENT	5-30
5.7	GROUNDWATER ASSESSMENT	5-35
5.7.1	Phase I Sampling Event Groundwater Samples	5-35
5.7.2	Phase II Sampling Event	5-35
5.7.2.1	Phase IIA Sampling Event	5-38
5.7.2.2	Phase IIB Sampling Event	5-38

TABLE OF CONTENTS (Continued)

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Chapter	Title	Page No.
6.0	HUMAN HEALTH RISK ASSESSMENT	6-1
6.1	DATA EVALUATION	6-1
6.2	SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN (HHCPCs)	6-2
6.2.1	Surface Soil	6-4
6.2.1.1	Site 14 Surface Soil	6-4
6.2.1.2	Site 14 Subsurface Soil	6-4
6.2.1.3	Groundwater	6-4
6.3	EXPOSURE ASSESSMENT	6-4
6.3.1	Surface Soil	6-13
6.3.2	Subsurface Soil	6-13
6.3.3	Groundwater	6-13
6.3.4	Exposure Point Concentrations (EPCs)	6-13
6.4	TOXICITY ASSESSMENT	6-13
6.5	RISK CHARACTERIZATION	6-15
6.5.1	Surface Soil	6-19
6.5.2	Groundwater	6-19
6.6	UNCERTAINTY ANALYSIS	6-19
6.7	REMEDIAL GOAL OPTIONS	6-27
6.8	SUMMARY OF HHRA FOR SITE 14	6-27
7.0	ECOLOGICAL RISK ASSESSMENT	7-1
7.1	SITE CHARACTERIZATION	7-2
7.2	PROBLEM FORMULATION	7-4
7.2.1	Identification of Receptors	7-4
7.2.2	Identification of Exposure Pathways	7-5
7.2.3	Identification of Endpoints	7-7
7.3	HAZARD ASSESSMENT AND SELECTION OF ECPCs	7-7
7.4	EXPOSURE ASSESSMENT	7-11
7.4.1	Calculation of EPCs	7-11
7.4.2	Terrestrial Wildlife	7-11
7.4.3	Terrestrial Plants and Invertebrates	7-17
7.5	ECOLOGICAL EFFECTS ASSESSMENT	7-21
7.5.1	Terrestrial Wildlife	7-21
7.5.2	Terrestrial Plants and Invertebrates	7-22
7.6	RISK CHARACTERIZATION	7-22
7.6.1	Terrestrial Wildlife	7-22
7.6.2	Terrestrial Plants	7-24
7.6.3	Terrestrial Invertebrates	7-24
7.7	UNCERTAINTY ANALYSIS	7-24
7.8	SUMMARY OF ECOLOGICAL ASSESSMENT FOR SITE 14	7-26
8.0	CONTAMINANT FATE AND TRANSPORT	8-1
8.1	POTENTIAL ROUTES OF MIGRATION	8-1

TABLE OF CONTENTS (Continued)

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Chapter	Title	Page No.
8.2	CONTAMINANT PERSISTENCE AND FATE	8-2
8.2.1	Processes	8-2
8.2.2	Persistence and Fate of Site 14 CPCs	8-5
8.2.3	Transport of Contaminants	8-8
9.0	CONCLUSIONS AND RECOMMENDATIONS	9-1
9.1	CONCLUSIONS	9-1
9.2	RECOMMENDATIONS	9-3
10.0	PROFESSIONAL REVIEW CERTIFICATION	10-1

REFERENCES

APPENDICES

Appendix A: Geophysical Data
Appendix B: Analytical Quality Control Data
Appendix C: Soil Sample Analytical Data
Appendix D: Groundwater Sample Analytical Data
Appendix E: Human Health Risk Data
Appendix F: Ecological Risk Data
Appendix G: Boring Logs

LIST OF FIGURES

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Figure	Title	Page No.
1-1	Facility Location Map	1-2
1-2	Location of RI/FS Sites at NAS Whiting Field	1-3
3-1	Location of Active Soil Gas Survey Points	3-3
3-2	Location of Surface Soil Samples, Test Pits, and PCPT Exploration	3-4
3-3	Location of Monitoring Wells and BAT Samples	3-6
5-1	Potentiometric Surface Map of the Water Table Zone in the Sand-and-Gravel Aquifer, Southeast Disposal Area, February 1994	5-10
5-2	Potentiometric Surface Map of the Water Table Zone in the Sand-and-Gravel Aquifer, Southeast Disposal Area, November 1996	5-11
6-1	Site 14, Complete Exposure Pathways for Human Receptors	6-11
6-2	Cancer Risk Summary, Current Land Use for Surface Soil at Site 14	6-20
6-3	Noncancer Risk Summary, Current Land Use for Surface Soil at Site 14	6-21
6-4	Cancer Risk Summary, Future Land Use for Surface Soil at Site 14	6-22
6-5	Noncancer Risk Summary, Figure Land Use for Surface Soil at Site 14	6-23
6-6	Cancer Risk Summary, Future Land Use for Groundwater at Site 14	6-24
6-7	Noncancer Risk Summary, Future Land Use for Groundwater at Site 14	6-25
7-1	Vegetative Cover Map	7-3
7-2	Contaminant Pathway Model for Site 14 Ecological Receptors	7-6
7-3	Ecological Contaminant of Potential Concern Selection Process	7-9

LIST OF TABLES

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Table	Title	Page No.
3-1	Summary of Monitoring Well Construction Details	3-9
4-1	Precision Summary for Soil and Groundwater Field Duplicate Samples	4-3
4-2	Accuracy Summary for MS/MSD Samples	4-5
4-3	Accuracy Summary for Surrogate Recoveries Outside QC Criteria	4-5
4-4	Summary of Initial and Continuing Calibration	4-7
4-5	Representativeness Summary Field Quality Control Samples	4-8
4-6	Summary of DQO Assessment - PARCC Parameters	4-10
5-1	Summary of Water-Level Elevations	5-2
5-2	Summary of Horizontal Hydraulic Gradients	5-12
5-3	Summary of Vertical Hydraulic Gradients Southeast Disposal Area	5-18
5-4	Summary of Hydraulic Conductivity (K) Data from Slug Tests	5-20
5-5	Summary of Phase II Seepage Velocities	5-21
5-6	Summary of Active Soil Gas Survey, July 13 through 16, 1995	5-23
5-7	Summary of Analytical Results, Site 14 Surface Soil	5-25
5-8	Comparison of Analytes Detected in Site 14 Surface Soil to Background Screening Values and Benchmark Concentrations	5-27
5-9	Summary of Analytical Results for Subsurface Soil Samples from Test Pits at Site 14	5-31
5-10	Comparison of Analytes Detected in Site 14 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations	5-32
5-11	Summary of Analytical Results for BAT Groundwater Samples, Site 14	5-36
5-12	Summary of Groundwater Field Parameters	5-36
5-13	Summary of Analytical Results Site 14 Groundwater (Unfiltered)	5-37
5-14	Comparison of Analytes Detected in Phase IIB Groundwater Samples to Background Screening Values and Benchmark Concentrations, Site 14	5-39
6-1	Selection of Human Health Chemicals of Potential Concern for Surface Soil	6-5
6-2	Selection of Human Health Chemicals of Potential Concern for Subsurface Soil	6-7
6-3	Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater	6-9
6-4	Summary of Potential Exposure Pathways	6-12
6-5	Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Soil	6-14
6-6	Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Groundwater	6-14
6-7	Risk Summary, Current Land Use	6-16
6-8	Risk Summary, Future Land Use	6-17
6-9	Summary of Remedial Goal Options for Surface Soil	6-28
6-10	Summary of Remedial Goal Options for Groundwater	6-29
7-1	Endpoints Selected for Ecological Risk Assessment	7-8
7-2	Selection of Ecological Chemicals of Potential Concern for Surface Soil	7-12
7-3	Estimation of Potential Chemical Exposures for Representative Wildlife Species	7-15

LIST OF TABLES (Continued)

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Table	Title	Page No.
7-4	Ecological Receptors Evaluated For Surface Soil	7-16
7-5	Exposure Parameters for Representative Wildlife Species	7-18
7-6	Estimation of Bioaccumulation Factors	7-19
7-7	Summary of HIs for Terrestrial Wildlife	7-23
7-8	Summary of Ecological Risk for Plants and Invertebrates in Surface Soil	7-25

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
BAF	bioaccumulation factor
BAT	Bengt-Arne-Torstensson
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeter per second
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CPC	chemical of potential concern
CRQL	contract-required quantitation limits
CT	central tendency
%D	percent difference
DQO	data quality objective
ELCR	excess lifetime cancer risk
EM	electromagnetic
ECPC	ecological chemical of potential concern
Eh	redox potential
EPC	exposure point concentration
ERA	ecological risk assessment
FDEP	Florida Department of Environmental Protection
FS	feasibility study
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
GIR	General Information Report
HHCPC	human health chemicals of potential concern
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
HRS	hazard ranking system
IAS	initial assessment study
IR	installation restoration
K_{oc}	carbon partitioning coefficients
LD_{50}	lethal dose to 50 percent of test population
LDC	Laboratory Data Consultants, Inc.
LOAEL	lowest observed adverse effects level
MAG	magnetometry
MCL	maximum contaminant level

GLOSSARY (Continued)

MS/MSD	matrix spike and matrix spike duplicate
mg/kg	milligrams per kilogram
mg/kg-day	milligrams per kilogram per day
μg/kg	micrograms per kilogram
μg/ℓ	micrograms per liter
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NFA	no further action
NOAEL	no observed adverse effect level
NPL	National Priority List
NTU	nephelometric turbidity units
PA	preliminary assessment
PARCC	precision, accuracy, representativeness, completeness, and comparability
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCPT	piezocone penetrometer test
PDE	potential dietary exposure
PVC	polyvinyl chloride
QAPP	quality assurance project plan
QA/QC	quality assurance/quality control
RBC	risk-based concentration
RGO	remedial goal option
RI	remedial investigation
RI/FS	remedial investigation and feasibility study
RME	reasonable maximum exposure
RPD	relative percent difference
RRF	relative response factor
%RSD	percent relative standard deviation
RTV	reference toxicity value
SARA	Superfund Amendments and Reauthorization Act
SDG	sample delivery group
SFF	site foraging frequency
SI	site inspection
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SPCC	system performance check compounds
SU	standard unit
SQL	sample quantitation limit
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
™	trademark
TVOC	total volatile organic compound

UCL	upper confidence limit
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UXB	UXB International, Inc.
VOC	volatile organic compound

1.0 INTRODUCTION

Harding Lawson Associates (HLA), under contract to the Department of Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) is submitting this Remedial Investigation (RI) Report for Site 14, Short-Term Sanitary Landfill, at Naval Air Station (NAS) Whiting Field located in Milton, Florida. The RI Report for Site 14 is one in a series of site-specific reports being completed in conjunction with the NAS Whiting Field General Information Report (GIR) (ABB-ES, 1998) to summarize the previous investigations and to present the results of the RI.

The Remedial Investigation and Feasibility Study (RI/FS) is being conducted on behalf of the Navy at NAS Whiting Field under contract No. N62467-89-D-0317. The RI was conducted in three phases. The Phase I RI field program was completed in May 1992. The Phase IIA RI field program was conducted between May 1992 and March 1994. The Phase IIB RI field program was completed in November 1996.

Installation Location and Description. NAS Whiting Field is located in Santa Rosa County, in Florida's northwest coastal area, approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 1-1). NAS Whiting Field presently consists of two air fields separated by an industrial area and encompasses an area of approximately 2,560 acres. Figure 1-2 presents the installation layout and locations of RI/FS sites at NAS Whiting Field. A complete description of historic operations at the facility is presented in Section 1.3 and Appendix A of the NAS Whiting Field GIR (ABB-ES, 1998).

1.1 PURPOSE OF THE RI/FS. The purpose of the NAS Whiting Field RI is to identify and characterize the nature and extent of chemicals in environmental media and potential risks to human and ecological receptors that might be posed by toxic or hazardous chemicals present on site. The chemicals were potentially released to the environment during past waste disposal practices or spills. The data collected during the RI field program will also be used in a feasibility study (FS) (if one is necessary) to screen, evaluate, and select remedial alternatives to provide permanent, feasible solutions to environmental impacts that may be a result of past waste disposal practices or spills.

1.2 SITE DESCRIPTION. Site 14 is an approximate 3-acre area located adjacent to the southeastern boundary of the facility, east of Perimeter Road (Figure 1-2). According to the U.S. Department of Agriculture's (USDA) Soil Conservation Service mapping (USDA, 1980), the site's soils are classified as Lucy loamy sand.

Site 14 is one of six sites (Site 9 through Site 14) that comprise the area known as the southeast disposal area. The site was the primary sanitary landfill for 6 to 9 months during the latter part of 1978 and the early part of 1979.

Landfilling operations ceased in this area in early 1979 because the soil contained a high clay content that resulted in the ponding of rainwater throughout the site. The disposal area was covered with soil and abandoned. Subsequent to covering the site, pine trees were planted, the predominant species being slash pine.

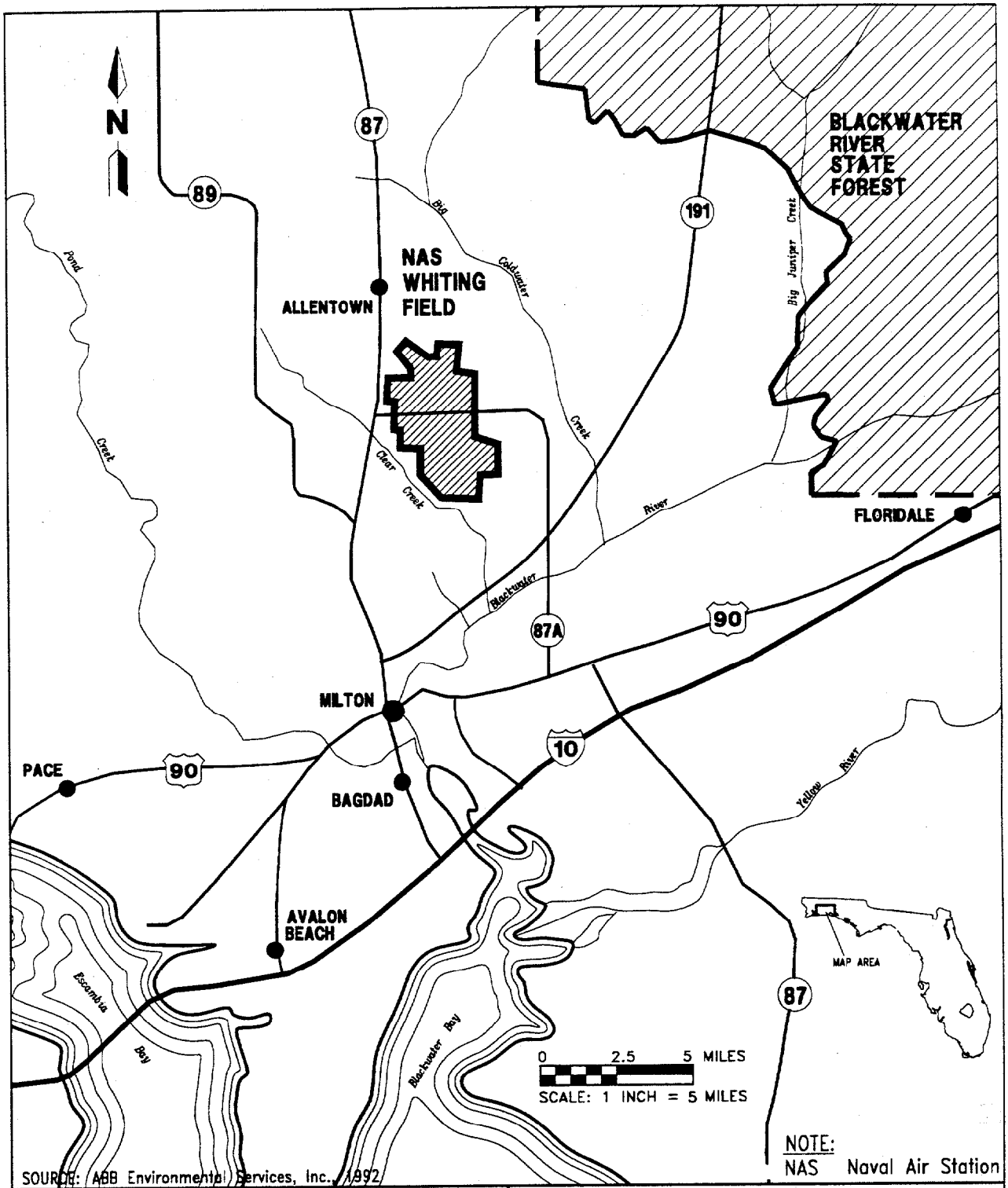


FIGURE 1-1
FACILITY LOCATION MAP

K:\02534\02534-04\RIV\02534520.DWG, PDP-NAB 03/18/98 17:05:54, AutoCAD R14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

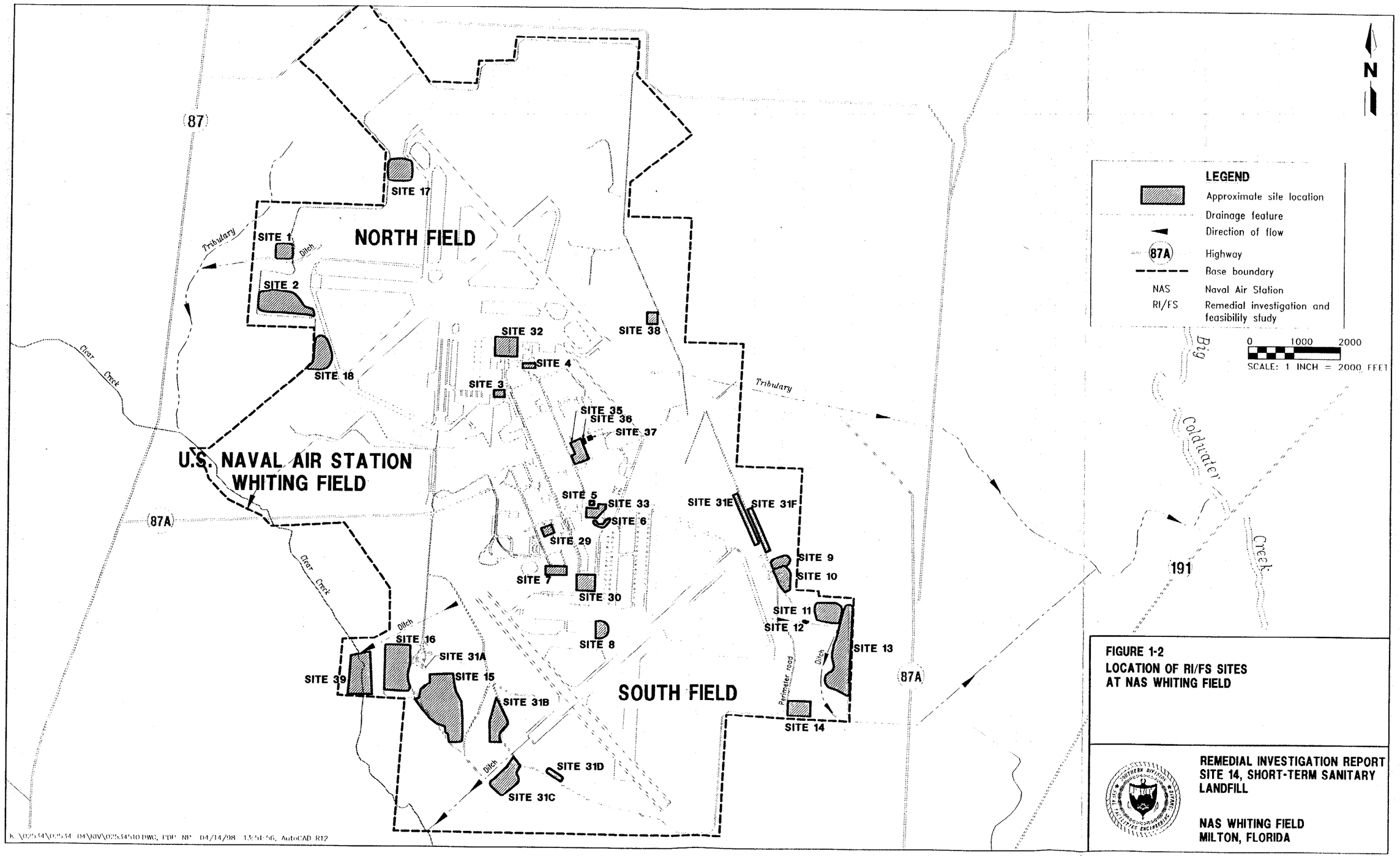


FIGURE 1-2
LOCATION OF RI/FS SITES
AT NAS WHITING FIELD

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

00246D012

Surface drainage from Site 14 is toward the unlined, vegetated "Y" ditch, which is located approximately 400 feet east of the site. The "Y" ditch drains east toward Big Coldwater Creek, which is located 1.8 miles east of Site 14.

1.3 REGULATORY SETTING. The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations. The IR program is the Navy response authority under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that Federal facilities comply with the act, both procedurally and substantively. SOUTHNAVFACENGCOM is the agency responsible for the Navy IR program in the southeastern United States. Therefore, SOUTHNAVFACENGCOM has the responsibility to process NAS Whiting Field through preliminary assessment (PA), site inspection (SI), RI/FS, and remedial response selection in compliance with the guidelines of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Section 105(a)(8)(A) of SARA requires the U.S. Environmental Protection Agency (USEPA) to develop criteria that set priorities for remedial action for chemicals detected in environmental media based on relative risk to human health and the environment. To meet this requirement, USEPA has established the hazard ranking system (HRS) as Appendix A to the NCP. First promulgated in 1982, the HRS was amended in December 1990, effective March 14, 1991 (55 Federal Register No. 241:51532-51667), to comply with requirements of Section 105(c)(1) of SARA to increase the accuracy of the assessment of relative risk. The HRS has been substantially revised and is designed to prioritize sites after the SI phase of the CERCLA process.

The HRS score for NAS Whiting Field was generated in 1993. The score was sufficient to place NAS Whiting Field on the National Priority List (NPL).

In January 1994, the USEPA placed NAS Whiting Field on a proposed list of sites to be included on the NPL (40 CFR 300, Federal Register, January 18, 1994), and on May 31, 1994, NAS Whiting Field was placed on the NPL effective June 30, 1994 (40 CFR 300, Federal Register, May 31, 1994). As a result, the RI/FS for NAS Whiting Field must meet the requirements of the NCP, as amended by SARA, and follow regulatory guidance for conducting RI/FS programs under CERCLA.

1.4 REPORT ORGANIZATION. This RI Report is organized into ten chapters (Chapters 1.0 to 10.0).

Chapter 1.0 presents the purpose, site description, and regulatory setting for the RI at NAS Whiting Field. Chapter 2.0 summarizes previous investigations. Chapter 3.0 presents the investigative methodology for conducting the assessment. Chapter 4.0 presents the site-specific data quality assessment. Chapter 5.0 discusses the investigative results of the assessment. Chapter 6.0 presents the Human Health Risk Assessment (HHRA). Chapter 7.0 presents the Ecological Risk Assessment (ERA). Chapter 8.0 discusses the fate and transport of chemicals determined to be human and/or ecological chemicals of potential concern. Chapter 9.0 provides a summary of the conclusions and recommendations. Chapter 10.0 presents professional review certification.

2.0 PREVIOUS INVESTIGATIONS

This chapter summarizes the previous investigations at Site 14, Short-Term Sanitary Landfill, at NAS Whiting Field.

2.1 INITIAL ASSESSMENT STUDY (IAS). Background information was gathered for the IAS (Envirodyne Engineers, Inc., 1985) by conducting a record search, performing an on-site reconnaissance survey, and conducting interviews with long-time employees and retired personnel familiar with the site.

For 6 to 9 months, starting in 1978 and ending in 1979, general refuse and wastes associated with pilot training, housing, and operation and maintenance of aircraft were disposed of at Site 14. Anecdotal evidence suggests that the disposal may have also included unknown quantities of waste paints, paint thinners, solvents, waste oils, and hydraulic fluids. Access to the site was uncontrolled, and there were no available written records of the types of wastes disposed of at the site (Envirodyne Engineers, Inc., 1985).

Envirodyne Engineers, Inc., recommended in the IAS that a confirmation study be completed based on the types of wastes possibly disposed of at the site, the potential for off-site migration, and the potential for the presence of human and ecological receptors. The confirmation study would typically consist of two parts: verification and characterization; however, only the verification phase was conducted.

2.2 VERIFICATION STUDY. The Verification Study (Geraghty & Miller, 1986) at Site 14 included installing one intermediate depth monitoring well (WHF-14-1) and collecting a groundwater sample. The monitoring well was installed near the eastern boundary of the site at a depth of approximately 151 feet below land surface (bls).

The monitoring well was located at an area assumed to be hydraulically downgradient from the site. However, interpretation of groundwater elevation data collected in 1992 and 1993 (ABB-ES, 1995c) suggest that the well was located hydraulically crossgradient to the landfilled area.

A groundwater sample was collected from the well and analyzed for USEPA priority pollutants, which include volatile organic compounds (VOCs), acid and base neutral extractable organic compounds, pesticides (including endrin, lindane, kepone, toxaphene, chlorodane, and malathion), herbicides (2,4-D and 2,4,5-TP Silvex), polychlorinated biphenyls (PCBs), and metals.

Organic compounds were not detected in the sample at concentrations that exceeded their respective detection limits. Two inorganic analytes (lead and zinc) were detected at concentrations below Florida's primary drinking water regulations (Chapter 17-22.104, Florida Administrative Code) that were in effect in 1986.

3.0 FIELD INVESTIGATIVE METHODS

Field investigative techniques used during the RI to collect the data are described in the RI/FS workplan (E.C. Jordan, 1990), which provides descriptions of sampling methods, field personnel responsibilities, sample management, chain of custody, project documentation, change in field methods, protocols on corrective actions, decontamination procedures, waste management handling, and other general project standards and procedures in Section 3.1, General Site Operations.

Field and laboratory quality assurance and quality control (QA/QC) requirements for the RI activities comply with the RI/FS Quality Assurance Project Plan (QAPP) located in Appendix A of the RI/FS workplan (E.C. Jordan, 1990). Health and safety requirements were in accordance with the general Health and Safety Plan located in the RI/FS workplan (E.C. Jordan, 1990).

Field investigative methods not covered in the documents identified above are described in Technical Memorandum No. 7, RI Phase IIB Workplan (ABB-ES, 1995b) and in the NAS Whiting Field GIR (ABB-ES, 1998).

These field and laboratory investigation techniques are in general conformance with USEPA standard operating procedures (USEPA, 1991a and 1996a) and were followed during the RI sampling and analysis program.

The RI Phase I investigation (ABB-ES, 1992a) at Site 14 consisted of collecting two groundwater samples using a piezocone penetrometer (PCPT) and Bengt-Arne Torstensson (BAT) sampler. The Phase IIA investigation included conducting a geophysical survey, collecting three surface soil samples and two subsurface soil samples from test pits, installing a monitoring well, and collecting two groundwater samples. The Phase IIB investigation included conducting an active soil gas survey and collecting three surface soil samples and two groundwater samples. The samples collected during the Phases IIA and IIB sampling events were analyzed for target compound list (TCL) VOCs, semivolatile organic compounds (SVOCs), pesticides and PCBs, and target analyte list (TAL) inorganic analytes.

The following provides a brief description of the number and types of environmental samples and the analytical methodology used for the RI at Site 14, Short-Term Sanitary Landfill.

3.1 GEOPHYSICAL SURVEY. Geophysical surveys at Site 14 were conducted between May 26, 1992, and June 14, 1992. The purpose of the geophysical surveys was to locate anomalies to the natural electromagnetic (EM) field that are used to identify locations where metallic or nonmetallic objects are buried at a potential waste disposal area. The survey results are used to assess the lateral and/or vertical extent (if possible) of the identified disposal area. In addition, the geophysical survey methods were used to locate underground utility lines, fuel distribution lines, and other anthropogenic obstructions that need to be avoided during the intrusive subsurface exploration activities.

Geophysical methods used at the site include EM induction and magnetometry (MAG). Blackhawk Geosciences, Inc., Golden, Colorado, was subcontracted by HLA to conduct the geophysical survey tasks. A technical report describing the

methodology, results, and conclusions from the geophysical survey was prepared in February 1993 (ABB-ES, 1993). The following paragraph presents a brief description of the geophysical field program.

Data from the EM and MAG surveys were collected along north to south grid lines that were spaced 40 feet apart. The grid lines were oriented with a magnetic compass and measuring tape. Data were collected at stations located at 10-foot-intervals along each grid line. These grid lines were later surveyed by a Florida-licensed surveyor. The location of the grid and the plotted geophysical data are presented on Figures A-1 through A-4 in Appendix A. A summary of the results from the geophysical survey are presented in Section 5.3.

3.2 SOIL GAS SURVEY FOR METHANE. A soil gas survey was conducted in June 1995 at Site 14 to assess whether or not methane gas or other VOCs are potentially emanating from the site. Soil gas samples were collected on a 100- by 100-foot grid, up to 100 feet beyond the site boundary. The grid origin was located at an area assumed not to be influenced by soil gas emanating from the site. Figure 3-1 presents the locations of the proposed active soil gas survey points. Not all proposed grid locations, however, were monitored for soil gas. Soil gas monitoring activities were discontinued once the soil gas analysis revealed the lack of measurable soil gas (two or more grid spacings) beyond the geophysical anomalies identified at the site.

At each soil gas sampling location, an open-ended stainless-steel tube was pushed or manually driven to proposed sampling depths of 1.5 feet and 3.0 feet bls. Organic vapor measurements were made at the two sampling depths. The air within the stainless-steel tube was purged with a vacuum pump to obtain a representative sample of soil gas.

Organic vapor concentrations were measured in the field with either a PortaFID II™ or a Foxboro OVA-128™ organic vapor analyzer. Soil gas samples were not submitted for laboratory analysis. Measurements of both total VOCs and organic vapors, collected following passage through a granulated charcoal filter (methane), were recorded. A comparison of the two measurements allowed a qualitative analysis of the presence of methane gas to be made.

The results of the soil gas survey are presented in Section 5.4.

3.3 SURFACE SOIL ASSESSMENT. The surface soil assessment included the collection of three surface soil samples during Phase IIA and three surface soil samples during Phase IIB of the RI.

The three Phase IIA soil samples were collected in August 1992 at locations (14-SL-01, 14-SL-02, and 14-SL-03) where surface geophysical anomalies were interpreted to be present (see Figure 3-2). Because these surface soil sample locations were biased based on geophysical anomalies, additional surface soil samples (Phase IIB) from other random locations were subsequently collected by HLA to confirm the presence or absence of the previously detected chemicals and to characterize the nature and extent of contamination.

Three Phase IIB surface soil samples (plus a duplicate sample) (14S00101, 14S00201, and 14S00301) were collected in December 1995. The sample locations

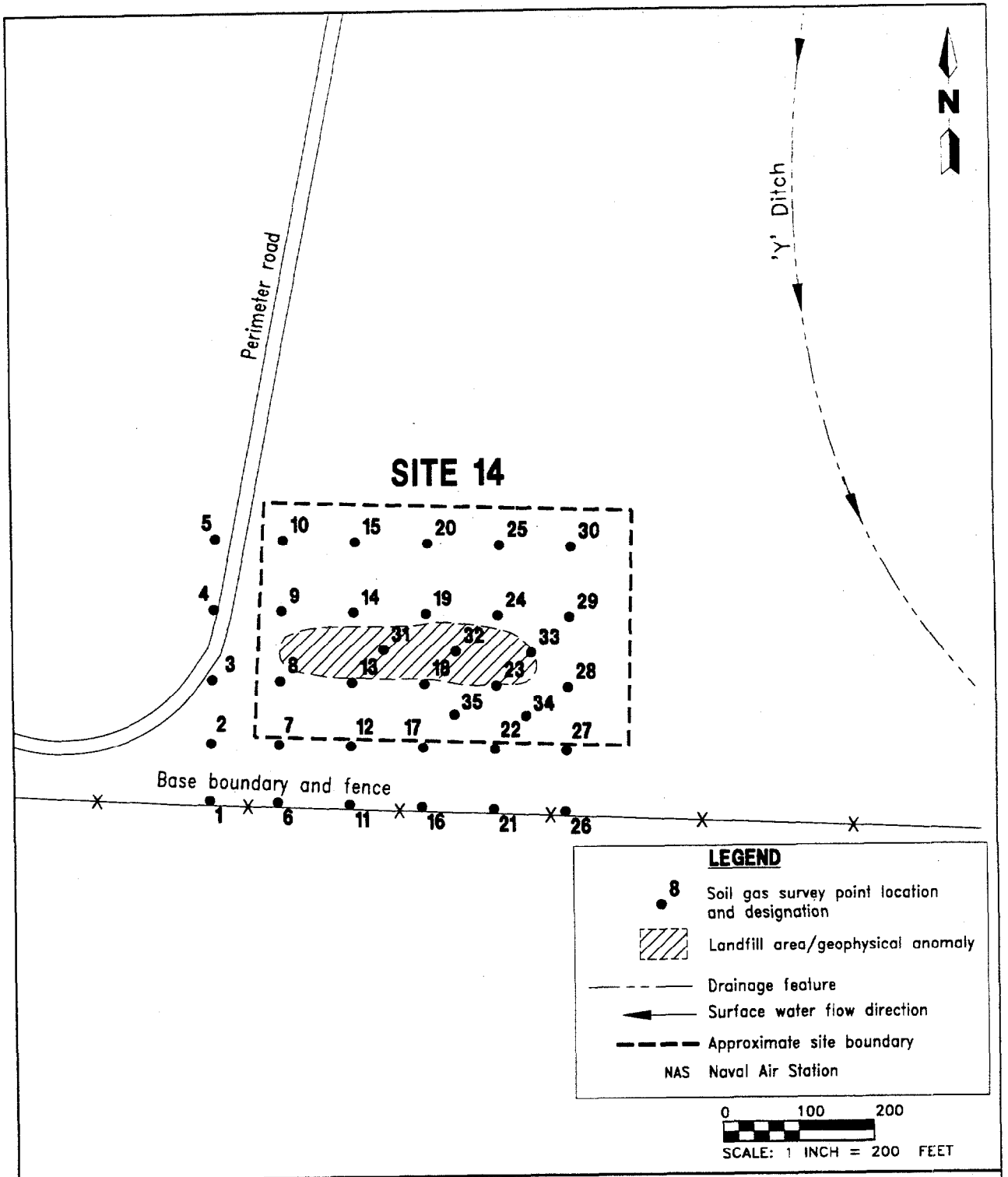


FIGURE 3-1
LOCATION OF ACTIVE SOIL GAS SURVEY POINTS

K:\02534\02534-04\RIV\02534534.DWG, DEL-PDP 03/19/98 10:30:35, AutoCAD R12

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

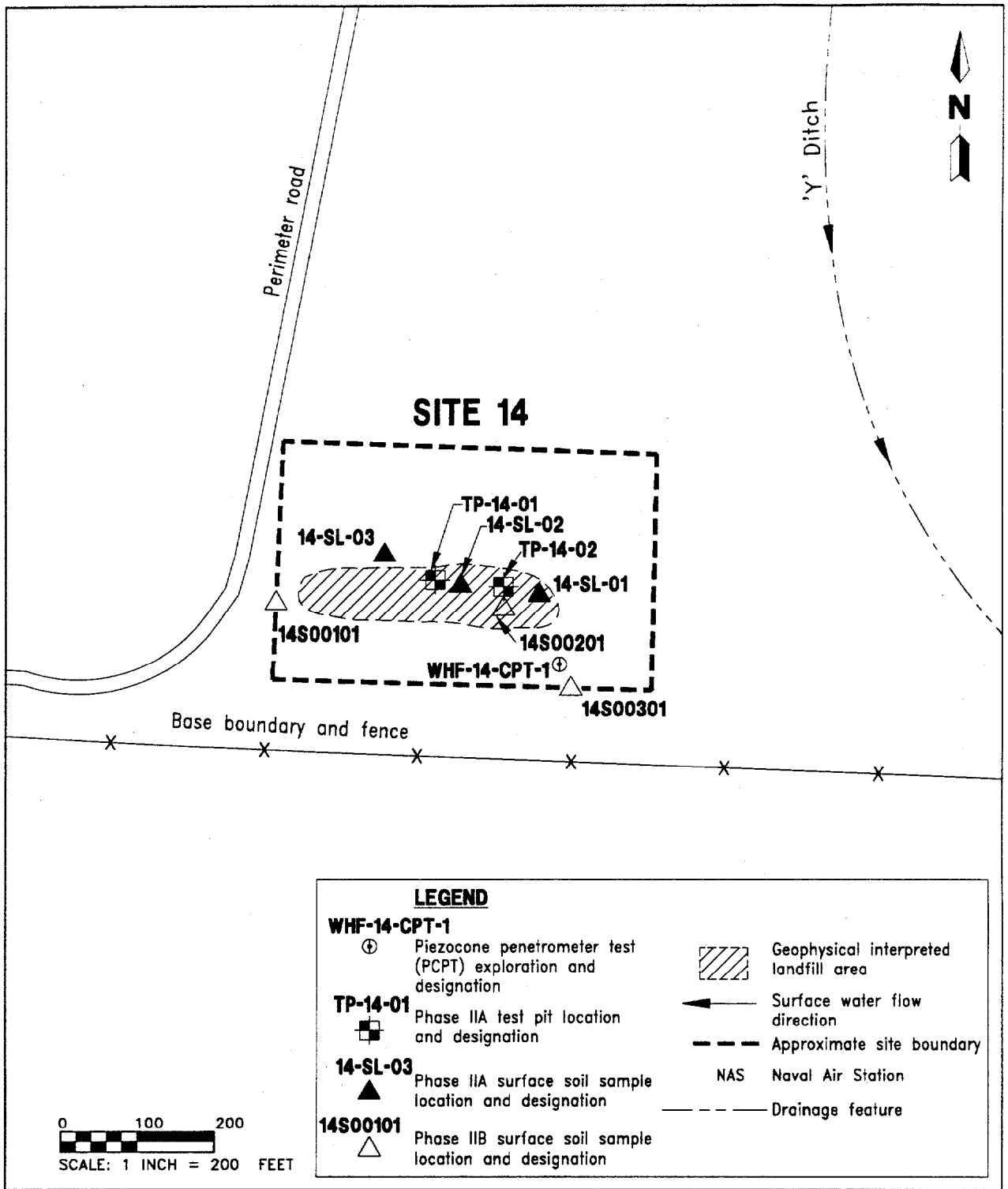


FIGURE 3-2
LOCATION OF SURFACE SOIL SAMPLES, TEST PITS, AND PCPT EXPLORATION

K:\02534\02534-04\RIV\02534535.DWG, DEL-PDP 03/19/98 13:20:29, AutoCAD R12

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

are shown on Figure 3-2. In addition to providing unbiased sampling locations, these samples were also used to support the human health (exposure of transient persons to site soil) and ecological (potential exposure to terrestrial wildlife) risk assessments. Sampling locations were determined using the systematic sampling method where a point is chosen at random along a transect, and then samples are collected at equidistant intervals thereafter (Gilbert, 1987; USEPA, 1989a).

Phase IIA and Phase IIB surface soil samples were collected from the land surface to a maximum depth of 12 inches bls using a decontaminated stainless-steel auger. Soil samples were described by HLA personnel, using the Unified Soil Classification System (USCS), with the results recorded in a bound field logbook.

The surface soil samples were analyzed for Contract Laboratory Program (CLP) (Naval Energy and Environmental Support Activity [NEESA] Level D) TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganic analytes. Three of the Phase IIB surface soil samples were also analyzed to determine physical characteristics. The samples were analyzed for the following physical parameters: dry bulk density, sieve analysis, hydrometer analysis, Atterberg limits, and permeability.

Background screening criteria were established by collecting background samples across the installation from each USDA soil type identified at NAS Whiting Field. These data are presented in Subsection 3.3.1 of the GIR (ABB-ES, 1998). The arithmetic mean of analytes detected in the background soil samples was calculated by summing individual analyte concentrations and then dividing the sum by the number of samples from which the analytes were detected. Samples from Phase IIA and IIB were then compared to twice the arithmetic mean of analyte concentrations detected in background surface soil samples associated with the Troup loamy sand and Lucy loamy sand soil types. Background samples from the Troup loamy sand were included in the site-specific background data set in order to create a larger data set more representative of facility conditions. The surface soil analytical results are presented in Appendix C and are discussed in Section 5.5 of this report.

3.4 SUBSURFACE SOIL ASSESSMENT. The RI subsurface soil investigation at Site 14 included a PCPT investigation, split-spoon sampling conducted during monitoring well installations, and test pit excavation and sampling. Detailed lithologic descriptions for all monitoring wells and PCPT soundings are presented in Phase I Technical Memorandum No. 1, Geological Assessment (ABB-ES, 1992b) and in Phase IIA Technical Memorandum No. 2, Geological Assessment (ABB-ES, 1995a). A summary of the Site 14 lithology is also presented in Section 5.1 of this report.

3.4.1 PCPT Investigation One PCPT sounding (WHF-14-CPT-1) was performed at Site 14 to a total depth of 160 feet bls in April 1991. The location of the PCPT sounding is presented on Figure 3-3. Specifically, a stainless-steel cone tip connected to stainless-steel rods was hydraulically pressed into the overburden soil.

The cone tip was advanced until the friction resistance of the overburden soil exceeded the power of the hydraulic system (refusal); the exploration was then terminated. The primary purpose of extending the boring exploration was to collect *in situ* groundwater samples using the BAT screening technique. The BAT

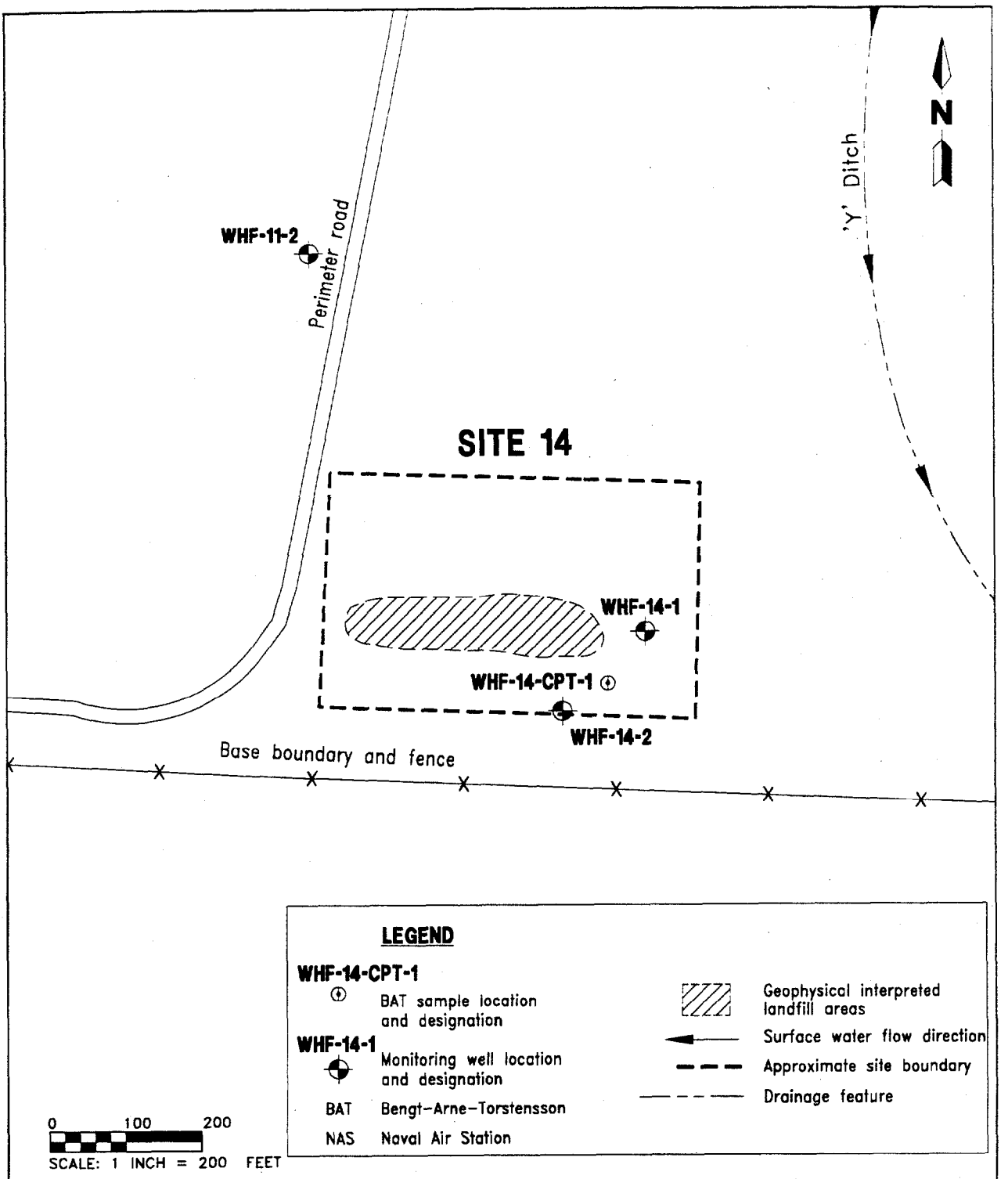


FIGURE 3-3
LOCATION OF MONITORING WELLS AND BAT SAMPLES

K:\02534\02534-04\RIV\02534536.DWG, DEL-PDP 03/19/98 13:38:31, AutoCAD R12

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

in situ groundwater sampling technique was described in Phase I Technical Memorandum No. 5, Groundwater Assessment (ABB-ES, 1992a).

3.4.2 **Split-Spoon Sampling** Lithologic data were also recorded during monitoring well installation. A 2-foot split-spoon sample was collected for visual inspection by an HLA geologist. All data were entered into a bound logbook. Detailed soil descriptions and other pertinent data are presented in the boring logs for the soil boring investigation located in Phase IIA Technical Memorandum No. 2, Geological Assessment (ABB-ES, 1995a). Split-spoon samples were generally collected at 5-foot intervals during drilling of the monitoring wells. Monitoring well installations were conducted in conjunction with the hydrogeologic and groundwater investigations (summarized in Phase IIA Technical Memoranda No. 4 [ABB-ES, 1995c] and 5 [ABB-ES, 1995d], respectively).

3.4.3 **Test Pitting** Two test pits were excavated on October 8, 1992, at Site 14 following the completion of the geophysical survey. UXB International, Inc. (UXB), from Chantilly, Virginia, was subcontracted by HLA to conduct the test pit excavation.

The test pits were excavated at locations where a geophysical anomaly potentially defined buried materials. The purpose of the test pits was to characterize waste materials, if present, and to classify the soil through the description, collection, and chemical analysis of subsurface soil samples.

Prior to excavating a test pit, the proposed areal dimensions and orientation of the test pit were surveyed by UXB with a hand-held magnetometer, a terrain conductivity meter (FEREX™ 4.021), and a metal detector. Site-specific field activities also included clearing of vegetation (as needed).

After the test pit location and orientation had been determined, the four corners of the test pit were staked. The staked locations were referenced to the grid coordinates defined for the geophysical survey. A backhoe was used to excavate a rectangular pit. The physical description of each soil layer and waste type was recorded in the field logbook during test pit excavation. A subsurface soil sample was collected directly from the backhoe bucket during the excavation. Following sample collection, the test pit was backfilled with excavated soil.

Two subsurface soil samples (14-SS-01-01 and 14-SS-02-02) were collected on October 8, 1992. Sample 14-SS-01-01 was collected from a depth of 5 to 6 feet bls in test pit TP-14-01 and sample 14-SS-02-02 was taken from a depth of 11.5 to 12.5 feet bls in test pit TP-14-02. Both pits were excavated within the landfilled area. The location of the test pits are presented on Figure 3-2 and sampling results are discussed in Section 5.6 of this report.

3.5 **GROUNDWATER ASSESSMENT**. Groundwater assessment activities included collecting groundwater samples using a BAT sampler during Phase I and collecting samples from monitoring wells in Phases IIA and IIB.

During the Phase I RI investigation, two groundwater samples (WHF-14-WP-01-01 and WHF-14-WP-01-02) were collected using the BAT sampling technique. The BAT groundwater sampling program was conducted in April 1991 in conjunction with the PCPT subsurface exploration to verify the potential contamination of groundwater downgradient of the site. Sample WHF-14-WP-01-01 was collected from a depth of

107 feet bls and sample WHF -14- WP-01-02 was collected at 160 feet bls. Both groundwater samples were analyzed for VOCs and TAL metals. The analytical results are presented in Subsection 5.7.1 of this report.

As noted in Section 2.2, the intermediate depth monitoring well (WHF-14-1) installed during the verification study was placed at a direction assumed to be hydraulically downgradient from the landfill. A subsequent groundwater flow direction study suggested that the well was hydraulically crossgradient to the landfill; therefore, during the Phase IIA investigation in 1993, a second monitoring well (WHF-14-2) was installed hydraulically downgradient from the site. This well was completed as a shallow (upper part of the aquifer) monitoring well (termination depth of approximately 115 feet bls). Groundwater samples were collected from these two wells (on November 2 and 3, 1993) as part of the Phase IIA field program and also during Phase IIB of the RI. During Phase IIB, groundwater sample 14G00201 was collected on September 10, 1996 and samples 14G00101 and 14G00101D (a duplicate sample) were collected on September 11, 1996. The monitoring well locations are presented on Figure 3-3 and the groundwater analytical data is discussed in Subsection 5.7.2 The analytical results are presented in Appendix D of this report.

During Phase IIA, the groundwater samples were collected from the monitoring wells using a Teflon™ bailer after purging the monitoring wells with a submersible pump. Purging and sampling methodology was followed as presented in Subsection 2.1.7.2 of the GIR (ABB-ES, 1998). The groundwater samples were analyzed for CLP (NEESA Level C) TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics.

During Phase IIB of the RI, groundwater samples were collected from the two monitoring wells using low-flow sampling techniques. Purging and sampling methodology was followed as presented in Subsection 2.1.7.2 of the GIR (ABB-ES, 1998). The groundwater samples were analyzed for CLP (NEESA Level D) TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganics. Samples for TAL inorganics were unfiltered (total analysis) if turbidity was below 10 nephelometric turbidity units (NTUs). If turbidity was greater than 10 NTUs, an additional groundwater sample was collected and filtered (dissolved-phase inorganics) using a 45-micron filter. The purpose of the additional groundwater sample was to assess uncertainty associated with a turbid unfiltered groundwater sample.

Analyses were also conducted to assess secondary water quality parameters and provide data for assessing remedial alternatives in the FS. The analyses included alkalinity, chloride, sulfates, color, hardness, ammonia nitrates, total Kjeldahl nitrogen, nitrate and nitrite, pH, phosphorous, total dissolved solids, total organic carbon and sulfides. Water quality parameter data is presented in Subsection 5.7.3 of this report.

3.6 HYDROGEOLOGIC ASSESSMENT. The hydrogeologic assessment of Site 14 also included five nearby sites located in the southeast area of the facility. The area investigated included Site 9 (Waste Fuel Disposal Pit), Site 10 (Southeast Open Disposal Area A), Site 11 (Southeast Open Disposal Area B), Site 12 (Tetraethyl Lead Disposal Area) and Site 13 (Sanitary Landfill). The hydrogeologic field investigation activities included collecting water-level data from 15 monitoring wells and conducting slug test analyses on five monitoring wells.

Table 3-1
Summary of Monitoring Well Construction Details

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	RI Phase of Well Completion	Well Size (inches)	Land Surface Elevation (feet msl)	TOC Elevation (feet msl)	Total Well Depth (feet BTOC)	Approximate Screen Interval (feet BTOC)	Surface Casing Length (feet bls)
Southeast Disposal Area							
Site 9, Waste Fuel Disposal Pit							
WHF-9-1	VS	4	144.66	146.55	118.40	108 to 118	NA
WHF-9-2	I	4	158.11	161.07	124.35	114 to 124	NA
WHF-9-3S	IIA	2	147.92	150.85	108.24	93 to 108	0 to 77
Site 10, Southeast Open Disposal Area (A)							
WHF-10-1	VS	4	144.19	146.73	118.20	108 to 118	NA
WHF-10-2	IIA	2	147.78	150.75	113.14	98 to 113	NA
Site 11, Southeast Open Disposal Area (B)							
WHF-11-1	VS	4	122.48	124.86	128.40	118 to 128	NA
WHF-11-1S	IIA	2	114.91	116.65	54.40	39 to 54	NA
WHF-11-2	I	4	145.19	148.12	125.84	120 to 125	NA
WHF-11-3	IIA	2	114.29	117.19	73.16	58 to 73	0 to 46
WHF-11-4S	IIB	2	126.13	129.43	79	64 to 79	NA
WHF-11-4D	IIB	2	125.79	128.94	109	99 to 109	NA
Site 12, Tetraethyl Lead Disposal Area							
WHF-12-1	VS	4	134.20	136.40	113.4	103 to 113	NA
WHF-12-2	IIB	2	132.45	135.56	85	70 to 85	NA
Site 13, Sanitary Landfill							
WHF-13-1	VS	4	100.40	102.66	122.90	112 to 122	NA
WHF-13-1S	IIA	2	104.61	108.97	61.30	46 to 61	NA
WHF-13-1I	IIB	2	106.09	109.17	93	83 to 93	NA
WHF-13-2S	IIA	2	99.94	102.86	72.41	57 to 72	0 to 42
WHF-13-3S	IIB	2	81.38	81.81	41	26 to 41	NA
WHF-13-4S	IIB	2	80.41	80.68	40	25 to 40	NA
Site 14, Short-Term Sanitary Landfill							
WHF-14-1	VS	4	137.83	139.69	153.20	143 to 153	NA
WHF-14-2	IIA	2	142.86	145.80	118.30	103 to 118	0 to 94

Notes: RI = remedial investigation.
msl = mean sea level.
TOC = top of casing.
BTOC = below top of casing.
bls = below land surface.
VS = verification study.
NA = not applicable.
I = Phase I remedial investigation.
IIA = Phase IIA remedial investigation.
IIB = Phase IIB remedial investigation.

Results of the Phase IIA hydrological assessment are presented in Phase IIA Technical Memorandum No. 4, Hydrogeologic Assessment (ABB-ES, 1995c). Monitoring well construction details are presented in Table 3-1. Results of the hydrogeologic assessment are also presented in Section 5.2 of this report.

4.0 SITE-SPECIFIC DATA QUALITY ASSESSMENT

This chapter describes how the data generated during Phase IIB of the RI at Site 14 were managed and evaluated. Section 4.1 describes the analytical program and data management for the RI at Site 11. Section 4.2 summarizes the precision, accuracy, representativeness, completeness, and comparability (PARCCs) report on the data. Section 4.3 presents a summary of the Data Quality Assessment.

The soil and groundwater samples collected during Phase IIA of the RI were qualified according to USEPA functional guidelines for evaluation of organic (USEPA, 1991b) and inorganic (USEPA, 1988) analytical data analyzed using USEPA CLP protocol. The data quality objective (DQO) assessment for the Phase IIA soil samples is presented in detail in Phase IIA RI Technical Memorandum No. 3 (ABB-ES, 1995e). The DQO assessment for the Phase IIA groundwater samples is presented in detail in Phase IIA RI Technical Memorandum No. 5 (ABB-ES, 1995d).

4.1 ANALYTICAL PROGRAM. Samples collected during the Phase IIB of the RI at Site 14 were analyzed using off-site laboratory analytical methods. Sampling locations are presented in Chapter 3.0 of this report and sample results are presented in Chapter 5.0 and Appendix C (soil data) and Appendix D (groundwater data).

Environmental samples (surface soil and groundwater) were collected and analyzed by an off-site laboratory using CLP methodology for analysis of VOCs, SVOCs, pesticides, PCBs, metals, and cyanide. Some groundwater samples were also analyzed for wet chemistry analyses. The laboratory analytical program is described in more detail in Section 2.2 of the NAS Whiting Field GIR (ABB-ES, 1998).

Analytical results for the environmental samples collected during the RI sampling events were reported as NEESA Level D (USEPA Level IV) analytical packages for VOCs, SVOCs, pesticides, PCBs, metals, cyanide, and wet chemistry.

4.2 DATA REVIEW. Data validation is the technical review of individual analytical results relative to the following criteria:

- DQOs and the QAPP in the NAS Whiting Field Workplan (E.C. Jordan Co. Inc., 1990, and ABB-ES, 1995b).
- NEESA guidance document 20.2-047B, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program (NEESA, 1988).
- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, February 1994 (USEPA, 1994a).
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994 (USEPA, 1994b).

The data validation process is described in Section 2.3 of the NAS Whiting Field GIR (ABB-ES, 1998).

The data were reviewed, validated, and evaluated using the PARCC specified in the DQOs. PARCC criteria are described in Section 2.3 of the NAS Whiting Field GIR (ABB-ES, 1998). The Site 14 Phase IIB soil and groundwater analytical data were validated by Laboratory Data Consultants, Inc. (LDC), of Carlsbad, California, in 1996. The Site 14 Phase IIB data include sample delivery group (SDG) WF007 for soil samples and SDG WF029 for groundwater samples. The subsections below summarize the PARCC criteria evaluation of the analytical data.

4.2.1 Precision Precision is a measure of the agreement or repeatability of a set of replicate results (relative percent difference [RPD]) obtained from duplicate laboratory analyses of samples collected from the same location and depth interval. Precision for analytical data collected during the RI sampling events was evaluated using results of field duplicate samples, laboratory duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and/or consecutive laboratory control samples. The evaluation of precision for the RI sampling event is presented in Table 4-1 and summarized below.

Organic Analytes. The RPD criteria for one VOC (acetone) in one groundwater sample (14G00101) did not meet the 30 percent control limit (Table 4-1). The other organic analytes were within the control limit for RPD.

Inorganic Analytes. The RPD criteria for one inorganic analyte (lead) in one groundwater sample (14G00101) did not meet the 30 percent control limit (Table 4-1). Exceedance of the RPD criteria may be due to poor instrument stability. According to the data validation (LDC, 1996-97), the exceedences in the inorganic analytes are considered moderately imprecise.

No soil samples exceeded RPD criteria for any organic or inorganic analytes.

Possible causes for RPD exceedances include improper sample collection, inconsistent sample preparation, and poor instrument stability. During the validation process, the precision results associated with the exceedances listed above for groundwater samples were considered moderately imprecise. The MS/MSD and field duplicate results indicate an acceptable level of precision was obtained (Appendix B).

4.2.2 Accuracy Accuracy is a measure of the agreement between the true value and the value measured using an analytical method (percent recovery). Accuracy also is evaluated during data validation by assessing initial and continuing calibration data for the analytical instrument. Accuracy for analytical data collected during the RI sampling events was assessed by evaluating percentage recoveries for MS/MSD samples, surrogate recoveries, laboratory control samples, and initial and continuing calibration standard results. The evaluation of recoveries for MS/MSD samples is presented in Table 4-2 and summarized below.

The percent recovery for some of the soil and groundwater samples was above the target range; therefore, some analytical results may be biased low. Some of the analytical results for SVOCs and inorganic analytes were qualified based on the evaluation of percent recovery. Review of the validation process suggests an acceptable level of accuracy was attained.

A summary of the surrogate spike samples and the surrogate compounds that were outside control limits for the Phase IIB samples collected at Site 14 is presented in Table 4-3. The required control limits were also identified for each surrogate compound. All the samples associated with these surrogates were

Table 4-1
Precision Summary for Soil and Groundwater Field Duplicate Samples

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

SDG Number	Sample ID	Compound	Sample Concentration	Duplicate Concentration	RPD	Control Limits
Soil						
WF007						
Organics (µg/kg)	14S00101	Acetone	8	ND	NC	50
		Methylene chloride	6	ND	NC	50
TAL Metals (mg/kg)		Aluminum	11,600	11,500	1	50
		Arsenic	1.5	1.9	23	50
		Barium	23.3	26.6	13	50
		Beryllium	0.15	0.16	6	50
		Calcium	120	183	6	50
		Chromium	7.8	7.8	0	50
		Cobalt	1.8	1.6	12	50
		Copper	3.8	4.3	12	50
		Iron	6,310	6,630	5	50
		Lead	7.7	11.9	42	50
		Magnesium	177	162	9	50
		Manganese	521	597	14	50
		Mercury	0.04	0.04	0	50
		Nickel	4.1	4.6	12	50
		Potassium	144	ND	NC	50
		Sodium	16.4	14.0	16	50
		Vanadium	16.8	17.4	6	50
		Zinc	6.0	6.6	10	50
Groundwater						
WF029						
Organics (µg/ℓ)	14G00101	Acetone	8	4	67	30
		Carbon disulfide	3	ND	NC	30
		Methylene chloride	1	ND	NC	30
		bis(2-Ethylhexyl)phthalate	4	4	0	

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

SDG Number	Sample ID	Compound	Sample Concentration	Duplicate Concentration	RPD	Control Limits
TAL Metals (mg/ℓ)		Aluminum	33.1	26.5	22	30
		Arsenic	0.50	ND	NC	30
		Barium	22.3	22.3	0	30
		Calcium	3,060	2,870	6	30
		Iron	22.0	27.3	22	30
		Lead	1.3	0.80	48	30
		Magnesium	702	691	2	30
		Manganese	1.9	1.9	0	30
		Mercury	0.12	ND	NC	30
		Sodium	1,590	1,570	1	30
		Vanadium	ND	1.4	NC	30
		Zinc	89.5	96.8	8	30

Notes: SDG = sample delivery group.
ID = identification.
RPD = relative percent difference.
μg/kg = micrograms per kilogram.
ND = nondetect.
NC = not calculable.
TAL = target analyte list.
mg/kg = milligrams per kilogram.
μg/ℓ = micrograms per liter.
mg/ℓ = milligrams per liter.
D_1 = sample concentration.
D_2 = duplicate concentration.

$$RPD = 100 \times \frac{|D_1 - D_2|}{0.5(D_1 + D_2)} \quad (1)$$

Table 4-2
Accuracy Summary for MS/MSD Samples

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

SDG Number	MS/MSD Sample	Analyte	% Recovery MS/MSD	Control Limits
WF007				
Soil				
Semivolatile Organic Compounds	10S00101	4-Chloro-3-methylphenol	111/-	26-103
WF029				
Groundwater				
Semivolatile Organic Compounds	14G00101	Pentachlorophenol	-/106	9-103
		4-Nitrophenol	88/91	10-80

Notes: MS/MSD = matrix spike and matrix spike duplicate.
SDG = sample delivery group.
% = percent.
- = not calculated

Table 4-3
Accuracy Summary for Surrogate Recoveries Outside QC Criteria

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

SDG Number	Sample ID	Spiked Analyte	Surrogate Recovery (%R)[1]	QC Limits (percent)
WF007	10R00101	Decachlorobiphenyl	54/-	60-150
WF029	13G00101	Decachlorobiphenyl	23/23	60-150
	66G00901	Decachlorobiphenyl	43/42	60-150
	66G00903	Decachlorobiphenyl	52/52	60-150

[1] Reported as value for first column/second column.

Notes: QC = quality control.
SDG = sample delivery group.
ID = identification.
%R = percent recovery.
- = not calculated.

qualified in accordance with the USEPA functional guidelines as presented in Subsection 3.3.4 of the GIR (ABB-ES, 1998). All data, based on surrogate recoveries, are acceptable for use in conducting the site characterization, risk assessment, and FS.

Initial calibrations are performed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data for VOCs on the TCL. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. Continuing calibrations are performed to ensure that the instrument is capable of producing acceptable qualitative and quantitative data.

Continuing calibration establishes the 12-hour relative response factor (RRF) on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. Initial and continuing calibrations for organic analysis are measured by the percent relative standard deviation (%RSD) for initial calibrations and the percent difference (%D) for continuing calibrations. For inorganic analysis, the initial calibration verification and continuing calibration verification are measured.

Table 4-4 summarizes the initial and continuing calibration details for the soil and groundwater samples collected at Site 14.

The evaluations of the %RSD for the initial calibrations and the %D for the continuing calibrations indicate that the response factors for the system performance check compounds (SPCCs) generally met the required criteria for VOCs, SVOCs, pesticides, and PCBs (LDC, 1996). Samples associated with those SDGs in which certain VOCs, SVOCs, pesticides, and PCBs exhibiting an RRF that did not meet the minimum requirements were qualified as UJ/J.

4.2.3 Representativeness Representativeness is the degree to which the data obtained from an environmental sample accurately reflect the presence or absence of contamination at a site. Field quality control samples (including source water blanks, equipment rinse blanks, and trip blanks) and laboratory quality control samples (including method [organic analyses] and preparation blanks [inorganic analysis]) were used to assess representativeness. Representativeness also is assessed by review of the adherence to extraction and analysis holding times. The evaluation of representativeness in field quality control samples for the RI sampling event is presented in Table 4-5 and summarized below.

- **Trip Blanks**. Acetone and methylene chloride were detected in trip blanks with a concentration ranging from 2 to 8 micrograms per liter ($\mu g/\ell$) for acetone and 0 to 1 $\mu g/\ell$ for methylene chloride. Both VOCs are widely recognized by the USEPA as laboratory contaminants commonly introduced during the calibration or cleaning of equipment (USEPA, 1994a).

  Environmental samples associated with the trip blanks with results greater than the instrument detection limit (IDL) but less than 10 times the amount detected in the trip blank were appropriately annotated with a J or UJ qualifier (LDC, 1996).

- **Equipment Rinsate Blanks**. VOCs were not detected in the equipment rinsate blanks (i.e., if present, VOCs were at concentrations less than

Table 4-4
Summary of Initial and Continuing Calibration

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

SDG	Compound	Initial Calibration	Continuing Calibration	Qualifier
WF007				
12/12/96	Dimethylphthalate	--	27.1	UJ
12/15/96	Nitrobenzene	--	25.6	UJ
	Pentachlorophenol	--	29.6	UJ
12/15/96	Nitrobenzene	--	30.8	
	2,4-Dinitrophenol	--	41.8	UJ
	4,6-Dinitro-2-methylphenol	--	30.1	UJ
	Pentachlorophenol	--	29.8	UJ
	Benzo(k)fluoranthene	--	26.5	UJ/J
WF029				
9/17/96	Chloromethane	--	38.1	J
	Methylene chloride	--	33.6	J
9/18/96	2-Hexatone	--	26.5	J
9/26/96	Benzo(k)fluoranthene	--	28.5	J
	Benzo(k)fluoranthene	--	25.6	J

Notes: Calibration values expressed as percent recovery.

SDG = sample delivery group.
-- = not detected.
UJ = The analyte was not detected above the reported sample instrument detection limit (IDL); however, the reported concentration is approximate and may not reliably be presumed to be less than the IDL value.
J = The analyte was positively identified and is reported as an approximate concentration.

Table 4-5
Representativeness Summary
Field Quality Control Samples

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	10T00101	10R00101	13T02301	13R01701
Collect Date:	07-DEC-95	07-DEC-95	9-SEP-96	11-SEP-96
Laboratory Sample No.:	G8889001	G8889009	RC092001	RC092008
Volatile Organic Compounds (μg/ℓ)				
Acetone	8	--	2	--
Methylene chloride	--	--	1	--
Semivolatile Organic Compounds (μg/ℓ)				
Di-*n*-butylphthalate	NA	15	NA	--
Pesticides and PCBs (μg/ℓ)				
None detected	NA	--	NA	--
Metals and Cyanide (μg/ℓ)				
Aluminum	NA	52.3 UJ	NA	--
Barium	NA	1.0 J	NA	--
Beryllium	NA	0.21 UJ	NA	--
Calcium	NA	22.6 UJ	NA	66.4 U
Copper	NA	5.0 UJ	NA	--
Iron	NA	45.4 UJ	NA	--
Sodium	NA	--	NA	25.4 U
Zinc	NA	1.5 UJ	NA	1.8 U

Notes: μg/ℓ = micrograms per kilogram.
-- = analyte not detected.
NA = not analyzed.
PCB = polychlorinated biphenyl.
U = analyte was not detected above instrument detection limits; value reported is detection limit.
J = estimated value.

the detection limit). One SVOC, di-*n*-butylphthalate, was detected in the equipment rinsate blank sample 10R00101 from SDG WF007 at a concentration of 15 $\mu g/\ell$.

Calcium and zinc were detected in equipment rinsate blanks from SDGs WF007 (10R00101) and WF029 (13R01701). The sample for SDG WF007 also contained aluminum (52.3 UJ $\mu g/\ell$), barium (1.0 J $\mu g/\ell$), beryllium (0.21 UJ $\mu g/\ell$), copper (5.0 UJ $\mu g/\ell$), and iron (45.4 UJ $\mu g/\ell$). The sample for SDG WF029 contained sodium (25.4 U $\mu g/\ell$) in the rinse blank (13R01701).

- **Laboratory Method and Preparation Blanks.** Concentrations of VOCs, SVOCs and metals were detected in the laboratory method blanks associated with SDGs WF007 and WF029.

  Environmental samples associated with laboratory method blanks that contained methylene chloride and acetone with results greater than the IDL but less than 10 times the amount detected in the laboratory preparation blanks were annotated with UJ qualifier (LDC, 1996).

  Sample results greater than the IDL but less than 5 times the amount detected in the laboratory preparation blanks were appropriately annotated with a J or UJ qualifier (LDC, 1996).

Sampling and analysis holding times for each analytical fraction were met in all samples.

Qualification of the environmental samples was required because of the detection of target analytes in laboratory and field blanks. Qualification of the RI data, based on blank contamination, was performed according to USEPA data validation guidelines (USEPA, 1994a and USEPA, 1994b).

4.2.4 **Comparability** Comparability is the confidence with which one data set can be compared with another and the degree to which the environmental data from each sampling event are considered equivalent. Comparability of the analytical data was assured by using standard operating procedures for sample collection, by using standard chemical analytical methods, and by reporting the analytical results in standard units (SU). The sampling, shipment, and analytical protocols were consistent with USEPA standard operation procedures and methodologies described in work plans for NAS Whiting Field throughout the period of the RI.

4.2.5 **Completeness** Completeness is the percentage of useable data reported and validated compared with the total number of measurements made. Useable data are those measurements that were not rejected (qualified with an "R") during the validation process. None of the analytical data were rejected. The goal for analytical completeness for the RI sampling event was 85 percent useable data. The completeness goal of 85 percent was met for all matrices and all parameters.

4.3 **SUMMARY**. Based on the results of the QC sample analyses, the established precision and accuracy goals of the project were achieved (Table 4-6). Some field- and/or laboratory-derived contamination was present in some of the QC samples, which required the results from some of the environmental samples to be amended. QC sample results and data validation criteria indicate a 100 percent

Table 4-6
Summary of DQO Assessment - PARCC Parameters

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
Soil and Groundwater Samples					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL Metals and Total Cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable

[1] Cumulative of sampling and analytical components.
[2] Analytical component.

Notes: All the units are expressed as the ratio of number of analytes meeting the quality control criteria to the total number of analytes.

DQO = data quality objective.
PARCC = precision, accuracy, reproducibility, completeness, and comparability.
% = percent.
TCL VOCs = target compound list volatile organic compounds.
TCL SVOCs = target compound list semivolatile organic compounds.
PCB = polychlorinated biphenyl.
TAL = target analyte list.

completeness was achieved, thus satisfying the 85 percent completeness goal. Standard methods of analysis and units of measure were used throughout the project, thus meeting the QC criteria and the DQOs presented in the work plan.

Overall, the data generated during the sampling event meet established DQOs and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures (LDC, 1996).

5.0 INVESTIGATIVE RESULTS

The RI Phase I investigation (ABB-ES, 1992a) at Site 14 consisted of collecting groundwater samples using a PCPT and BAT sampler. The Phase IIA investigation included conducting a geophysical survey, collecting surface and subsurface soil samples, installing a monitoring well, and collecting groundwater samples from the site's two monitoring wells. During Phase IIB the investigation included conducting a soil gas survey and collecting of surface soil and groundwater samples.

The following sections present the results of the geologic, hydrogeologic, and geophysical assessment and the analytical results from the soil gas, surface soil, subsurface soil, and groundwater sampling events.

5.1 GEOLOGIC ASSESSMENT. Surface soil was generally described as yellowish brown to yellowish orange, fine to very fine sand grading to brick red (fine- to very fine-grained) clayey sand. The shallow soil (2 to 7 feet bls) tended to be brown to red in color and contained interbedded sand, silt, and clay layers (ABB-ES, 1995e). Also, buried refuse (aluminum, newspapers, bottles, plastic, etc.) was encountered from depths of approximately 2 feet to 12 feet bls during the excavation of the test pits.

The general lithology of subsurface soil beneath Site 14 consists predominantly of light-colored, poorly graded (fine- to medium-grained) sand to a depth of at least 74 feet bls. An approximate 25-foot-thick clay layer was encountered at a depth of 74 feet bls at the location of monitoring well WHF-14-2. A clay layer was also reported at the same depth in monitoring well WHF-11-2, located northwest of the site. Considering the thickness of the clay and the relatively small size of Site 14, the clay layer may underlie the entire site. However, it should be noted that the clay layer was not identified in the lithologic log of monitoring well WHF-13-1S.

Detailed descriptions of the lithology encountered during test pit and monitoring well construction are presented in the RI Phase IIA Technical Memorandum No. 3 (ABB-ES, 1995e).

A general discussion of the geology at NAS Whiting Field is presented in Subsection 1.4.5 of the GIR (ABB-ES, 1998). Site 14 monitoring well boring logs are presented in Appendix G of this report.

5.2 HYDROGEOLOGIC ASSESSMENT. The hydrogeologic assessment included determining horizontal and vertical hydraulic gradients, hydraulic conductivities (K), and seepage velocities. The hydrogeologic assessment results are used to characterize the transport of chemicals of potential concern (CPCs) from the site by groundwater flow. Contaminant fate and transport for human health and ecological CPCs at Site 14 is presented in Chapter 8.0 of this report.

Groundwater Flow Direction. Table 5-1 summarizes the results of the water-level measurements for the southeast disposal area sites during the RI field program. Facilitywide water table elevation data is provided in Appendix D of the GIR (ABB-ES, 1998). Potentiometric surface maps for the southeast disposal area,

Table 5-1
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	September 30 and October 1, 1993		February 8 and 9, 1994	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	86.72	59.83	89.34	57.21
WHF-9-2	161.07	124.35	100.03	61.04	102.69	58.38
WHF-9-3S	150.85	108.24	90.78	60.07	93.35	57.50
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	88.12	58.61	90.62	56.11
WHF-10-2	150.75	113.14	92.04	58.71	94.58	56.17
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	51.08	73.78	63.42	61.44
WHF-11-1S	116.65	54.40	45.50	71.15	45.99	70.66
WHF-11-2	148.12	125.84	93.50	54.62	95.93	52.19
WHF-11-3	117.19	73.16	61.91	55.28	64.22	52.97
WHF-11-4S	129.43	79	--	--	--	--
WHF-11-4D	129.28	109	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	80.20	56.20	82.68	53.72
WHF-12-2	135.56	85	--	--	--	--
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	50.62	52.04	52.90	49.76
WHF-13-1S	108.97	61.30	55.25	53.72	57.59	51.38
WHF-13-1I	109.17	93	--	--	--	--
WHF-13-2S	102.86	72.41	51.61	51.25	53.85	49.01
WHF-13-3	81.81	41	--	--	--	--
WHF-13-4	80.86	40	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	88.49	51.20	90.79	48.90
WHF-14-2	145.80	118.30	95.15	50.65	97.45	48.35

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	June 22 to 24, 1994		October 10 to 13, 1994	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	88.19	58.36	82.20	64.35
WHF-9-2	161.07	124.35	101.95	59.12	95.49	65.58
WHF-9-3S	150.85	108.24	92.28	58.57	86.16	64.69
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	89.60	57.13	83.45	63.28
WHF-10-2	150.75	113.14	93.62	57.13	113.02	37.73
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	62.23	62.63	56.37	68.49
WHF-11-1S	116.65	54.40	44.63	72.02	43.56	73.09
WHF-11-2	148.12	125.84	94.97	53.15	88.79	59.33
WHF-11-3	117.19	73.16	63.08	54.11	57.16	60.03
WHF-11-4S	129.43	79	--	--	--	--
WHF-11-4D	129.28	109	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	81.67	54.73	75.41	60.99
WHF-12-2	135.56	85	--	--	--	--
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	51.89	50.77	46.00	56.66
WHF-13-1S	108.97	61.30	56.45	52.52	50.29	58.68
WHF-13-1I	109.17	93	--	--	--	--
WHF-13-2S	102.86	72.41	52.93	49.93	47.00	55.86
WHF-13-3	81.81	41	--	--	--	--
WHF-13-4	80.86	40	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	90.12	49.57	83.88	55.81
WHF-14-2	145.80	118.30	96.86	48.94	90.56	55.24

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 10 to 13, 1995		April 19 and 20, 1995	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	82.82	63.73	82.73	63.82
WHF-9-2	161.07	124.35	95.99	65.08	96.14	64.93
WHF-9-3S	150.85	108.24	86.73	64.12	86.80	64.05
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	83.97	62.76	84.12	62.61
WHF-10-2	150.75	113.14	88.00	62.75	88.10	62.65
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	57.17	67.69	56.92	67.94
WHF-11-1S	116.65	54.40	44.57	72.08	44.03	72.62
WHF-11-2	148.12	125.84	89.22	58.90	89.56	58.56
WHF-11-3	117.19	73.16	57.97	59.22	57.74	59.45
WHF-11-4S	129.43	79	--	--	--	--
WHF-11-4D	129.28	109	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	76.06	60.34	76.22	60.18
WHF-12-2	135.56	85	--	--	--	--
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	46.73	55.93	46.61	56.05
WHF-13-1S	108.97	61.30	51.18	57.79	51.02	57.95
WHF-13-1I	109.17	93	--	--	--	--
WHF-13-2S	102.86	72.41	47.66	55.20	47.64	55.22
WHF-13-3	81.81	41	--	--	--	--
WHF-13-4	80.86	40	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	84.30	55.39	84.67	55.02
WHF-14-2	145.80	118.30	90.93	54.87	91.41	54.39

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	July 28 and 29, 1995		October 12 to 14, 1995	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	82.01	64.54	82.27	64.28
WHF-9-2	161.07	124.35	95.15	65.92	95.35	65.72
WHF-9-3S	150.85	108.24	85.90	64.95	86.14	64.71
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	83.22	63.51	83.62	63.11
WHF-10-2	150.75	113.14	87.15	63.60	87.55	63.20
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	56.49	68.37	56.96	67.90
WHF-11-1S	116.65	54.40	44.41	72.24	44.18	72.47
WHF-11-2	148.12	125.84	88.73	59.39	89.45	58.67
WHF-11-3	117.19	73.16	57.31	59.88	57.81	59.38
WHF-11-4S	129.43	79	--	--	--	--
WHF-11-4D	129.28	109	--	61.59	--	57.75
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	75.38	61.02	75.99	60.41
WHF-12-2	135.56	85	--	--	--	--
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	46.19	56.47	46.93	55.73
WHF-13-1S	108.97	61.30	50.62	58.35	51.34	57.63
WHF-13-1I	109.17	93	--	--	--	--
WHF-13-2S	102.86	72.41	46.09	56.77	47.98	54.88
WHF-13-3	81.81	41	--	--	--	--
WHF-13-4	80.86	40	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	83.90	55.79	84.84	54.85
WHF-14-2	145.80	118.30	90.55	55.25	91.55	54.25

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 19 and 20, 1996		April 25 to 27, 1996	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	76.91	69.64	75.99	70.56
WHF-9-2	161.07	124.35	90.03	71.04	89.13	71.94
WHF-9-3S	150.85	108.24	80.78	70.07	79.96	70.89
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	78.33	68.40	77.49	69.24
WHF-10-2	150.75	113.14	82.25	68.50	81.44	69.31
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	51.85	73.01	50.82	74.04
WHF-11-1S	116.65	54.40	43.26	73.39	43.35	73.30
WHF-11-2	148.12	125.84	84.03	64.09	83.53	64.59
WHF-11-3	117.19	73.16	52.69	64.50	51.68	65.51
WHF-11-4S	129.43	79	--	--	--	--
WHF-11-4D	129.28	109	--	61.59	--	57.75
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	70.61	65.79	69.90	66.50
WHF-12-2	135.56	85	--	--	--	--
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	41.87	60.79	41.14	57.48
WHF-13-1S	108.97	61.30	45.92	63.05	45.18	63.79
WHF-13-1I	--	93	--	--	--	--
WHF-13-2S	102.86	72.41	42.91	59.95	42.26	60.60
WHF-13-3	81.81	41	--	--	--	--
WHF-13-4	80.86	40	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	79.60	60.09	79.14	60.55
WHF-14-2	145.80	118.30	86.30	59.50	85.90	59.90

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	July 25 to 27, 1996		November 7 to 9, 1996	
			Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)	Depth to Water Level (ft BTOC)	Groundwater Elevation (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	77.40	69.11	80.95	65.70
WHF-9-2	161.07	124.35	90.27	70.80	93.61	67.46
WHF-9-3S	150.85	108.24	81.30	69.55	84.67	66.18
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	78.82	67.91	82.18	64.55
WHF-10-2	150.75	113.14	82.66	68.09	86.02	64.73
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	52.98	71.88	56.17	68.69
WHF-11-1S	116.65	54.40	44.43	72.22	45.25	71.40
WHF-11-2	148.12	125.84	84.58	63.54	88.01	60.11
WHF-11-3	117.19	73.16	53.78	63.41	57.03	60.16
WHF-114S	129.43	79	--	--	67.81	61.62
WHF-11-4D	129.28	109	64.20	61.59	68.04	57.75
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	71.37	65.03	74.75	61.65
WHF-12-2	135.56	85	--	--	51.45	57.72
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	42.84	55.55	46.17	526.49
WHF-13-1S	108.97	61.30	47.11	61.86	50.48	58.49
WHF-13-1I	109.17	93	--	--	51.45	--
WHF-13-2S	102.86	72.41	43.88	58.98	47.13	55.73
WHF-13-3S	--	--	--	--	--	--
WHF-13-4S	--	--	--	--	--	--
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	80.19	59.50	63.65	76.04
WHF-14-2	145.80	118.30	86.83	58.97	90.33	55.47

See notes at end of table.

Table 5-1 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 16 to 18, 1997		August 7 to 9, 1997	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	83.07	63.48	84.69	61.86
WHF-9-2	161.07	124.35	96.01	65.06	97.88	63.19
WHF-9-3S	150.85	108.24	87.01	63.84	88.69	62.16
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	84.50	62.23	86.16	60.57
WHF-10-2	150.75	113.14	88.38	62.37	90.08	60.67
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	58.24	66.47	59.28	65.43
WHF-11-1S	116.65	54.40	45.71	70.94	44.83	71.82
WHF-11-2	148.12	125.84	90.29	57.83	92.20	55.92
WHF-11-3	117.19	73.16	59.10	58.09	60.13	57.06
WHF-11-4S	129.43	76.00	70.07	59.36	71.19	58.24
WHF-11-4D	129.28	106.00	69.72	59.56	71.16	58.12
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	77.02	59.38	78.42	57.98
WHF-12-2	135.56	85.00	76.11	59.45	79.54	56.02
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	48.38	54.28	49.41	53.25
WHF-13-1S	108.97	61.30	52.27	56.70	53.55	55.42
WHF-13-1I	109.17	91.00	52.20	56.97	53.63	55.54
WHF-13-2S	102.86	72.41	49.10	53.76	50.14	52.72
WHF-13-3S	81.44	42.00	--	--	28.26	53.18
WHF-13-4S	80.37	42.00	--	--	31.35	49.02
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	85.85	53.84	87.11	52.58
WHF-14-2	145.80	118.30	92.55	53.25	93.83	52.17

Notes: TOC = top of casing.
msl = mean sea level.
ft BTOC = feet below top of casing.
ft msl = feet above mean sea level.
-- = no water level was recorded for this round of sampling.

generated from the water-level measurement events presented in Table 5-1, indicate a groundwater flow direction to the southeast at Site 14. Furthermore, the potentiometric surface maps for the February 1994 monitoring event (Figure 5-1) and the November 1996 monitoring event (Figure 5-2) suggest that groundwater flow patterns are similar over this period of time.

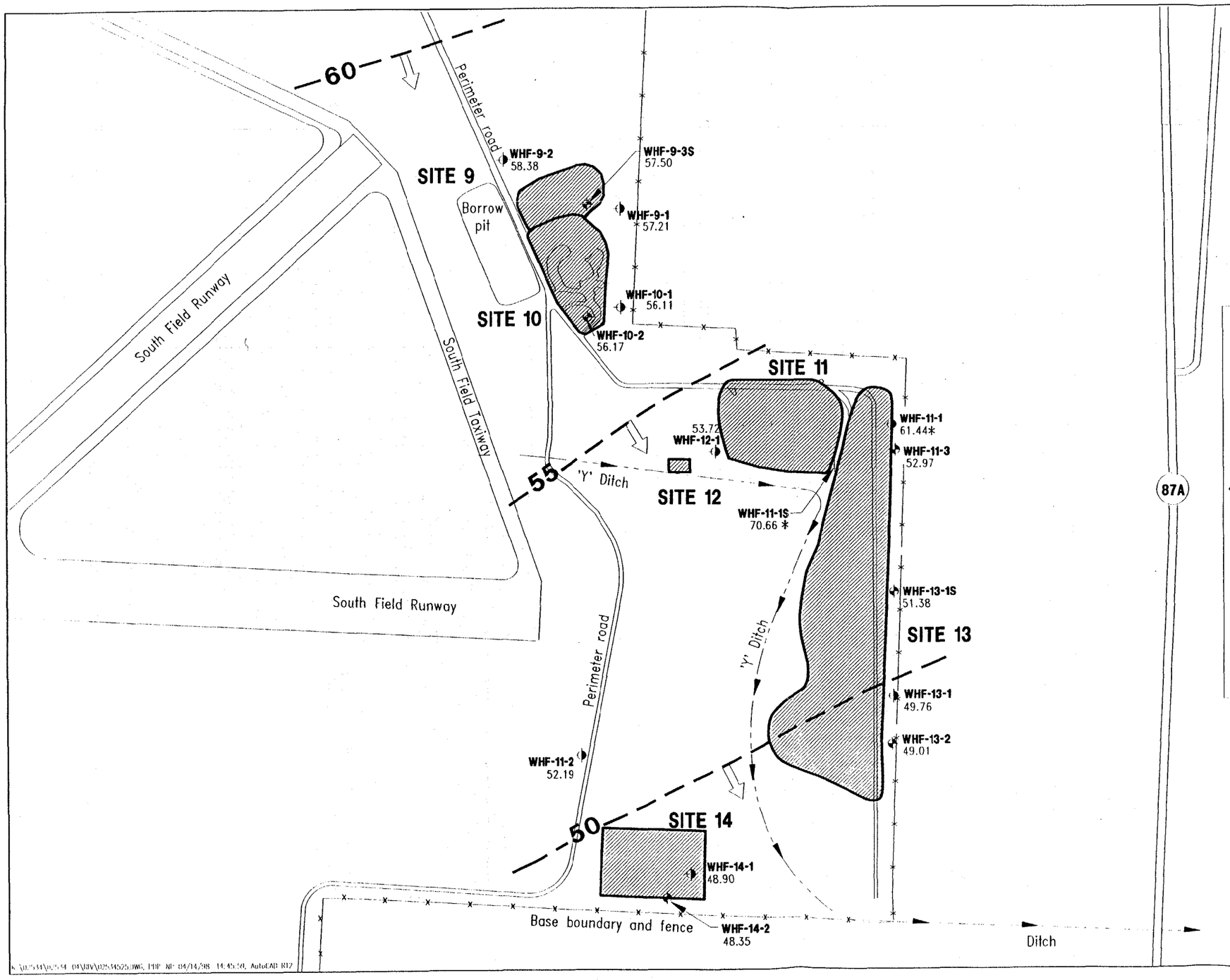
Three intermediate depth wells (WHF-11-1, WHF-13-1, and WHF-14-1) were completed at depths generally 10 to 30 feet deeper than the shallow zone monitoring wells (Table 3-1). Water-level measurements from these three wells suggests a groundwater flow pattern to the southeast. This deeper flow path appears to be similar to the flow pattern for the shallow water table zone.

Horizontal Hydraulic Gradients. Table 5-2 provides a summary of the horizontal hydraulic gradients calculated for the southeast disposal area from October 1993 to November 1996. The individual horizontal hydraulic gradients between well pairs in the southeast disposal area ranged from a low of 0.0021 feet per foot (ft/ft) to a maximum of 0.0036 ft/ft. The average horizontal hydraulic gradient for the southeast disposal area at any one measurement period ranged from 0.0026 ft/ft for February 1994 to 0.0033 ft/ft for April 1996. The overall average horizontal hydraulic gradient for all measurement events from 1993 through 1996 was 0.0029 ft/ft. Two anomalous water-level measurements were excluded from the above averages due to potential data errors. These exclusions were monitoring well WHF-10-2 for October 1994 and monitoring well WHF-14-1 for November 1996.

Vertical Hydraulic Gradients. Table 5-3 presents a summary of the vertical hydraulic gradients calculated for the Site 14 area. The vertical hydraulic gradients have been calculated for the southeast disposal area since 1993 using wells WHF-14-1 and WHF-14-2. Vertical gradients were also calculated at these sites using November 1996 data for two additional well clusters installed during the Phase IIB at Site 11 (WHF-11-4S/WHF-11-4D) and Site 13 (WHF-13-1S/WHF-13-1I).

A downward vertical hydraulic gradient of 0.024 ft/ft was measured at both Site 11 and Site 13. The downward hydraulic gradient is in contrast to the consistently upward hydraulic gradient measured at Site 14 in the southern half the southeast disposal area. Typically, the upward hydraulic gradient at well cluster WHF-14-1/WHF-14-2 ranged from 0.013 ft/ft to 0.016 ft/ft. However, the November 1996 measurements indicated an anomalously high hydraulic gradient of 0.50 ft/ft at this well cluster based on a 20-foot difference in water levels between these two wells. The average water-level difference between these wells is approximately 0.6 feet, suggesting a potential measurement error rather than a dramatic change in the site hydrogeology.

Hydraulic Conductivity. Slug tests were conducted at five shallow monitoring wells in the southeast disposal area during the RI. Table 5-4 summarizes the hydraulic conductivity values and geometric mean calculated for monitoring wells in the southeast disposal area. The slug test trials on monitoring well WHF-11-2 were rejected because data were extremely varied (Table 5-4). In addition, hydraulic conductivity data from monitoring well WHF-10-2 were rejected because the data exceeded the 20 percent variance criteria. A description of the procedure used to conduct and evaluate the hydraulic conductivity data is presented in Section 2.3 in Table 2-2 of Technical Memorandum No. 4, Hydrogeologic Assessment (ABB-ES, 1995c).



N

0 250 500
SCALE: 1 INCH = 500 FEET

LEGEND

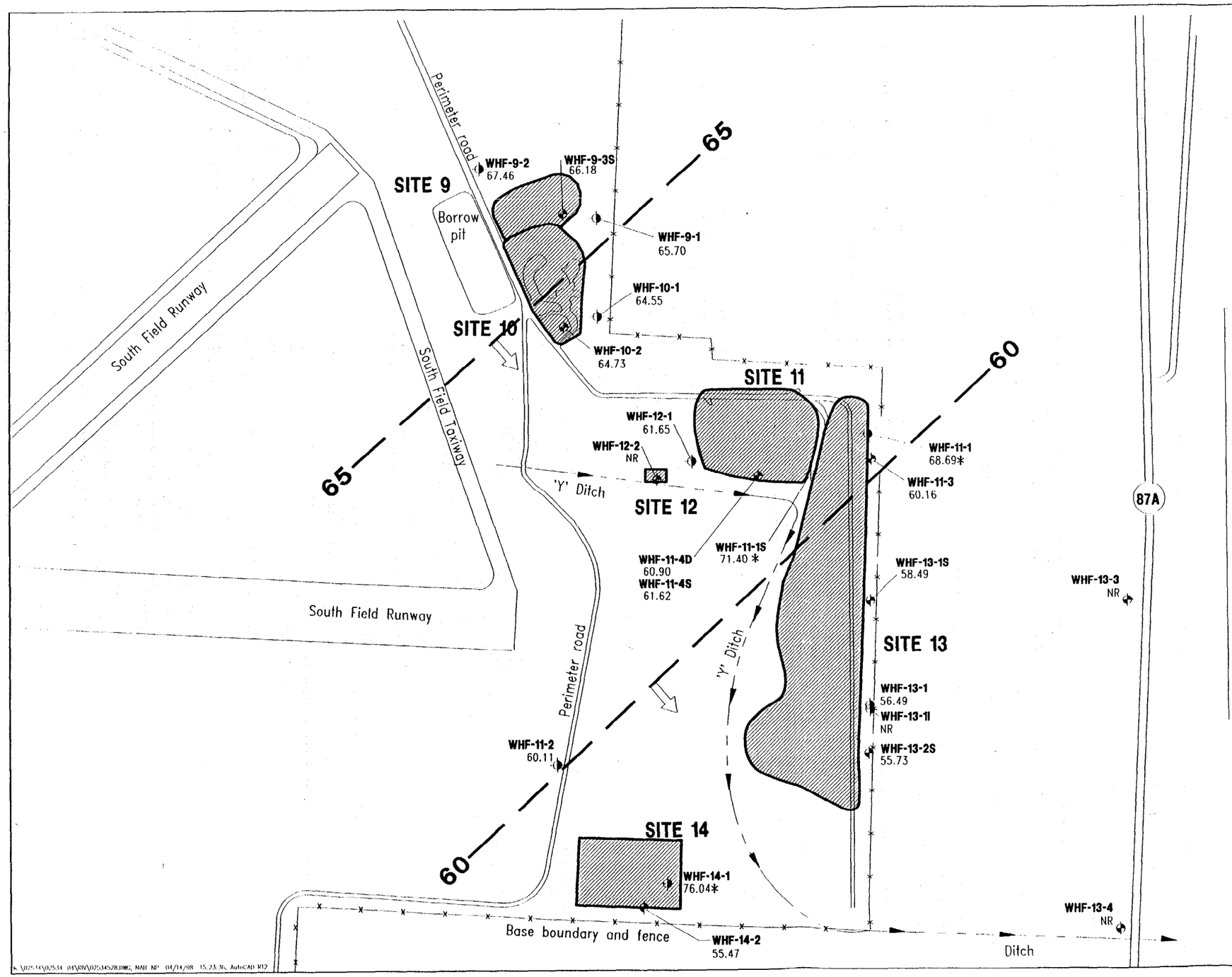
WHF-13-2 49.01	Shallow monitoring well location and designation with groundwater elevation value in feet, mean sea level
WHF-9-1 57.21	Intermediate or deep monitoring well location and designation, with groundwater elevation value in feet, mean sea level
WHF-11-1S 70.66	Perched monitoring well location and designation with groundwater elevation value in feet, mean sea level
50	Inferred groundwater elevation contour in feet above mean sea level, contour interval = 5 feet
*	Data not used in groundwater contour determination
	Groundwater flow direction
	Approximate site location
	Drainage feature and surface water flow direction
NAS	Naval Air Station
87A	Highway

FIGURE 5-1
POTENTIOMETRIC SURFACE MAP OF THE WATER TABLE ZONE IN THE SAND-AND-GRAVEL AQUIFER, SOUTHEAST DISPOSAL AREA, FEBRUARY 1994

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

00246DB22



0 250 500
SCALE: 1 INCH = 500 FEET

LEGEND

WHF-13-2S 55.73	Shallow monitoring well location and designation with groundwater elevation value in feet, mean sea level
WHF-9-1 65.70	Intermediate or deep monitoring well location and designation, with groundwater elevation value in feet, mean sea level
WHF-11-1S 71.40	Perched monitoring well location and designation with groundwater elevation value in feet, mean sea level
60	Inferred groundwater elevation contour in feet above mean sea level, contour interval = 5 feet
*	Data not used in groundwater contour determination
	Groundwater flow direction
	Approximate site location
	Drainage feature and surface water flow direction
NR	Not recorded
NAS	Naval Air Station
87A	Highway

FIGURE 5-2
POTENTIOMETRIC SURFACE MAP OF THE WATER TABLE ZONE IN THE SAND-AND-GRAVEL AQUIFER, SOUTHEAST DISPOSAL AREA, NOVEMBER 1996

REMEDIAL INVESTIGATION REPORT
SITES 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

Table 5-2
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	September 30 to October 1, 1993		February 8 and 9, 1994	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	60.07	0.0026	57.50	0.0025
WHF-10-2		58.71		56.17	
WHF-9-1	460	59.83	0.0027	57.21	0.0024
WHF-10-1		58.61		56.11	
WHF-9-2	842	61.04	0.0028	58.38	0.0026
WHF-10-2		58.71		56.17	
WHF-11-3	1,381	55.28	0.0029	52.97	0.0029
WHF-13-2		51.25		49.01	
WHF-11-2	1,123	54.62	0.0031	52.19	0.0029
WHF-14-1		51.20		48.90	
WHF-9-2	3,547	61.04	0.0029	58.38	0.0028
WHF-14-2		50.65		48.35	
		Average Gradient	0.0028		0.0026

See notes at end of table.

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	June 22 to 24, 1994		October 10 to 13, 1994	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	58.57	0.0027	64.69	**
WHF-10-2		57.13		37.73	
WHF-9-1	460	58.36	0.0027	64.35	0.0023
WHF-10-1		57.13		63.28	
WHF-9-2	842	59.12	0.0024	65.58	**
WHF-10-2		57.13		37.73	
WHF-11-3	1,381	54.11	0.0030	60.03	0.0030
WHF-13-2		49.93		55.86	
WHF-11-2	1,123	53.15	0.0032	59.33	0.0031
WHF-14-1		49.57		55.81	
WHF-9-2	3,547	59.12	0.0029	65.58	0.0029
WHF-14-2		48.94		55.24	
		Average Gradient	0.0029		0.0028

See notes at end of table.

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 10 to 13, 1995		April 19 and 20, 1995	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	64.12	0.0026	64.05	0.0027
WHF-10-2		62.75		62.65	
WHF-9-1	460	63.73	0.0021	63.82	0.0026
WHF-10-1		62.76		62.61	
WHF-9-2	842	65.08	0.0028	64.93	0.0027
WHF-10-2		62.75		62.65	
WHF-11-3	1,381	59.22	0.0029	59.45	0.0031
WHF-13-2		55.20		55.22	
WHF-11-2	1,123	58.90	0.0031	58.56	0.0032
WHF-14-1		55.39		55.02	
WHF-9-2	3,547	65.08	0.0029	64.93	0.0030
WHF-14-2		54.87		54.39	
		Average Gradient	0.0027		0.0029

See notes at end of table.

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	July 28 and 29, 1995		October 12 to 14, 1995	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	64.95	0.0026	64.71	0.0029
WHF-10-2		63.60		63.20	
WHF-9-1	460	64.54	0.0022	64.28	0.0025
WHF-10-1		63.51		63.11	
WHF-9-2	842	65.92	0.0028	65.72	0.0030
WHF-10-2		63.60		63.20	
WHF-11-3	1,381	59.88	0.0023	59.38	0.0033
WHF-13-2		56.77		54.88	
WHF-11-2	1,123	59.39	0.0032	58.67	0.0034
WHF-14-1		55.79		54.85	
WHF-9-2	3,547	65.92	0.0030	65.72	0.0032
WHF-14-2		55.25		54.25	
		Average Gradient	0.0027		0.0031

See notes at end of table.

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 19 and 20, 1996		April 25 to 27, 1996	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	70.07	0.0030	70.89	0.0030
WHF-10-2		68.50		69.31	
WHF-9-1	460	69.64	0.0027	70.56	0.0029
WHF-10-1		68.40		69.24	
WHF-9-2	842	71.04	0.0030	71.94	0.0031
WHF-10-2		68.50		69.31	
WHF-11-3	1,381	64.50	0.0033	65.51	0.0036
WHF-13-2		59.95		60.60	
WHF-11-2	1,123	64.09	0.0036	64.59	0.0036
WHF-14-1		60.09		60.55	
WHF-9-2	3,547	71.04	0.0033	71.94	0.0034
WHF-14-2		59.50		59.90	
	Average Gradient		0.0032		0.0033

See notes at end of table.

Table 5-2 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	July 25 to 27, 1996		November 7 to 9, 1996	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	69.55	0.0028	66.18	0.0028
WHF-10-2		68.09		64.73	
WHF-9-1	460	69.11	0.0026	65.70	0.0025
WHF-10-1		67.91		64.55	
WHF-9-2	842	70.80	0.0032	67.46	0.0032
WHF-10-2		68.09		64.73	
WHF-11-3	1,381	63.41	0.0032	60.16	0.0032
WHF-13-2		58.98		55.73	
WHF-11-2	1,123	63.54	0.0036	60.11	**
WHF-14-1		59.50		76.04	
WHF-9-2	3,547	70.80	0.0033	67.46	0.0034
WHF-14-2		58.97		55.47	
	Average Gradient		0.0031		0.0031

Notes: msl = mean sea level.
ft/ft = feet per foot.
** = horizontal gradient not calculated due to anomaly in water-level data.

Table 5-3
Summary of Vertical Hydraulic Gradients
Southeast Disposal Area

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Well Screens (feet)	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
September 30 and October 1, 1993					
WHF-14-2	27.5	41.01	50.65	0.0134	Upward
WHF-14-1	-13.51		51.20		
February 8 and 9, 1994					
WHF-14-2	27.5	41.01	48.35	0.0134	Upward
WHF-14-1	-13.51		48.90		
June 22 to 24, 1994					
WHF-14-2	27.5	41.01	48.94	0.0154	Upward
WHF-14-1	-13.51		49.57		
October 10 to 13, 1994					
WHF-14-2	27.5	41.01	55.24	0.0139	Upward
WHF-14-1	-13.51		55.81		
January 10 to 13, 1995					
WHF-14-2	27.5	41.01	54.87	0.0127	Upward
WHF-14-1	-13.51		55.39		
April 19 and 20, 1995					
WHF-14-2	27.5	41.01	54.39	0.0154	Upward
WHF-14-1	-13.51		55.02		

See notes at end of table.

Table 5-3 (Continued)
Summary of Vertical Hydraulic Gradients
Southeast Disposal Area

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Well Screens (feet)	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
July 28 and 29, 1995					
WHF-14-2	27.5	41.01	55.25	0.0132	Upward
WHF-14-1	-13.51		55.79		
October 12 and 14, 1995					
WHF-14-2	27.5	41.01	54.25	0.0146	Upward
WHF-14-1	-13.51		54.85		
January 19 and 20, 1995					
WHF-14-2	27.5	41.01	59.50	0.0144	Upward
WHF-14-1	-13.51		60.09		
April 25 to 27, 1996					
WHF-14-2	27.5	41.01	59.90	0.0158	Upward
WHF-14-1	-13.51		60.55		
July 25 to 27, 1996					
WHF-14-2	27.5	41.01	58.97	0.0129	Upward
WHF-14-1	-13.51		59.50		
November 7 to 9, 1996					
WHF-14-2	27.5	41.01	55.47	0.5016	Upward
WHF-14-1	-13.51		76.04		
WHF-13-1S	47.67	31.5	58.49	0.0244	Downward
WHF-13-1I	16.17		57.72		
WHF-11-4S	50.43	30.49	61.62	0.0236	Downward
WHF-11-4D	19.94		60.90		

Notes: msl = mean sea level.
ft/ft = feet per foot.

Table 5-4
Summary of Hydraulic Conductivity (K) Data from Slug Tests

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Well Number	Range of K (ft/day)	Number of Usable Runs	Average K (ft/min)	Average K (ft/day)	Average K (cm/sec)
Southeast Disposal Area					
Site 10, Southeast Open Disposal Area (A)					
WHF-10-2	R	R	R	R	R
Site 11, Southeast Open Disposal Area (B)					
WHF-11-2	R	R	R	R	R
WHF-11-3	4.41 to 5.23	3	0.0033	4.73	1.67×10^{-3}
Site 13, Sanitary Landfill					
WHF-13-2S	13.23 to 15.51	6	0.0101	14.55	5.13×10^{-3}
Site 14, Short-Term Sanitary Landfill					
WHF-14-2	8.53 to 8.57	2	0.0059	8.55	3.02×10^{-3}
			Geometric Mean	8.38	2.96×10^{-3}

Notes: Average is the arithmetic average.

ft/day = feet per day.
ft/min = feet per minute.
cm/sec = centimeters per second.
R = data rejected.

Average hydraulic conductivity values for individual monitoring wells in the southeast disposal area ranged from 4.73 feet per day (ft/day) (1.67×10^{-3} centimeters per second [cm/sec]) for WHF-11-3 to 14.55 ft/day (5.13×10^{-3} cm/sec) for WHF-13-2S. The variation is likely a result of the lithology of sediment adjacent to the screened intervals. The lithological log ranged from well-graded to poorly-graded sand between 27 to 59 feet above msl. The geometric mean for the hydraulic conductivity data of monitoring wells in the area was 8.38 ft/day (2.96×10^{-3} cm/sec) (Table 5-4).

Seepage Velocity. The seepage velocity was calculated by multiplying the hydraulic conductivity (K) by the hydraulic gradient and dividing by the effective porosity (n). Table 5-5 summarizes the average linear pore water velocity (i.e., seepage velocity) for the water table zone of the sand and gravel aquifer for sites in the southeast disposal area. The calculations are based on an assumed effective porosity (n) of 0.35 for the site soil. The effective porosity (n) value represents silty through poorly graded sand (Fetter, 1988). Seepage velocities ranged from 0.069 ft/day at Sites 9, 10, 11, 13, and 14 to 0.079 ft/day at Sites 11 and 13. The average of the seepage velocity values for the southeast disposal area sites was 0.074 ft/day (27 feet per year [ft/yr]).

Table 5-5
Summary of Phase II Seepage Velocities

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Investigation Area	Sites	Monitoring Well Pair	Horizontal[1] Gradient (ft/ft)	K (ft/day)	Effective Porosity(n)	Seepage Velocity (ft/day)
Southeast Disposal Area	11 and 13	WHF-11-3 and WHF-13-2	0.0029	[2]9.65	0.35	0.079
	9, 10, 11, 13, and 14	WHF-9-2 and WHF-14-2	0.0029	[3]8.37	0.35	0.069
					Arithmetic average	0.074

[1] Horizontal gradients based on groundwater measurements from September 1993 through November 1996.
[2] The K is averaged where values are available for both wells in the well pair.
[3] Geometric mean for the area.

Notes: ft/ft = feet per foot.
K = hydraulic conductivity (ft/day).
ft/day = feet per day.

5.3 GEOPHYSICAL SURVEY ASSESSMENT. Interpretation of the geophysical survey data from Site 14 suggests that there are two anomalies. The total magnetic, conductivity, and inphase data sets show a large-scale anomaly, approximately 320 feet long by 60 feet wide, that is characteristic of fill containing metallic debris. This area, shown on Figure 3-1 and in Appendix A, has been interpreted as the former disposal area. In addition to the larger area, a low amplitude anomaly was identified in both the total magnetic and EM-31 conductivity data sets. The location of this anomaly is shown on Figures A-1, A-2, and A-3 in Appendix A.

5.4 SOIL GAS ASSESSMENT. The geophysical interpreted anomalies were used to select locations where soil gas was monitored at 24 of the original 35 proposed locations. The monitoring began with those points on either side of the identified disposal area and moved outward from these locations. Because total volatile organic compounds (TVOCs) and methane were only detected at four grid locations (Locations 14, 18, 23, and 32) adjacent to or within the former disposal area, it was determined that there was no need to monitor the remaining points located to the south (Locations 6, 11, 16, 21, and 26) or the west (Locations 1, 2, 3, 4, and 5).

Table 5-6 presents the analytical results from the soil gas survey at Site 14. In general, methane was the significant component of the TVOCs (greater than 80 percent). Results from the second sample at Location 23 (taken three days after original sample) demonstrate both spatial and temporal variability in soil gas concentrations within a 10-foot-radius. As indicated on Table 5-6, the soil gas at Site 14 was limited in areal extent and there was no evidence of off-site migration.

5.5 SURFACE SOIL ASSESSMENT. Table 5-7 summarizes the analytical results for organic and inorganic analytes detected in six surface soil samples (and one duplicate) at Site 14. The sample locations are shown on Figure 3-2. Table 5-8 summarizes the frequency of detection, range of detection limits, range of detection concentrations, and background screening values for Site 14 surface soil samples. A summary of the analytical results is presented below.

TCL VOCs. Xylene (total) (estimated 2 micrograms per kilogram [μg/kg]) was the only VOC detected in a surface soil sample (14-SL-01) during the Phase IIA sampling event. Methylene chloride was the only VOC detected in surface soil (14S00101 [estimated 6 μg/kg] and 14S00301 [estimated 8 μg/kg]) during the Phase IIB sampling. Neither xylene nor methylene chloride was detected in the background samples for the site. The concentrations detected in the on-site soil did not exceed the USEPA Region III risk-based concentration (RBCs) or Florida soil cleanup target levels.

TCL SVOCs. Two SVOCs (chrysene and bis(2-ethylhexyl)phthalate) were detected. Both compounds were detected in sample 14-SL-02, which was collected during the Phase IIA sampling event. The detected concentrations did not exceed USEPA Region III RBCs or the Florida soil cleanup target levels.

Pesticides and PCBs. No pesticides or PCBs were detected in surface soil samples collected at Site 14.

TAL Metals and (Total) Cyanide. Nineteen TAL metals and cyanide were detected in the surface soil samples. Nine of the analytes including aluminum, arsenic barium, cadmium, chromium, iron, manganese, potassium, and vanadium were detected at concentrations exceeding the background screening concentration. Aluminum was detected at concentrations that exceeded the USEPA Region III residential RBC of 7,800 milligrams per kilogram (mg/kg) in all samples. The Florida soil cleanup target level for aluminum was not exceeded. Only two samples, 14-SL-01 (20,400 mg/kg) and 14S00201 (23,800 mg/kg) exceeded the background screening concentration of 15,300 mg/kg. Arsenic was detected in all surface soil samples at concentrations

Table 5-6
Summary of Active Soil Gas Survey, July 13 through 16, 1995

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
7	1.5	0	0	NA	0
	3.0	0	0	NA	
8	1.5	0	0	NA	0
	3.0	0	0	NA	
9	1.5	0	0	NA	1
	3.0	0	0	NA	
10	1.5	0	0	NA	0
	3.0	0	0	NA	
12	1.5	0	0	NA	1
	3.0	0	0	NA	
13	1.5	0	0	NA	0
	3.0	0	0	NA	
14	1.5	1	0	0	2
	3.0	5	0	0	
15	1.5	0	0	NA	0
	3.0	0	0	NA	
17	1.5	0	0	NA	0
	3.0	0	0	NA	
18	1.5	0	0	NA	0
	3.0	3	3	100	
19	1.5	0	0	NA	0
	3.0	0	0	NA	
20	1.5	0	0	NA	0
	3.0	0	0	NA	
22	1.5	0	0	NA	0
	3.0	0	0	NA	
23	1.5	3,200	2,600	81	0
	3.0	4,500	3,700	82	
23D	1.5	350	80	23	0
	3.0	30	0	NA	

See notes at end of table.

Table 5-6 (Continued)
Summary of Active Soil Gas Survey, July 13 through 16, 1995

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample ID	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Methane/VOC (percent)	Rinsate Blank (ppm)
24	1.5	0	0	NA	0
	3.0	0	0	NA	
25	1.5	0	0	NA	0
	3.0	0	0	NA	
28	1.5	0	0	NA	0
	3.0	0	0	NA	
29	1.5	No sample	No sample	NA	2
	3.0	No sample	No sample	NA	
30	1.5	0	0	NA	0
	3.0	0	0	NA	
31	1.5	0	0	NA	0
	3.0	0	0	NA	
32	1.5	31	29	NA	0
	3.0	>5,000	>5,000	NA	
33	1.5	0	0	NA	0
	3.0	0	0	NA	
34	1.5	0	0	NA	0
	3.0	0	0	NA	
35	1.5	0	0	NA	1
	3.0	0	0	NA	

Notes: ID = identification.
VOC = volatile organic compounds.
ppm = parts per million.
NA = not applicable.
> = greater than.

Table 5-7
Summary of Analytical Results, Site 14 Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	14-SL-01	14-SL-02	14-SL-03	14S00101	14S00101D	14S00201	14S00301
Collect Date:	08/11/92	08/11/92	08/11/92	12/08/95	12/08/95	12/08/95	12/08/95
Volatile Organic Compounds (µg/kg)							
Methylene chloride	--	--	--	6 J	--	--	8 J
Xylenes (total)	2 J	--	--	--	--	--	--
Semivolatile Organic Compounds (µg/kg)							
Chrysene	--	380 J	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	40 J	--	--	--	--	--
Pesticides and PCBs (µg/kg)							
None detected							
Inorganic Analytes (mg/kg)							
Aluminum	20,400	13,500	11,800	11,600	11,500	23,800	10,100
Arsenic	4.2	2.2 J	1.8 J	1.5 J	1.9 J	4.3	1.7 J
Barium	12 J	6.2 J	17.1 J	23.3 J	26.6 J	11.9 J	14.9 J
Beryllium	0.15 J	0.13 J	0.12 J	--	--	--	--
Cadmium	--	0.94 J	--	--	--	--	--
Calcium	118 J	80.9 J	110 J	120 J	183 J	56.6 J	51.9 J
Chromium	17	17.6	7.2	7.8	7.8	19.6	5.9
Cobalt	1.5 J	1.5 J	1.8 J	1.8 J	1.6 J	0.65 J	1.3 J
Copper	4.9 J	5.1 J	7.8	--	--	--	--
Cyanide	--	--	--	0.07 J	--	--	--
Iron	14,300	15,800	7,120	6,310	6,630	15,500	5,470

See notes at end of table.

Table 5-7 (Continued)
Summary of Analytical Results, Site 14 Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	14-SL-01	14-SL-02	14-SL-03	14S00101	14S00101D	14S00201	14S00301
Collect Date:	08/11/92	08/11/92	08/11/92	12/08/95	12/08/95	12/08/95	12/08/95
Inorganic Analytes (mg/kg) (Continued)							
Lead	5.7 J	5.1 J	4.3 J	7.7 J	11.9 J	6.2 J	5.3 J
Magnesium	87.4 J	48.6 J	106 J	177 J	162 J	142 J	122 J
Manganese	62.3	33.6	113	521 J	597 J	43.6 J	313 J
Mercury	--	--	--	0.04 J	0.04 J	0.02 J	0.04 J
Nickel	--	--	--	4.1 J	4.6 J	5 J	3.5 J
Potassium	--	--	--	144 J	--	174 J	--
Sodium	170 J	179 J	180 J	--	--	--	--
Vanadium	37.4	42.1	16.9	16.8	17.4	41.1	14.1
Zinc	7.7 J	11.1	7.8 J	--	--	--	--

Notes: μg/kg = micrograms per kilogram.
-- = analyte, if present, was less than the detection limit.
J = estimated value.
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.

Table 5-8
Comparison of Analytes Detected in Site 14 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/Industrial[4]	Florida Soil Cleanup Target Levels Residential/Industrial/ Leachability[5]
Volatile Organic Compounds (µg/kg)						
Methylene chloride	2/6	6 to 11.5	6* to 8	NA	[6]85,000/760,000	16,000/23,000/20
Xylenes (total)	1/6	5 to 11.5	2	NA	[7]160,000,000/410,000,000	5,900,000/40,000,000/200
Semivolatile Organic Compounds (µg/kg)						
bis(2-Ethylhexyl)phthalate	1/6	350 to 380	40	NA	[6]46,000/410,000	76,000/280,000/3,600,000
Chrysene	1/6	350 to 380	380	NA	[6]87,000/780,000	140,000/450,000/77,000
Inorganic Analytes (mg/kg)						
Aluminum	6/6	40	10,100 to 23,800	15,300	[7]7,800/200,000	72,000/--/SPLP[10]
Arsenic	6/6	2	1.7 * to 4.3	3	[8]0.43/3.8	0.8/[12]4.62/29
Barium	6/6	40	6.2 to 25 *	23.8	[7]550/14,000	110/87,000/1,600
Beryllium	3/6	1	0.12 to 0.15	0.36	[8]16/410	120/800/63
Cadmium	1/6	0.59 to 1	0.94	0.58	[7]3.9/100	75/1,300/8
Calcium	6/6	1,000	51.9 to 152 *	402	--/--	--/--/--
Chromium[9]	6/6	2	5.9 to 19.6	10.8	[7]23/610	210/420/38
Cobalt	6/6	10	0.65 to 1.8	3	[7]470/12,000	4,700/110,000/SPLP[10]
Copper	3/6	5	4.9 to 7.8	9.4	[7]310/8,200	110/76,000/SPLP[10]
Cyanide	1/6	0.24 to 0.5	0.16 *	0.26	[7,11]160/4,100	30/28,000/40
Iron	6/6	20	5,470 to 15,800	8,590	[7]2,300/61,000	23,000/480,000/SPLP[10]
Lead	6/6	0.6 to 1	4.3 to 9.8 *	11.4	[8]400	400/920/SPLP[10]
Magnesium	6/6	1,000	48.6 to 170 *	258	--/--	--/--/--
Manganese	6/6	3	33.6 to 559 *	404	[7]160/4,100	1,600/22,000/SPLP[10]
Mercury	3/6	0.08 to 0.1	0.02 to 0.04 *	0.12	[7]2.3/61	3/26/2.1
Nickel	3/6	2.3 to 8	3.5 to 5	7.2	[7]160/4,100	110/28,000/130
Potassium	2/6	129 to 1,000	174 to 322 *	177	--/--	--/--/--

See notes at end of table.

Table 5-8 (Continued)
Comparison of Analytes Detected in Site 14 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/Industrial[4]	Florida Soil Cleanup Target Levels Residential/Industrial/ Leachability[5]
Inorganic Analytes (mg/kg) (Continued)						
Sodium	3/6	1,000	170 to 180	388	--/--	--/--/--
Vanadium	6/6	10	14.1 to 42.1	21.2	[7]55/1,400	15/7,400/980
Zinc	3/6	4	7.7 to 11.1	15.4	[7]2,300/61,000	23,000/560,000/6,000

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] USEPA Region III RBC Table (October 1, 1998).
[5] Chapter 62-777, Florida Administrative Code, June 1999.
[6] Values correspond to a human cancer risk level of 1 in 1,000,000.
[7] Values correspond to a noncancer hazard quotient of 0.1.
[8] Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12) (USEPA, 1994c).
[9] Values are for hexavalent chromium.
[10] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.
[11] Values based on hydrogen cyanide.
[12] Value is a FDEP approved site-specific soil cleanup goal for arsenic at covered landfill sites, Naval Air Station, Whiting Field (Appendix G).

Notes continued on following page.

Table 5-8 (Continued)
Comparison of Analytes Detected in Site 14 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Notes (continued):

The average of a sample and its duplicate is used for all table calculations.
Samples: 14-SL-01, 14-SL-02, 14-SL-03, 14S00101, 14S00201, 14S00301.
Sample duplicate: 14S00101D.
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501.
Background duplicate sample: BKS00201D.

µg/kg = micrograms per kilogram.
* = average of sample and duplicate.
NA = analyte not detected in background soil sample.
mg/kg = milligrams per kilogram.
– = no value available.
OSWER = Office of Solid Waste and Emergency Response.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.
RCRA = Resource Conservation and Recovery Act.

that exceeded the USEPA RBC of 0.43 mg/kg and Florida soil cleanup target level (residential soil) of 0.8 mg/kg. However, only samples 14-SL-01 (4.2 mg/kg) and 14S00201 (4.3 mg/kg) exceeded the background screening concentration of 3.0 mg/kg. Iron was detected at concentrations that exceeded the USEPA Region III RBC of 2,300 mg/kg in all samples, but only samples 14-SL-01 (14,300 mg/kg), 14-SL-02 (15,800 mg/kg), and 14S00201 (15,500 mg/kg) exceeded the background screening concentration of 8,590 mg/kg. Manganese was detected at concentrations that exceeded the USEPA Region III RBC of 160 mg/kg in samples 14S00101 (estimated 521 mg/kg), its duplicate 14S00101D (estimated 597 mg/kg), and 14S00301 (313 mg/kg). Vanadium was detected in 5 of 6 samples at concentrations above the Florida cleanup target level of 15 mg/kg. However, all of the vanadium detections were below the USEPA RBC of 55 mg/kg.

5.6 SUBSURFACE SOIL ASSESSMENT. Table 5-9 summarizes the analytical results for organic and inorganic analytes detected in two subsurface soil samples at Site 14. The sample locations are shown on Figure 3-2. Table 5-10 summarizes the frequency of detection, range of detection limits, range of detection concentrations, and background screening values for Site 14 subsurface soil samples.

TCL VOCs. Subsurface soil sample 14SS0202 contained four VOCs (acetone, ethylbenzene, toluene, and xylene) (Table 5-9). None of the detected VOC concentrations exceeded their respective USEPA Region III RBCs or the Florida soil cleanup target levels (with the exception of xylene). Xylene was detected at a concentration (260 μg/kg) greater than the Florida leachability cleanup target level of 200 μg/kg.

TCL SVOCs. Sample 14SS0202 contained of three SVOCs (4-methylphenol, naphthalene, and bis(2-ethylhexyl)phthalate) (Table 5-9). None of the detected SVOC concentrations exceeded their respective USEPA Region III RBCs or Florida soil cleanup target levels.

TCL Pesticides and PCBs. No pesticides or PCBs were detected in either of the two subsurface soil samples collected at Site 14.

TAL Metal and Cyanide (Total). Seventeen metals were detected in sample 14SS0101 and nineteen metals were detected in sample 14SS0202. The detected concentrations of cobalt (1.8 estimated mg/kg), iron (18,800 mg/kg), and vanadium (47.7 mg/kg) in sample 14SS0101 exceeded their respective background screening concentrations (Tables 5-9 and 5-10). The concentrations of cadmium (1.7 mg/kg) and silver(0.5 estimated mg/kg) detected in sample 14SS0202 were above their respective background screening concentrations (Tables 5-7 and 5-10).

Arsenic was detected in sample 14SS0101 at a concentration of 4.5 mg/kg. This value exceeds the USEPA Region III and industrial RBC and Florida soil cleanup target level for industrial exposures. Arsenic was detected in sample 14SS0202 at a concentration of 3.7 mg/kg, exceeding the USEPA Region III RBC for residential soil (0.43 mg/kg) and the Florida soil cleanup target level for residential soil (0.8 mg/kg) soil. However, the detected concentrations of arsenic in the two samples are less than the background screening value of 6.2 mg/kg and the FDEP approved site-specific soil cleanup goal.

Table 5-9
Summary of Analytical Results for Subsurface Soil Samples from Test Pits at Site 14

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	14SS0101	14SS0202
Test Pit Identifier/Sample Depth (feet bls):	TP-14-01/5 to 6	TP-14-02/11.5 to 12
Collect Date:	10/08/92	10/08/92
Volatile Organic Compounds (µg/kg)		
Acetone	--	170 J
Ethylbenzene	--	500
Toluene	--	23 J
Xylenes (total)	--	[1]260 J
Semivolatile Organic Compounds (µg/kg)		
4-Methylphenol	--	60 J
Naphthalene	--	1,500
bis(2-Ethylhexyl)phthalate	--	290 J
Pesticides and PCBs (µg/kg)		
None detected		
Inorganic Analytes (mg/kg)		
Aluminum	14,900	8,830
Arsenic	4.5	3.7
Barium	7.9 J	7.7 J
Beryllium	0.21 J	0.2 J
Cadmium	--	1.7
Calcium	126 J	256 J
Chromium	18.6	18.4
Cobalt	1.8 J	1.4 J
Copper	7.5	4.6 J
Iron	18,800	15,300
Lead	7.3	5.6
Magnesium	104 J	71.6 J
Manganese	35	23.4
Mercury	0.12 J	0.14 J
Nickel	3.1 J	3.6 J
Silver	--	0.5 J
Sodium	169 J	190 J
Vanadium	47.7	38.8
Zinc	9.8 J	15.4

[1] Result is from a diluted sample for volatile organic compounds.

Notes: bls = below land surface.
µg/kg = micrograms per kilogram.
-- = analyte, if present, was less than the detection limit.
J = estimated value.
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.

Table 5-10
Comparison of Analytes Detected in Site 14 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Background Screening Concentration[2]	USEPA Region III RBCs[3] (Industrial)	Florida Soil Cleanup Target Levels (Residential/ Industrial/Leachability)[4]
Volatile Organic Compounds (µg/kg)						
Acetone	1/2	57 to 72	170	NA	20,000,000	780,000/5,500,000/2,800
Ethylbenzene	1/2	12 to 57	500	NA	20,000,000	1,100,000/8,400,000/600
Toluene	1/2	12 to 57	23	NA	41,000,000	380,000/2,600,000/500
Xylenes (total)	1/2	12 to 1,400	260	NA	410,000,000	5,900,000/40,000,000/200
Semivolatile Organic Compounds (µg/kg)						
4-Methylphenol	1/2	380 to 410	60	NA	1,000,000	250,000/3,000,000/30
Naphthalene	1/2	380 to 410	1,500	NA	4,100,000	40,000/270,000/1,700
bis(2-Ethyl)phthalate	1/2	380 to 410	290	NA	410,000	76,000/280,000/3,600,000
Inorganic Analytes (mg/kg)						
Aluminum	2/2	40	8,830 to 14,900	27,800	[5]200,000	72,000/--/SPLP[9]
Arsenic	2/2	2	3.7 to 4.5	6.2	[6]3.8	0.8/4.62/29
Barium	2/2	40	7.7 to 7.9	15.8	[5]14,000	110/87,000/1,600
Beryllium	2/2	1	0.2 to 0.21	0.26	[6]410	120/800/63
Cadmium	1/2	0.68 to 1	1.7	0.92	[5]100	75/1,300/8
Calcium	2/2	1,000	126 to 256	444	--	--/--/--
Chromium[8]	2/2	2	18.4 to 18.6	22.8	[5]610	210/420/38
Cobalt	2/2	10	1.4 to 1.8	1.5	[5]12,000	4,700/110,000/SPLP[9]
Copper	2/2	5	4.6 to 7.5	8.8	[5]8,200	110/76,000/SPLP[9]
Iron	2/2	20	15,300 to 18,800	18,100	[5]61,000	23,000/480,000/SPLP[9]
Lead	2/2	1	5.6 to 7.3	8.4	[7]400	400/920/SPLP[9]
Magnesium	2/2	1,000	71.6 to 104	272	---	--/--/--
Manganese	2/2	3	23.4 to 35	42.6	[5]4,100	1,600/22,000/SPLP[9]
Mercury	2/2	0.1	0.12 to 0.14	ND	[5]61	3.4/26/2.1

See notes at end of table.

Table 5-10 (Continued)
Comparison of Analytes Detected In Site 14 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection [1]	Range of Reporting Limit	Range of Detected Concentrations	Background Screening Concentration[2]	USEPA Region III RBCs[3] (Industrial)	Florida Soil Cleanup Target Levels (Residential/ Industrial/Leachability)[4]
Inorganic Analytes (mg/kg) (Continued)						
Nickel	2/2	5	3.1 to 3.6	5.0	[5]4,100	110/28,000/130
Silver	1/2	0.45 to 2	0.5	0.3	[5]1,000	390/9,100/17
Sodium	2/2	1,000	169 to 190	ND	--	--/--/--
Vanadium	2/2	10	38.8 to 47.7	45	[5]1,400	15/7,400/980
Zinc	2/2	4	9.8 to 15.4	15.6	[5]61,000	23,000/560,000/6,000

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[3] USEPA Region III RBC Table (October 1, 1998).
[4] Chapter 62-777, Florida Administrative Code, June 1999.
[5] The values correspond to a noncancer hazard quotient of 0.1.
[6] The values correspond to a human cancer risk level of 1 in 1,000,000.
[7] Lead value is from the *Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites* (OSWER Directive 9355.4-12) (USEPA, 1994c).
[8] The values represent hexavalent chromium.
[9] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.

Notes continued on following page.

Table 5-10 (Continued)
Comparison of Analytes Detected in Site 14 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Notes (continued):

Samples: 14SS0101, 14SS0202, 14SS0202DL.
Background samples: BKB00101, BKB00102, BKB00201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, BKB00702.
Background duplicate samples: BKB00401D and BKB00602D.

µg/kg = micrograms per kilogram.
NA = not analyzed.
mg/kg = milligrams per kilogram.
-- = no value available.
ND = not detected.
OSWER = Office of Solid Waste and Emergency Response.
RI/FS = remedial investigation and feasibility study.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act.
RCRA = Resource Conservation and Recovery Act.

5.7 GROUNDWATER ASSESSMENT. The groundwater assessment at Site 14 consisted of the collection of groundwater samples using the BAT sampling method during Phase I of the RI and groundwater samples collected from monitoring wells WHF-14-1 and WHF-14-2 during the RI Phase IIA and Phase IIB. The sample locations are shown on Figure 3-3. The results from different groundwater sampling rounds are discussed as separate data sets because of differences in sampling methodology.

5.7.1 Phase I Sampling Event Groundwater Samples In April 1991, two groundwater samples (WHF-14-WP-01-01 and WHF-14-WP-01-02) were collected using a BAT sampling apparatus. Sample WHF-14-WP-01-01 was collected from a depth of 107 feet bls and sample WHF-14-WP-01-02 was collected from a depth of 160 feet bls. A summary of the analytical results for the sample is presented in Table 5-11.

Acetone and carbon disulfide were detected in sample WHF-14-WP-01-01 at concentrations of 21 and 6.5 $\mu g/\ell$, respectively. No other VOCs were detected in either of the two samples. Seven inorganic analytes (barium, calcium, chromium, iron, manganese, sodium, and zinc) were detected in the BAT groundwater samples.

The BAT groundwater data were intended for screening and therefore are not used in the data sets for the HHRA or ERA. The BAT *in situ* groundwater sampling techniques and data were described in Phase I Technical Memorandum No. 5, Groundwater Assessment (ABB-ES, 1992a).

5.7.2 Phase II Sampling Event Table 5-12 presents the field parameter data for both Phase IIA and Phase IIB groundwater investigations. Table 5-13 summarizes the analytical results for the groundwater samples collected at Site 14 during the Phase IIA RI and Phase IIB sampling events. Below is a discussion of the field parameters and analytical results for the sampling events. The sample locations are shown on Figure 3-3.

Field Parameters. The field parameter measurements are presented in Table 5-12. The pH values for groundwater samples collected at Site 14 ranged from 4.39 to 5.80 SUs.

The pH values are below the lower range for the Florida secondary drinking water standard of 6.5 SUs but are within the range observed in background samples collected at NAS Whiting Field (ABB-ES, 1998).

Temperature measurements ranged from 23.0 to 27.0 degrees Celsius, and the specific conductance ranged from 27 to 28 micromhos per centimeter. Turbidity measurements for Phase IIA (November 1993) groundwater samples ranged from 2.59 to 103.4 NTUs. Turbidity measurements for Phase IIB groundwater samples (September 1996), collected using low-flow sampling methods, ranged from 0.93 to 0.96 NTUs. All Phase IIB groundwater samples had turbidity measurements below 10 NTUs.

Groundwater samples collected during Phase IIB were collected using the low-flow sampling process. This procedure resulted in less turbid groundwater samples for the Phase IIB sampling event as compared to the groundwater samples collected during Phase IIA. Because the low flow sampling method produces less turbid samples that are more representative of the surficial aquifer than those obtained with a bailer, the preferred data set was from the Phase IIB sampling event and will be used in evaluation of the data.

Table 5-11
Summary of Analytical Results for BAT Groundwater Samples, Site 14

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	WHF-14-WP-01-01	WHF-14-WP-01-02
Sample Date:	April 15, 1991	April 15, 1991
Sample Depth:	107 ft bls	160 ft bls
Volatile Organic Compounds (μg/ℓ)		
Acetone	21	10 U
Carbon disulfide	6.5	5 U
Inorganic Analytes (μg/ℓ)		
Barium	57.6 J	28.8 J
Calcium	1,190 J	1,050 J
Chromium	11.3	10 U
Iron	822	495
Manganese	11.4 J	10 U
Sodium	2,18 J	1,840 J
Zinc	112	52.4

Notes: BAT = Bengt-Arne-Torstensson.
ft bls = feet below land surface.
μg/ℓ = micrograms per liter.
U = compound not detected above instrument detection limits.
J = estimated concentration.

Table 5-12
Summary of Groundwater Field Parameters

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (μmhos/cm)	Turbidity (NTU)
WHF-14-1	11-03-93	4.90	21.6	20	2.59
	9-11-96	4.39	27.0	28	0.96
WHF-14-2	11-02-93	4.91	21.3	20	103.4
	9-10-96	5.80	23.0	27	0.93

Notes: SU = standard unit.
°C = degrees Celsius.
μmhos/cm = micromhos per centimeter.
NTU = nephelometric turbidity unit.

Table 5-13
Summary of Analytical Results Site 14
Groundwater (Unfiltered)

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

	Phase IIA		Phase IIB		
Sample Identifier:	WHF14-1	WHF14-2	14G00101	14G00101D	14G00201
Collect Date:	11/03/93	11/02/93	09/11/96	09/11/96	09/10/96
Volatile Organic Compounds (μg/ℓ)					
Carbon disulfide	--	--	3 J	--	--
Semivolatile Organic Compounds (μg/ℓ)					
Butylbenzylphthalate	2 J	--	--	--	--
bis(2-Ethylhexyl)phthalate	7 J	18	--	--	--
Pesticides and PCBs (μg/ℓ)					
None detected					
Inorganic Analytes (μg/ℓ)					
Aluminum	63.3 J	1,760	--	--	--
Arsenic	--	--	0.5 J	--	--
Barium	36.5 J	23.9 J	22.3 J	22.3 J	17.2 J
Calcium	13,000	906 J	3,060 J	2,870 J	766 J
Chromium	--	7.9 J	--	--	--
Copper	12.9 J	3.5 J	--	--	--
Iron	26.1 J	2,770	--	--	--
Lead	--	1.2 J	1.3 J	0.8 J	0.6 J
Magnesium	676 J	827 J	702 J	691 J	618 J
Manganese	3.9 J	7.5 J	1.9 J	1.9 J	1.3 J
Mercury	--	--	0.12 J	--	--
Potassium	933 J	1,470 J	--	--	--
Sodium	2,480 J	2,320 J	1,590 J	1,570 J	1,870 J
Vanadium	--	9.3 J	--	--	--
Zinc	301	12 J	89.5	96.8	--

Notes: μg/ℓ = micrograms per liter.
J = estimated concentration.
-- = compound not detected.
PCB = polychlorinated biphenyl.

5.7.2.1 **Phase IIA Sampling Event** In November 1993, groundwater samples were collected during the RI Phase IIA investigation. Intermediate depth monitoring well WHF-14-1 and shallow monitoring well WHF-14-2 were sampled using bailerS. Because the sampling method produced turbid samples, the inorganic results may be biased high and are not likely to be representative of the aquifer.

TCL VOCs. No VOCs were detected in any of the groundwater samples collected during the RI Phase IIA.

TCL SVOCs. Bis(2-ethylhexyl)phthalate was detected in both groundwater samples WHF-14-1 and WHF-14-2 at concentrations of 7 $\mu g/\ell$ (estimated) and 18 $\mu g/\ell$, respectively. Butylbenzylphthalate was also detected in sample WHF-14-1 at an estimated concentration of 2 $\mu g/\ell$.

Pesticides and PCBs. No pesticides or PCBs were detected in either of the two groundwater samples collected during the Phase IIA RI investigation.

TAL Metals and (Total) Cyanide. Thirteen inorganic analytes (aluminum, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, potassium, sodium, vanadium, and zinc) were detected in the Phase II groundwater samples. The concentrations of aluminum (1,760 $\mu g/\ell$) and iron (2,770 $\mu g/\ell$) detected in sample WHF-14-2 exceeded their respective Florida secondary standards of 200 $\mu g/\ell$ and 300 $\mu g/\ell$.

5.7.2.2 **Phase IIB Sampling Event** Table 5-13 summarizes the analytical results for organic and inorganic analytes detected in two (plus one duplicate) groundwater samples at Site 14 during the Phase IIB RI investigation. Table 5-14 summarizes the frequency of detection, range of reporting limits, range of detected concentrations, average of detected concentrations, and background screening values for Site 14 Phase IIB groundwater samples. The sample locations are shown on Figure 3-3.

In September 1996, groundwater samples were collected during the RI Phase IIB investigation. Intermediate depth monitoring well WHF-14-1 and shallow monitoring well WHF-12-2 were sampled using low-flow procedures. The low-flow sampling procedure produces low turbidity samples that are representative of aquifer conditions.

TCL VOCs. Carbon disulfide was detected in sample 14G00101 at an estimated concentration of 3 $\mu g/\ell$. The detected concentration did not exceed the Florida groundwater cleanup target level. Currently, a Federal MCL does not exist for this compound. No other VOCs were detected in the groundwater samples collected during the Phase IIB of the RI.

TCL SVOCs. No SVOCs were detected in the groundwater samples collected during the Phase IIB of the RI.

Pesticides and PCBs. No pesticides or PCBs were detected in the groundwater samples collected during the Phase IIB of the RI.

TAL Metals and (Total) Cyanide. Six inorganic compounds (barium, calcium, lead, magnesium, manganese, and sodium) were detected in both groundwater samples and the duplicate sample collected during Phase IIB of the RI. Arsenic (estimated 0.5 $\mu g/\ell$) and mercury (estimated 0.12 $\mu g/\ell$) were detected in sample 14G00101, but

Table 5-14
Comparison of Analytes Detected in Phase IIB Groundwater Samples to Background Screening Values and Benchmark Concentrations, Site 14

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentration[2]	Background Screening Concentration[3]	Federal MCLs[4]	Florida Cleanup Target Level	
						Concentration[5]	Basis[6]
Volatile Organic Compounds (µg/ℓ)							
Carbon disulfide	1/2	10	4*	NA	NA	700	T
Inorganic Analytes (µg/ℓ)							
Arsenic	1/2	0.25 to 0.5	0.38*	ND	50	50	P
Barium	2/2	NA	17.2 to 22.3	72.6	2,000	2,000	P
Calcium	2/2	NA	766 to 2,970	3,316	NA	NA	
Lead	2/2	NA	0.6 to 1.1*	ND	15	15	P
Magnesium	2/2	NA	618 to 697*	2,426	NA	NA	
Manganese	2/2	NA	1.3 to 1.9*	42.8	[8]50	50	S,T
Mercury	1/2	0.05 to 0.1	0.1*	ND	2	2	P
Sodium	2/2	NA	1,580* to 1,870	4,772	[9]NA	160,000	P
Zinc	1/2	4.2	93.2*	200	[8]5,000	5,000	S

See notes at end of table.

Table 5-14 (Continued)
Comparison of Analytes Detected in Site 14 Groundwater Samples to Background Screening Values and Benchmark Concentrations, Site 14

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] Federal MCLs are maximum permissible concentrations of contaminants in water that is delivered to a user by a public water system.
[5] Chapter 62-777, Florida Administrative Code, June 1999.
[6] The concentrations are based on a number of enforceable State of Florida regulations:
P = primary drinking water standards based on Florida Administrative Code (FAC) Rule 17-550.310, .320,
S = secondary drinking water standards based on FAC Rule 17-550.310, .320,
C = carcinogens based on FAC Rule 17-520.400 (1) (b), and
T = systemic toxicants based on FAC Rule 17-520.400 (1) (d).
[7] Secondary MCL.
[8] No MCL has been determined for sodium but a reporting limit of 20,000 $\mu g/\ell$ has been established.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 14G00101 and 14G00201.
Duplicate sample: 14G00101D.
Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D.

MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
* = average of sample and duplicate.
NA = not applicable.
ND = not detected in any background samples.

not detected in the duplicate sample 14G00101D. Zinc was detected in both 14G00101 and its duplicate 14G00101D at concentrations of 89.5 and 96.8 $\mu g/\ell$, respectively. None of the groundwater samples contained inorganic analyte concentrations that exceeded the Florida groundwater cleanup target levels or Federal MCLs (Table 5-13).

6.0 HUMAN HEALTH RISK ASSESSMENT

A HHRA has been conducted as part of the RI for Site 14 at NAS Whiting Field. The purpose of the HHRA is to characterize the risks associated with the hypothetical exposures to site-related chemicals. This HHRA is conducted in accordance with the following guidance documents:

- USEPA's *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A)* (USEPA, 1989),
- *Guidance for Data Useability in Risk Assessment (Part A), Final* (USEPA, 1992a), and
- Region IV Risk Assessment Guidance (USEPA, 1995a).

Additionally, the HHRA will consider FDEP guidance:

- Soil Cleanup Goals for Florida (FDEP, 1995a),
- Applicability of Soil Cleanup Goals for Florida (FDEP, 1996), and
- Florida Groundwater Guidance Concentrations (FDEP, 1994).

The methodology for the HHRA is described in Chapter 2 of the GIR (ABB-ES, 1998). The HHRA methodology presented in the GIR (ABB-ES, 1998) consists of the following steps:

- data evaluation,
- selection of chemicals of potential concern,
- exposure assessment,
- toxicity assessment, and
- risk characterization.

Site 14 was a short-term sanitary landfill. Site 14 is located southeast of the south field taxiway at NAS Whiting Field. The location, physical description, and history associated with Site 14 are described in Chapter 1 of this report. Surface soil, subsurface soil, and groundwater samples were collected from Site 14 during the RI. Sampling locations and results are presented in Chapters 3 and 5 of this report, respectively.

6.1 DATA EVALUATION. The data evaluation involves numerous activities, including sorting data by medium, evaluating sample quantitation limits (SQLs), and evaluating quality of data with respect to qualifiers.

The data for Site 14 was categorized into surface soil, subsurface soil, groundwater, and background for each medium.

SQLs are compared to USEPA Region III RBCs (USEPA, 1997b), and Florida screening values (FDEP 1994, 1995c, 1996). Surface soil and subsurface soil SQLs were compared to Region III RBCs (USEPA, 1997b) and Florida Soil Cleanup Goals (FDEP 1995a, 1995b, and 1996) for residential and industrial, respectively. Groundwater SQLs were compared to Florida Groundwater Guidance Concentration (FDEP, 1994) and Region III tap water RBCs (USEPA, 1997a). Analyte-specific SQLs

that are above RBCs and Florida screening values are identified and discussed in the uncertainty analysis.

The quality of the data was evaluated with respect to the data qualifiers. Only data of sufficient quality were retained for evaluation in the HHRA. The HHRA considers data with "J", "U", and "UJ" qualifiers as well as data with no qualifier.

6.2 SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN (HHCPCs). The HHCPCs were selected per the methodology described in Section 2.5 of the GIR (ABB-ES, 1998). This HHCPC methodology considers 1) frequency of detection, 2) consistency with background conditions, 3) a comparison with regulatory and risk-based screening values (screening values are presented in Appendix C, Tables C-1 through C-3), and 4) a comparison to essential nutrient levels.

USEPA Region IV criteria were used in selecting HHCPCs (USEPA, 1995a). For each medium, the following criteria were employed to exclude detected analytes from the list of HHCPCs. Each criterion by itself is a justification for excluding the analyte.

Less than 5 Percent Frequency of Detection. An analyte is not selected as a HHCPC if it has a frequency of detection (number of samples in which the analyte is detected divided by the number of samples analyzed for that analyte) less than 5 percent (USEPA, 1995a) and is not selected as a HHCPC in another medium. This criterion is not used if there are less than 20 environmental samples for a specific medium and was therefore not applicable in this HHRA. Less than 20 environmental samples were collected for each medium sampled, therefore, their criteria were not used.

Less than Background Screening Concentrations. If the maximum detected concentration of an analyte is less than twice the arithmetic mean of the background concentration (inorganics only), the analyte is not selected as a HHCPC (USEPA, 1995a). Development of background screening values for surface soil, groundwater, and subsurface soil are discussed below.

- A representative surface soil background data set consisting of Troup loamy sand and Lucy loamy sand soil is used for background screening of Site 14 surface soil samples. Sample locations are identified on Figure 3-10 and are discussed in Subsection 3.3.1 of the GIR (ABB-ES, 1998). The background surface soil data used for screening Site 14 surface soil are presented in Tables 3-8 and 3-14 of the GIR (ABB-ES, 1998).

- Subsurface soil locations are identified on Figure 3-11 and are discussed in Subsection 3.3.2 of the GIR (ABB-ES, 1998). Tables 3-15 through 3-17 in the GIR report present background sample data for various types of subsurface soil. Table 3-18 of the GIR (ABB-ES, 1998) presents summary statistics and background screening data values used in the Site 14 HHRA subsurface soil evaluation.

- Background groundwater sample locations are identified on Figure 3-12 and discussed in Subsection 3.3.3 of the GIR (ABB-ES, 1998). Tables 3-21 through 3-23 of the GIR (ABB-ES, 1998) present background

screening data for groundwater. Table 3-24 of the GIR (ABB-ES, 1998) presents the summary statistics used for screening the groundwater at Site 14.

Less than Risk-Based Screening Concentrations, Standards, and Guidelines. If the maximum detected concentration of the analyte in a medium is less than its corresponding adjusted USEPA Region III RBC (USEPA, 1997a), and less than FDEP standards and guidelines, the analyte is not selected as an HHCPC (USEPA, 1995a). The target hazard quotient (HQ) in the USEPA Region III RBC table is 1 and the target cancer risk is 1×10^{-6}. All RBCs based on noncarcinogenic effects are adjusted for a target HQ of 0.1 per Region IV guidance (USEPA, 1995b).

The residential soil RBCs are used for screening surface soil. The industrial soil RBCs are used for screening subsurface soil. No RBC is available for lead in soil due to a lack of toxicity data. Based on an USEPA recommendation, a screening level (surrogate RBC) of 400 mg/kg is used for lead under the assumption that residential land use is used as the RBC for lead in soil (USEPA, 1994c).

The maximum detected concentrations of analytes in surface soil and subsurface soil are also compared to residential and industrial Florida Soil Cleanup Goals (FDEP, 1995a, 1995b, and 1996), respectively.

Tap water RBCs (USEPA, 1997a), Federal MCLs (USEPA, 1996b) and Florida Groundwater Guidance Concentrations (FDEP, 1994) are used for screening HHCPCs in groundwater.

Less than Essential Nutrient Screening Values. If the maximum detected concentration of an essential nutrient (i.e., sodium, potassium, magnesium, and calcium) in a medium is below a toxic level and consistent with or only slightly above its background concentration, the essential nutrient is not selected as an HHCPC. The derivation of essential nutrient screening values is presented in the GIR (Appendix C) (ABB-ES, 1998).

HHCPCs were not screened using the essential nutrient value for iron; the RBC for iron was used instead. However, if iron is determined to be a risk driver, a comparison of the exposure concentrations against the essential nutrient level for iron will be presented in the uncertainty analysis section for that medium.

If the analyte meets any of the above criteria, is not a member of the same chemical class as other HHCPCs in the medium, and is not a breakdown product of other HHCPCs in the medium, then the analyte is not selected as an HHCPC. In situations where multiple screening values are available, a chemical is excluded only if its maximum screening concentration is less than all of the corresponding screening values. Appendix E of this report presents the RBCs, regulatory guidance values, and applicable or relevant and appropriate requirements that are used in HHCPC selection. After applying these criteria with professional judgment, HHCPCs are identified for each medium. HHCPC selection for each medium is presented below in Subsections 6.2.1 through 6.2.3.

6.2.1 Surface Soil

6.2.1.1 Site 14 Surface Soil Six surface soil samples (14-SL-01 through 14-SL-03, 14S00101, 14S00201, and 14S00301 and one duplicate 14S00101D) were considered in the Site 14 HHRA. VOCs, SVOCs, pesticides, PCBs, and inorganic data from all of these samples are evaluated in this HHRA. Table 5-7 presents the analytes detected and the concentrations in surface soil. Table 6-1 presents summary statistics for the detected analytes and identifies four inorganic analytes (aluminum, arsenic, iron, manganese, and vanadium) as HHCPCs for surface soil at Site 14.

Vanadium was recently added as an HHCPC because the Florida residential cleanup target level was lowered to 15 mg/kg. Vanadium was not carried through the remainder of the HHRA, but it will be addressed in the feasibility study as a HHCPC along with arsenic.

6.2.1.2 Site 14 Subsurface Soil Two samples (14SS0101 and 14SS0202 from test pits TP-14-01 and TP-14-02, respectively) were collected from Site 14 (Figure 3-2). The data for sample dilution 14SS0202DL were combined with 14SS0202. VOCs, SVOCs, pesticides, PCBs and inorganic data from all of these samples are evaluated in this HHRA (Table 5-9). Table 6-2 presents the HHCPC selection for subsurface soil at Site 14. No analytes were selected as HHCPCs in the subsurface soil.

6.2.1.3 Groundwater Two groundwater samples (14G00101 and 14G00201 from monitoring wells WJF-14-1 and WHF-14-2, respectively) and the duplicate sample (14G00101D) were collected from Site 14. VOCs, SVOCs, pesticides, PCBs, and inorganic data from these samples are evaluated in this HHRA (Table 5-11). Table 6-3 presents the summary statistics for the detected analytes and identifies one inorganic analyte (arsenic) as a HHCPC for groundwater at Site 14.

6.3 EXPOSURE ASSESSMENT. The exposure assessment methodology is described in Subsection 2.5.3 of the GIR (ABB-ES, 1998). This process involves the following steps:

- characterization of the exposure setting in terms of physical characteristics and the populations that may hypothetically be exposed to site-related chemicals;
- identification of potential exposure pathways and receptors; and
- quantification of exposure for each population in terms of the amount of chemical either ingested, inhaled, or absorbed through the skin from all complete or hypothetically complete (potential future) exposure pathways.

Summaries of hypothetical exposure pathways to chemicals detected at Site 14 are presented on Figure 6-1.

The hypothetical pathways including medium and route of exposure, the hypothetical exposed population, and the rationale for pathway selection or exclusion are presented in Table 6-4, and are described in more detail in Subsections 6.3.1 through 6.3.3. Receptor-specific exposure parameters for each exposure scenario

Table 6-1
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Selected HH Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (µg/kg)								
Methylene chloride	2/6	6 to 11.5	6* to 8	7	NA	16,000	No	S
Xylenes (total)	1/6	5 to 11.5	2	2	NA	5,900,000	No	S
Semivolatile Organic Compounds (µg/kg)								
bis(2-Ethylhexyl)phthalate	1/6	350 to 380	40	40	NA	46,000	No	S
Chrysene	1/6	350 to 380	380	380	NA	87,000	No	S
Inorganic Analytes (mg/kg)								
Aluminum	6/6	40	10,100 to 23,800	15,200	15,300	7,800	Yes	
Arsenic	6/6	2	1.7* to 4.3	2.7	3	0.43	Yes	
Barium	6/6	40	6.2 to 25*	14.5	23.8	110	No	S
Beryllium	3/6	1	0.12 to 0.15	0.13	0.36	16	No	B, S
Cadmium	1/6	0.58 to 1	0.94	0.94	0.58	3.9	No	S
Calcium	6/6	1,000	51.9 to 152*	94.8	402	1,000,000	No	B, S
Chromium	6/6	2	5.9 to 19.6	12.5	10.8	23	No	S
Cobalt	6/6	10	0.65 to 1.8	1.4	3	470	No	B, S
Copper	3/6	5	4.9 to 7.8	5.9	9.4	110	No	B, S
Cyanide	1/6	0.24 to 0.5	0.16*	0.16	0.26	30	No	B, S
Iron	6/6	20	5,470 to 15,800	10,800	8,590	2,300	Yes	
Lead	6/6	0.6 to 1	4.3 to 9.8*	6.1	11.4	400	No	B, S
Magnesium	6/6	1,000	48.6 to 170*	113	258	460,468	No	B, S
Manganese	6/6	3	33.6 to 559*	187	404	160	Yes	

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Selected HH Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Inorganic Analytes (mg/kg) (Continued)								
Mercury	3/6	0.08 to 0.1	0.02 to 0.04*	0.03	0.12	3	No	B,S
Nickel	3/6	2.3 to 8	3.5 to 5	4.3	7.2	110	No	B,S
Potassium	2/6	129 to 1,000	174 to 322*	248	177	1,000,000	No	S
Sodium	3/6	1,000	170 to 180	176	388	1,000,000	No	B,S
Vanadium	6/6	10	14.1 to 42.1	28.1	21.2	15	Yes	
Zinc	3/6	4	7.7 to 11.1	8.9	15.4	2,300	No	B,S

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) Table for residential soil exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993a]) or the Florida Soil Cleanup Target Levels (Florida Department of Environmental Protection, 1999) was used for screening. Values from the USEPA Region III RBC Tables, dated October 1, 1998, are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1 (USEPA, 1997a). For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12) (USEPA, 1994c).
[6] Analyte was excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 14-SL-01, 14-SL-02, 14-SL-03, 14S00101, 14S00201, 14S00301.
Sample duplicate: 14S00101D.
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501.
Background duplicate sample: BKS00201D.

HH = Human Health.
HHCPC = human health chemical of potential concern.
μg/kg = micrograms per kilogram.
* = average of sample and duplicate.
NA = not applicable.
mg/kg = milligrams per kilogram.
OSWER = Office of Solid Waste and Emergency Response.

Table 6-2
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (µg/kg)								
Acetone	1/2	57 to 72	170	170	NA	5,500,000	No	S
Ethylbenzene	1/2	12 to 57	500	500	NA	8,400,000	No	S
Toluene	1/2	12 to 57	23	23	NA	2,600,000	No	S
Xylenes (total)	1/2	12 to 1,400	260	260	NA	40,000,000	No	S
Semivolatile Organic Compounds (µg/kg)								
4-Methylphenol	1/2	380 to 410	60	60	NA	1,000,000	No	S
Naphthalene	1/2	380 to 410	1,500	1,500	NA	270,000	No	S
bis(2-Ethylhexyl)phthalate	1/2	380 to 410	290	290	NA	280,000	No	S
Inorganic Analytes (mg/kg)								
Aluminum	2/2	40	8,830 to 14,900	11,900	27,800	200,000	No	B,S
Arsenic	2/2	2	3.7 to 4.5	4.1	6.2	3.7	No	B
Barium	2/2	40	7.7 to 7.9	7.8	15.8	14,000	No	B,S
Beryllium	2/2	1	0.2 to 0.21	0.21	0.26	410	No	B,S
Cadmium	1/2	0.68 to 1	1.7	1.7	0.92	100	No	S
Calcium	2/2	1,000	126 to 256	191	444	1,000,000	No	B,S
Chromium	2/2	2	18.4 to 18.6	18.5	22.8	420	No	B,S
Cobalt	2/2	10	1.4 to 1.8	1.6	1.5	12,000	No	S
Copper	2/2	5	4.6 to 7.5	6.1	8.8	8,200	No	B,S
Iron	2/2	20	15,300 to 18,800	17,100	18,100	61,000	No	S
Lead	2/2	1	5.6 to 7.3	6.5	8.4	400	No	B,S
Magnesium	2/2	1,000	71.6 to 104	87.8	272	460,468	No	B,S
Manganese	2/2	3	23.4 to 35	29.2	42.6	4,100	No	B,S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Inorganic Analytes (mg/kg) (Continued)								
Mercury	2/2	0.1	0.12 to 0.14	0.13	ND	26	No	S
Nickel	2/2	5	3.1 to 3.6	3.4	5.0	4,100	No	B, S
Silver	1/2	0.45 to 2	0.5	0.5	0.3	1,000	No	S
Sodium	2/2	1,000	169 to 190	180	ND	1,000,000	No	S
Vanadium	2/2	10	38.8 to 47.7	43.3	45	1,400	No	S
Zinc	2/2	4	9.8 to 15.4	12.6	15.6	61,000	No	B, S

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) Table for industrial soil exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993a]) or Florida Soil Cleanup Target Levels (Florida Department of Environmental Protection, 1999) were used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1 (USEPA, 1997a). For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12) (USEPA, 1994c).
[5] Analyte was excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background; therefore the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 14SS0101, 14SS0202, 14SS0202DL.
Background samples: BKB00101, BKB00102, BKB00201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, BKB00702.
Background duplicate samples: BKB00401D and BKB00602D.

HHCPC = human health chemical of potential concern.
μg/kg = micrograms per kilogram.
ND = not detected in any background sample.
NA = not applicable.
mg/kg = milligrams per kilogram.

Table 6-3
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (μg/ℓ)								
Carbon disulfide	1/2	10	4*	4	NA	100	No	S
Inorganic Analytes (μg/ℓ)								
Arsenic	1/2	0.25 to 0.5	0.38*	0.38	ND	0.045	Yes	
Barium	2/2	NA	17.2 to 22.3	19.8	72.6	260	No	B, S
Calcium	2/2	NA	766 to 2,970	1,870	3,320	1,060,000	No	B, S
Lead	2/2	NA	0.6 to 1.1*	0.83	ND	15	No	S
Magnesium	2/2	NA	618 to 697*	657	2,430	118,807	No	B, S
Manganese	2/2	NA	1.3 to 1.9*	1.6	42.8	50	No	B, S
Mercury	1/2	0.05 to 0.1	0.1*	0.09	ND	1.1	No	S
Sodium	2/2	NA	1,580* to 1,870	1,730	4,770	160,000	No	B, S
Zinc	1/2	4.2	93.2*	93.2	200	1,100	No	B, S

See notes at end of table.

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater Associated

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium). The lesser of the U.S. Environmental Protection Agency (USEPA), Region III Risk-Based Concentration (RBC) table for tap water exposure per January 1993 guidance (*Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*, EPA/903/R-93-001 [USEPA, 1993c]) or the Florida Cleanup Target Levels (Florida Department of Environmental Protection, 1999) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on a excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1 (USEPA, 1997a). For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report (ABB-ES, 1998).
[6] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 14G00101 and 14G00201.
Duplicate sample: 14G00101D.
Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D.

HHCPC = human health chemical of potential concern.
$\mu g/\ell$ = micrograms per liter.
* = average of sample and duplicate.
NA = not applicable.
ND = not detected in any background samples.

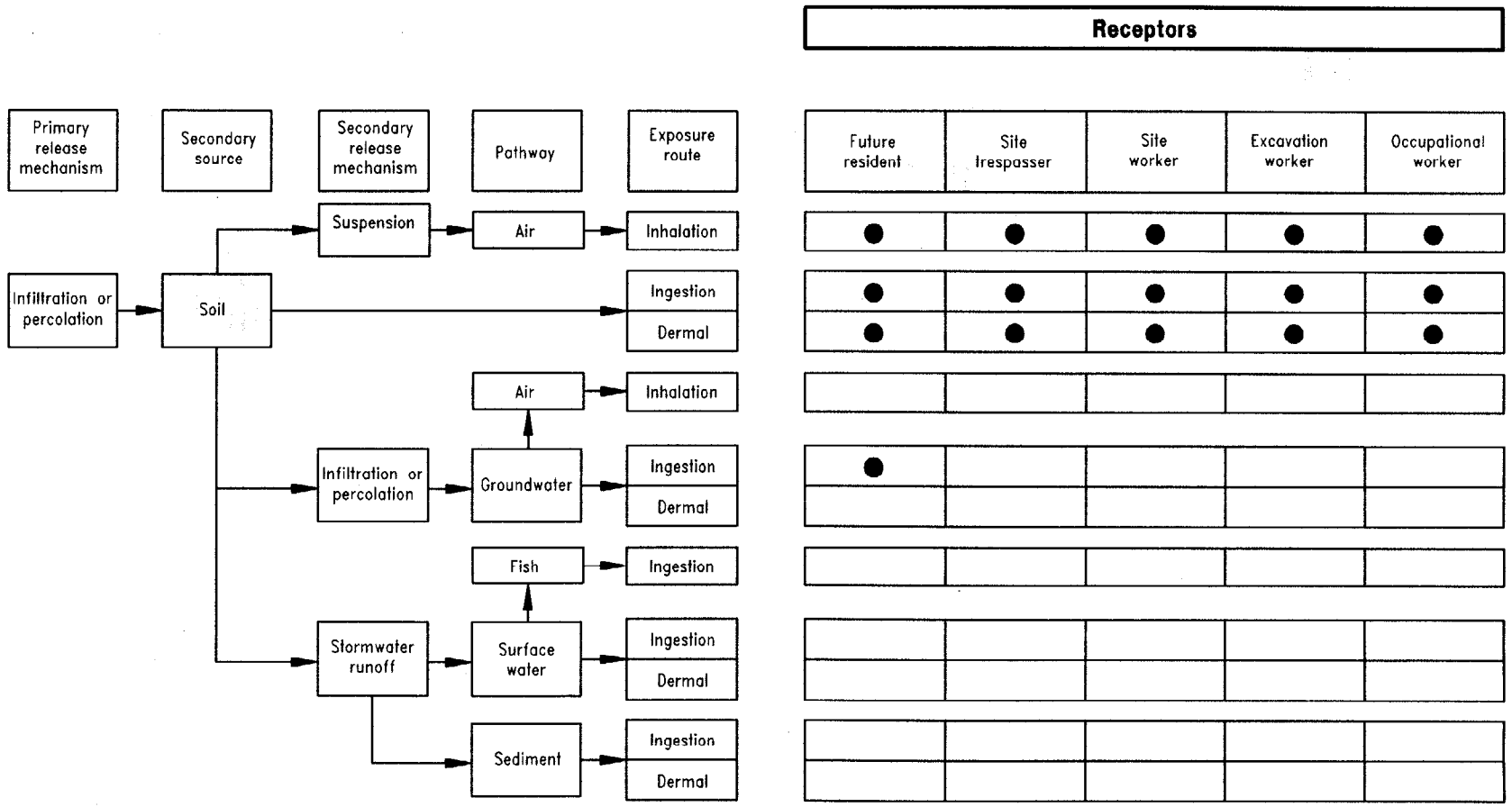


FIGURE 6-1
SITE 14, COMPLETE EXPOSURE PATHWAYS FOR HUMAN RECEPTORS

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

K:\02531\02531-81\RAS\02531500.DWG, VC-VC 07/27/99 15:00:19, ACAD14

Table 6-4
Summary of Potential Exposure Pathways

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation?	Reason for Selection or Evaluation
Current Land Use				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (adult and child) Trespasser (adult and adolescent) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	No Yes No Yes No	No humans currently reside at Site 14. Adolescents and adults may be exposed to contaminants in the surface soil while trespassing. The site maintenance workers may be exposed to contaminants in surface soil while performing routine site activities.
Subsurface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation worker (adult)	No	An excavation worker could be exposed to soil during excavation activities, but no excavation activities are ongoing. Additionally, there were no human health chemical of potential concern (HHCPCs) selected for subsurface soil at Site 14.
Groundwater	Ingestion of groundwater as drinking water	Resident (adult and child)	No	There are no current exposures to groundwater.
Future Land Use				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (child and adult) Trespasser (adolescent and adult) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	Yes Yes Yes Yes Yes	If Site 14 is developed for residential use, residents could be exposed to chemicals in surface soil. Exposure of trespassers, occupational workers, site maintenance workers and excavation worker to chemicals in surface soil is possible.
Subsurface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation worker (adult)	No	An excavation worker could be exposed to subsurface soil during utility work or construction activities; however, there were no HHCPCs selected for subsurface soil at Site 14.
Groundwater	Ingestion of groundwater as drinking water and inhalation of volatiles while showering	Resident (adult and child)	Yes	If Site 14 is developed for residential use, drinking water wells in the surficial aquifer could be influenced by contaminants in the groundwater associated with Site 14.

are presented in Appendix C to the GIR (ABB-ES, 1998). Risk calculation spreadsheets in Appendix E to this RI report also contain the assumed exposure parameters and quantitation of exposures.

6.3.1 Surface Soil No humans currently reside or work at Site 14. Currently there are no buildings present at the site; therefore, exposure of occupational workers will be only considered as part of the future land-use scenario. Site 14 may be developed eventually for residential land use; therefore, the residential receptor will be evaluated as part of the hypothetical future land-use scenario. Other possible future exposure scenarios include excavation activities, such as installation of utility lines, and site maintenance, such as mowing the grass.

Exposures of hypothetical future residents (adult and child), hypothetical future occupational workers, current and future site maintenance workers, future excavation workers, and current and future trespassers (adult and child) to surface soil contaminants through ingestion, dermal contact, and inhalation of particulates are evaluated in this HHRA.

6.3.2 Subsurface Soil Currently, there are no exposures to subsurface soil because no excavation or construction activities are ongoing at Site 14 and there are no HHCPCs identified in subsurface soil. Therefore, subsurface soil exposure pathways are not evaluated as current or potential future (hypothetical) exposure pathways in this HHRA.

6.3.3 Groundwater Currently, groundwater at Site 14 is not used for any potable or nonpotable purpose. There are no plans to use the water resource in the foreseeable future. In the event that Site 14 or areas hydraulically downgradient of Site 14 are developed for residential use, the exposure pathway to chemicals in groundwater could become complete. Therefore, hypothetical future domestic use of the surficial aquifer (adult and child ingestion) has been evaluated in this HHRA as a worst-case estimate of hypothetical future receptors.

6.3.4 Exposure Point Concentrations (EPCs) EPCs for all HHCPCs in surface soil and groundwater were calculated according to Subsection 2.5.3.3 of the GIR (ABB-ES, 1998). This quantification process involves developing assumptions regarding exposure conditions and exposure scenarios for each receptor to estimate the total amount of contaminants that a hypothetical receptor may ingest, dermally absorb, or inhale from each exposure pathway. The ultimate goal of this step, as defined in USEPA guidance, is to identify the combination of these exposure variables or parameters that result in the most intense level of exposure that may "reasonably" be expected to occur under current and future site conditions (USEPA, 1989c). The EPCs for HHCPCs in surface soil for Site 14 are presented in Table 6-5. The EPCs for HHCPCs in groundwater for Site 14 are presented in Table 6-6. The EPCs were used with receptor-specific exposure parameters to quantify exposures to the HHCPCs. Risk calculation spreadsheets and exposure assumptions are in Appendix C to this report.

6.4 TOXICITY ASSESSMENT. The toxicity assessment methodology is described in Subsection 2.5.4 of the GIR (ABB-ES, 1998). The toxicity assessment evaluates the available evidence on the hypothetical adverse effects associated with exposure to each HHCPC. This information is used to develop a relationship between the extent of exposure and the likelihood or severity of adverse human

Table 6-5
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Inorganic Analytes (mg/kg)				
Aluminum	6/6	23,800	NC	23,800
Arsenic	6/6	4.3	NC	4.3
Iron	6/6	15,800	NC	15,800
Manganese	6/6	559	NC	559

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% upper confidence limit (UCL) of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
mg/kg = milligrams per kilogram.
NC = not calculated.

Table 6-6
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Groundwater

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	Arithmetic Mean[2]	Exposure Point Concentration[3]
Inorganic Analytes (μg/ℓ)				
Arsenic	1/2	0.38	0.31	0.31

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] Arithmetic mean of all samples calculated using one-half the contract-required quantitation limit and contract-required detection limit for nondetects.
[3] Exposure point concentration is the lower of either the 95 percent upper confidence limit concentration or maximum detected concentration.

Note: μg/ℓ = micrograms per liter.

health effects. Two steps are typically associated with toxicity assessment: hazard identification and dose-response assessment.

- Hazard identification is the process of determining if exposure to an agent can cause a particular adverse health effect and, more importantly, if that effect will occur in humans. The objectives of the hazard identification in the HHRA are to (1) identify which of the contaminants detected at the site are hypothetical hazards, and (2) summarize their potential toxicity in brief nontechnical language.

- A dose-response assessment is conducted to characterize and quantify the relationship between intake or dose of an HHCPC and the likelihood of a toxic effect or response. There are two categories of toxic effects evaluated in this HHRA: carcinogenic and noncarcinogenic. Following USEPA guidance for HHRAs (USEPA, 1989c), these two endpoints (cancer and noncancer) are evaluated separately. As a result of the dose-response assessment, identified toxicity values are used to estimate the incidence of adverse effects as a function of human exposure to a chemical.

Appendix E to this report contains brief toxicity profiles for HHCPCs identified in the surface soil and groundwater at Site 14. Appendix E to this report also contains dose-response information for the HHCPCs (Tables E-4 through E-9). Toxicity values used in this HHRA were current as of November 1997 for Integrated Risk Information System (USEPA, 1997b) and July 1997 for Health Effects Assessment Summary Tables (USEPA, 1997c).

6.5 RISK CHARACTERIZATION. Risk characterization is the final step in the risk assessment process. This step involves the integration of the exposure and toxicity assessments into a qualitative or quantitative expression of potential human health risks associated with contaminant exposure. Quantitative estimates of both carcinogenic and noncarcinogenic risks are made for each HHCPC and each complete exposure pathway identified in the exposure assessment. The risk characterization methodology is described in Subsection 2.5.5 of the GIR (ABB-ES, 1998).

Risk estimates for hypothetical exposures to surface soil and groundwater under current and hypothetical future land-use scenarios are discussed below in Subsections 6.5.1 and 6.5.2. These risk estimates are then compared to USEPA and FDEP carcinogenic and noncarcinogenic target levels.

The USEPA guidelines, established in the NCP, indicate that the total excess lifetime cancer risk (ELCR) due to exposure to the HHCPCs at a site should not exceed a range of 1 in 1,000,000 (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). FDEP has indicated that chemical-specific risks greater than one in one million (1×10^{-6}) warrant further consideration.

An HQ less than 1 indicates that noncarcinogenic toxic effects are not expected to occur due to HHCPC exposure. Hazard indices (HIs) greater than 1 may be indicative of possible noncarcinogenic toxic effects, but the circumstances must be evaluated on a case-by-case basis (USEPA, 1989c). As the HI increases, so does the likelihood that adverse effects might be associated with exposure. Both

the USEPA and FDEP consider that chemicals with HIs greater than 1 warrant further evaluation and require an evaluation of the noncarcinogenic effects.

Table 6-7 summarizes the cancer and noncancer risk under a current land-use scenario for Site 14. Table 6-8 summarizes the cancer and noncancer risk under a hypothetical future land-use scenario for Site 14.

Table 6-7
Risk Summary, Current Land Use

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI	ELCR
Current Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.02	3×10^{-7}
	Dermal contact	0.03	2×10^{-8}
	Inhalation of particulates	0.0002	9×10^{-11}
	Total Adult Trespasser:	0.05	3×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.03	3×10^{-7}
	Dermal contact	0.04	1×10^{-8}
	Inhalation of particulates	0.0002	5×10^{-11}
	Total Adolescent Trespasser:	0.1	3×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	6×10^{-7}
Site Maintenance Worker:	Incidental ingestion	0.01	3×10^{-7}
	Dermal contact	0.02	3×10^{-8}
	Inhalation of particulates	0.0008	4×10^{-10}
	Total Site Maintenance Worker:	0.03	2×10^{-7}

Notes: HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = Not calculated because child and adult HIs are not additive.

Table 6-8
Risk Summary, Future Land Use

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI	ELCR
Future Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.02	3×10^{-7}
	Dermal contact	0.03	2×10^{-8}
	Inhalation of particulates	0.0002	9×10^{-11}
	Total Adult Trespasser:	0.05	3×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.03	3×10^{-7}
	Dermal contact	0.04	1×10^{-8}
	Inhalation of particulates	0.0002	5×10^{-11}
	Total Adolescent Trespasser:	0.07	3×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	6×10^{-7}
Adult Resident:	Incidental ingestion	0.1	3×10^{-6}
	Dermal contact	0.2	2×10^{-7}
	Inhalation of particulates	0.006	3×10^{-9}
	Total Adult Resident:	0.4	3×10^{-6}
Child Resident:	Incidental ingestion	1	7×10^{-6}
	Dermal contact	0.4	7×10^{-8}
	Inhalation of particulates	0.03	4×10^{-9}
	Total Child Resident:	2	7×10^{-6}
	Total Risk to Resident (Adult and Child) Exposed to Surface Soil:	NC	1×10^{-5}
Occupational Worker:	Incidental ingestion	0.05	1×10^{-6}
	Dermal contact	0.07	5×10^{-8}
	Inhalation of particulates	0.002	1×10^{-9}
	Total Occupational Worker:	0.01	1×10^{-6}
Site Maintenance Worker:	Incidental ingestion	0.01	3×10^{-7}
	Dermal contact	0.02	3×10^{-8}
	Inhalation of particulates	0.0008	4×10^{-10}
	Total Site Maintenance Worker:	0.03	2×10^{-7}

See notes at end of table.

Table 6-8 (Continued)
Risk Summary, Future Land Use

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Land Use		Exposure Route	HI	ELCR
Future Land Use (Continued)				
	Excavation Worker:	Incidental ingestion	0.01	5×10^{-8}
		Dermal contact	0.001	6×10^{-10}
		Inhalation of particulates	0.0008	2×10^{-11}
		Total Excavation Worker:	0.01	5×10^{-8}
Groundwater:				
	Adult Resident:	Ingestion of groundwater as drinking water	0.03	9×10^{-6}
		Total Adult Resident:	0.03	9×10^{-6}
	Child Resident:	Ingestion of groundwater as drinking water	0.07	3×10^{-6}
		Total Child Resident:	0.07	3×10^{-6}
		Total Risk to Resident (Adult and Child) Exposed to groundwater:	NC	1×10^{-5}
		Total Risk to Resident (Adult and Child) Exposed to Surface Soil, groundwater:	NC	2×10^{-5}

Notes: HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = Not calculated because child and adult HIs are not additive.

6.5.1 Surface Soil The risk calculations for surface soil exposure are shown in Tables E-10 through E-23 in Appendix E to this report. For the current land-use scenario, the cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 6×10^{-7} for an aggregate (combined adult and adolescent) trespasser, and 2×10^{-7} for a site maintenance worker. Both receptor's cancer risk values are below the USEPA acceptable cancer risk range of 1 in 10,000 to 1 in 1,000,000. The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation for all receptors under current land use are below USEPA's and FDEP's target HI of 1. Figures 6-2 and 6-3 present summaries of cancer risks and HIs, respectively, associated with exposure scenarios under potential current land-use exposure scenarios.

The cancer risks associated with exposure to surface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical future land use are 1×10^{-5} for an aggregate resident (combined adult and child), 6×10^{-7} for an aggregate trespasser (combined adult and adolescent), 1×10^{-6} for an occupational worker, 2×10^{-7} for a site maintenance worker, and 5×10^{-8} for an excavation worker under hypothetical future land use. Figure 6-4 presents a summary of cancer risk associated with exposure scenarios under future land use. All of these hypothetical future receptor risks are within or below the USEPA acceptable cancer risk range; however, the hypothetical future residential risk exceeds the Florida level of concern of 1×10^{-6} (due to arsenic).

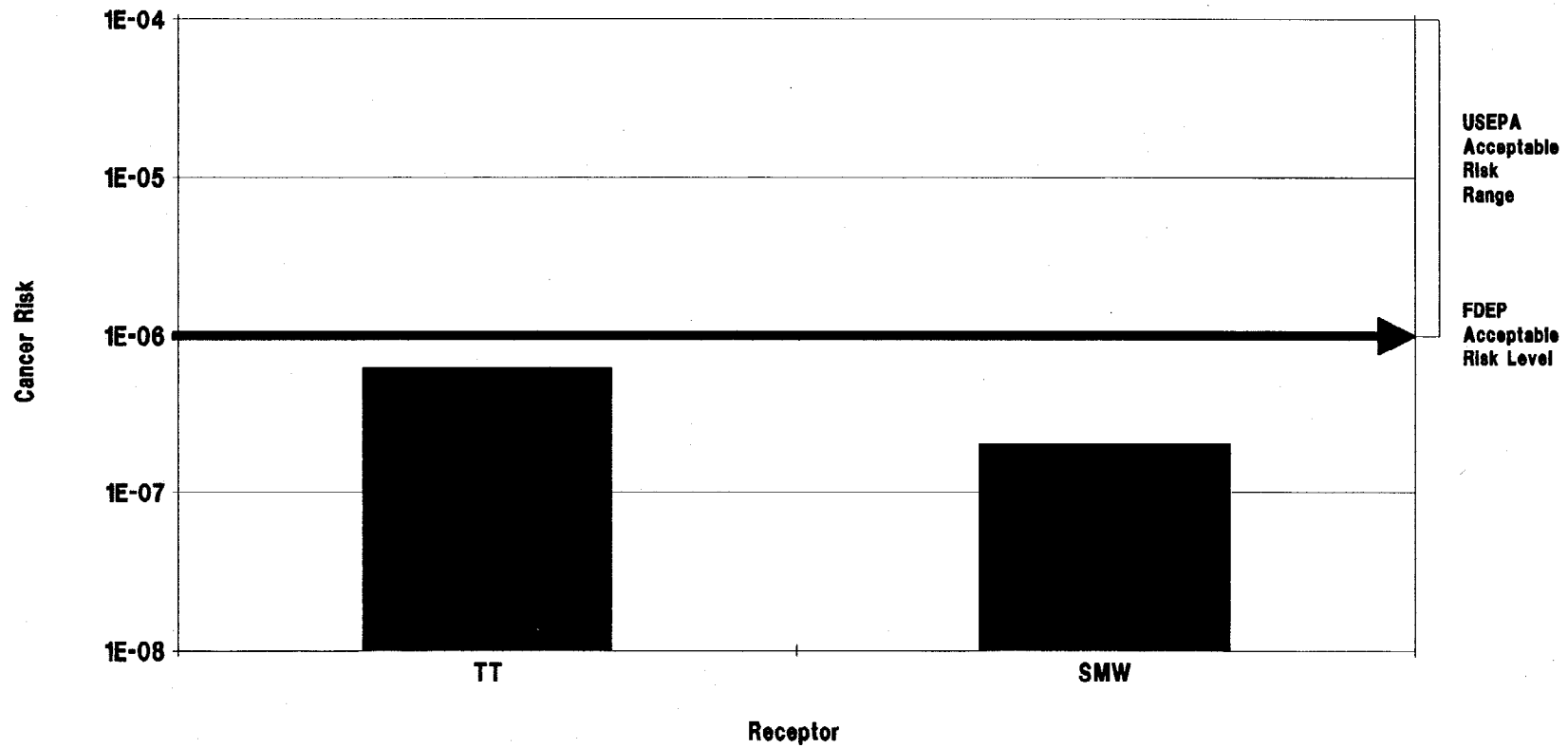
The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under future land use for the adult resident, adult and adolescent trespasser, occupational worker, site worker, and excavation worker are at or below USEPA's and FDEP's target HI of 1. The HI for the future child resident is 2. The major contributors to this HI are iron (HQ = 1), aluminum (HQ = 0.3), arsenic (HQ = 0.2), and manganese (HQ = 0.2). Figure 6-5 presents a summary of HIs associated with exposure scenarios under future land use.

6.5.2 Groundwater The risk calculations for groundwater exposure are shown in Tables E-24 through E-25 in Appendix E to this report. Currently, there are no potable supply wells at the site; thus, there is no human exposure to groundwater. Therefore, risk was not evaluated for the current land-use scenario.

The cancer risks associated with exposure to groundwater ingestion and inhalation of volatiles while showering under hypothetical future land use are 1×10^{-5} for an aggregate resident (combined adult and child). Figure 6-6 presents a summary of cancer risks associated with exposure scenarios under future land use. The hypothetical future residential receptor risks exceed the Florida level of concern of 1×10^{-6} (due to arsenic). Figure 6-6 present a summary of the cancer risk to potential future residents.

Under hypothetical future land use, the noncancer risks associated with groundwater ingestion are less than 1 for both the adult resident and child resident. These HIs do not exceed USEPA's or FDEP's target HI of 1. Figure 6-7 presents a summary of the noncancer risk to potential future residents.

6.6 UNCERTAINTY ANALYSIS. General uncertainties associated with the collection, analysis, and evaluation of data; exposure assessment; toxicity assessment; and

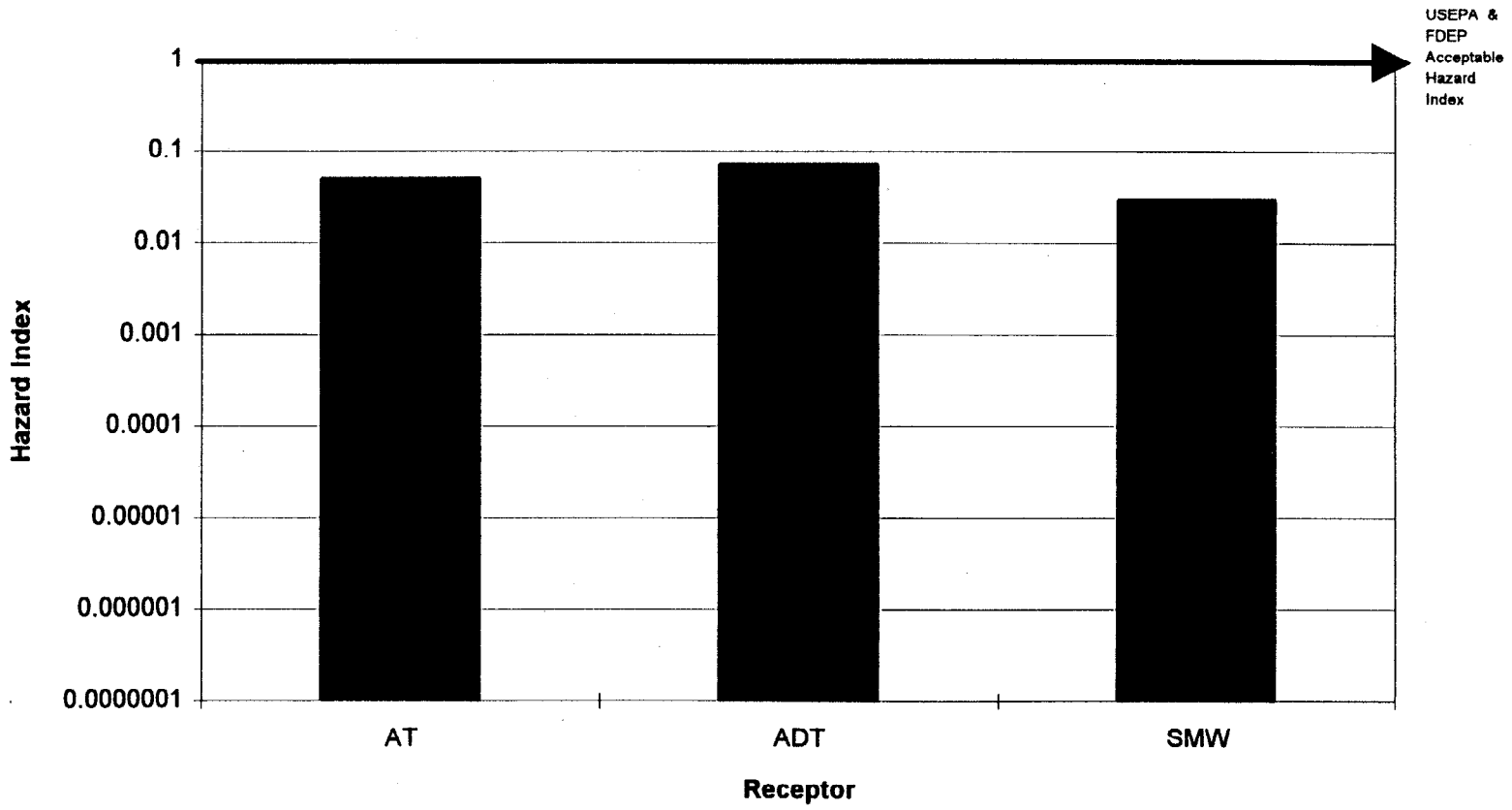


NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
TT = Total trespasser
SMW = Site maintenance worker

FIGURE 6-2
CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



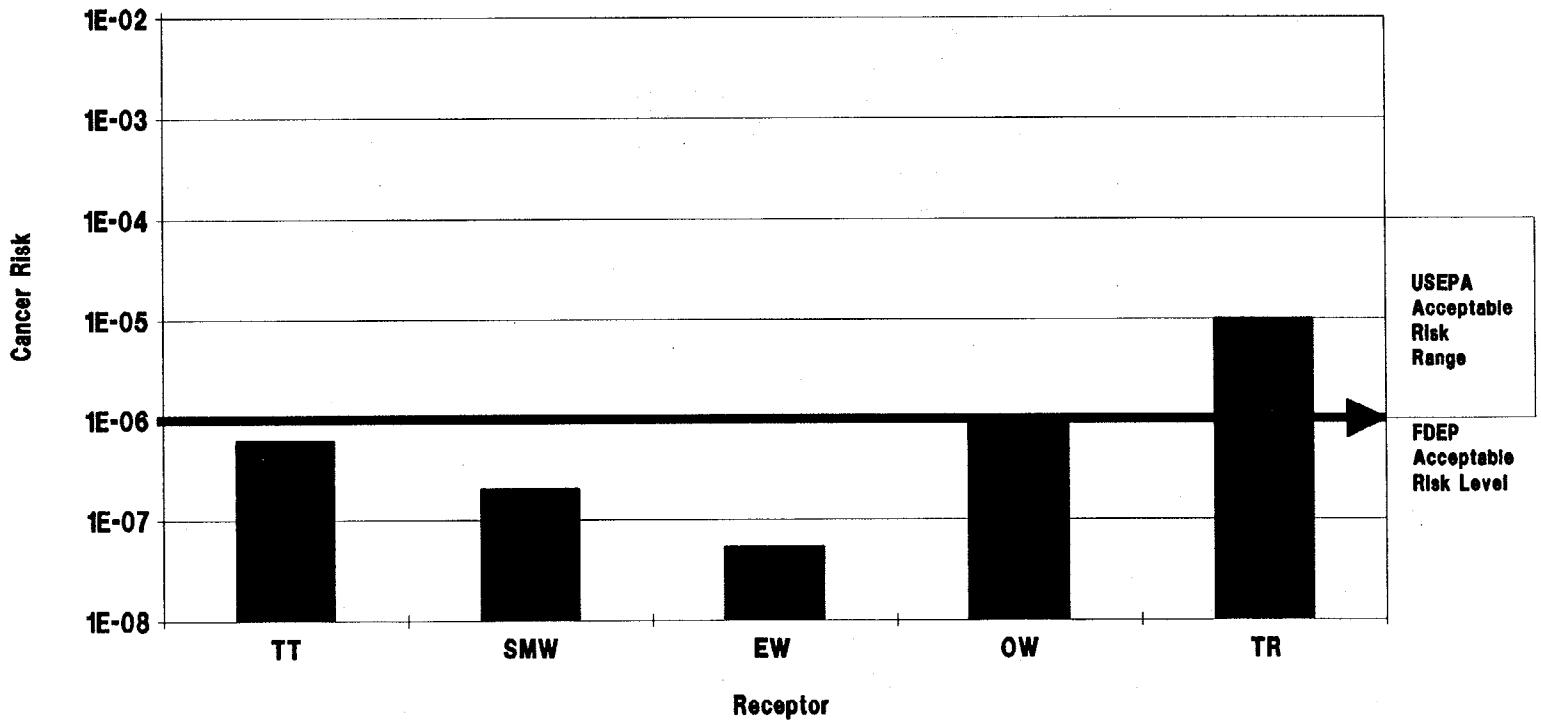
NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
AT = Adult trespasser
ADT = Adolescent trespasser
SMW = Site maintenance worker

FIGURE 6-3
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

H:\HEIDI\WHITING\SITE14\FIG6-3.PM5 FIGS1B.XLS 042398HAS

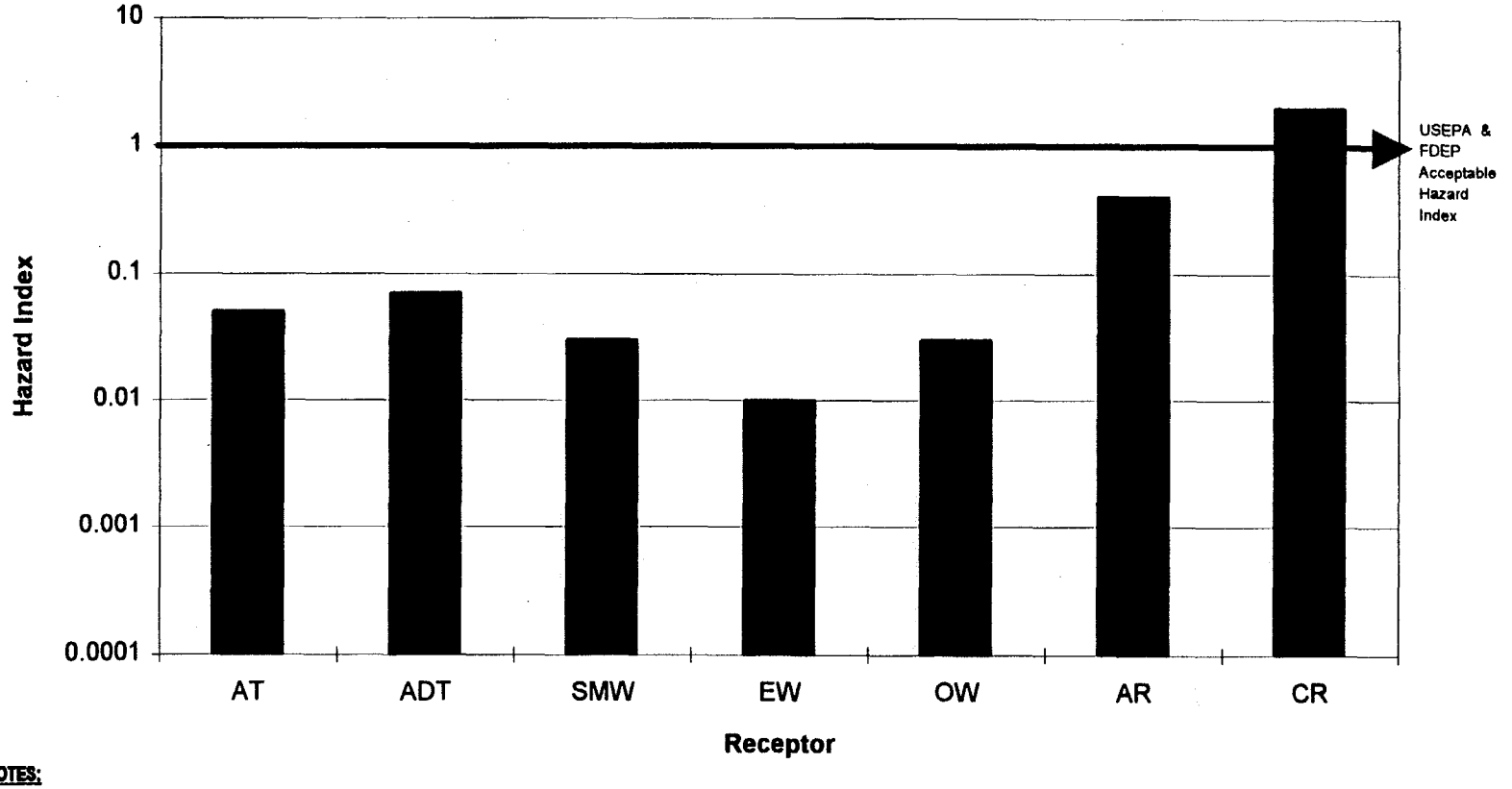


NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
TT = Total trespasser
SMW = Site maintenance worker
EW = Excavation worker
OW = Occupational worker
TR = Total resident

FIGURE 6-4
CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE
SOIL AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY
LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



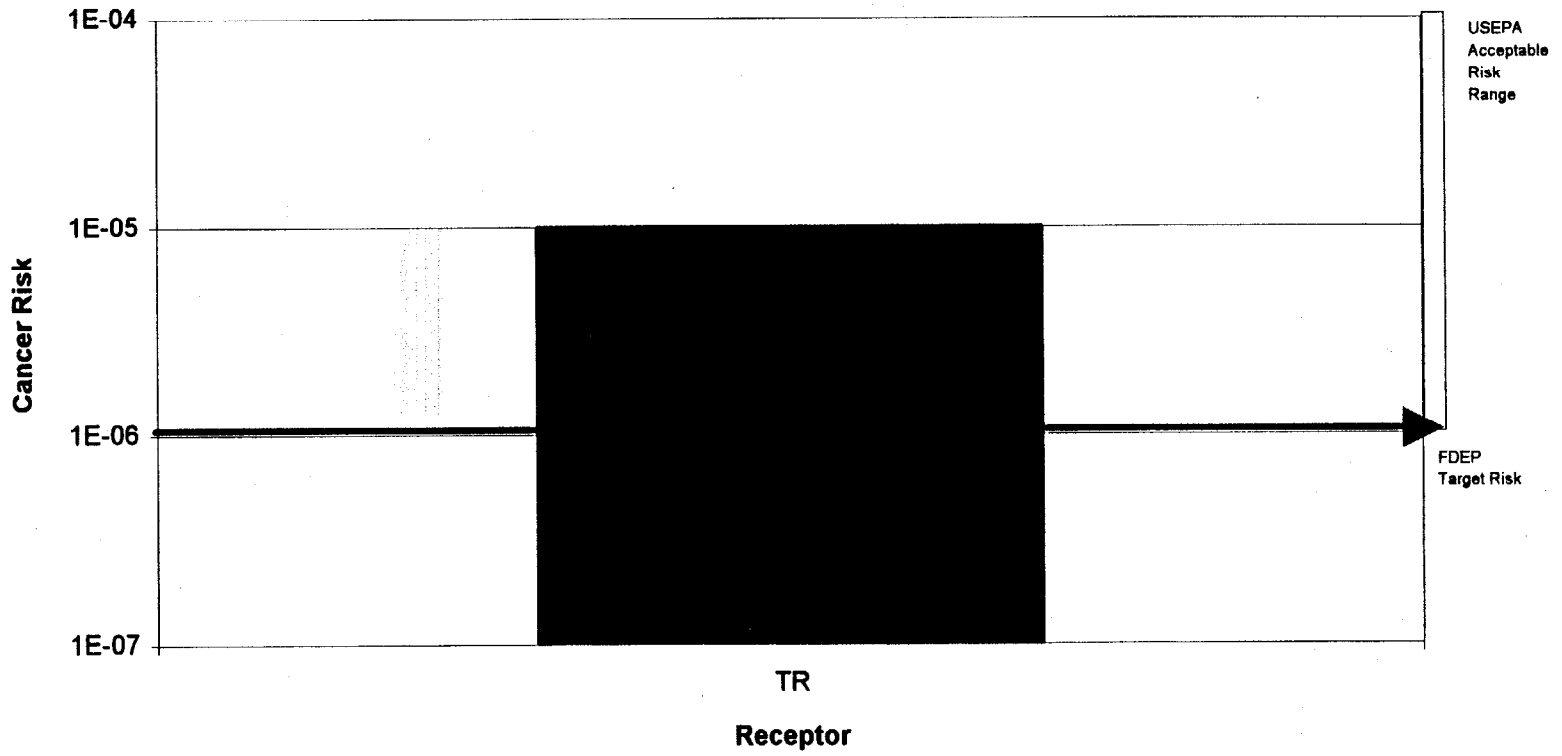
NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
AT = Adult trespasser
ADT = Adolescent trespasser
SMW = Site maintenance worker
EW = Excavation worker
OW = Occupational worker
AR = Adult resident
CR = Child resident

FIGURE 6-5
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE
SOIL AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY
LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

H:\HEIDI\WHITING\SITE14\FIG6-5.PM5 FIGS1B.XLS 04239BHAS



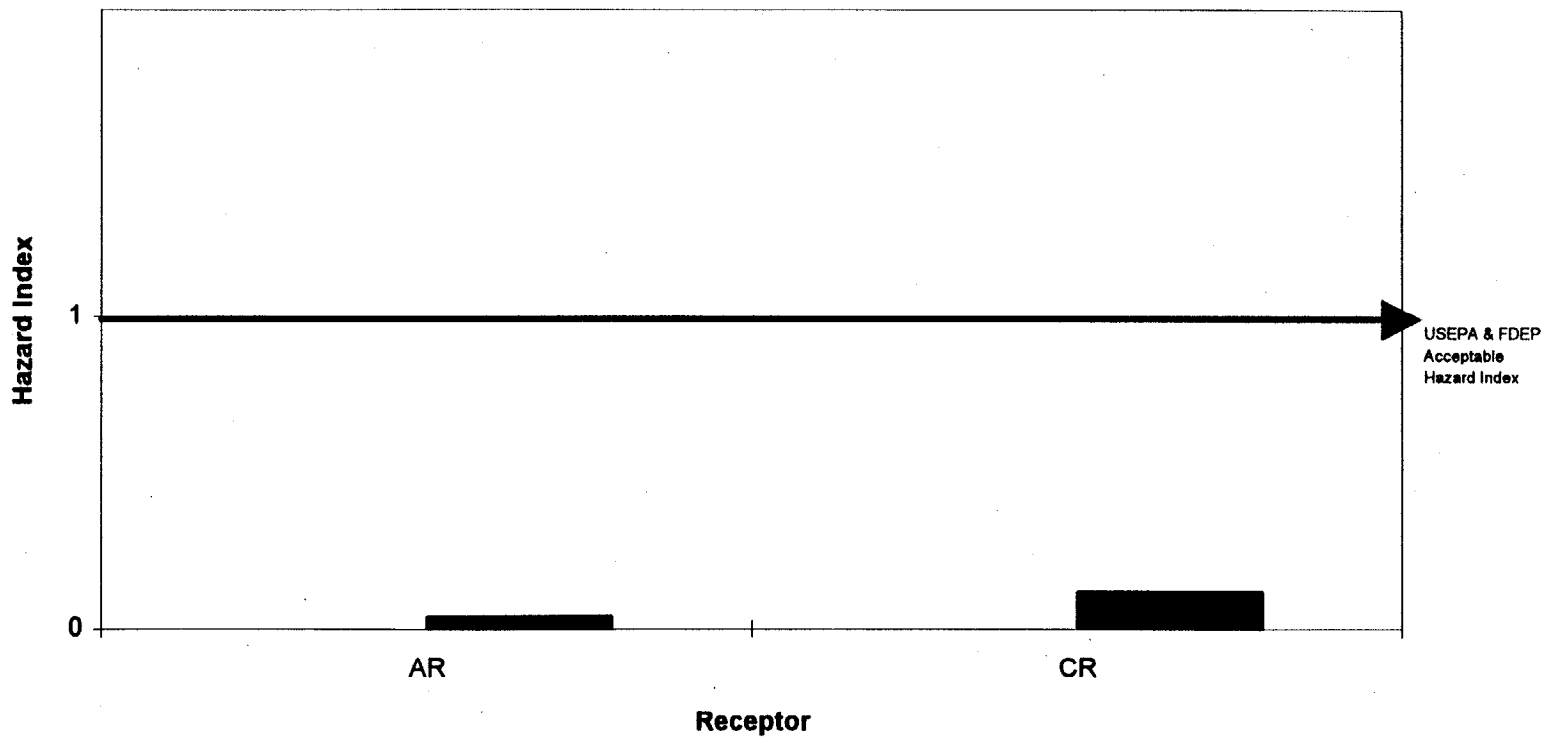
NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
TR = Total resident

FIGURE 6-6
CANCER RISK SUMMARY
FUTURE LAND USE FOR GROUNDWATER AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

H:\HEIDI\WHITING\SITE14\FIG6-6.PM5 GW14B.XLS 04239@HAS



NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection
AR = Adult resident
CR = Child resident

FIGURE 6-7
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR GROUNDWATER AT SITE 14

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL AREA

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

H:\HEIDI\WHITING\SITE14\FIG6-7.PM5 GW14B.XLS 042398HAS

the risk estimation process are discussed in Subsection 2.5.5.1 of the GIR (ABB-ES, 1998). Site-specific uncertainties that are important for the interpretation of the calculated risk estimates for surface soil and groundwater at Site 14 are discussed below.

- The surface soil carcinogenic risk at Site 14 is driven by a naturally occurring metal, arsenic. It is uncertain whether or not this risk to hypothetical future residents is actually due to past site operations. Detected arsenic concentrations may actually be at naturally occurring levels or due to other anthropogenic activities such as pesticide application. This is especially noteworthy because the risk from arsenic at background conditions is 7×10^{-6}. Therefore, the risk from arsenic at Site 14 is likely to be an overestimate.

- Although the soil HI for iron is equal to 1 for the child resident, the EPC for iron in the surface soil is less than the essential nutrient screening value. Therefore, the noncancer risk from iron to the child is likely to be an overestimate.

- The lack of inhalation RfDs for most of the HHCPCs in surface soil may have resulted in underestimates of the HIs associated with exposure to surface soil at Site 14; however, these noncancer risks are not likely to be significant when compared to oral and dermal risks that are fully characterized.

- According to the methodology described in the GIR (ABB-ES, 1998) (Subsection 2.5.3.3), central tendency (CT) carcinogenic risk to hypothetical future receptors that have risks exceeding Florida or USEPA levels of concern was evaluated. The CT evaluation is designed to provide a probable risk level (USEPA, 1995b).

  The hypothetical future resident reasonable maximum exposure (RME) carcinogenic risk exceeded its target of 1×10^{-6}. The CT carcinogenic risk results for hypothetical trespasser, future residential and occupational receptors and the CT exposure parameters are presented in Table E-26 through E-27 in Appendix E of this report. Only CT ingestion and dermal exposures were characterized because the contribution from inhalation was insignificant compared to the total risk. The CT aggregate residential risk exposed to surface soil is 3×10^{-6}. The CT aggregate residential risk exposed to groundwater is 1×10^{-5}. The risk range of 3×10^{-6} to 1×10^{-5} as presented by the RME and CT exposure scenarios for hypothetical future residential receptors are useful to provide perspective for the risk manager and compliance with Agency guidance (USEPA, 1995b).

- The SQLs were compared to the risk-based screening criteria and Florida and State regulatory guidelines for all analytes not selected as HHCPCs to assess whether or not the detection limits were adequate to detect analytes at levels of concern (SQLs of analytes with 100 percent frequency of detection were not evaluated). The only analyte with a SQL that exceeds its screening criteria is beryllium in surface soil. However, the laboratory equipment was able to detect the compound below the SQL for beryllium; therefore, the SQL was considered adequate for this HHRA.

6.7 REMEDIAL GOAL OPTIONS. Remedial goal options (RGO) tables are presented for each medium with a total ELCR greater than 1×10^{-6} or an HI greater than 1 per USEPA guidance, and for media with chemicals whose EPCs exceed Florida standards. The RGO concentrations are calculated using the scenario representing the highest estimated risk for a given medium. Based on the above criteria, RGOs are developed for each chemical with a total ELCR greater than 1×10^{-6} or an HQ greater than 0.1. Analytes whose EPCs exceed Florida standards are also presented in the RGO tables.

RGOs and available Federal and FDEP risk-based criteria are intended to provide the basis for the development of remedial alternatives in the FS. The RGO are not actual or proposed cleanup levels, but are provided to assist risk-management decision making in the FS.

Table 6-9 presents the RGOs for surface soil at Site 14. RGOs are presented for aluminum, arsenic, iron, and manganese based on cancer and noncancer risks for the adult and child resident at Site 14.

Table 6-10 presents the RGOs for groundwater for these analytes. RGOs are presented for arsenic based on cancer risks for the adult and child resident at Site 14. It should be noted that the EPC for arsenic is an order of magnitude less than the Federal drinking water standard and Florida groundwater cleanup target level.

6.8 SUMMARY OF HHRA FOR SITE 14. HHCPCs were identified and risks were estimated for surface soil and groundwater associated with Site 14. No HHCPCs were identified for subsurface soil; therefore, no additional evaluations were performed. The conclusions listed below were drawn based on this HHRA.

- The HHCPCs detected in surface soil, and groundwater are not likely to pose unacceptable carcinogenic risks to the receptors evaluated based on evaluation of the samples using USEPA guidelines and target risk range.

- The total ELCR of 1×10^{-5} at Site 14, associated with exposure to soil by a hypothetical future resident exceeds Florida's target risk level of concern 1×10^{-6} due to arsenic. However, it should be noted that the background concentrations of arsenic detected in surface soil samples exceed the Florida residential soil cleanup goal and may result in an unacceptable carcinogenic risk. It is possible that naturally occurring arsenic contributes to the FDEP target risk-level exceedance.

- The total ELCR at Site 14, associated with ingestion of groundwater by hypothetical future resident (1x10-5), exceeds Florida's target risk level of concern due to arsenic. Additionally, it should be noted that the EPC for arsenic is an order of magnitude less than the Federal drinking water standard and Florida groundwater cleanup target level.

Table 6-9
Summary of Remedial Goal Options for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to Resident [adult and child])			Total Hazard Index (Based on Risk to Child Resident)			Florida Soil Cleanup Goal (Residential)[1]	Florida Soil Cleanup Goal (Leaching)[2]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Inorganic Analytes (mg/kg)											
Aluminum	10,100 to 23,800	23,800	NA	NA	NA	NR	NR	7,440	75,000	NC	15,300
Arsenic	1.7 to 4.3	4.3	NR	4.3	0.43	NR	NR	2.3	0.8	NC	3
Iron	5,470 to 15,800	15,800	NA	NA	NA	NR	15,800	1,580	NA	NC	8,590
Manganese	33.6 to 559	559	NA	NA	NA	NR	NR	294	370	NC	404

[1] Values are for residential soil, from Florida Department of Environmental Protection memoranda titled Soil Cleanup Goals for Florida, dated September 29, 1995, and Applicability of Soil Cleanup Goals for Florida, dated January 19, 1996.
[2] Values are from the Florida Department of Environmental Protection memorandum titled Soil Cleanup Goals for Florida, dated September 29, 1995.

Notes: mg/kg = milligrams per kilograms.
NA = not applicable.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NC = not calculated.

Table 6-10
Summary of Remedial Goal Options for Groundwater

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (Based on Risk to (Resident [adult and child])			Total Hazard Index (Based on Risk to Child Resident)			Florida Groundwater Guidance Concentration[1]	Federal MCL[2]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Inorganic Analytes (μg/ℓ)											
Arsenic	0.38	0.31	NR	0.31	0.031	NA	NA	NA	50	50	ND

[1] Florida Department of Environmental Protection Groundwater Guidance Concentrations from June 1994.
[2] Federal MCLs are taken from U.S. Environmental Protection Agency Drinking Water Regulations and Health Advisories from October 1996.

Notes: MCL = maximum contaminant level.
μg/ℓ = micrograms per liter.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NA = not applicable.
ND = not detected in any background sample.

7.0 ECOLOGICAL RISK ASSESSMENT

The ERA evaluates actual and potential adverse effects to ecological receptors associated with exposure to chemicals from Site 14, the Short-Term Sanitary Landfill, at NAS Whiting Field. The ERA for Site 14 follows the methodologies described in the NAS Whiting Field GIR (ABB-ES, 1998), and current guidance materials for ERAs at Superfund sites including the following:

- *Risk Assessment Guidance for Superfund Environmental Evaluation Manual* (USEPA, 1989b)
- *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference* (USEPA, 1989d)
- *Framework for Ecological Risk Assessment* (USEPA, 1992b)
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997d)
- Supplemental Guidance to RAGS: Region 4 Bulletins on Ecological Risk Assessment (USEPA, 1995a)
- *Proposed Guidelines for Ecological Risk Assessment* (USEPA, 1996c)

Risk assessment guidance included in the USEPA "Eco Update" bulletins (1991c, 1992c, and 1992d) and recent publications (e.g., Maughan, 1993; Suter, 1993) were also consulted.

This ERA was conducted to determine if ecological receptors are potentially exposed to contaminants from Site 14 at concentrations that could cause adverse ecological effects. The Site 14 ERA consists of eight subsections, including

- Site Characterization (Section 7.1) describes current ecological conditions at the site,
- Problem Formulation (Section 7.2) establishes the goals and focus of the assessment and identifies major factors to be considered,
- Hazard Assessment and Selection of Ecological Contaminant of Potential Concern (ECPCs) (Section 7.3) reviews the analytical data and identifies chemicals present at the site that may pose ecological risks,
- Exposure Assessment (Section 7.4) identifies complete exposure pathways and quantifies the magnitude and frequency of exposure,
- Ecological Effects Assessment (Section 7.5) identifies potential adverse effects to ecological receptors associated with the chemicals of concern identified in Section 7.3,
- Risk Characterization (Section 7.6) integrates exposure and concentration-toxicity response information to derive a likely estimate of adverse effects,

- Uncertainties (Section 7.7) identifies assumptions of the ERA process that may influence the risk assessment conclusions, and

- Summary of Ecological Risk (Section 7.8).

7.1 SITE CHARACTERIZATION. NAS Whiting Field Site 14 is approximately 3 acres in size and is located adjacent to the southeastern boundary of the facility, east of Perimeter Road (see Figure 1-2). The site was used as a sanitary landfill for 6 to 9 months during the latter part of 1978 and early 1979. Based on a geophysical survey of the site, it appears that refuse disposal was limited to less than an acre within the south central portion of the site.

The landfill was abandoned because the soil contained a high clay content that resulted in the ponding of rainwater throughout the site. Therefore, in early 1979 the disposal area was abandoned and covered with soil. A pine plantation was planted in the area with the predominant species being slash pine (*Pinus elliotii*).

The wastes disposed of at Site 14 presumably included general domestic refuse, although waste solvents and residue from paint-stripping operations may have been disposed of in the past.

Surface drainage from Site 14 is toward the unlined, vegetated "Y" ditch, which is located approximately 400 feet east of the site. The "Y" ditch drains east toward Big Coldwater Creek, which is located 1.8 miles east of Site 14.

The landfill area of Site 14 is sparsely vegetated with patches of grass, while the surrounding area is characterized as planted pine forest (Figure 7-1). In addition to slash pine and long-leaf pine (*Pinus palustris*), other saplings and shrubs commonly found in the planted pine area and herbaceous layer of Site 14 include groundsel tree (*Baccharis halimifolia*), ageratum (*Conoclinium coelestinum*), rattle box (*Crotalaria lanceolata*), dog fennel (*Eupatorium capillifolium*), rabbit tobacco (*Gnaphalium obtusifolium*), yaupon holly (*Ilex vomitoria*), chinese privet (*Ligustrum sinense*), goldenaster (*Pityopis graminifolia*), blackberry vine (*Rubus* sp.), gentian (*Sabatia* sp.), blue sage (*Salvia azurea*), and greenbriar (*Smilax* sp.). A complete list of vegetative species occurring at Site 14 is provided in Appendix G of the GIR (ABB-ES, 1998).

NAS Whiting Field maintains a program for planting and harvesting of pine trees, primarily long-leaf and slash pines. The planted pine area of Site 14 is subject to controlled burns and timber harvesting activities. As part of the ecosystem management plan, planted pine forests undergo periodic burning, usually once every four years, and selective thinning of long-leaf and slash pines, every eight to ten years. These forestry management activities provide a variety of habitats and food sources for wildlife and other ecological receptors. The planted pine area of Site 14 is reaching a mature status with a well-developed canopy and an open understory typical of uplands pine forests of the southeastern United States. The forested area at Site 14 is contiguous with a mature planted pine forest that surrounds the site. The pine forest canopy is approximately 30 feet high, the typical tree diameter is approximately 8 inches, and spacing between planted pines is about 6 to 10 feet.

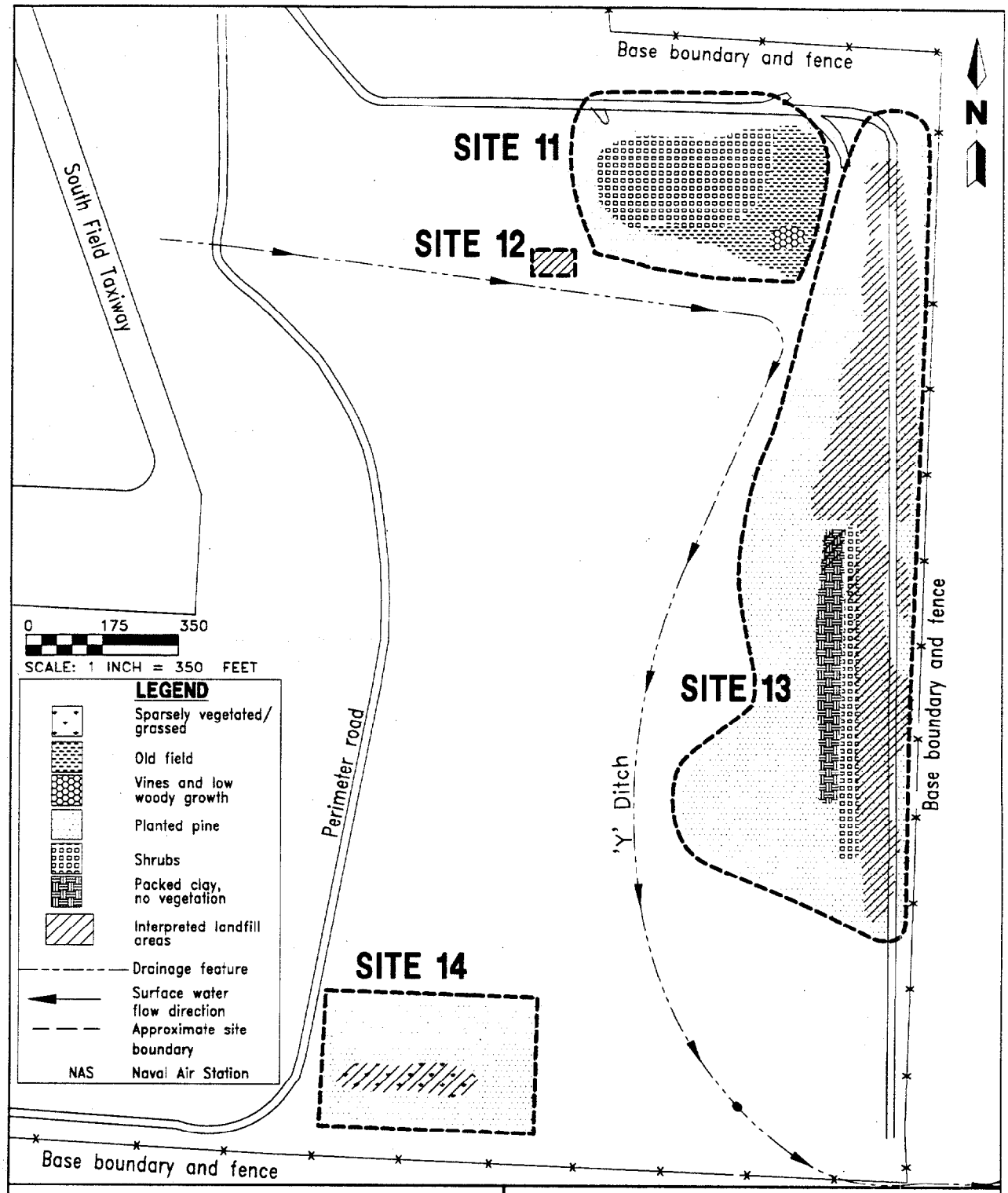


FIGURE 7-1
VEGETATIVE COVER MAP

K:\02534\02534-09\RIV\02534581.DWG, PDP-PDP 03/18/98 14:20:52, AutoCAD R12

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

Southeastern pine forests provide habitat for a diverse array of birds, including insectivorous gleaners of pine needles and bark, flycatchers, seed-eaters, and nocturnal and diurnal aerial predators (Wolfe et. al., 1988). The pine flatwoods at and surrounding Site 14 are likely to host such an assemblage of species. Birds of prey, such as owls and hawks, may also nest in these wooded areas.

It is likely that the terrestrial invertebrate biomass at Site 14 serves as a forage base for a variety of wildlife species, including adult amphibians, reptiles, small birds, and small mammals. Small reptiles, mammals, and birds may use the open portion of Site 14 for foraging, while returning to the forested pine area for protection. Predatory birds and mammals inhabiting the pine flatwood areas may also be attracted to the site.

During the 1995 biological field investigation, an eastern cottontail rabbit (*Sylvilagus floridanus*) was observed at Site 14. Other mammals and birds that may occur in the planted pine area of Site 14 include the hispid cotton rat (*Sigmodon hispidus*), cotton mouse (*Peromyscus gossypinus*), short-tailed shrew (*Blarina brevicauda*), American robin (*Turdus migratorius*), and eastern meadowlark (*Sturnella magna*). Predatory mammals and birds such as the red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), great horned owl (*Bubo virginianus*), and the red-tailed hawk (*Buteo jamaicensis*) may also forage in the area of Site 14.

As previously discussed, surface drainage from Site 14 moves toward the "Y" drainage ditch, which is located approximately 400 feet east of Site 14. Off-site migration of surface soil constituents from both Site 14 and Site 13 to the "Y" drainage ditch is possible. The "Y" ditch only contains water following periods of heavy rain. Because the ditch is intermittent in nature, it does not provide adequate aquatic habitat to support aquatic receptors.

Although no aquatic habitat is present at Site 14, groundwater from Site 14 may discharge to Big Coldwater Creek, which is located approximately 1.8 miles hydraulically downgradient and to the east of the site. Groundwater discharge to surface water is not evaluated as part of the ERA for Site 14 because Big Coldwater Creek receives groundwater discharge and stormwater runoff from multiple sources of potential contamination at NAS Whiting Field. In addition, detected concentrations of contaminants in Site 14 groundwater are low enough that they are not a concern for current and future discharges to surface water. With the exception of carbon disulfide, which was detected at a concentration of 0.004 mg/ℓ, no other organic constituents were detected in groundwater samples. In addition, the majority of inorganic constituents were detected at concentrations below the background screening values. Background screening values are equal to 2 times the average detected inorganic concentration in background samples and are presented in Section 3.3 of the GIR (ABB-ES, 1998).

7.2 PROBLEM FORMULATION. The problem formulation is the initial step of the ERA process. Problem formulation consists of identification of receptors, identification of exposure pathways for those receptors, and selection of assessment and measurement endpoints based on information gathered from the site characterization.

7.2.1 Identification of Receptors Ecological receptors that may potentially utilize the available planted pine forest habitat at Site 14 include terrestrial

wildlife (i.e., mammal, birds, reptiles, and adult amphibians), terrestrial plants, and soil invertebrates. Terrestrial flora and fauna potentially using NAS Whiting Field are identified in the GIR (ABB-ES, 1998). Aquatic receptors are not evaluated in the ERA because no aquatic habitats exist at Site 14.

Certain species that potentially reside at NAS Whiting Field are protected by Federal and/or State laws. A list of State and federally protected species is provided in the GIR (ABB-ES, 1998). No State or federally listed rare, threatened, or endangered species or species of concern are known or likely to inhabit Site 14.

7.2.2 Identification of Exposure Pathways Exposure pathways are identified for three groups of receptors (terrestrial wildlife, terrestrial plants, and soil invertebrates). A complete exposure pathway includes a source of contamination, an exposure route, and a receptor. A conceptual model of the exposure pathways from source to ecological receptors is depicted in the contaminant pathway model on Figure 7-2.

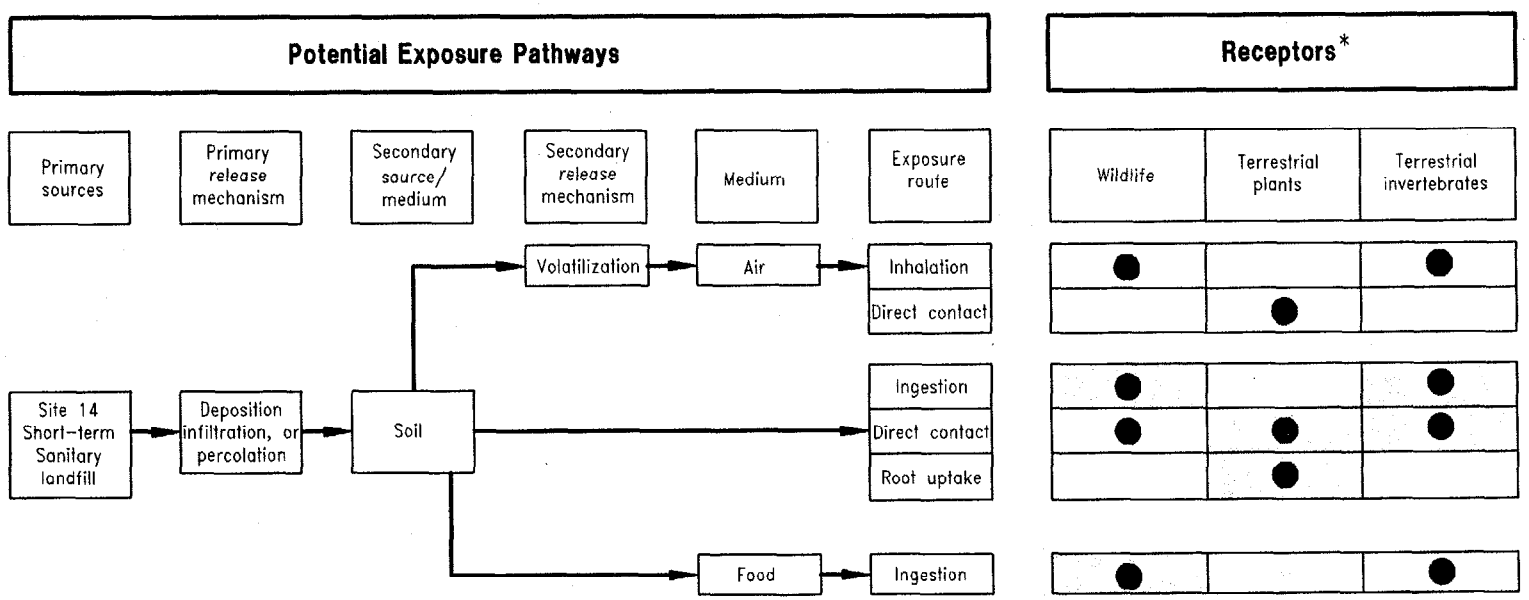
All potential routes of exposure are considered in the ERA and are presented in the contaminant pathway model. The model differentiates between those exposure routes that are quantitatively evaluated and those that are qualitatively discussed. This limitation is necessary to focus the risk evaluation on those pathways for which contaminant exposures are the highest and most likely to occur. Those pathways that cannot be quantitatively evaluated, due to a lack of toxicological information, are qualitatively discussed and addressed as uncertainties. The general approach used to identify exposure pathways for the three groups of receptors is explained below.

Terrestrial Wildlife. Terrestrial wildlife may be exposed to contaminants in surface soil and food items that are contaminated as a result of ingestion, dermal adsorption, and inhalation of fugitive dust and volatile emissions. Because surface water is not present at Site 14, only exposures associated with ingestion of surface soil and potentially contaminated food are evaluated in the Site 14 ERA.

Dermal adsorption is considered to be a negligible exposure pathway because the presence of fur, feathers, or chitinous exoskeleton is likely to prevent contamination from coming in direct contact with the skin (personal communication with Ted Simon, USEPA Region IV, September 1997). In addition, soil trapped in the fur or feathers is likely to be ingested during grooming or preening activities, which are evaluated as part of the indirect ingestion exposure pathway.

Exposure via inhalation of fugitive dust is also not likely to be a significant exposure pathway because the vegetation at Site 14 would limit the release of fugitive dust. Only two VOCs, methylene chloride and xylene, were detected at low concentrations in the surface soil of Site 14. Exposures associated with VOCs are not evaluated in the ERA because of the low frequency and detection of VOCs in the surface soil. In addition, during the biological field investigation, no evidence of burrowing animals and/or burrows was noted.

Potential contaminant exposures for reptiles and adult amphibians exist at NAS Whiting Field; however, ingestion toxicity data and bioaccumulation factors are



LEGEND

ERA Ecological risk assessment
NAS Naval Air Station

NOTES:

1. ● Indicates the exposure pathways that are qualitatively evaluated for receptors in the Site 14 ERA.

2. * Shading indicates the exposure pathways that are quantitatively evaluated for receptors in the Site 14 ERA. Nonshaded pathways are not evaluated because they are not considered significant pathways or data to quantitatively evaluate these pathways are not available.

FIGURE 7-2
CONTAMINANT PATHWAY MODEL FOR SITE 14 ECOLOGICAL RECEPTORS

REMEDIAL INVESTIGATION REPORT SITE 14, SHORT-TERM SANITARY LANDFILL

NAS WHITING FIELD MILTON, FLORIDA

K:\02534\02534-09\RIV\02534690.DWG, VC-VC 10/14/99 12:53:03, ACAD14

generally not available for these receptors. Therefore, potential risks associated with ingestion of affected media and food to these reptiles and amphibians will be qualitatively addressed in the Uncertainties Section of the ERA.

Terrestrial Plants and Invertebrates. Terrestrial plants and soil invertebrates may be exposed to contamination in surface soil by direct contact with and root uptake (plants) or ingestion (invertebrates) of soil. The ingestion exposure routes include the ingestion of soil and food items containing chemicals accumulated from Site 14 surface soil. The inhalation exposure route is not evaluated for terrestrial plants and invertebrates due to the reasons discussed above for terrestrial wildlife. Because the depth to groundwater is approximately 80 feet bls, far below the root zone of Site 14 plants, it is not expected that terrestrial plants will be exposed to potential groundwater contamination.

7.2.3 Identification of Endpoints The assessment and measurement endpoints selected for the Site 14 ERA are listed in Table 7-1. Assessment endpoints represent the ecological component to be protected, whereas the measurement endpoints approximate or provide a measure of the achievement of the assessment endpoint. The assessment endpoint selected for the Site 14 ERA is the survival and maintenance of receptor populations and communities at Site 14. The measurement endpoints used to gauge the likelihood of population- and community-level effects are chemical-specific toxicological benchmark values derived from the literature that are based on laboratory-measured survival, growth, and reproductive effects. Table 7-1 presents the assessment endpoint, endpoint species, measurement endpoint, and decision point (i.e., the outcome at which additional evaluation may be warranted).

Three hypotheses were developed to gauge potential risks associated with exposure to Site 14 surface soil. These hypotheses are designed for multiple species and trophic levels and represent both individual and community dynamics. Hypotheses for the Site 14 ERA are described below.

1. ECPCs present in the surface soil are not at concentrations sufficiently high enough to reduce plant or soil invertebrate biomass or plant cover availability such that small mammal and bird populations would be affected.

2. ECPC concentrations in plants and invertebrates are not sufficiently high enough to adversely affect foraging small mammal or bird populations following consumption of contaminated prey.

3. Bioaccumulating chemicals are not present at concentrations sufficiently high enough to reduce survivability, growth, or reproduction in top predators (i.e., foxes and owls).

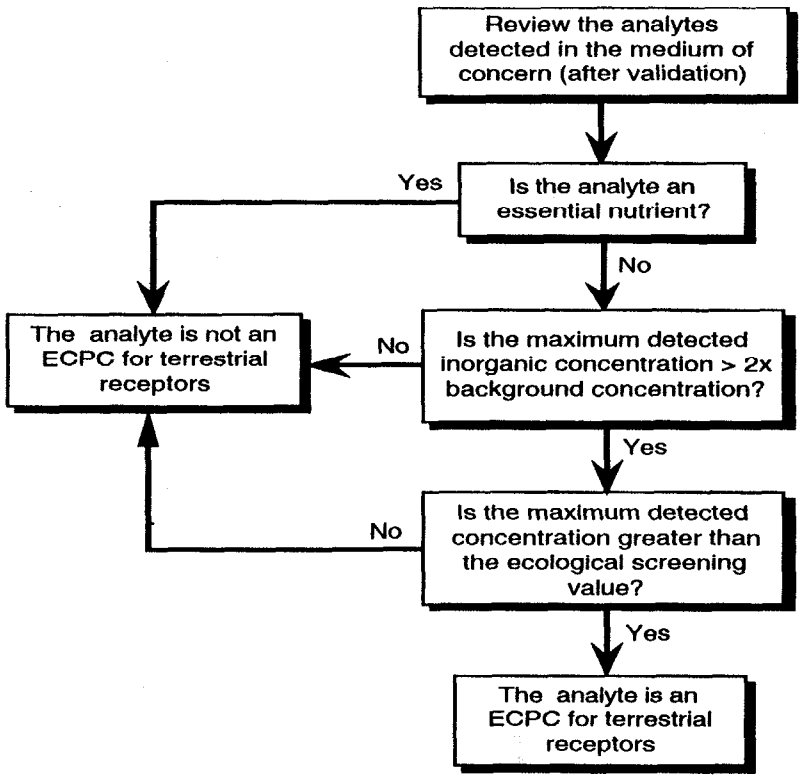
7.3 HAZARD ASSESSMENT AND SELECTION OF ECPCs. The hazard assessment includes a review of analytical data and selection of ECPCs. ECPCs represent analytes detected in environmental media (i.e., surface soil) that are considered in the ERA and could present a potential risk for ecological receptors. The process for selecting ECPCs is depicted on Figure 7-3. Additional details regarding the ECPC selection process are provided in Subsection 2.4.2 of the GIR (ABB-ES, 1998). Analytical data for Site 14 were evaluated for use in risk assessment pursuant

Table 7-1
Endpoints Selected for Ecological Risk Assessment

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Assessment Endpoint	Receptor	Measurement Endpoint	Decision Point
Survival and growth of terrestrial plant communities.	Terrestrial plants	Chemical concentrations (mg/kg) in surface soil that result in adverse effects on growth, reproduction, or survival to terrestrial plants.	The reasonable maximum exposure concentration (mg/kg) of an ECPC in surface soil is greater than the terrestrial plant RTV.
Survival and growth of terrestrial invertebrate communities	Terrestrial invertebrates	Chemical concentrations (mg/kg) in surface soil that result in adverse effects on survival (i.e., LC_{50} studies) or measured adverse effects on reproduction and growth to terrestrial invertebrates.	The reasonable maximum exposure concentration (mg/kg) in surface soil is greater than the terrestrial invertebrate RTV.
Survival and maintenance of wildlife populations.	Wildlife species	Oral chemical doses (mg/kg BW/day) based on measured adverse effects on growth, reproduction, or survival (i.e., NOAEL, LOAEL, and LD_{50} studies) of mammalian and avian laboratory test populations.	Comparison of potential dietary exposures in mammalian and avian wildlife with literature-derived RTVs. HQs >1 indicate potential risk.

Notes: mg/kg = milligrams per kilogram.
ECPC = ecological chemical of potential concern.
RTV = reference toxicity value.
LC_{50} = lethal concentration to 50 percent of a test population.
BW/day = body weight per day.
NOAEL = no observed adverse effect level.
LOAEL = lowest observed adverse effect level.
LD_{50} = lethal dose to 50 percent of a test population.
HQ = hazard quotient.
> = greater than.



NOTES:
ECPC = ecological chemical of potential concern
> = greater than
x = times

FIGURE 7-3
ECOLOGICAL CHEMICAL OF POTENTIAL CONCERN SELECTION PROCESS

REMEDIAL INVESTIGATION REPORT SITE 14, SHORT-TERM SANITARY LANDFILL

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

2534-09 WHITING RI 12 FIG 7-3 FINAL 022498HAS

to national guidance, *Guidance for Data Useability in Risk Assessment (Parts A and B)* (USEPA, 1992a).

Following the data validation step, calcium, iron, magnesium, potassium, and sodium were excluded as ECPCs because they are considered to be essential nutrients and not toxic. The rationale for eliminating essential nutrients as ECPCs is provided in the GIR (ABB-ES, 1998).

Inorganic chemicals representative of background conditions are not selected as ECPCs. In accordance with USEPA Region IV guidance (USEPA, 1991a), an inorganic analyte is not selected as an ECPC if the maximum detected concentration is less than 2 times the average detected inorganic concentration in background samples. The maximum detected concentrations are compared against representative site-specific background soil screening concentrations to eliminate chemicals that are unlikely to be site related.

A site-specific background investigation was conducted at NAS Whiting Field, and the findings are presented in Paragraph 3.3.1.1 of the GIR (ABB-ES, 1998). The site-specific background study used to establish background screening values for Site 14 consists of nine surface soil samples (BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501) and one duplicate sample (BKS00201D) collected from Troup and Dothan/Lucy/Bonifay soil types, which are considered most geologically similar to the soil from Site 14.

Analytes that exceed the background screening concentration and are not essential nutrients are also screened against ecological screening values for surface soil. The surface soil ecological screening values are the Dutch Soil Criteria "A", which refer to background concentrations in surface soil issued by the U.S. Fish and Wildlife Service (Beyer, 1990). If the maximum detected concentration of an analyte exceeds the ecological screening value, the analyte is retained as an ECPC for all ecological receptors including terrestrial wildlife, terrestrial plants, and soil invertebrates.

Six surface soil samples (14-SL-01, 14-SL-02, 14-SL-03, 14S00101 (and its duplicate 14S00101D), 14S00201, and 14S00301) were collected at Site 14 (see Figure 3-2). Samples 14-SL-01, 14-SL-02, and 14-SL-03 were collected as part of the Phase IIA investigation in August 1992, and samples 14S00101, 14S00201, and 14S00301 were collected as part of the Phase IIB investigation in December 1995. Surface soil samples were analyzed for VOCs, SVOCs, pesticides and PCBs, and inorganics. The location of surface soil samples appears to be biased toward the interpreted landfill area, which is located in the south central portion of the site (Figure 3-2). Of the six surface soil samples collected at Site 14, none were collected north of the landfill area, and only two samples (14S00101 and 14S00301) were collected outside of the area of the interpreted landfill. In general, surface soil samples collected within the 1-acre landfill area contained higher concentrations of constituents as compared with samples collected outside the landfill area. Subsurface soil samples were collected from location 14SS0101 and 14SS0202 at depths between 5 and 12 feet below the ground surface. However, these data were not included in the ERA because no exposure pathway to subsurface soils exist for ecological receptors. It should be noted that selection of the surface soil sampling locations toward the suspected area of contamination is likely to result in a data set that is biased toward the highest or worst-case concentrations and may not be representative of the entire area of Site 14. Two subsurface soil samples, 14SS0101 and 14SS0202, were collected from test pits at Site 14.

Table 7-2 presents a summary of the analytical data and the following information: frequency of detection, range of detection limits, range of detected concentrations, average of detected concentrations, background screening concentrations, ecological screening values, and selected ECPCs. ECPCs selected for the surface soil samples collected at Site 14 include one VOC (methylene chloride), two SVOCs (chrysene and bis(2-ethylhexyl)phthalate), and three inorganics (aluminum, manganese, and vanadium).

7.4 EXPOSURE ASSESSMENT. The purpose of the ecological exposure assessment is to estimate or quantify the amount of an ECPC to which an ecological receptor may be exposed. The following sections briefly describe how contaminant exposures are estimated or measured for wildlife, terrestrial plants, and invertebrates at Site 14. The contaminant pathway model (Figure 7-2) provides a summary of the potential exposure pathways that exist at Site 14 for each group of receptors. Additional details regarding the exposure assessment are provided in the GIR (ABB-ES, 1998).

7.4.1 Calculation of EPCs The EPC is a representative concentration used for evaluating risks throughout this ERA. RME and CT concentrations are derived for each ECPC. If the sample size is greater than or equal to 10, the RME value is equal to the lesser of the maximum detected concentration and the 95th percent upper confidence limit (UCL) calculated on the log-transformed arithmetic mean (USEPA, 1992d). One-half of the detection limit is used to calculate the 95th percent UCL. If the sample size is less than or equal to nine, the RME concentration is equal to the maximum detected concentration. If potential risks are predicted based on the RME scenario, then the CT exposure scenario is also evaluated. The CT exposure concentration is represented by the arithmetic mean of all samples. One-half of the detection limit is also used as a surrogate value for sample results that are below the detection limit.

Because less than 10 surface soil samples were collected at Site 14, the maximum detected concentration is used as the RME concentration (USEPA, 1992d). Table 7-2 presents the RME and CT EPCs for selected ECPCs.

7.4.2 Terrestrial Wildlife Exposure routes for wildlife receptors include direct and indirect ingestion of soil and ingestion of food containing site-related chemicals. The actual amount of an ECPC taken in by wildlife species (i.e., ingestion dose in milligrams per kilogram per day [mg/kg-day]) depends on a number of factors. A potential dietary exposure (PDE) model is used to estimate exposure to representative wildlife species. The PDE (or body dose) is calculated for each ECPC in surface soil using the equations presented in Table 7-3 and the methodologies described in the GIR (ABB-ES, 1998).

Wildlife species from different trophic guilds that may be present at the site were selected for the PDE model. The model uses species-specific feeding and habitat characteristics to estimate chemical exposures to wildlife species respective to their position in the food chain. Terrestrial receptors were chosen to represent the trophic levels typically found in the planted pine forest habitat and disturbed open area present at Site 14. The representative wildlife species considered in the ERA are summarized in Table 7-4 and discussed below.

- **Cotton mouse** (*Peromyscus gossypinus*). The cotton mouse represents a small mammalian herbivore that could potentially be exposed to con-

Table 7-2
Selection of Ecological Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentration[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern[6]	Average of All Samples[7]	Exposure Point Concentration	
									RME[8]	CT[9]
Volatiles Organic Compounds (µg/kg)										
Methylene chloride	2/6	6 to 11.5	6* to 8	7	ND	NA	Yes	4.8	8	4.8
Xylenes (total)	1/6	5 to 11.5	2 to 2	2	ND	50	No[10]			
Semivolatile Organic Compounds (µg/kg)										
Chrysene	1/6	350 to 380	380 to 380	380	ND	NA	Yes	217	380	217
bis(2-Ethylhexyl)phthalate	1/6	350 to 380	40 to 40	40	80.3	NA	Yes	160	40	40
Inorganic Analytes (mg/kg)										
Aluminum	6/6	40 to 40	10,100 to 23,800	15,192	15,334	NA	Yes	15,192	23,800	15,192
Arsenic	6/6	2 to 2	1.7* to 4.3	2.7	3	20	No[10]			
Barium	6/6	40 to 40	6.2 to 24.95*	14.5	23.8	200	No[10]			
Beryllium	3/6	1 to 1	0.12 to 0.15	0.13	0.36	NA	No[11]			
Cadmium	1/6	0.59 to 1	0.94 to 0.94	0.94	0.58	1	No[10]			
Calcium	6/6	1,000 to 1,000	51.9 to 151.5*	94.8	402	NA	No[11,12]			
Chromium	6/6	2 to 2	5.9 to 19.6	12.5	10.8	100	No[10]			
Cobalt	6/6	10 to 10	0.65 to 1.8	1.4	3	20	No[10,11]			
Copper	3/6	5 to 5	4.9 to 7.8	5.9	9.4	50	No[10,11]			
Cyanide	1/6	0.24 to 0.5	0.16* to 0.16*	0.16	0.26	NA	No[11]			
Iron	6/6	20 to 20	5,470 to 15,800	10,777	8,588	NA	No[12]			

See notes at end of table.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentration[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern[6]	Average of All Samples[7]	Exposure Point Concentration	
									RME[8]	CT[9]
Inorganic Analytes (mg/kg) (Continued)										
Lead	6/6	0.6 to 1	4.3 to 9.8*	6.1	11.4	50	No[10,11]			
Magnesium	6/6	1,000 to 1,000	48.6 to 169.5*	113	258	NA	No[11,12]			
Manganese	6/6	3 to 3	33.6 to 559*	187	404	NA	Yes	187	559	187
Mercury	3/6	0.08 to 0.1	0.02 to 0.04*	0.03	0.12	0.5	No[10,11]			
Nickel	3/6	2.3 to 8	3.5 to 5	4.3	7.2	50	No[10,11]			
Potassium	2/6	129 to 1,000	174 to 322*	248	177	NA	No[12]			
Sodium	3/6	1,000 to 1,000	170 to 180	176	388	NA	No[11,12]			
Vanadium	6/6	10 to 10	14.1 to 42.1	28.1	21.2	NA	Yes	28.1	42.1	28.1
Zinc	3/6	4 to 4	7.7 to 11.1	8.9	15.4	200	No[10,11]			

See notes at end of table.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the detection limit is used as a surrogate for the nondetect value.
[3] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. Background screening values for organic analyte values are one times the average of detected concentrations. Organic values are included for comparison purposes only (i.e., not used to select ecological contaminant of potential concerns).
[5] The ecological screening values are the Dutch Soil Criteria as reported in the U.S. Fish and Wildlife Service, Biological Report (2), "Evaluating Soil Contamination" (Beyer, 1990).
[6] These chemicals are retained for further evaluation in the ecological risk assessment.
[7] The average of all samples assigns a value of one-half of the detection limit as a surrogate concentration for nondetect values.
[8] The reasonable maximum exposure point concentration (EPC) is equal to the maximum detected concentration.
[9] The central tendency (CT) EPC is equal to the lesser of the average of all samples or the maximum EPC.
[10] The maximum detected concentration is less than the ecological screening value.
[11] The maximum detected concentration is less than the background screening concentration.
[12] The analyte is an essential nutrient and not considered toxic.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 14-SL-01, 14-SL-02, 14-SL-03, 14S00101, 14S00201, and 14S00301.
Duplicate sample: 14S00101D.
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00301, BKS00401, and BKS00501.
Background duplicate sample: BKS00201D.

RME = reasonable maximum exposure.
µg/kg = micrograms per kilogram.
* = average of sample and duplicate.
ND = not detected in any background sample.
NA = not available.
mg/kg = milligrams per kilogram.

Table 7-3
Estimation of Potential Chemical Exposures for Representative Wildlife Species

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Estimation of Chemical Exposures Related to Surface Soil

Scope: Estimates the amount (dose) of a chemical ingested and accumulated by a species via incidental ingestion of surface soil and food items containing site-related chemicals.

Soil Chemical Concentration: The maximum detected concentration of the ecological chemicals of potential concern when the sample size is ≤ 9, and the lesser of the maximum detected concentration or the 95th percent upper confidence limit of the mean when the sample size is ≥ 10.

Soil Exposure Concentration:

$$\underset{(mg/kg)}{\text{Soil Exposure}} = \left(\underset{\text{as Soil}}{\text{\% of Diet}} \times \underset{(mg/kg)}{\text{Soil Concentration}} \right)$$

Primary Prey Item Concentration (T_{N1})

$$\underset{(mg/kg)}{\text{Primary Prey Item Concentration}} = \left(BAF_{\text{inv or plant}} \times \underset{(mg/kg)}{\text{Soil Concentration}} \right)$$

Secondary Prey Item Concentration (T_{N2}):

$$\underset{(mg/kg)}{\text{Secondary Prey Item Concentration}} = \left(BAF_{\text{mam or bird}} \times \underset{(mg/kg)}{\text{Tissue Concentration of Primary Prey Items}^{*}} \right)$$

where BAF = Bioaccumulation factor or mg/kg fresh weight tissue over mg/kg dry weight soil for invertebrates and plants, and mg/kg fresh weight tissue over mg/kg fresh weight food for small mammals and small birds.

* For a discussion of the weighted chemical concentration in prey items, see explanation of the PDE term below, and the General Information Report (ABB-ES, 1998)

Total Exposure Related to Surface Soil:

$$\underset{(mg/kg\ BW\text{-}day)}{PDE} = \frac{[P_1 \times T_1 + \ldots + P_N \times T_N + \text{soil exposure}] \times IR_{Diet} \times SFF \times ED}{BW}$$

where PDE = potential dietary exposure (mg/kg BW-day),
P_N = percent of diet composed of food item N,
T_N = tissue concentration in food item N (mg/kg),
IR_{Diet} = food ingestion rate of receptor (kg of food or dietary item per day),
BW = body weight (kg) of receptor,
SFF = site foraging frequency (site area [acres] divided by home range [acres]), assumed to be equal to 1 for lethal exposure scenario, and
ED = exposure duration (fraction of year species is expected to occur on site.

Notes: ≤ = less than or equal to.
≥ = greater than or equal to.
mg/kg = milligrams per kilogram.
% = percent.
BAF = bioaccumulation factor.
inv = invertebrate species.
mam = mammal species.
mg/kg BW-day = milligrams per kilograms of body weight per day.
kg = kilograms.

tamination in soil and in plant tissue (accumulated from the soil). The cotton mouse home range is estimated at 0.147 acre and could reside entirely on the site. The cotton mouse represents the small mammal herbivore community at Site 14.

Table 7-4
Ecological Receptors Evaluated
For Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Receptor Evaluated		Method of Evaluation
Common Name	Scientific Name	
Terrestrial Plants	NA	Benchmark comparison
Terrestrial Invertebrate	NA	Benchmark comparison
Cotton mouse	*Peromyscus gossypinus*	Food-web model
Short-tailed shrew	*Blarina brevicauda*	Food-web model
Eastern meadowlark	*Sturnella magna*	Food-web model
Red fox	*Vulpes vulpes*	Food-web model
Red-tailed hawk	*Buteo jamaicensis*	Food-web model

Note: NA = not applicable.

- **Short-tailed shrew** (*Blarina brevicauda*). The short-tailed shrew finds suitable habitat in forests, fields, marshes, and brush and has a home range of approximately 1 acre. It primarily feeds on earthworms, snails, centipedes, insects, small vertebrates, and slugs (DeGraaf and Rudis, 1986). Insectivorous species may receive relatively high chemical doses of bioaccumulating compounds as a result of their voracious appetites. The shrew represents small omnivorous mammals that may be found in the pine forest of Site 14.

- **Eastern meadowlark** (*Sturnella magna*). The eastern meadowlark is most commonly found in open pastures, prairies, farms, and meadows, and has a home range of approximately 5 acres. The meadowlark feeds primarily on invertebrates, although its diet is supplemented with plants. The meadowlark represents insectivorous avian receptors found in the open disturbed area of Site 14.

- **Red Fox** (*Vulpes vulpes*). This omnivorous mammal prefers open woodlands and grassy fields and is most active at night and twilight. It is an opportunistic forager, feeding on small mammals, birds, amphibians, reptiles, invertebrates, berries, and other fruits (Burt and Grossenheider, 1976). The red fox has an estimated home range of approximately 250 acres and represents the large predatory mammal guild at Site 14.

- **Red-tailed Hawk** (*Buteo jamaicensis*). The red-tailed hawk forages in open country, frequently on woodland edges, feeding primarily on small mammals and has a home range of approximately 800 acres. It will also

consume invertebrates, reptiles, and small birds. Red-tailed hawks are year-round residents in the southeast areas of the United States and are frequently seen perched adjacent to open fields (DeGraaf and Rudis, 1986). The hawk may reside in forested areas and feed on species that have been exposed to affected media at Site 14.

Parameters for quantitatively evaluating exposures to wildlife include body weight, food ingestion rate, home range, and relative consumption of food items. Exposure assumptions for each of the representative wildlife species for Site 14 are provided in Table 7-5 and Table F-6 of Appendix F. In addition to these parameters, the species foraging habits and bioaccumulation in food items are also considered.

The site foraging frequency (SFF) is an adjustment term that accounts for the frequency a receptor feeds within the site area. The SFF is based on both the acreage of the site relative to the receptor's home range and the fraction of the year the receptor would be exposed to site-related chemicals (i.e., the exposure duration). By definition, the SFF cannot exceed 1. The area of Site 14 (approximately 3 acres) is larger than the home range for the cotton mouse and short-tailed shrew and smaller than the home range for the eastern meadowlark, red fox, and red-tailed hawk. Because all representative wildlife species are expected to actively forage at the site year round, it is assumed that the exposure durations for these organisms are 1.

Wildlife species may be exposed to ECPCs in surface soil via incidental ingestion of soil or by ingesting prey items that have bioaccumulated these ECPCs.

This exposure has a PDE estimated for all representative wildlife species for each ECPC according to the equations in Table 7-3 and the methodologies described in Subsection 2.4.3 of the GIR (ABB-ES, 1998).

Bioaccumulation factors (BAFs) are used in the wildlife exposure model to estimate the transfer of chemicals between soil and plants or soil invertebrates, and between these organisms and primary consumer species. The PDE is determined by estimating tissue concentrations of ECPCs in prey items using BAFs for surface soil. BAFs for most receptors are extrapolated from literature values or estimated using regression equations from scientific literature. Based on the evidence provided in several reference materials (Suter, 1993; Maughan, 1993), an assumption is made that VOCs do not bioaccumulate in prey tissue. The general approach used to select BAFs for Site 14 is summarized in Table 7-6.

BAFs for invertebrate and plant food items are defined as the ratio of the ECPC concentration in plant or invertebrate tissue (mg chemical/kg tissue wet-weight) to the ECPC concentration in surface soil (mg chemical/kg dry-weight soil). BAFs reported in the scientific literature for avian and mammalian receptors are the reported ratios of ECPC concentrations in the tissues of these receptors (mg chemical/kg tissue wet-weight) to the concentrations of ECPCs in their food items (mg chemical/kg tissue wet-weight). BAFs for each of the ECPCs evaluated at Site 14 are included in Table F-1 of Appendix F.

<u>7.4.3 Terrestrial Plants and Invertebrates</u> Terrestrial plants and invertebrates may be exposed to ECPCs via direct contact and root uptake (plants) or ingestion (invertebrates) of ECPCs measured in Site 14 surface soil. The Site 14 ERA assumes that exposures to terrestrial plants and invertebrates occur within the

Table 7-5
Exposure Parameters for Representative Wildlife Species

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Representative Wildlife Species	Body Weight (kg)	Reported Diet	Assumed Diet for Terrestrial Exposure Assessment (% of diet)	Food Ingestion Rate (kg/day)	Home Range (acres)
Cotton mouse [a] (*Peromyscus gossypinus*)	0.021 [b]	Seeds and some insects. [c]	88% Plants 10% Invertebrates 2% Soil [d]	0.0029 [e]	0.147 [f]
Short-tailed shrew (*Blarina brevicauda*)	0.017 [g]	Earthworms, slugs and snails, fungi, insects, and vegetation. [c]	78% Invertebrates 12% Plants 10% Soil [c]	0.0024 [e]	0.96 ± 0.09 [c]
Eastern meadowlark (*Sturnella magna*)	0.087 [h]	Weed seeds, grass seeds, and invertebrates including beetles, grubs, bugs, grasshoppers, crickets, ants, and spiders. [h]	75% Invertebrates 20% Plants 5% Soil [h]	0.0119 [i]	5 [h]
Red fox (*Vulpes vulpes*)	4.69 [c]	Small mammals, birds, and invertebrates, as well as berries and other fruits. [c]	57% Small mammals 20% Invertebrates 10% Small birds 10% Plants 3% Soil [c]	0.24 [e]	250 [c]
Red-tailed hawk (*Buteo jamaicensis*)	1.02 [h]	Primarily small mammals; also birds, snakes, turtles, frogs, crickets, beetles, crayfish, and carp. [c]	70% Small mammals 27% Small birds 3% Soil [c]	0.059 [i]	800 [c]

[a] Values for the deer mouse were used for the cotton mouse (U.S. Environmental Protection Agency [USEPA], 1993b).
[b] Average of adult male and female deer mice in North America (USEPA, 1993b).
[c] Wildlife Exposure Factors Handbook (USEPA, 1993b).
- Invertebrate, plant, and soil values for the short-tailed shrew derived from data presented in Whitaker & Ferraro, 1963.
- Invertebrate, plant, small mammal, small bird, and soil values are averages of values presented in the Wildlife Exposure Factors Handbook.
- Small mammal, small bird, and soil values are averages of values presented in the Wildlife Exposure Factors Handbook.

[d] Deer mouse value used for cotton mouse based on similarities in diet. (Plant, invertebrate, and soil values are averages of values presented in Wildlife Exposure Factors Handbook) (USEPA 1993b).
[e] Calculated using the mammal equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = $0.0687 \times Wt^{0.822}$ (kg) (USEPA, 1993b).
[f] Average for male and female deer mice, Virginia/mixed deciduous forest (USEPA, 1993b).
[g] Mean of means reported for male and female shrews in summer and fall (USEPA, 1993b).
[h] Terres (1980).
[i] Calculated using the bird equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = $0.0582 \times Wt^{0.651}$ (kg) (USEPA, 1993b).

Notes: kg = kilograms. kg/day = kilograms per day.
% = percent. ± = plus or minus.

Table 7-6
Estimation of Bioaccumulation Factors

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Receptor Group	Nature of Approach	General Approach
Terrestrial Plants		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature values	When available, literature values were used to estimate plant BAFs.
	Extrapolation and empirical data	When literature values were not available, plant BAFs for inorganic compounds were obtained from Baes et al. (1984).[1]
	Assumption	Although evidence suggests that plants may transport organic analytes with log K_{ow}s < 5 (i.e., volatile organic compounds [VOCs]) from the roots into leafy portions (Briggs et al., 1982; Briggs et al., 1983), bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that transfer of VOCs from plant tissue to animal tissue does not occur.
Terrestrial Invertebrates		
Unit : mg/kg wet tissue per mg/kg dry soil	Literature values	When no specific values were available, literature values were used to estimate BAFs for invertebrates.
	Assumption	Bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that soil invertebrates do not bioaccumulate VOCs.
Small Mammals		
Unit : mg/kg wet tissue per mg/kg wet food	Literature values	When available, literature values were used to estimate BAFs for small mammals.
	Extrapolation and empirical data	When literature values were not available, BAFs for small mammals for inorganics were derived from ingestion-to-beef biotransfer factors (BTFs) presented in Baes et al. (1984)[2].
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that small mammals do not bioaccumulate VOCs.

See notes at end of table.

Table 7-6 (Continued)
Estimation of Bioaccumulation Factors

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Receptor Group	Nature of Approach	General Approach
Small Birds		
Unit: mg/kg wet tissue per mg/kg wet food	Literature values	When available, literature values were used to estimate BAFs for small birds.
	No information	BAFs were not obtained for semivolatile organic compounds or for inorganic compounds because there is little bioaccumulation data available for birds. It was assumed that small birds do not accumulate VOCs.

[1] BAFs derived from Baes et al. (1984). Values are based on analysis of literature references, correlations with other chemical and physical parameters, or comparisons of observed and predicted elemental concentrations in vegetative and reproductive plant material and soil. Data are based on dry weight and were converted to a fresh weight basis assuming that plants are 80 percent water. This is generally consistent with the water content of berries (82 to 87 percent water) and leafy vegetables (87 to 95 percent water), presented in Suter (1993). Grains contain a much lower percentage of water (approximately 10 percent); therefore, this assumption likely underestimates exposure to graminivores.
[2] BTFs were converted to a BAF (mg/kg tissue divided by mg/kg food) by multiplying by a food ingestion rate of 50 kg/day (fresh weight) per day (average intake for lactating and nonlactating cattle reported in Travis and Arms, 1988).

Notes: mg/kg = milligrams per kilogram.
BAF = bioaccumulation factor.
Log K_{ow} = Logarithmic expression of the octanol-water partition coefficient.
< = less than.
kg/day = kilograms per day.
VOC = volatile organic compound.

top one-foot-interval of surface soil. Exposure of terrestrial plants to groundwater is not evaluated because the depth to the water table is approximately 80 feet bls (see hydrogeological discussion in Chapter 5 of this report).

7.5 ECOLOGICAL EFFECTS ASSESSMENT. The ecological effects assessment discusses the measurement endpoints that were used to evaluate potential adverse impacts to the assessment endpoints (i.e., the maintenance of receptor populations). The methods used for identifying and characterizing ecological effects for ECPCs in surface soil are described in the following subsections and in greater detail in Subsection 2.4.4 of the GIR (ABB-ES, 1998).

Wildlife receptors, terrestrial plants, and terrestrial invertebrates are potentially exposed to ECPCs in surface soil at Site 14. The measures of adverse ecological effects for these receptors are discussed separately.

7.5.1 Terrestrial Wildlife The assessment endpoint selected for terrestrial wildlife is the survival and maintenance of wildlife populations and communities present within the planted pine forest and disturbed area of Site 14. Because no long-term wildlife population data are available at NAS Whiting Field, a direct measurement of this assessment endpoint is not possible. The literature-derived results of laboratory toxicity studies that relate the dose of a chemical in an oral exposure with an adverse response to growth, reproduction, or survival of a test population (avian or mammalian species) are used as a measure of the assessment endpoint. Wildlife ingestion toxicity data are presented in Appendix F, Table F-2.

Reference toxicity values (RTVs) are derived for each ECPC and representative wildlife species according to the data hierarchy presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (USEPA, 1997d). The RTV represents the highest exposure level (e.g., concentration in the diet) not shown to produce adverse effects (e.g., reduced growth, impaired reproduction, increased mortality). Two RTVs representing lethal and sublethal effects are selected for each ECPC representative wildlife species. Lethal effects are those that result in mortality while sublethal effects include those that impair or prevent reproduction or growth. The RTVs are assumed to be a measure of the assessment endpoints for the protection of the survival, growth, and reproduction of terrestrial wildlife populations. Lethal RTVs are developed using the data hierarchy discussed in bullet items 1, 2, and 3, while sublethal RTVs are derived using the methodology discussed in bullet items 1 and 2:

1) For contaminants with well-documented adverse effects that are applicable to the assessment endpoint, the highest exposure level that is a no observed adverse effect level (NOAEL) is selected as the RTV.

2) If applicable NOAEL values are not available, the RTV was derived from the lowest observed adverse effect level (LOAEL). The LOAEL was divided by an uncertainty factor of up to 10 times based on consideration of the exposure duration, type of toxicity test, and the relationship between the selected measurement and assessment endpoints.

3) If NOAEL or LOAEL values are not available, the lowest reported oral LD_{50} value (oral dose [in mg/kg body weight-day] lethal to 50 percent

of a test population) is used to derive the lethal RTV. The lethal RTV is one-fifth of the lowest reported LD_{50} value for the species most closely related to the representative wildlife receptor. One-fifth of an oral LD_{50} value is considered to be protective against lethal effects for 99.9 percent of individuals in a test population (USEPA, 1986b). An assumption is made that the value represented by one-fifth of an oral LD_{50} would be protective of 99.9 percent of the individuals within the terrestrial wildlife populations and represents a level of acceptable risk.

A summary of lethal and sublethal RTVs selected from the ingestion toxicity data is provided in Table F-3 of Appendix F.

If neither lethal nor sublethal toxicity information is available for a taxonomic group, no RTVs are identified and risks associated with the respective ECPC are not quantitatively evaluated. However, the absence of specific data for a taxonomic group does not imply that there is no toxicological effect associated with contaminant exposure by these receptors; therefore, potential risks to these taxonomic groups are qualitatively discussed in Section 7.7, Uncertainties.

7.5.2 Terrestrial Plants and Invertebrates The assessment endpoints selected for terrestrial plants and soil invertebrates are reduction in the biomass of terrestrial plants and abundance of soil invertebrates used as forage material. Site-specific toxicity data for plants and invertebrates are not available for Site 14; therefore, the results of toxicity studies from the literature that relate the soil concentrations of a contaminant with adverse effects to growth, reproduction, or survival of a test population are used as a measure of the assessment endpoint. These study results are summarized for each ECPC in Appendix F, Tables F-4 (plants) and F-5 (invertebrates).

7.6 RISK CHARACTERIZATION. This section presents the risk characterization for ecological receptors exposed to affected surface soil at Site 14. Potential risks associated with exposures to ECPCs in surface soil at Site 14 are discussed separately for wildlife, terrestrial plants, and soil invertebrates. Risks to wildlife are characterized by comparing the PDE concentrations (based on RME and CT exposure concentrations) for each surface soil ECPC with its respective RTV (estimated threshold dose for toxicity). Risks for terrestrial plants and soil invertebrates are evaluated by comparing toxicity benchmarks to RME and CT exposure concentrations.

7.6.1 Terrestrial Wildlife Risks for the representative wildlife species associated with ingestion and bioaccumulation of ECPCs in surface soil and prey items are quantitatively evaluated using HQs. HQs are calculated for each ECPC by dividing the PDE concentration by the selected lethal and sublethal RTV. HIs are determined for each receptor by summing the HQs for all ECPCs. When the estimated PDE is less than the RTV (i.e., the HQ < 1), it is assumed that chemical exposures are not associated with adverse effects to receptors and risks to wildlife populations are unlikely to be significant. For instance, if the PDE calculated using the RME concentration is less than the lethal RTV, then it is assumed that adverse effects to the survival of wildlife populations are unlikely to occur. Similarly, if the reasonable maximum PDE is less than the sublethal RTV, then it is assumed that adverse effects to wildlife populations related to growth and reproduction are unlikely to occur. When an HI is greater than 1, a

discussion of the ecological significance of the HQs comprising the HI is completed and risks from exposure to CT concentrations of ECPCs are evaluated. Although adverse effects to individual birds and mammals are possible at HI values of one, the likelihood of population-level effects to terrestrial wildlife populations, which was selected as the assessment endpoint for the ERA, are considered negligible.

This HRS evaluates potential ecological effects to individual organisms and does not evaluate potential populationwide effects. Contaminants may cause population reductions by affecting birth and mortality rates, immigration, and emigration (USEPA, 1989b). In many circumstances, lethal or sublethal effects may occur to individual organisms with little population- or community-level impacts; however, as the number of individual organisms experiencing toxic effects increases, the probability that population effects will occur also increases. The number of affected individuals in a population presumably increases with increasing HQ or HI values; therefore, the likelihood of population-level effects occurring is generally expected to increase with higher HQ or HI values.

The lethal and sublethal HQs and HIs are calculated for each ECPC and each representative wildlife species. Tables F-6 through F-11 of Appendix F present the HQ and HI calculations. A summary of risks to representative wildlife receptors is provided in Table 7-7.

Table 7-7
Summary of HIs for Terrestrial Wildlife[1]

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Central Tendency EPCs
Cotton mouse	0.13	0.25	0.16
Short-tailed shrew	0.74	1.4	0.9
Eastern meadowlark	0.027	0.46	0.31
Red fox	0.0017	0.0035	0.0022
Red-tailed hawk	0.00011	0.0019	0.0013

[1] The information is a summary of the HIs presented in Tables E-6 through E-11 of Appendix E.

Notes: EPC = exposure point concentration.
HI = hazard index.

Summary HIs for representative wildlife species exposed to RME concentrations of ECPCs for lethal effects were less than 1; therefore, lethal risks are not predicted for these receptors (i.e., bioaccumulating chemicals are not sufficiently high to reduce survivability in terrestrial wildlife populations at Site 14).

The sublethal HI of 1.4 for the short-tailed shrew slightly exceeds 1 based on RME concentrations from Site 14. The primary contributor to the sublethal HI is aluminum. Because the RME HI value only slightly exceeds 1, and the HI value based on CT exposure concentrations is less than 1, population-level sublethal impacts to the short-tailed shrew are unlikely. In addition, the distribution

of aluminum in surface soil at Site 14 suggests that detected concentrations of aluminum in only two of six samples were above the background screening concentration of 15,334 mg/kg. These two samples were collected within the interpreted landfill area delineated by the geophysical survey.

In summary, the results of the food-web modeling suggest that reductions in the survivability, growth, and reproduction of terrestrial wildlife populations at Site 14 is not expected to occur.

7.6.2 Terrestrial Plants Risks for terrestrial plants are evaluated by comparing the selected phytotoxicity RTVs to the RME and CT concentrations. The results of this comparison are summarized in Table 7-8.

RME and CT exposure concentrations of aluminum and vanadium exceed their respective phytoxicity benchmarks by three orders and one order of magnitude, respectively. Although the RME concentration of manganese slightly exceeds the 500 mg/kg benchmark value, the CT exposure concentration of 187 mg/kg is well below the benchmark value. The landfill area is vegetated by many voluntee pine trees and small shrubs while the majority of the site is covered with planted pine trees. As previously discussed, sample locations were selectively biased toward the area of suspected contamination and may not be representative of the entire area. Although concentrations of aluminum and vanadium near the landfill area exceed phytotoxicity benchmarks, it is unlikely that the assessment endpoint including plant biomass and/or plant cover would be reduced over the entire area of Site 14 such that small mammal and bird populations would be affected.

7.6.3 Terrestrial Invertebrates Risks for terrestrial invertebrates are evaluated by comparing invertebrate toxicity benchmark values to RME and CT exposure concentrations. The results of this evaluation for Site 14 surface soil are also presented in Table 7-8. Invertebrate toxicity benchmark values are not available for aluminum, manganese, and vanadium.

RME exposure concentrations of ECPCs are well below the available invertebrate toxicity benchmark values; therefore, it is unlikely that the assessment endpoint including invertebrate biomass and/or abundance would be reduced such that small mammal and bird populations would be affected at Site 14.

7.7 UNCERTAINTY ANALYSIS. The objective of the uncertainty analysis is to discuss the assumptions of the ERA process that may influence the risk assessment results and conclusions. Table 2.5 of the GIR presents several general uncertainties inherent in the risk assessment process (ABB-ES, 1998).

Specific uncertainties associated with exposure to surface soil at Site 14 are described below.

- Surface soil sampling locations were selected based on the suspected area of contamination (Figure 3-2). Surface soil samples were not collected north of the interpreted landfill area; therefore, the data set may be biased high and not representative of the entire area of Site 14. Consequently, risks to ecological receptors may be overestimated.

Table 7-8
Summary of Ecological Risk for Plants and Invertebrates in Surface Soil

Remedial Investigation Report
Site 14, Short-Term Sanitary Landfill
Naval Air Station Whiting Field
Milton, Florida

Analyte	Exposure Point Concentrations[1]		RTV		RTV Exceeded?[3] (by RME/by CT)	
	RME	CT	Plant[2]	Invertebrate[2]	Plant	Invertebrate
Volatile Organic Compounds (mg/kg)						
Methylene chloride	0.008	0.0048	1,000	150	No/No	No/No
Semivolatile Organic Compounds (mg/kg)						
Chrysene	0.38	0.217	25	34	No/No	No/No
bis(2-Ethylhexyl)phthalate	0.04	0.04	1,000	478	No/No	No/No
Inorganic Analytes (mg/kg)						
Aluminum	23,800	15,192	50	NA	Yes/Yes	NA
Manganese	559	187	500	NA	Yes/Yes	NA
Vanadium	42.1	28.1	2	NA	Yes/Yes	NA

[1] Exposure point concentrations (EPCs) are presented in Table 7-2. The RME EPCs are equal to the maximum detected concentration. CT EPCs are equal to the mean of all concentrations. When the average is greater than the RME EPC, the maximum EPC is used.
[2] Plant and invertebrate RTVs are presented in Appendix E, Tables E-4 and E-5, respectively. Generally, the plant RTVs are the lowest observed effect concentration from among growth studies on plants in solid media, and invertebrate RTVs are the lowest concentration lethal to 50 percent of a test population (14-day soil test on *Eisenia foetida*) from among chemicals in the same chemical class (applies to organic compounds). A conservative factor of 0.2 was applied to invertebrate RTVs; the resultant value should be protective of 99.9 percent of the population from acute effects (Neuhauser et al., 1986).
[3] Comparison shown is RME EPC to RTV/CT EPC to RTV.

Notes: Shading indicates exceedances.

RME = reasonable maximum exposure.
CT = central tendency.
RTV = reference toxicity value.
mg/kg = milligram per kilogram.
NA = not available.

- Risks to avian species may have been underestimated because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with several ECPCs were not evaluated for avian species. If the toxicological and contaminant transport data obtained from studies conducted on mammals were used to estimate risks to avian species, then risk estimates for birds would be higher. However, there is also uncertainty in assuming that the metabolic functions of mammals and birds are similar enough to use intertaxonomic surrogates.

- Risks to adult amphibians and reptiles species were not estimated because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with ECPCs are uncertain for these species. Intertaxonomic surrogates were not used to calculate dietary risks to reptiles because of the uncertainty associated with extrapolation of data from endothermic to essentially ectothermic species.

- Site-specific toxicity data for Site 14 surface soil is not available. Phytotoxicity and invertebrate benchmark values used in the risk assessment were designed for risk screening purposes only and may not be relevant to the specific conditions of the surface soil at Site 14. The conservative nature of these screening tools may overestimate the actual risk to terrestrial plants and invertebrates at Site 14. However, invertebrate benchmark values for several analytes are not available, potentially resulting in an underestimation of risk for terrestrial invertebrates.

- The DDEs for the red fox and red-tailed hawk assume no exposure from small birds as prey items due to a lack of avian BAFs. Birds make up a small portion of the red fox and red-tailed hawk diet, and for this evaluation it is assumed that small birds would not provide a source of contaminant exposure. In addition, the risks predicted (i.e., the HQs and HIs) for the red fox and red-tailed hawk are so low that is unlikely that including avian BAFs (if they were available) would alter the findings of the ERA.

7.8 SUMMARY OF ECOLOGICAL ASSESSMENT FOR SITE 14. Potential risks for ecological receptors including terrestrial wildlife, terrestrial plants, and soil invertebrates were evaluated for ECPCs in surface soil at Site 14.

Risks associated with exposures to ECPCs in Site 14 surface soil were evaluated for terrestrial wildlife based on a model that estimates the amount of contaminant exposure obtained via the diet and incidental ingestion of surface soil. Comparison of estimated doses for wildlife species with reference toxicity doses representing thresholds for lethal and sublethal effects is the basis of wildlife risk evaluation. Risks were not identified for terrestrial wildlife resulting from exposure to ECPCs in surface soil; therefore, reductions in the survivability, growth, and reproduction of wildlife receptor populations at Site 14 is not expected to occur.

Reduction in terrestrial plant and soil invertebrate biomass used as forage material was evaluated by comparing exposure concentrations for surface soil with

toxicity benchmarks. Based on this comparison, plants exposed to RME and CT concentrations of aluminum and vanadium in surface soil may be adversely affected in the area of the landfill. However, it is unlikely that plant biomass or plant cover availability would be reduced over the entire area of Site 14 such that small mammal and bird populations would be affected. Similarly, soil invertebrate biomass is also not expected to be reduced because RME concentrations of all ECPCs were well below available invertebrate toxicity benchmark values.

In summary, the results of the ERA suggest that risks are not predicted for ecological receptor populations at Site 14.

8.0 CONTAMINANT FATE AND TRANSPORT

This chapter discusses the fate and transport of human health and ECPCs detected in soil and groundwater samples at Site 14. Fate, in the context of this chapter, refers to the ultimate disposition of a given CPC following its release into the environment. Transport refers to the mechanism(s) by which a given chemical released into the environment will arrive at its fate. Explanation of the fate and transport of chemicals in the environment can be very complicated or very simple, depending on the physical, chemical, and biological characteristics of the compound or metal considered and the environment into which that compound is released.

Several organic compounds and inorganics were detected in soil and groundwater sampled at Site 14. Because of the number of potential chemicals detected and the myriad fate and transport scenarios possible for those chemicals in the media, this discussion will focus only on those chemicals that may pose adverse risk to human or ecological receptors, as identified by the HHRA (Chapter 6.0) and the ERA (Chapter 7.0) in this report.

The following discussion of contaminant fate and transport is divided into two sections. Section 8.1 discusses potential migration routes of a chemical(s) in the media evaluated and does not focus specifically on media found to be of concern at Site 14. The site-specific persistence, fate, and transport of those compounds and elements found to pose a potential risk to human health or the environment are discussed in Section 8.2.

8.1 POTENTIAL ROUTES OF MIGRATION. Several routes of migration are possible for a contaminant in the various media: air, soil, surface water, groundwater, and biota. These routes are summarized below.

Air. Gases and particulate material can be transported in the atmosphere. Organic compounds, metals, and metal complexes that exist as gases at surface temperature and pressure may disperse or diffuse into the air and particulates may become entrained in air and thereby migrate. The extent to which gaseous constituents and particulate material remain airborne is a function of the level of excitation of the air (wind and temperature) and fate processes acting on the constituent and, for particulates, their density. Particulate material as discussed herein consists of organic compounds and inorganic material that would otherwise not be present in a gaseous medium under atmospheric conditions.

Soil. The primary agents of migration acting on soil include wind, rainwater, running water, biological activity, and human activity. Wind commonly transports soil in the form of particulate material. Rainwater may cause soil to migrate either by washing soil particles downward into the subsurface or by carrying soil particles overland to surface water bodies or other areas of deposition. The amount and type of vegetative cover and surface disturbance affects the degree to which wind and water cause soil to migrate.

Surface Water. The mechanisms for migration of constituents in surface water are dissolution and suspension. Several organic compounds and metals are soluble in water and can be transported in the aqueous phase. Other organic compounds and elements are not soluble in water, but may be transported by surface water via

suspension. The amount of suspended particulate material in surface water is largely a function of the water's energy; as that energy decreases, suspended material will settle and become part of the soil or sediment. Colloidal material may remain in suspension (by electrochemical forces) in water of very low energy (e.g., standing water).

Sediment. Saltation, traction, suspension, biological action, and human action are the primary mechanisms of migration for sediment. Physical, chemical, and biological processes affecting a constituent will determine where and how migration from sediment will occur.

Groundwater. Groundwater is a liquid medium capable of transporting constituents as colloidal forms, complexes, pure-phase liquids, or dissolved-phase liquids. Organic compounds and elements generally reach groundwater either by being placed directly into the water table (e.g., disposal pits) or by being leached from soil or solid waste to the water table by physical or chemical processes. Groundwater may discharge to the land surface, surface water bodies, other aquifers, or pumping wells. The migration of constituents from groundwater upon discharge depends on the chemical and/or physical processes acting upon that individual constituent in the medium to which it is discharged.

Biota. Biota may be considered a medium for migration of certain organic compounds and inorganics. Several compounds and elements are known to accumulate in the tissues of organisms at various levels in the food chain. As these organisms are consumed by other organisms, compounds and elements are accumulated in their tissue and passed on to organisms higher in the food chain. In this manner, contaminants may be transported by biota. Additionally, some organisms disturb bed sediments in streams and rivers. This disturbance can cause organic compounds and elements to be transported downstream as suspended material in surface water.

8.2 CONTAMINANT PERSISTENCE AND FATE. The discussion of contaminant persistence and fate in the environment is divided into three subsections. Subsection 8.2.1 discusses the processes that control the persistence and fate of organic compounds and inorganics in the environment. Subsection 8.2.2 discusses the primary persistence and fate characteristics of the constituents detected at Site 14. Subsection 8.2.3 discusses contaminant transport for Site 14.

8.2.1 Processes The persistence and fate of chemical constituents in the environment depends on various chemical, physical, and biological processes. The predominant processes affecting the environmental persistence and fate of chemical constituents include solubility, photolysis, volatilization, hydrolysis, oxidation, chemical speciation, complexion, precipitation or coprecipitation, cationic exchange, sorption, biodegradation or biotransformation, and bioaccumulation. These processes are briefly summarized below.

Solubility. The solubility of chemical constituents in water is important in assessing their mobility in the environment. This is particularly important for the transport and ultimate fate of chemicals from soil and sediment to water (i.e., groundwater and/or surface water). Generally, for organic compounds, aqueous solubility is a function of molecular size, molecular polarity, temperature, and the presence of other dissolved organic cosolvents. For metals and other inorganic parameters, solubility is generally controlled by chemical

speciation, pH, Eh (redox potential), oxygen content, and the presence of dissolved and/or colloidal organic compounds (e.g., humic and fulvic acids) or other inorganic ion species (e.g., hydroxides and sulfates) (USEPA, 1979). Increased solubility is usually directly related to increased environmental mobility with groundwater and/or surface water being the principal transport medium. Therefore, solubility is a significant factor affecting the fate of a compound or element in the water environment.

Photolysis. Many chemical constituents, particularly organic compounds, are susceptible to photolytic degradation, either directly or indirectly. Direct photolysis involves a splitting of the chemical compound by light, whereas indirect photolysis occurs when another compound is transformed by light into a reactive species (i.e., usually an hydroxyl radical) that reacts with and modifies the original compound. In general, photolysis primarily occurs within the atmosphere, although it may also occur to a limited extent in surface water and/or soil under certain environmental conditions (USEPA, 1979).

Volatilization. Volatilization of organic chemicals from soil or water to the atmosphere is an important pathway for chemicals with high vapor pressures. For organic compounds, volatilization is a function of partial pressure gradients, temperature, and molecular size and is more likely to occur for compounds with low molecular weights. In addition, certain metals such as mercury, arsenic, and lead are capable of undergoing biologically-mediated transformations (i.e., alkylation) that form volatile end products. Volatilization is important for the transport of certain chemical constituents from surface soil (i.e., vadose zone), sediment, and surface water and is evaluated using Henry's law and other associated chemical-specific rate constants.

Hydrolysis. Hydrolysis involves the decomposition of a chemical compound by its reaction with water. The rate of reaction may be promoted by acid (hydronium ion, [H_3O^+]) and/or base (hydroxyl ion, [OH^-]) compounds. In general, most organic compounds are resistant to hydrolytic reactions unless they contain a functional group (or groups) capable of reacting with water. Metallic compounds, however, generally dissociate readily in water depending upon the aqueous environmental conditions (e.g., pH and ionic strength). For metals, hydrolytic dissociation is an indirect process that affects the primary fate and transport mechanism of aqueous solubility.

Oxidation. The direct oxidation of organic compounds in natural environmental matrices may occur but this is generally a slow, insignificant transformation mechanism of minimal importance (USEPA, 1979). However, some inorganic compounds may be rapidly oxidized under naturally occurring environmental conditions when the surrounding environment changes from anaerobic to aerobic conditions.

Chemical Speciation. Chemical speciation is important primarily for metals that may exist in multiple forms in the environment, particularly within aqueous matrices. In general, the aqueous speciation of metals depends primarily upon the relative stabilities of individual valence states (which are element specific), oxygen content, pH and Eh condition, and the presence of available complexating agents and/or other cations and anions (USEPA, 1979). Because various metallic species exhibit differential aqueous solubilities and differential mobilities within soils and/or sediments (USEPA, 1979), the particular speciation of an individual metal will greatly affect its environmental mobility.

Complexation. For metals, complexation with various ligands is an important process because these complexes may be highly soluble in water. Therefore, complexation may greatly enhance mobility within environmental matrices, particularly in groundwater and surface water, depending upon the aqueous solubility of the resulting complex. Complexation depends upon numerous factors such as pH, Eh, type and concentration of complexing ligands, and other ions present (USEPA, 1979).

Most metals are capable of forming numerous organic and/or inorganic complexes in the natural environment (USEPA, 1979). Metals may form organo-metallic complexes, especially with naturally occurring organic acids (i.e., humic and fulvic acids). In some cases, these metallic species may exhibit varying affinities for different organic ligands (i.e., mercury and arsenic for amino acids and their derivatives) (USEPA, 1979). Metals may also form metallo-inorganic complexes with inorganic ligands such as carbonate, halogens (usually chlorine), hydroxyl, and sulfate (USEPA, 1979). However, organo-metallic complex formation is usually favored over metallo-inorganic complexes.

Precipitation and Coprecipitation. Both chemical precipitation and co-precipitation are important removal mechanisms, particularly for metals and metallo-cyanides in the environment. Precipitation and/or coprecipitation reactions depend on numerous aqueous environmental conditions such as pH, Eh, organic ligands present, oxygen content, and cationic and anionic species present (USEPA, 1979). Depending on the specific conditions, the removal of aqueous metallic species and metallo-cyanides from groundwater and/or surface water can greatly affect a metal's environmental mobility and, hence, its ultimate fate and transport.

Cation Exchange. Cation exchange is important primarily for metals and other ions that may substitute with other cations of similar charge and size within the lattice structure of clay minerals in soil and/or sediment (USEPA, 1979). Therefore, this process can significantly affect the mobility of an aqueous metal cation by removing it from solution under certain environmental conditions.

Sorption. The sorption of chemical constituents by inorganic particulate matter (i.e., soil or sediment) and organic compounds is an important process that affects mobility in the environment. This process is particularly important for the fate and transport of chemicals from soil or sediment to water (i.e., groundwater and surface water). In general, most metals exhibit a potential for adsorption to inorganic particulate matter and organic compounds (USEPA, 1979). Organic compounds also exhibit sorptive capability, but show greater variability in their ability to sorb to particulate or organic matter. The tendency for organic compounds to sorb to soils or sediment is reflected in their organic carbon partitioning coefficients (K_{oc}). K_{oc} is a measure of relative adsorption potential. The normal range of K_{oc} values is from 1 to 10^7 with higher values indicating greater sorption potential. Actual adsorption is chemical specific and is largely dependent on the organic content of the soil. The fraction of organic carbon, f_{oc}, in soil times the K_{oc} is defined as the distribution coefficient, K_d. The K_d is a ratio of the concentration adsorbed to the concentration partitioned to water.

Regardless of chemical class, sorption is a reversible process whereby desorption can be favored over sorption under certain environmental conditions (e.g., low pH for metals). For organic compounds in general, as the molecular weight

increases and the aqueous solubility decreases (i.e., low polarity and high hydrophobicity), the sorptive binding affinity increases (i.e., K_{oc} increases). The tendency for chemical constituents to adsorb to inorganic particulate and/or organic compounds is a particularly important process because sorption to soils and/or sediments can effectively reduce a chemical constituent's mobility.

Biodegradation or Biotransformation. Biodegradation is a result of the enzyme-catalyzed transformation of chemicals. Organisms require energy, carbon, and essential nutrients from the environment for their growth and maintenance. In the process, chemicals from the environment will be transformed by enzymes into a form that can be used by the organism. The biodegradation rate is the rate by which contaminants will be degraded. The rate is a function of microbial biomass and a chemical's concentration under given environmental conditions. When a pollutant is introduced into the environment, there is often a lag time before biodegradation begins while the organism generates an enzyme capable of digesting the chemical. Co-metabolism occurs when a pollutant can be biotransformed only in the presence of another compound that serves as a carbon and energy source (USEPA, 1979).

Bioaccumulation. Bioconcentration and bioaccumulation data are important when evaluating the impact of chemicals in the aquatic environment. The process is characterized by hydrophobic chemicals that can be partitioned into fat and lipid tissues and inorganic chemicals that can be partitioned into bone marrow. The bioconcentration factor is a measure of the concentration of a chemical in tissue (on a dry-weight basis) divided by the concentration in water, and is a commonly used parameter to quantify bioconcentration (USEPA, 1979). The process is significant because bioaccumulation magnifies up through the food chain.

8.2.2 Persistence and Fate of Site 14 CPCs This section discusses the persistence and fate characteristics for CPCs detected at Site 14. To focus the discussion of persistence and fate characteristics, only those constituents that were (1) identified by the human health or ERAs (presented in Chapters 6.0 and 7.0, respectively) as CPCs and (2) those constituents that were present above relevant standards will be addressed. These constituents are summarized below by medium for Site 14.

Human Health Assessment Constituents

- Surface soil: aluminum, arsenic, iron, and manganese.
- Groundwater: arsenic.

Ecological Assessment Constituents

- Surface soil: methylene chloride, chrysene, bis(2-ethylhexyl)pyrene, aluminum, manganese, and vanadium.

The fate and persistence characteristics of these constituents are summarized below by analytical fraction.

VOCs

Methylene chloride. Methylene chloride is a man-made chemical used as an industrial solvent and a paint stripper. Most of the methylene chloride released to the environment results from its use as an end product by various industries.

Methylene chloride is not strongly sorbed to soils or sediment and is likely to be highly mobile in soils, thus can be expected to leach into groundwater. Methylene chloride has a vapor pressure of 349 millimeters of mercury at 20 degrees Celsius, therefore, it tends to volatilize to the atmosphere from water and soil. Because of its high vapor pressure, volatilization to the atmosphere is the most likely fate process (Agency for Toxic Substances and Disease Registry [ATSDR], 1993a).

SVOCs

Bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate (also known as di(2-ethylhexyl)phthalate) ($C_{24}H_{38}O_4$) is principally used as a plasticizer in the production of polyvinyl chloride (PVC) and vinyl chloride resins. PVC is used in many common household items such as toys, vinyl upholstery, shower curtains, adhesives, and as a component of paper and paperboard. Bis(2-ethylhexyl)phthalate has also been used as a solvent, an acaracide in orchards, and as an inert ingredient in pesticide products (ATSDR, 1991a).

Bis(2-ethylhexyl)phthalate is a widely used chemical that enters the environment primarily through the disposal of industrial and municipal wastes in landfills. Bis(2-ethylhexyl)phthalate tends to adsorb strongly to soil and sediment and to bioconcentrate in aquatic organisms. Sorption, bioaccumulation, and biodegradation are likely to be competing processes, with the dominant fate being determined by local environmental conditions (ATSDR, 1991a).

Bis(2-ethylhexyl)phthalate has a strong tendency to be adsorbed to atmospheric particulate matter, soils, and sediment. Bis(2-ethylhexyl)phthalate biodegradation in soil is slow since strong adsorption reduces the availability for degradation. Biodegradation is expected to occur under aerobic conditions. Bis(2-ethylhexyl)phthalate may slowly volatilize into air. In air, direct photolysis and photooxidation are not likely (ATSDR, 1991a).

Bis(2-ethylhexyl)phthalate is relatively insoluble; however, it may leach to the groundwater in the presence of common organic solvents such as alcohols and ketones. Bis(2-ethylhexyl)phthalate in the water will undergo biodegradation under aerobic conditions. Chemical hydrolysis occurs too slowly to be important (ATSDR, 1991a).

Polynuclear Aromatic Hydrocarbons (PAHs). One polynuclear aromatic hydrocarbon (PAH) was identified as a CPC (chrysene) at Site 14. PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances. PAHs can either be man-made or occur naturally. A few of the PAHs are used in medicines and to make dyes, plastics, and pesticides, while others are contained in asphalt used in road construction. There are more than 100 different PAH compounds (ATSDR, 1993b).

In air, PAHs are found sorbed to particulates and as gases. Particle-bound PAHs can be transported long distances and are removed from the atmosphere through precipitation and dry deposition. PAHs are transported in surface water by volatilization and sorption to settling particles. The compounds are transformed in surface water by photooxidation, chemical oxidation, and microbial metabolism. Sorption of PAHs to soil and sediment increases with increasing organic content and is also directly dependant upon particle size. Microbial metabolism is the major process for degradation of PAHs in soil environments. PAHs have relatively

low solubilities, but if transported through soil by either leaching or colloidal movement, PAHs can enter groundwater and be transported within an aquifer (ATSDR, 1993b).

Inorganic Analytes

Aluminum. Aluminum is the third most common element in the environment, though not generally found in elevated concentrations in groundwater. Aluminum is known to complex readily; however, high concentrations present in groundwater are generally due to silt-sized particles of aluminum-containing compounds often present as clays or aluminum hydroxides. Complexing and polymerization of the most common valence state of aluminum, Al^{+3}, represents the predominant transport mechanism for aluminum in the environment.

Arsenic. Arsenic has two stable forms in solution in groundwater, arsenate (As^{5+}) and arsenite (As^{3+}). In groundwater with pH ranging from 3 to 7, the monovalent arsenate anion $H_2AsO_4^-$ is the dominant form. Upon entering surface water, via groundwater discharge, arsenic may partition to sediment from solution by hydrous iron oxide adsorption and/or coprecipitation (or a combination of both) with sulfides in the sediment. The Eh and pH conditions of the surface water and sediment govern the effectiveness of these mechanisms (adsorption and coprecipitation) as a sink for arsenic. These mechanisms appear to be the major inorganic factors controlling arsenic concentrations in surface water (Hem, 1992).

Arsenic may be very mobile in the aquatic environment, cycling through the water column, sediment, biota, and air. Most arsenic released into the environment (on the earth's surface) eventually ends up either in sediment (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of arsenic (USEPA, 1979).

Iron. Iron is the second most abundant element in the environment though dissolved concentrations present in groundwater are generally low. The chemical behavior of iron and its solubility depend upon the oxidation intensity and pH of the environmental system in which it is found. Iron exists in two valence states, Fe^{2+} and Fe^{3+}, with the Fe^{2+}, or ferrous, form the most common form of iron found in solution in the reducing conditions within the groundwater environment. Dissolved iron generally sorbs to sediment and may precipitate as iron hydroxide or may oxidize to form iron oxides and iron oxyhydroxides (USEPA, 1979). Iron also may complex with organic molecules, especially fluvic and humic acids. Aerated or flowing water with a pH in the range of 6.5 to 8.5 should contain little dissolved iron.

Manganese. Manganese is a naturally occurring element found in soil, lakes, streams, and food. Manganese does not occur in the environment as a pure metal, but is found combined with other chemicals like oxygen, sulfur, and chlorine. Elemental manganese and inorganic manganese compounds have negligible vapor pressures, but exist in air as suspended particulate matter derived from industrial emissions or the erosion of soils. Manganese is often transported in rivers as suspended sediment. The metal may exist in any of four oxidation states (2+, 3+, 4+, or 7+). Mn+2 is the most common form found in water with a pH between 4 and 7, but manganese may oxidize at a pH greater than 8. The transportation of manganese in water is controlled by the solubility of the

specific chemical form present and the characteristics of available anions (ATSDR, 1991b).

Vanadium. Vanadium commonly exists in the V^{3+}, V^{4+}, and V^{5+} valence states. Its aqueous chemistry is quite complex, but overall concentrations seem to be controlled more by availability of a vanadium source rather than equilibrium considerations. Bioconcentration of vanadium by vegetation has been reported by several researchers.

8.2.3 Transport of Contaminants This section discusses the transport of chemicals in various media at Site 14. All media, surface soil, subsurface soil, surface water, sediment, and groundwater will be discussed.

Surface Soil. Transport of the CPCs in soil is dependent on several factors, as discussed in Section 8.1. The primary agents of migration acting on soil include wind, water, and human activity. Soil can also act as a source medium from which the CPCs are transported to other media. Transport of the CPCs from soil via wind is not expected to be a major transport mechanism because of the vegetation present at Site 14. Vegetative cover is an effective means of limiting wind erosion of soil. Humans are effective at moving soil and can greatly affect the transport of soil-bound chemicals at hazardous waste sites. Under the current use of Site 14, human activity is not a major transport mechanism for the CPCs in soils. This condition may change based on the future use of Site 14.

Water can cause the transport of soil and, therefore, the CPCs in soil, via the mechanisms of physical transport of soil or the leaching of constituents from the soil to groundwater. Soil erosion, the physical transport of soil via surface water runoff, is currently not considered a major mechanism for the transport of the CPCs in soil at Site 14 because of the vegetation at the site and the nature of the constituents remaining in the soil at the site.

The majority of the analytes detected in the soil at Site 14 are likely to remain attached to the soil because most metal analytes adsorb readily to or are natural constituents of clays and other minerals.

Surface Water. There are no permanent surface water bodies associated with Site 14. The "Y" drainage ditch is located approximately 400 feet east of site; however, off-site migration of site-related surface soil constituents to the ditch is unlikely because the surrounding vegetation.

Currently, transport of the CPCs at Site 14 via runoff is not considered an important transport mechanism because of (1) high infiltration capacity of soil at the site, (2) the heavy vegetation surrounding Site 14, and (3) the tendency of the surface soil contaminants at the sites to remain attached to clays in the soil.

Sediment. The transport of sediment at Site 14 by the action of humans is not currently a significant transport mechanism. Little or no surficial erosion is likely due to vegetative cover. Surficial drainage from the site is toward the "Y" ditch, but it is not considered a significant transport mechanism.

Groundwater. Arsenic was the only HHCPC identified at Site 14. Arsenic has two stable forms in solution in groundwater, arsenate (As^{5+}) and arsenite (As^{3+}). In groundwater with pH ranging from 3 to 7, the monovalent arsenate anion $H_2AsO_4^-$

is the dominant form. Currently, groundwater at Site 14 is not used for any potable or nonpotable purpose. Transportation of arsenic through its mobility in groundwater is possible. During groundwater discharge to surface water, arsenic may partition to sediment from solution by hydrous iron oxide adsorption and/or coprecipitation (or a combination of both) with sulfides in the sediment.

Hydrogeology at Site 14 is discussed in Section 5.2 of this report. Groundwater flow direction in the surficial aquifer at Site 14 is primarily to the south-southeast. Big Coldwater Creek acts as a point of discharge approximately 9,000 feet east-southeast of the site.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS. The following is a summary based on the RI investigations at Site 14, Short-Term Sanitary Landfill, NAS Whiting Field.

- The soil at Site 14 is interbedded sand, silt, and clay ranging from very fine to medium grain size. An approximately 25-foot-thick clay layer was encountered at 74 feet bls in one monitoring well soil boring, but it is unknown if the layer is continuous throughout the site.

- The groundwater water table is located approximately 80 feet bls at Site 14. The groundwater flow direction is to the southeast and likely discharges to Big Coldwater Creek east-southeast of the facility. The average horizontal seepage velocity for the Southeast Disposal Area sites was approximately 27 ft/yr.

- Interpretation of the geophysical survey suggested presence of two anomalies which were interpreted to be former disposal areas.

- Methane and TVOCs were detected at four of the 24 soil gas locations investigated. At these locations, methane accounted for 80 percent or greater of the total gas measurement. However, the occurrence of soil gas appears to be limited in areal extent and there is no evidence of off-site migration.

- Surface soil samples were reported to contain two VOCs (xylene and methylene chloride) and two SVOCs (chrysene and bis(2-ethylhexyl)-phthalate. The concentrations detected did not exceed the USEPA Region III RBCs or the Florida soil cleanup target levels.

- Nine inorganic analytes (aluminum, arsenic, barium, cadmium, chromium, iron, manganese, potassium, and vanadium) were detected in surface soil samples at concentrations exceeding the background screening criteria. Aluminum, arsenic, beryllium, iron, and manganese were detected at concentrations that exceeded either the USEPA Region III RBCs or Florida soil cleanup target levels.

- Subsurface soil samples collected from test pits contained four VOCs (acetone, ethylbenzene, toluene, and xylenes) and three SVOCs (4-methylphenol, naphthalene, and bis(2-ethylhexyl) phthalate) at detectable concentrations. All reported concentrations were below the Florida soil cleanup target levels and USEPA Region III RBCs. Nineteen inorganic analytes were detected in the subsurface soil samples. However, only arsenic was detected at concentrations that exceeded the USEPA Region III RBCs for residential and industrial soil and Florida soil cleanup target levels for residential and industrial soil. The detected arsenic concentrations did not exceed the background screening value for the facility.

- The pH values reported for the groundwater samples at Site 14 were below the lower range of the Florida secondary drinking water standard

of 6.5 standard units but were within the range observed in background samples collected at NAS Whiting Field.

- Carbon disulfide was the only organic compound detected in the Phase IIB groundwater samples collected at Site 14. The detected concentration did not exceed the Federal MCLs or the Florida groundwater cleanup target levels. Nine inorganic analytes were detected in groundwater samples. None of the analytes were detected at concentrations above the USEPA MCLs or the Florida groundwater cleanup target levels.

- Human health CPCs identified at Site 14 include aluminum, arsenic, iron, manganese, and vanadium in surface soil, and arsenic in groundwater. No human health CPCs were identified for subsurface soil; therefore, no additional evaluations were performed.

- The human health CPCs detected in surface soil and groundwater are not likely to pose unacceptable carcinogenic risks to the receptors evaluated based on evaluation of the samples using USEPA guidelines and target risk range.

- The total ELCR of 1×10^{-5} at Site 14, associated with exposure to soil by a hypothetical future resident exceeds Florida's target risk level of concern 1×10^{-6} due to arsenic. However, it should be noted, that concentrations of arsenic detected in NAS Whiting Field background samples exceeded Florida soil residential cleanup goals and may result in an unacceptable carcinogenic risk. It is likely that naturally occurring arsenic contributes to the FDEP target risk-level exceedance.

- The total ELCR of 1×10^{-5} at Site 14, associated with ingestion of groundwater by hypothetical future resident exceeds Florida's target risk level of concern due to arsenic. Additionally, it should be noted that the EPC for arsenic is an order of magnitude less than the Federal drinking water standard and Florida groundwater cleanup target level.

- The surface soil, subsurface soil, and groundwater noncancer risks are below USEPA and FDEP target levels for all potential current and hypothetical future receptors.

- ECPCs in surface soil include one VOC, methylene chloride; two SVOCs, chrysene, and bis(2-ethylhexyl)pyrene; and three inorganic analytes, aluminum, manganese, and vanadium.

- The results of the ERA suggest that risks are not predicted for terrestrial wildlife resulting from exposure to ECPCs in the surface soils; therefore, reduction in the survivability, growth, and reproduction of wildlife receptor populations at Site 14 are not expected to occur.

- Reduction in terrestrial plant and soil invertebrate biomass used as forage material was evaluated by comparing exposure concentrations for surface soil with toxicity benchmarks. Based on this comparison, plants exposed to RME and CT concentrations of aluminum and vanadium in surface soil may be adversely affected in the area of the landfill. However, it is unlikely that plant biomass or plant cover availability

would be reduced over the entire area of Site 14 such that small mammal and bird populations would be affected. Similarly soil invertebrate biomass is not expected to be reduced because RME concentrations of all ECPCs were well below available invertebrate toxicity benchmark values.

9.2 RECOMMENDATIONS. Based upon the interpretation of findings from the RI activities, a focused feasibility study is recommended for Site 14 to address the presence of arsenic and vanadium in surface soil.

Although groundwater analytical results, summaries, and conclusions are included in this RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Facilitywide Groundwater). Therefore, chemicals in the groundwater that pose a threat to human and ecological receptors will be evaluated as part of the Site 40 RI/FS. The Site 40 assessment will supersede the evaluation presented in this report.

10.0 PROFESSIONAL REVIEW CERTIFICATION

The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures and protocols consistent with applied standards of practice. This report is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are discovered or determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. The remedial investigation for Site 14, Short-Term Sanitary Landfill, was developed for NAS Whiting Field in Milton, Florida, and should not be construed to apply for any other purpose or to any other site.

Eric A. Blomberg
Professional Geologist
P.G. No. 1695

10-27-99
Date

REFERENCES

ABB Environmental Services, Inc. (ABB-ES). 1992a. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 5, Groundwater Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1992b. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 1, Geological Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina.

ABB-ES. 1993. *Geophysical Survey Technical Report, NAS Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1995a. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 2, Geological Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1995b. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 7, Phase IIB Workplan, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1995c. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 4, Hydrogeologic Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1995d. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 5, Groundwater Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1995e. *Remedial Investigation and Feasibility Study, Technical Memorandum No. 3, Soil Assessment, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1998. *Remedial Investigation and Feasibility Study, General Information Report, Naval Air Station Whiting Field, Milton, Florida.* Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ATSDR. U.S. Public Health Service. 1991a. *Draft Toxicological Profile for Vinyl Chloride.* Washington, D.C.

ATSDR. U.S. Public Health Service. 1991b. *Draft Toxicological Profile for Manganese.* Washington, D.C.

ATSDR. U.S. Public Health Service. 1993a. *Draft Toxicological Profile for Methylene Chloride*. Washington, D.C.

ATSDR. U.S. Public Health Service. 1993b. *Draft Toxicological Profile for PAHs*. Washington, D.C.

Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor. 1984. *A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture*. ORNL-5786. U.S. Department of Energy, Environmental Sciences Division. Oak Ridge, Tennessee: Oak Ridge National Laboratory (September).

Beyer, W.N. 1990. *Evaluating Soil Contamination*. Biological Report No. 90(2). U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.

Briggs, G.G., R.H. Bromilow, and A.A. Evans. 1982. "Relationships Between Lipophilicity and Root Uptake and Translocation of Non-ionised Chemicals by Barley." *Pestic. Sci.* 14 (January):495-504.

Briggs, G.G., R.H. Bromilow, A.A. Evans, and M. Williams. 1983. "Relationships Between Lipophilicity and the Distribution of Non-Ionised Chemicals in Barley Shoots Following Uptake by the Roots." *Pestic. Sci.* 14(February): 492-500.

Burt, W.H., and R.P. Grossenheider. 1976. *A Field Guide to the Mammals*. Boston: Houghton Mifflin Co.

The Chemical Rubber Co. (CRC). 1972. *Handbook of Chemistry and Physics*. Vol.52 Ed., Robert C. Weast.

DeGraaf, R.M., and D.D. Rudis. 1986. *New England Wildlife: Habitat, Natural History, and Distribution*. General Technical Report NE-108. U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. Washington, D.C.

E.C. Jordan Co. Inc. 1990. *Remedial Investigation and Feasibility Study Planning Document, Naval Air Station Whiting Field, Milton, Florida. Volume I (Workplan); Volume II (Sampling and Analysis Plan); Volume III (Data Management and Health and Safety Plan)*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

Envirodyne Engineers, Inc. 1985. *Initial Assessment Study, Naval Air Station Whiting Field, Milton, Florida*. Prepared for Naval Energy and Environmental Support Activity, Port Hueneme, California.

Fetter, C.W. 1988. *Applied Hydrogeology*. Columbus, Ohio: Merrill Publishing Company.

Florida Department of Environmental Protection (FDEP). 1994. *Ground Water Guidance Concentrations*. Tallahassee, Florida (June).

FDEP. 1995a. Memorandum from John Ruddell, Director, Division of Waste Management, to District Directors, Waste Program. Subject: "Soil Cleanup Goals for Florida." Tallahassee, Florida (September 29).

FDEP. 1995b. Memorandum from Ligia Mora Applegate, Director, Technical Review Section, Bureau of Waste Cleanup. Subject: "Cleanup Goals for Military Sites in Florida." Tallahassee, Florida (April).

FDEP. 1995c. Drinking Water Standards, (62-302 Florida Administrative Code), Florida Department of Environmental Protection, (February 2).

FDEP. 1996. "Applicability of Soil Cleanup Goals for Florida." Memorandum from FDEP (January 19).

Geraghty & Miller, Inc. 1986. *Verification Study, Assessment of Potential Groundwater Pollution at NAS Whiting Field, Milton, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring*. New York: Van Nostrand Reinhold.

Hem, John D. 1992. Study and Interpretation of the Chemical Characteristics of Natural Water. 3rd Edition. Waster Supply Paper No. 2254, U.S. Geological Survey.

Laboratory Data Consultants, Inc. 1996. Data Validation Report for Sample Delivery Groups (SDGs) WF007, WF11B, WF012, and WF028.

Maughan, J.T. 1993. *Ecological Assessment of Hazardous Waste Sites*. New York: Van Nostrand Reinhold.

Naval Energy and Environmental Support Activity (NEESA). 1988. *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program*. NEESA Guidance Document, 20.2-047B.

Neuhauser, E.F, P.R. Durkin, M.R. Malecki, and M. Anatra. 1986. "Comparative Toxicity of Ten Organic Chemicals to Four Earthworm Species." *Comp. Biochem. Physiol.*, Vol. 83C, No. 1, pp. 197-200, 1986.

Simon, T. 1997. *Personal Communication between Mr. Ted Simon of USEPA Region IV and Ms. Anita Peases of ABB-ES, September 18*.

Suter, G. W. 1993. *Ecological Risk Assessment*. Chelsea Michigan: Lewis Publishers.

Terres, J. 1980. *Audubon Encyclopedia of North American Birds*. New York: Alfred Knopf.

Terres, J. 1991. *Audubon Encyclopedia of North American Birds*. New York: Alfred Knopf.

U.S. Department of Agriculture. 1980. *Soil Survey of Santa Rosa County, Florida*. Soil Conservation Service, Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 1979. *Water-Related Fate of 129 Priority Pollutants. Volume I and II*. Washington, D.C.

USEPA. 1986a. *Test Methods for Evaluating Solid Waste, Volume IB, Laboratory Manual Physical/Chemical Methods*. Office of Solid Waste and Emergency Response. Washington, D.C. (November).

USEPA. 1986b. *Hazard Evaluation Division Standard Evaluation Procedure: Ecological Risk Assessment*. USEPA/540/9-85-001. Office of Pesticide Programs. Washington, D.C.

USEPA. 1988. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Washington, D.C. (July 1).

USEPA. 1989a. *Methods for Evaluating the Attainment of Cleanup Standards. Volume I: Soils and Solid Media*. Statistical Policy Branch. Washington, D.C. (February).

USEPA. 1989a. *Risk Assessment Guidance for Superfund. Volume 2: Environmental Evaluation Manual*. USEPA/540/1-89/002. Washington D.C. (December).

USEPA. 1989b. *Risk Assessment Guidance for Superfund: "Environmental Evaluation Manual. Volume 2*. EPA/540/1-89/002. Washington, D.C. (December).

USEPA. 1989c. *Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A)*. Washington, D.C. (December).

USEPA. 1989d. "Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference." EPA 600/3-89/013. Environmental Research Laboratory. Corvallis, Oregon.

USEPA. 1990. *National Oil and Hazardous Substances Contingency Plan*. Washington, D.C.

USEPA. 1991a. *Standard Operating Procedures and Quality Assurance Manual (SOPQAM)*. Environmental Compliance Branch, Region IV. Atlanta, Georgia (February 1).

USEPA. 1991b. *National Functional Guidelines for Organic Data Review*. Washington, D.C. (June).

USEPA. 1991c-92. *ECO Update*. Volume 1: Number 1 (September, 1991), Number 2 (December, 1991), Number 3 (March, 1992), Number 4 (May, 1992), Number 5 (August, 1992). Publication No. 9345.0.051. Washington, D.C.

USEPA. 1991d. *Supplemental Region IV Risk Assessment Guidance*. USEPA Region IV. Atlanta, Georgia (March).

USEPA. 1992a. *Guidance for Data Useability in Risk Assessment (Part A)*. Publication No. 9285.07-09A. Office of Emergency and Remedial Response. Washington, D.C. (April).

USEPA. 1992b. *Framework for Ecological Risk Assessment*. USEPA/630/R-92/001. Washington, D.C. (February).

USEPA. 1992c. "ECO Update." Volume 1, Number 2, Publication 9345.0-051. May

USEPA. 1992d. "ECO Update." Volume 1, Number 3, Publication 9345.0-051. August.

USEPA. 1992d. "Central Tendency and RME Exposure Parameters". Memorandum from Jon Rausher, Texas Remedy Section, Region VI (August 18).

USEPA. 1993a. *Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening*. USEPA Region III (January).

USEPA. 1993b. *Wildlife Exposure Factors Handbook*. Vols. I and II. USEPA/600/-R93/187a,b. Office of Research and Development. Washington, D.C. (December).

USEPA. 1994a. *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (February).

USEPA. 1994b. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (February).

USEPA. 1994c. *Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities*. Office of Solid Waste and Emergency Response. Washington, D.C.

USEPA. 1995a. *Supplemental Guidance to RAGS: Ecological Risk Assessment*. Region 4 Bulletins. USEPA Region IV Waste Management Division. Atlanta, Georgia.

USEPA. 1995b. *Data Collection and Evaluation*. USEPA Region IV (November).

USEPA. 1996a. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual*. Washington, D.C. (May).

USEPA, 1996b. *Drinking Water Regulations and Health Advisors*. (October).

USEPA. 1996c. "Proposed Guidelines for Ecological Risk Assessment." Federal Register, Vol.61, No 175, pages 47552-47631. September 9, 1996.

USEPA. 1997a. *Risk-Based Concentration Table*. USEPA Region III. (October).

USEPA, 1997b. *Integrated Risk Information System*. (November).

USEPA, 1997c. *Health Effects Assessment Summary Tables*. (July).

USEPA. 1997d. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*. Environmental Response Team. Edison, New Jersey.

Whitaker, J.O., Jr.; Ferraro, M.G. 1963. Summer Food at 220 Short-tailed Shrews from Ithaca, New York. J. Mammal. 44:419.

Wolfe, S.H., J.A. Reidenauer, and D.B. Means. 1988. "An Ecological Characterization of the Florida Panhandle." Biological Report 88(12), OCS MMS 88-0063. Fish and Wildlife Service. U.S. Department of the Interior. Washington, D.C.

APPENDIX A

GEOPHYSICAL DATA

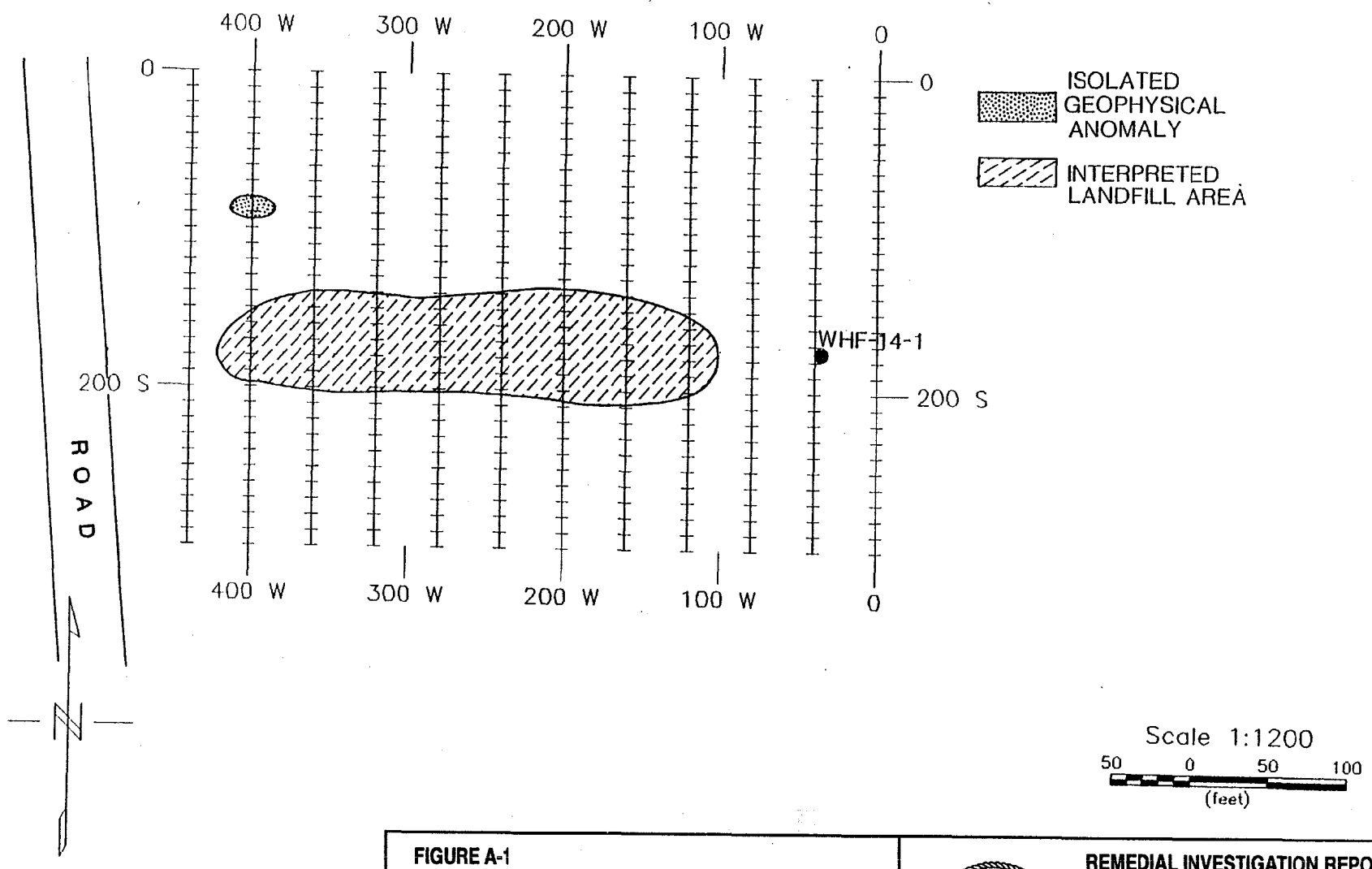


FIGURE A-1
SITE 14
GEOPHYSICAL SURVEY GRID LINES
AND INTERPRETED ANOMALY LOCATIONS

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM
SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-1 SITE 14 111097MAW

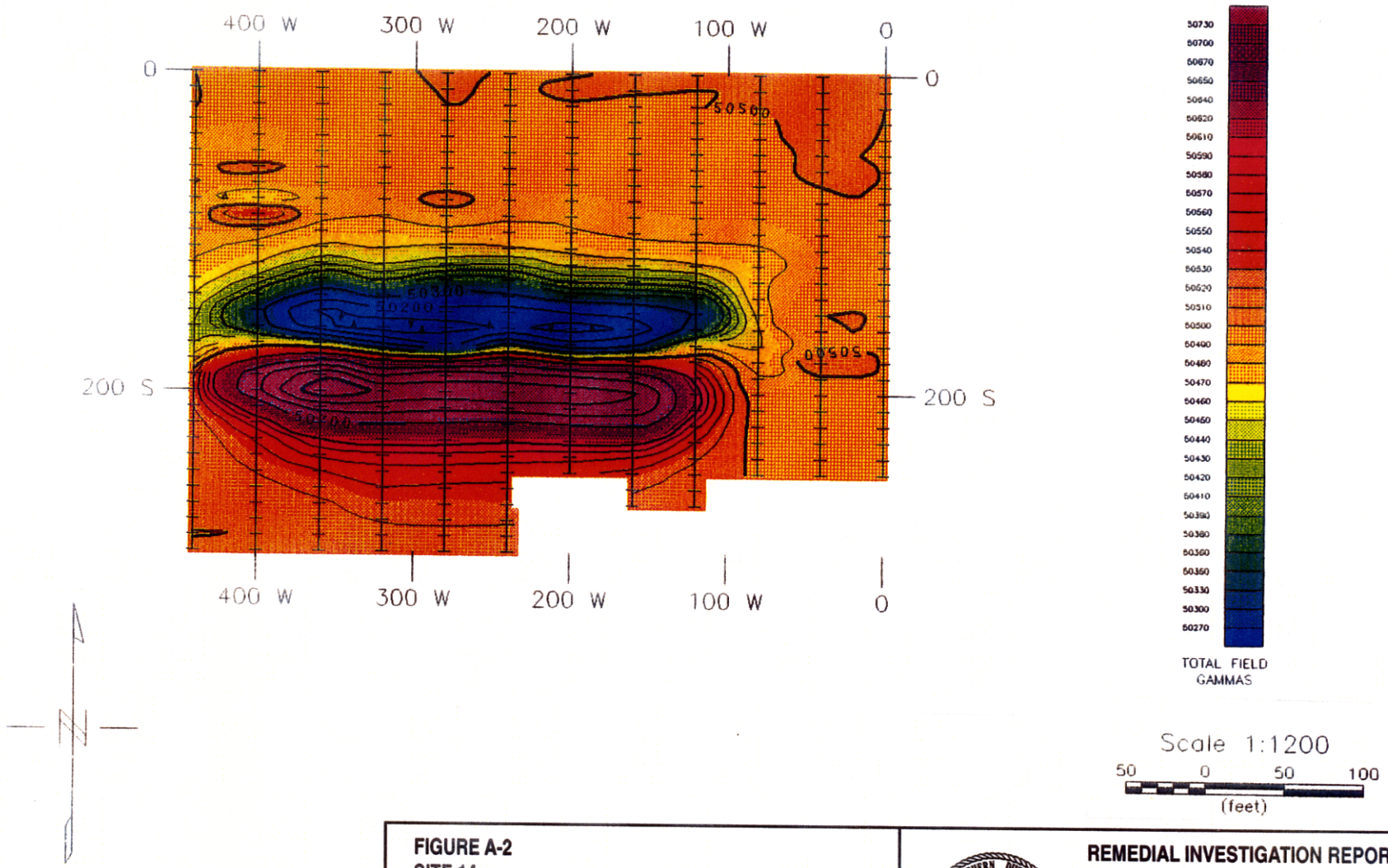


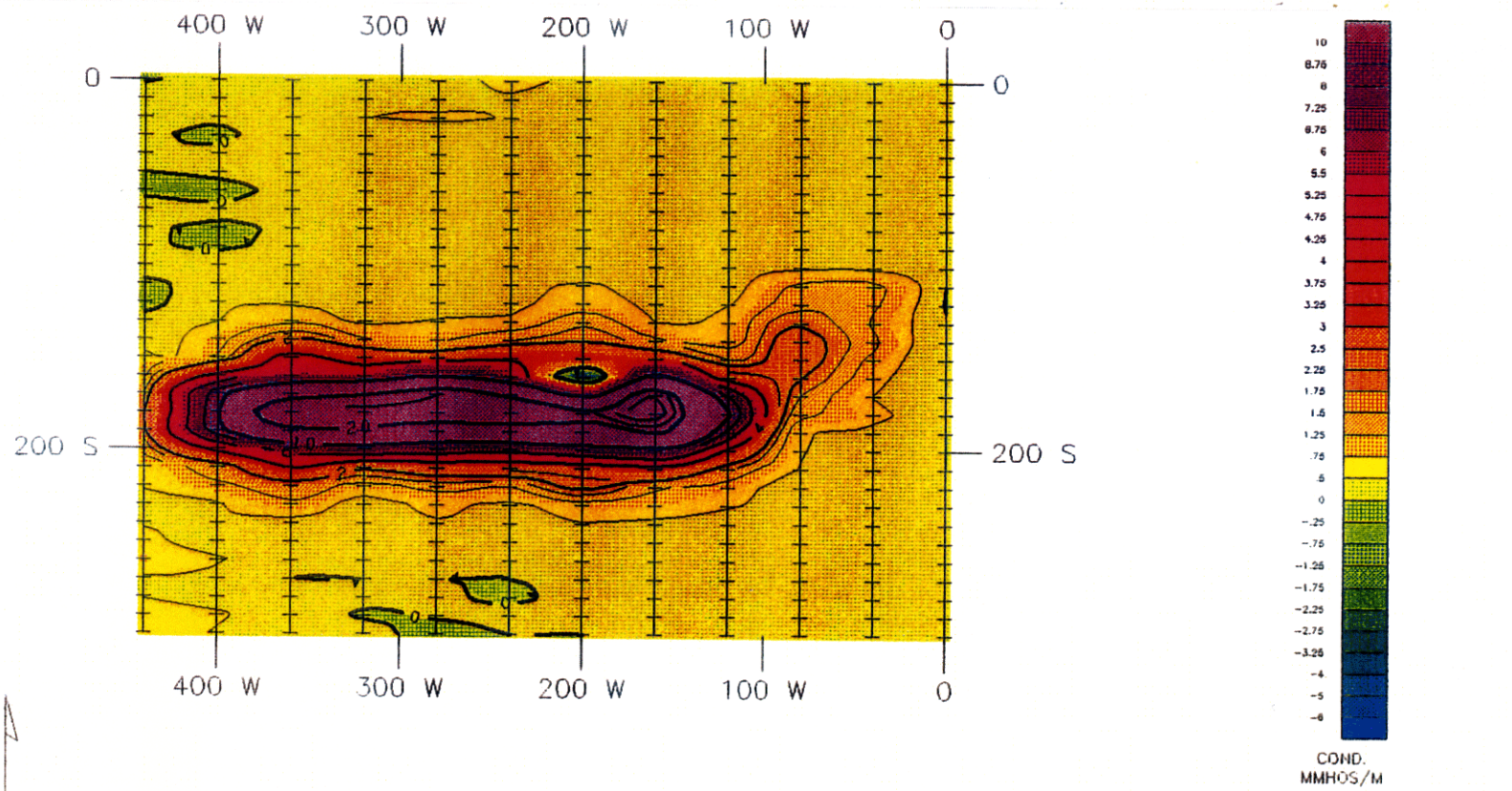
FIGURE A-2
SITE 14
TOTAL MAGNETIC FIELD
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM
SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-2 SITE 14 111097MAW

00746DB3Y



Scale 1:1200

50 0 50 100

(feet)

FIGURE A-3
SITE 14
EM-31 CONDUCTIVITY
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM
SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-3 SITE 14 111097MAW

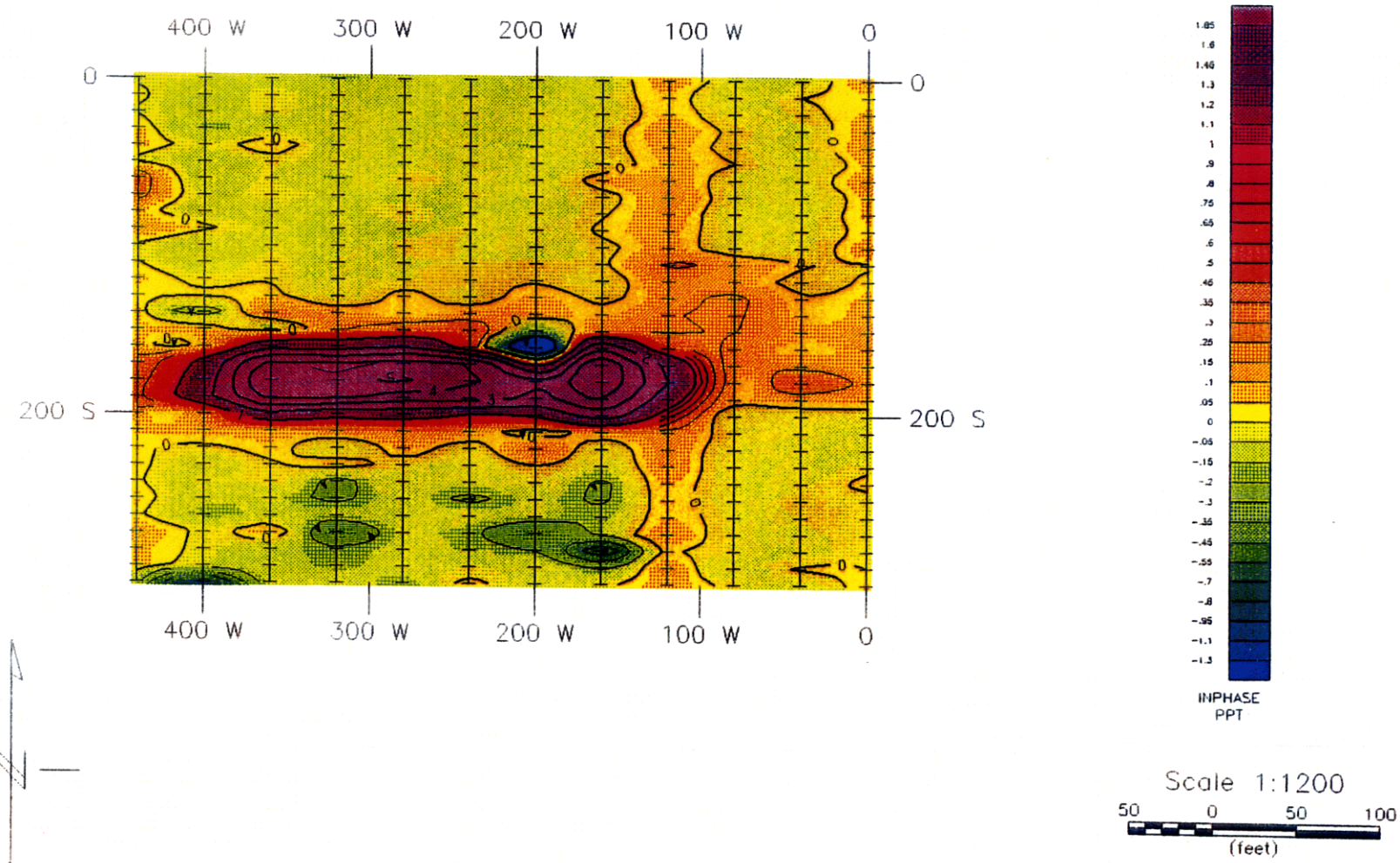


FIGURE A-4
SITE 14
EM-31 INPHASE
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITE 14, SHORT-TERM
SANITARY LANDFILL

NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-4 SITE 14 111097MAW

APPENDIX B

ANALYTICAL QUALITY CONTROL DATA

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2C, Carlsbad, CA 92009 Phone: 619/634-0437 Fax: 619/634-0439

APPENDIX A

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Final Version

5/1/96

APPENDIX A

Table of Contents

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

Table	Title	Page No.
I	Sample Delivery Group Versus Sample Identification	A-1
II	Summary of Rejected Data (Organics)	A-16
III	Summary of Rejected Data (Inorganics)	A-17
Organics		
IV	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates	A-18
V	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-21
VI	Summary of Surrogate Recoveries	A-25
VII	Summary of Compounds Exceeding Instrument Calibration	A-29
VIII	Summary of Method Blank Contamination	A-33
IX	Summary of Field Blank Contamination	A-36
Inorganics		
X	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboatory Duplicate Samples	A-40
XI	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-42
XII	Summary of Analytes Exceeding Instrument Calibration	A-50
XIII	Summary of Method Blank Contamination	A-51
XIV	Summary of Field Blank Contamination	A-55
XV	Sample Event PARCC Summary	A-58

le I

SDG#: WF006 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779A

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
01T00101	G8864001	TB	water	12-5-95	X					
01S00101	G8864002		soil	12-5-95	X	X	X	X	X	
01S00201	G8864003		soil	12-5-95	X	X	X	X	X	
01S00301	G8864004		soil	12-5-95	X	X	X	X	X	
01S00401	G8864005		soil	12-5-95	X	X	X	X	X	
01S00501	G8864006		soil	12-5-95	X	X	X	X	X	
02S00401	G8864007	FD	soil	12-5-95	X	X	X	X	X	
02S00401D	G8864008	FD	soil	12-5-95	X	X	X	X	X	
02S00401DDL	G8864008DL		soil	12-5-95		X				
02T00101	G8876001	TB	water	12-6-95	X					
02S00101	G8876002		soil	12-6-95	X	X	X	X	X	
02S00201	G8876003		soil	12-6-95	X	X	X	X	X	
02S00301	G8876004		soil	12-6-95	X	X	X	X	X	
02S00501	G8876005		soil	12-6-95	X	X	X	X	X	
09S00101	G8876006		soil	12-6-95	X	X	X	X	X	X
09S00201	G8876007		soil	12-6-95	X	X	X	X	X	X
09S00401	G8876008		soil	12-6-95	X	X	X	X	X	X
09S00501	G8876009		soil	12-6-95	X	X	X	X	X	X
09S00301	G8876010	FD	soil	12-6-95	X	X	X	X	X	X
09S00301D	G8876011	FD	soil	12-6-95	X	X	X	X	X	X
01R00101	G8876012	R	water	12-6-95	X	X	X	X	X	X
01F00101	G8876013	SB	water	12-6-95	X	X	X	X	X	X
02S00401MS	G8864007MS	MS	soil	12-5-95	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF006 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779A

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
02S00401MSD	G8864007MSD	MSD	soil	12-5-95	X	X	X	X	X	
09S00101MS	G8876006MS	MS	soil	12-6-95						X
09S00101DUP	G8876006MSD	DUP	soil	12-6-95						X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

e I

SDG#: WF007 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1779B

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
10T00101	G8889001	TB	water	12-7-95	X					
10S00101	G8889002	FD	soil	12-7-95	X	X	X	X	X	X
10S00101R	G8889002R		soil	12-7-95		X				
10S00101D	G8889003	FD	soil	12-7-95	X	X	X	X	X	X
10S00401	G8889004		soil	12-7-95	X	X	X	X	X	X
10S00601	G8889005		soil	12-7-95	X	X	X	X	X	X
12S00301	G8889006		soil	12-7-95	X	X	X	X	X	X
12S00101	G8889007		soil	12-7-95	X	X	X	X	X	X
12S00601	G8889008		soil	12-7-95	X	X	X	X	X	X
10R00101	G8889009	R	water	12-7-95	X	X	X	X	X	X
13T00101	G8895001	TB	water	12-8-95	X					
13S00101	G8895002		soil	12-8-95	X	X	X	X	X	
13S00201	G8895003		soil	12-8-95	X	X	X	X	X	
13S00301	G8895004		soil	12-8-95	X	X	X	X	X	
13S00401	G8895005		soil	12-8-95	X	X	X	X	X	
13S00501	G8895006		soil	12-8-95	X	X	X	X	X	
14S00101	G8895007	FD	soil	12-8-95	X	X	X	X	X	
14S00101D	G8895008	FD	soil	12-8-95	X	X	X	X	X	
14S00201	G8895009		soil	12-8-95	X	X	X	X	X	
14S00301	G8895010		soil	12-8-95	X	X	X	X	X	
10S00101MS	G8889002MS	MS	soil	12-7-95	X		X	X	X	X
10S00101MSD	G8889002MSD	MSD	soil	12-7-95	X		X	X	X	X
10S00101RMS	G8889002RMS	MS	soil	12-7-95		X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF007 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1779B

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
10S00101RMSD	G8889002RMSD	MSD	soil	12-7-95		X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF008 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1779C

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00101	G8913001	TB	water	12-9-95	X				
15S02001	G8913002	FD	soil	12-9-95	X	X	X	X	X
15S02001D	G8913003	FD	soil	12-9-95	X	X	X	X	X
15S02101	G8913004		soil	12-9-95	X	X	X	X	X
15S02201	G8913005		soil	12-9-95	X	X	X	X	X
15S02301	G8913006		soil	12-9-95	X	X	X	X	X
15S02401	G8913007		soil	12-9-95	X	X	X	X	X
15S02501	G8913008		soil	12-9-95	X	X	X	X	X
15S01501	G8913009		soil	12-9-95	X	X	X	X	X
15S01401	G8913010		soil	12-9-95	X	X	X	X	X
15S01301	G8913011		soil	12-9-95	X	X	X	X	X
15S01601	G8913012		soil	12-10-95	X	X	X	X	X
15S01701	G8913013	FD	soil	12-10-95	X	X	X	X	X
15S01701D	G8913014	FD	soil	12-10-95	X	X	X	X	X
15S01801	G8913015		soil	12-10-95	X	X	X	X	X
15S01901	G8913016		soil	12-10-95	X	X	X	X	X
15S00901	G8913017		soil	12-11-95	X	X	X	X	X
15S00901RE	G8913017RE		soil	12-11-95		X			
15R00101	G8913020	R	water	12-11-95	X	X	X	X	X
15S02001MS	G8913002MS	MS	soil	12-9-95	X	X	X	X	X
15S02001MSD	G8913002MSD	MSD	soil	12-9-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF009 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779D

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00201	G8914001	TB	water	12-11-95	X				
15S00101	G8914002	FD	soil	12-11-95	X	X	X	X	X
15S00101R	G8914002R		soil	12-11-95		X			
15S00101D	G8914003	FD	soil	12-11-95	X	X	X	X	X
15S00201	G8914004		soil	12-11-95	X	X	X	X	X
15S00301	G8914005		soil	12-11-95	X	X	X	X	X
15S00501	G8914006		soil	12-11-95	X	X	X	X	X
15S00401	G8914007		soil	12-11-95	X	X	X	X	X
15S00601	G8914008		soil	12-11-95	X	X	X	X	X
15S00701	G8914009		soil	12-11-95	X	X	X	X	X
15S00801	G8914010		soil	12-11-95	X	X	X	X	X
15S01201	G8914011		soil	12-11-95	X	X	X	X	X
15R00201	G8914012	R	water	12-11-95	X	X	X	X	X
15S01101	G8914013		soil	12-10-95	X	X	X	X	X
15S01001	G8914014		soil	12-10-95	X	X	X	X	X
15S00101MS	G8914002MS	MS	soil	12-11-95	X	X	X	X	X
15S00101MSD	G8914002MSD	MSD	soil	12-11-95	X	X	X	X	X
15S00101RMS	G8914002RMS	MS	soil	12-11-95		X			
15S00101RMSD	G8914002RMSD	MSD	soil	12-11-95		X			

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF010 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1779E

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31S00101	G8924001		soil	12-12-95	X	X	X	X	X
31S00201	G8924002		soil	12-12-95	X	X	X	X	X
31S00301	G8924003		soil	12-12-95	X	X	X	X	X
31S00401	G8924004		soil	12-12-95	X	X	X	X	X
31T00101	G8924005	TB	water	12-12-95	X				
31R00101	G8924006	R	water	12-12-95	X	X	X	X	X
31T00201	G8938001	TB	water	12-13-95	X				
31S01501	G8938002	FD	soil	12-13-95	X	X	X	X	X
31S01501D	G8938003	FD	soil	12-13-95	X	X	X	X	X
31S01601	G8938004		soil	12-13-95	X	X	X	X	X
31S01701	G8938005		soil	12-13-95	X	X	X	X	X
31S01801	G8938006		soil	12-13-95	X	X	X	X	X
31S01901	G8938007		soil	12-13-95	X	X	X	X	X
31S01501MS	G8938002MS	MS	soil	12-13-95	X	X	X	X	X
31S01501MSD	G8938002MSD	MSD	soil	12-13-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF11A | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1777A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
09W00101	RA903001	FD	water	1-5-96	X	X	X	X	X	X
09W00101D	RA903002	FD	water	1-5-96	X	X	X	X	X	X
16W00101	RA903003		water	1-5-96	X	X	X	X	X	
09W00101MS	RA903001MS	MS	water	1-5-96	X	X	X	X	X	X
09W00101MSD	RA903001MSD	MSD	water	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF11B

Sample Delivery Group Versus Sample Identification

LDC#: 1777B

Project Name: NAS Whiting Field

Parameters/Analytical Method

Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
12T00101	RA847001	TB	water	1-5-96	X					
10S00201	RA847002	FD	soil	1-5-96	X	X	X	X	X	X
10S00201DL	RA847002DL		soil	1-5-96		X				
10S00201D	RA847003	FD	soil	1-5-96	X	X	X	X	X	X
10S00301	RA847004		soil	1-5-96	X	X	X	X	X	X
10S00301R	RA847004R		soil	1-5-96		X				
10S00501	RA847005		soil	1-5-96	X	X	X	X	X	X
12S00201	RA847006		soil	1-5-96	X	X	X	X	X	X
12S00401	RA847007		soil	1-5-96	X	X	X	X	X	X
12S00501	RA847008		soil	1-5-96	X	X	X	X	X	X
12R00101	RA847012	R	water	1-5-96	X	X	X	X	X	X
11T00101	RA847013	TB	water	1-6-96	X					
11S00101	RA847014		soil	1-6-96	X	X	X	X	X	X
11S00201	RA847015		soil	1-6-96	X	X	X	X	X	X
11S00201DL	RA847015DL		soil	1-6-96			X			
11S00201R	RA847015R		soil	1-6-96	X					
11S00501	RA847016		soil	1-6-96	X	X	X	X	X	X
11S00401	RA847017		soil	1-7-96	X	X	X	X	X	X
11S00301	RA847018		soil	1-7-96	X	X	X	X	X	X
10S00201MS	RA847002MS	MS	soil	1-5-96	X	X	X	X	X	X
10S00201MSD	RA847002MSD	MSD	soil	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF012 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777C

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide	Lead	TCLP Metals
11S00601	RA855001	FD	soil	1-7-96						X	
11S00601D	RA855002	FD	soil	1-7-96						X	
11S00701	RA855003		soil	1-7-96						X	
11S00801	RA855004		soil	1-7-96						X	
11S00901	RA855005		soil	1-7-96						X	
11S01001	RA855006		soil	1-7-96						X	
11S01101	RA855007		soil	1-7-96						X	
11S01201	RA855008		soil	1-7-96						X	
11S01301	RA855009		soil	1-7-96						X	
31S00401	RA855010		soil	1-7-96	X	X	X	X	X		
31S00501	RA855011	FD	soil	1-7-96	X	X	X	X	X		
31S00501D	RA855012	FD	soil	1-7-96	X	X	X	X	X		
31S00601	RA855013		soil	1-7-96	X	X	X	X	X		
31S00701	RA855014		soil	1-7-96	X	X	X	X	X		
31S01001	RA855015		soil	1-7-96	X	X	X	X	X		
31S01101	RA855016		soil	1-7-96	X	X	X	X	X		
31S00901	RA855017		soil	1-7-96	X	X	X	X	X		
31S00801	RA855018		soil	1-7-96	X	X	X	X	X		
31S01201	RA855019		soil	1-8-96	X	X	X	X	X		
31S01201R	RA855019R		soil	1-8-96	X						
31S01301	RA855020		soil	1-8-96	X	X	X	X	X		
31R00201	RA855021	R	water	1-8-96	X	X	X	X	X		
31S00401	RA857001		soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF012 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777C

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide	Lead	TCLP Metals
31S00501	RA857002	FD	soil	1-7-96							X
31S00501D	RA857003	FD	soil	1-7-96							X
31S00601	RA857004		soil	1-7-96							X
31S00701	RA847005		soil	1-7-96							X
31S01001	RA857006		soil	1-7-96							X
31S01101	RA857007		soil	1-7-96							X
31S00901	RA857008		soil	1-7-96							X
31S00801	RA857009		soil	1-7-96							X
31S01201	RA857010		soil	1-8-96							X
31S01301	RA857011		soil	1-8-96							X
31S00501MS	RA855011MS	MS	soil	1-7-96	X	X	X	X	X		
31S00501MSD	RA855011MSD	MSD	soil	1-7-96	X	X	X	X	X		
31S00501MS	RA857002MS	MS	soil	1-7-96							X
31S00501MSD	RA857002MSD	MSD	soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF013 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1777D

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide
16S00101	RA856001	FD	soil	1-8-96	X	X	X	X	X
16S00501	RA856002		soil	1-8-96	X	X	X	X	X
16S00401	RA856003		soil	1-8-96	X	X	X	X	X
16S00901	RA856004		soil	1-8-96	X	X	X	X	X
16S00901R	RA856004R		soil	1-8-96		X			
16S01501	RA856005		soil	1-8-96	X	X	X	X	X
16S00201	RA856006		soil	1-9-96	X	X	X	X	X
16S00301	RA856007		soil	1-9-96	X	X	X	X	X
16S00801	RA856008		soil	1-9-96	X	X	X	X	X
16S00801RE	RA856008RE		soil	1-9-96		X			
16S00601	RA856009		soil	1-9-96	X	X	X	X	X
16S00601DL	RA856009DL		soil	1-9-96		X			
16S01201	RA856010		soil	1-9-96	X	X	X	X	X
16S01301	RA856011		soil	1-9-96	X	X	X	X	X
BKS00301	RA856012		soil	1-9-96	X	X	X	X	X
BKS00101	RA856013		soil	1-9-96	X	X	X	X	X
16S01001	RA856014	FD	soil	1-9-96	X	X	X	X	X
16S01001D	RA856015	FD	soil	1-9-96	X	X	X	X	X
16T00101	RA856016	TB	water	1-9-96	X				
16R00101	RA856017	R	water	1-9-96	X	X	X	X	X
16S00101D	RA856018	FD	soil	1-9-96	X	X	X	X	X
24T00101	RA871001	TB	water	1-10-96	X				
24S00101	RA871002		soil	1-10-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF013 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1777D

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide
16S01001MS	RA856014MS	MS	soil	1-9-96	X	X	X	X	X
16S01001MSD	RA856014MSD	MSD	soil	1-9-96	X	X	X	X	X
24S00101MS	RA871002MS	MS	soil	1-10-96					X
24S00101MSD	RA871002MSD	MSD	soil	1-10-96					X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF014 | **Sample Delivery Group Versus Sample Identification** | **LDC#:** 1777E

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
BKR00101	RA870001	R	water	1-10-96	X	X	X	X	X
BKT00101	RA870002	TB	water	1-10-96	X				
16S01401	RA870003		soil	1-10-96	X	X	X	X	X
16S00701	RA870004		soil	1-10-96	X	X	X	X	X
16S01101	RA870005		soil	1-10-96	X	X	X	X	X
16S01701	RA870006		soil	1-10-96	X	X	X	X	X
16S01601	RA870007		soil	1-10-96	X	X	X	X	X
BKS00201	RA870008	FD	soil	1-10-96	X	X	X	X	X
BKS00201D	RA870009	FD	soil	1-10-96	X	X	X	X	X
BKS00501	RA870010		soil	1-10-96	X	X	X	X	X
BKS00401	RA870011		soil	1-10-96	X	X	X	X	X
31B00401	RA870012		soil	1-11-96	X	X	X	X	X
31B00301	RA870013		soil	1-11-96	X	X	X	X	X
31B00201	RA870014	FD	soil	1-11-96	X	X	X	X	X
31B00201D	RA870015	FD	soil	1-11-96	X	X	X	X	X
31B00101	RA870016		soil	1-11-96	X	X	X	X	X
31B00501	RA870017		soil	1-11-96	X	X	X	X	X
31T00201	RA870018	TB	water	1-11-96	X				
BKS00201MS	RA870008MS	MS	soil	1-10-96	X	X	X	X	X
BKS00201MSD	RA870008MSD	MSD	soil	1-10-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF015 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777F

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
COR00101	RA908001	R	water	1-18-96	X	X	X	X	X
COF00101	RA908002	SB	water	1-18-96	X	X	X	X	X
COT00101	RA908003	TB	water	1-18-96	X				
COS00101	RA908004	FD	soil	1-18-96	X	X	X	X	X
COS00101D	RA908005	FD	soil	1-18-96	X	X	X	X	X
EOS00101	RA908006		soil	1-18-96	X	X	X	X	X
POS00101	RA908007		soil	1-18-96	X	X	X	X	X
YOS00101	RA908008		soil	1-18-96	X	X	X	X	X
SOS00101	RA908009		soil	1-18-96	X	X	X	X	X
WOS00101	RA908010		soil	1-18-96	X	X	X	X	X
AOS00101	RA908011		soil	1-18-96	X	X	X	X	X
COS00101MS	RA908004MS	MS	soil	1-18-96	X	X	X	X	X
COS00101MSD	RA908004MSD	MSD	soil	1-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table II
Summary of Rejected Data (Organics)
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF006	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBS	All samples	No rejected results	-
WF007	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF008	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF009	Volatiles	All samples	No rejected results	-
	Semivolatiles	15S00201	1,4-Dichlorobenzene	Low MS/MSD recoveries
			1,2,4-Trichlorobenzene	Low MS/MSD recoveries
			Acenaphthene	Low MS/MSD recoveries
			Pyrene	MS/MSD recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF010	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF11A	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF11B	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF012	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF013	Volatiles	All samples	No rejected results	-
	Semivolatiles	16S00801	All compounds	Low Surrogate recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF014	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF015	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	COS00101	All compounds	Low Surrogate recoveries
		SOS00101	All compounds	Low Surrogate recoveries

Table III
Summary of Rejected Data (Inorganics)
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF006	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
	TRPH	All samples	No rejected results	-
WF007	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
	TRPH	All samples	No rejected results	-
WF008	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF009	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF010	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF11A	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
	TRPH	All samples	No rejected results	-
WF11B	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
	TRPH	All samples	No rejected results	-
WF012	All metals	All samples	No rejected results	-
	All TCLP metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	
WF013	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF014	Mercury	31B00301	Mercury	Low LCS % Recovery
	Cyanide	All samples	No rejected results	-
WF015	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
			Criteria		% Recovery			
SDG	Client ID	Compound	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF006	02S00401	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	92	-	None
		4-Chloro-3-methylphenol	26-103	-	-	104	-	None
		2,4-Dinitrotoluene	28-89	-	-	100	-	None
		Pyrene	35-142	-	29	30	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF007	10S00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	26-103	-	111	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF008	15S02001	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	28-104	≤27	-	14	142	None
		1,2,4-Trichlorobenzene	38-107	≤23	-	12	149	None
		Acenaphthene	-	≤19	-	-	96	None
		2,4-Dinitrotoluene	28-89	-	100	94	-	None
		Pyrene	35-142	≤36	-	6	67	None
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101	Volatiles	-	-	-	-	-	None
		2-Chlorophenol	25-102	≤50	16	-	110	None
		1,4-Dichlorobenzene	28-104	-	0	0	-	R
		1,2,4-Trichlorobenzene	38-107	≤23	0	3	200	R
		Acenaphthene	31-137	≤19	0	9	200	R
		Pentachlorophenol	17-109	≤47	10	-	127	None
		Pyrene	35-142	-	0	0	-	R
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101R	2,4-Dinitrotoluene	28-89	-	-	95	-	UJ

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF010	31S01501	Volatiles	-	-	-	-	-	-
		4-Chloro-3-methylphenol	26-103	-	104	-	-	None
		2,4-Dinitrotoluene	28-89	-	94	-	-	None
		Pesticides & PCBs	-	-	-	-	-	-
WF11A	09W00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	23-97	-	104	107	-	None
		4-Nitrophenol	10-80	-	117	119	-	None
		2,4-Dinitrophenol	24-96	-	106	107	-	None
		Pentachlorophenol	96-103	-	120	119	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF11B	10S00201	Volatiles	-	-	-	-	-	None
		Pyrene	-	≤36	-	-	39	None
		Pesticides & PCBs	-	-	-	-	-	None
WF012	31S00501	Volatiles	-	-	-	-	-	None
		4-Nitrophenol	11-114	-	120	115	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF013	16S01001	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	96	-	U
		2-Chlorophenol	25-102	-	-	103	-	U
		Pentachlorophenol	17-109	-	-	110	-	U
		Pesticides & PCBs	-	-	-	-	-	None
WF014	BKS00201	Volatiles	-	-	-	-	-	None
		Pentachlorophenol	17-109	-	133	136	-	None
		4-Nitrophenol	11-114	-	-	132	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
			Criteria		% Recovery			
SDG	Client ID	Compound	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF015	COS00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF006	**Client ID**	**02S00401**	**02S00401D**	
	Laboratory ID	**G8864007**	**G8864008**	
	Collection Date	**12/5/95**	**12/5/95**	
	Volatiles	ND	ND	-
	Semivolatiles	ND	ND	-
	Dieldrin	8.3	8.0	4
	Alpha-chlordane	5.6	5.1	9
	Gamma-chlordane	3.5	2.9	19
WF006	**Client ID**	**09S00301**	**09S00301D**	
	Laboratory ID	**G8876010**	**G8876011**	
	Collection Date	**12/6/96**	**12/6/96**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID**	**10S00101**	**10S00101D**	
	Laboratory ID	**G8889002**	**G8889003**	
	Collection Date	**12/7/95**	**12/7/95**	
	Volatiles	ND	ND	-
	Phenanthrene	280 ug/Kg	1200 ug/Kg	124
	Fluoranthene	660 ug/Kg	2300 ug/Kg	111
	Pyrene	580 ug/Kg	1600 ug/Kg	94
	Benzo(a)anthracene	340 ug/Kg	1200 ug/Kg	112
	Chrysene	500 ug/Kg	1400 ug/Kg	120
	Bis(2-ethylhexyl)phthalate	200 ug/Kg	360U ug/Kg	Not calculable
	Benzo(b)fluoranthene	480 ug/Kg	1300 ug/Kg	92
	Benzo(k)fluoranthene	360 ug/Kg	900 ug/Kg	86
	Benzo(a)pyrene	400 ug/Kg	1000 ug/Kg	86
	Indeno(1,2,3-cd)pyrene	180 ug/Kg	360 ug/Kg	67
	Benzo(g,h,i)perylene	180 ug/Kg	340 ug/Kg	62
	Anthracene	370U ug/Kg	270 ug/Kg	Not calculable
	Carbazole	370U ug/Kg	100 ug/Kg	Not calculable
	Dibenz(a,h)anthracene	370U ug/Kg	170 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID**	**14S00101**	**14S00101D**	
	Laboratory ID	**G8895007**	**G8895008**	
	Collection Date	**12/8/95**	**12/8/95**	
	Acetone	8 ug/Kg	ND	Not calculable
	Methylene chloride	6 ug/Kg	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Acetone	5 ug/Kg	ND	Not calculable
	Methylene chloride	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Acetone	6 ug/Kg	4 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Acetone	6 ug/Kg	7 ug/Kg	15
	Bis(2-ethylhexyl)phthalate	ND	1700 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Toluene	10U ug/L	1 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Acetone	29 ug/Kg	20 ug/Kg	37
	2-Hexanone	11U ug/Kg	4 ug/Kg	Not calculable
	Phenanthrene	68 ug/Kg	310 ug/Kg	128
	Di-n-butylphthalate	46 ug/Kg	380U ug/Kg	Not calculable
	Fluoranthene	160 ug/Kg	420 ug/Kg	90
	Pyrene	170 ug/Kg	290 ug/Kg	52
	Butylbenzylphthalate	57 ug/Kg	380U ug/Kg	Not calculable
	Benzo(a)anthracene	87 ug/Kg	190 ug/Kg	74
	Chrysene	120 ug/Kg	220 ug/Kg	59
	Bis(2-ethylhexyl)phthalate	3200 ug/Kg	140 ug/Kg	183
	Benzo(a)fluoranthene	150 ug/Kg	200 ug/Kg	28
	Benzo(k)fluoranthene	110 ug/Kg	210 ug/Kg	62
	Benzo(a)pyrene	95 ug/Kg	150 ug/Kg	45
	Indeno(1,2,3-cd)pyrene	58 ug/Kg	56 ug/Kg	4
	Acenaphthene	380U ug/Kg	40 ug/Kg	Not calculable
	Anthracene	380U ug/Kg	54 ug/Kg	Not calculable
	Carbazole	380U ug/Kg	84 ug/Kg	Not calculable
	4,4'-DDT	7.0 ug/Kg	8.9 ug/Kg	24
	Aroclor 1254	340 ug/Kg	390 ug/Kg	14
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Acetone	9 ug/Kg	8 ug/Kg	12
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Acetone	4 ug/Kg	9 ug/Kg	77
	Bis(2-ethylhexyl)phthalate	45 ug/Kg	380U ug/Kg	Not calculable
	4,4'-DDE	3.2 ug/Kg	2.0 ug/Kg	46
	4,4'-DDT	3.8 ug/Kg	2.7 ug/Kg	34
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Acetone	14 ug/Kg	4 ug/Kg	111
	Bis(2-ethylhexyl)phthalate	60 ug/Kg	58 ug/Kg	3
	Dieldrin	33 ug/Kg	60 ug/Kg	58
	4,4'-DDE	13 ug/Kg	22 ug/Kg	51
	4,4'-DDT	6.4 ug/Kg	9.0 ug/Kg	34
	Alpha-chlordane	6.8 ug/Kg	12 ug/Kg	55
	Gamma-chlordane	4.0 ug/Kg	7.9 ug/Kg	66
	Aroclor 1260	48 ug/Kg	110 ug/Kg	78

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF014	**Client ID**	**BKS00201**	**BKS00201D**	
	Laboratory ID	**RA870008**	**RA870009**	
	Collection Date	**1/10/96**	**1/10/96**	
	Acetone	8 ug/Kg	4 ug/Kg	67
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	45 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF014	**Client ID**	**31B00201**	**31B00201D**	
	Laboratory ID	**RA870014**	**RA870015**	
	Collection Date	**1/11/96**	**1/11/96**	
	Acetone	3 ug/Kg	11U ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	48 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF015	**Client ID**	**COS00101**	**COS00101D**	
	Laboratory ID	**RA908004**	**RA908005**	
	Collection Date	**1/18/96**	**1/18/96**	
	Acetone	22 ug/Kg	12U ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF006	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF007	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	10R00101	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF008	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	15S02501	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF009	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF010	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	31S00101	Tetrachloro-m-xylene	57	60-150	1	UJ/J (all compounds)
		Tetrachloro-m-xylene	56	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF11A	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	09W00101	Decachlorobiphenyl	56	60-150	3	UJ (all compounds)
		Decachlorobiphenyl	50	60-150		
	09W00101D	Decachlorobiphenyl	58	60-150		UJ (all compounds)
		Decachlorobiphenyl	51	60-150		
	16W00101	Decachlorobiphenyl	45	60-150		UJ (all compounds)
		Decachlorobiphenyl	40	60-150		
WF11B	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	12R00101	Decachlorobiphenyl	33	60-150	4	UJ (all compounds)
		Decachlorobiphenyl	29	60-150		
	10S00201	Decachlorobiphenyl	56	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	10S00301	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	42	60-150		
	11S00201	Decachlorobiphenyl	50	60-150		UJ/J (all compounds)
WF012	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs	54	60-150	4	UJ (all compounds)
	31R00201	Decachlorobiphenyl	43	60-150		
	31S00901	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	40	60-150		
	31S01201	Decachlorobiphenyl	48	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	50	60-150		
	31S01301	Decachlorobiphenyl	46	60-150		UJ (all compounds)

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF013	All samples	Volatiles	All within QC limits	-	-	None
		Semivolatiles				
	16S00801	Nitrobenzene-d5	3	23-120	1	R
		2-Fluorobiphenyl	3	30-115		
		Terphenyl-d14	4	18-137		
		Phenol-d5	2	24-113		
		2-Fluorophenol	2	25-121		
		2,4,6-Tribromophenol	3	19-122		
		2-Chlorophenol-d4	3	20-130		
		1,2-Dichlorobenzene-d4	2	20-130		
		Pesticides & PCBs				
	16R00101	Decachlorobiphenyl	58	60-150	8	UJ (all compounds)
	16S00101D	Tetrachloro-m-xylene	22	60-150		UJ/J (all compounds)
		Tetrachloro-m-xylene	21	60-150		
	16S00301	Tetrachloro-m-xylene	57	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	57	60-150		
		Decachlorobiphenyl	54	60-150		
	16S01001	Decachlorobiphenyl	44	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	41	60-150		
	16S01201	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
	16S01301	Decachlorobiphenyl	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	24S00101	Tetrachloro-m-xylene	48	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	46	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	BKS00101	Tetrachloro-m-xylene	56	60-150		UJ (all compounds)
WF014	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	BKR00101	Decachlorobiphenyl	43	60-150	1	UJ (all compounds)
		Decachlorobiphenyl	39	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF015	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	COR00101	Decachlorobiphenyl	55	60-150	5	UJ (all compounds)
	AOS00101	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	51	60-150		
		Decachlorobiphenyl	48	60-150		UJ (all compounds
	COS00101D	Tetrachloro-m-xylene	26	60-150		
		Tetrachloro-m-xylene	24	60-150		UJ/J (all compounds)
	WOS00101	Tetrachloro-m-xylene	39	60-150		
		Tetrachloro-m-xylene	37	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	YOS00101	Tetrachloro-m-xylene	37	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	36	60-150		
	COS00101	Tetrachloro-m-xylene	7	60-150	2	R (ND compounds)
		Tetrachloro-m-xylene	7	60-150		
	SOS00101	Tetrachloro-m-xylene	2	60-150		R (ND compounds)
		Tetrachloro-m-xylene	1	60-150		
		Decachlorobiphenyl	15	60-150		
		Decachlorobiphenyl	16	60-150		

Notes: J = estimated value
UJ = *undetected, but number that is reported as the quantification limit is an estimated value.*

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF006	All	Volatiles	-	-	None
	12/7/96	2,4-Dinitrophenol	-	33.1	UJ
	12/8/96	2,4-Dinitrophenol	-	27.0	UJ
	12/11/96	Diethylphthalate	-	30.1	UJ
	12/12/96	Diethylphthalate	-	27.1	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF007	All	Volatiles	-	-	None
	12/12/96	Dimethylphthalate	-	27.1	UJ
	12/15/96	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/15/96	Nitrobenzene	-	30.8	UJ
		2,4-Dinitrophenol	-	41.8	UJ
		4,6-Dinitro-2-methylphenol	-	30.1	UJ
		Pentachlorophenol	-	29.8	UJ
		Benzo(k)fluoranthene	-	26.5	UJ/J
	All	Pesticides & PCBs	-	-	None
WF008	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF009	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	All	Pesticides & PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF010	All	Volatiles	-	-	None
	12/27/95	4-Nitrophenol	-	28.1	UJ
		Benzo(b)fluoranthene	-	31.4	UJ
		Indeno(1,2,3-cd)pyrene	-	32.8	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF11A	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	1/10/96	Endosulfan I	22	-	UJ
WF11B	1/10/96	Acetone	-	40.0	UJ/J
		2-Butanone	-	37.3	UJ
		4-Methyl-2-pentanone	-	37.7	UJ
		2-Hexanone	-	41.0	UJ/J
	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ/J
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ/J
	1/10/96	Endosulfan I	22	-	UJ
WF012	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	All	Semivolatiles	-	-	None
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF013	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/17/96	2-Hexanone	41.7	-	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	1/18/96	2-Hexanone	-	27.5	UJ
	1/22/96	Chloromethane	-	41.8	UJ
		Vinyl chloride	-	37.1	UJ
		Chloroethane	-	41.7	UJ
		Acetone	-	31.7	UJ/J
		Carbon disulfide	-	25.8	UJ
		2-Hexanone	-	38.4	UJ
	1/19/96	Benzo(g,h,i)perylene	-	29.0	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ
WF014	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/14/96	Acetone	31.3	-	UJ/J
	1/16/96	Acetone	-	46.7	UJ/J
		Methylene chloride	-	32.3	UJ
		2-Butanone	-	54.2	UJ
		4-Methyl-2-pentanone	-	31.9	UJ
		2-Hexanone	-	60.0	UJ
	1/12/96	Acetone	-	36.7	UJ/J
	1/20/96	Benzo(k)fluoranthene	-	30.7	UJ/J
	1/31/96	4-Nitrophenol	-	38.2	UJ
		4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF015	1/17/96	2-Hexanone	41.7	-	UJ
	1/19/96	Chloromethane	-	47.1	UJ
		Vinyl chloride	-	39.0	UJ
		Chloroethane	-	54.7	UJ
		Acetone	-	25.8	UJ/J
		Carbon disulfide	-	45.5	UJ
	1/31/96	4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ
	2/2/96	2-Chlorophenol	-	26.6	UJ
		2-Nitroaniline	-	25.1	UJ
		2,4-Dinitrophenol	-	25.7	UJ
		4-Bromophenyl-phenylether	-	27.2	UJ
		Hexachlorobenzene	-	35.4	UJ
	2/1/96	4-Bromophenyl-phenylether	-	28.4	UJ
		Hexachlorobenzene	-	35.0	UJ
	1/30/96	Endosulfan sulfate	21.0	-	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF006	Volatiles	ND	All samples in SDG WF006
	Pesticides & PCBs	ND	All samples in SDG WF006
	Diethylphthalate	4 ug/L	01R00101 01F00101
	Diethylphthalate	150 ug/Kg	02S00101 02S00201 02S00301 02S00501 09S00101 09S00201 09S00401 09S00501
WF007	Volatiles	ND	All samples in SDG WF007
	Pesticides & PCBs	ND	All samples in SDG WF007
	Diethylphthalate	2 ug/L	10R00101
	Di-n-octylphthalate	230 ug/Kg	13S00101 13S00301 13S00401 13S00501 14S00101D 14S00301
	Di-n-octylphthalate	180 ug/Kg	13S00201 14S00101
WF008	Volatiles	ND	All samples in SDG WF008
	Pesticides & PCBs	ND	All samples in SDG WF008
	Di-n-butylphthalate	280 ug/Kg	15S02001D 15S02101 15S02201 15S01701 15S01701D
WF009	Volatiles	ND	All samples in SDG WF009
	Semivolatiles	ND	All samples in SDG WF009
	Pesticides & PCBs	ND	All samples in SDG WF009
WF010	Volatiles	ND	All samples in SDG WF010
	Di-n-butylphthalate	320 ug/Kg	31S00101 31S00201 31S00301 31S01401 31S01501 31S01501D 31S01601 31S01701 31S01801 31S01901
	Pesticides & PCBs	ND	All samples in SDG WF010

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF11A	Volatiles	ND	All samples in SDG WF11A
	Bis(2-ethylhexyl)phthalate	3 ug/L	09W00101 09W00101D 16W00101
	Pesticides & PCBs	ND	All samples in SDG WF11A
WF11B	Styrene	1 ug/L	11T00101
	Xylenes (total)	2 ug/L	
	Acetone	7 ug/Kg	10S00301 10S00501 11S00101 11S00201 12S00201 12S00401 12S00501
	Acetone	4 ug/Kg	11S00201R 11S00301 11S00401 11S00501
	Bis(2-ethylhexyl)phthalate	3 ug/L	12R00101
	Di-n-butylphthalate	69 ug/Kg	10S00301
	Bis(2-ethylhexyl)phthalate	37 ug/Kg	10S00501 12S00201
	Di-n-butylphthalate	100 ug/Kg	10S00201 10S00201DL 10S00201D 10S00301R 12S00401 12S00501 11S00101
	Pesticides & PCBs	ND	All samples in SDG WF11B
WF012	Xylenes (total)	2 ug/L	31R00201
	Styrene	1 ug/L	
	Acetone	7 ug/Kg	31S00801 31S01201
	Acetone	4 ug/Kg	31S00401 31S00501 31S00501D 31S01201R
	Semivolatiles	ND	All samples in SDG WF12
	Pesticides & PCBs	ND	All samples in SDG WF12
WF013	Xylenes (total)	2 ug/L	16T00101
	Styrene	1 ug/L	16R00101 24T00101

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF013	Bis(2-ethylhexyl)phthalate	34 ug/Kg	16S00101 16S00501 16S00401 16S00901
	Bis(2-ethylhexyl)phthalate	46 ug/Kg	16S00901R 16S00201
	Bis(2-ethylhexyl)phthalate	76 ug/Kg	16S00301 16S00801 16S00601 16S00601DL 16S01201 16S01301 BKS00301 16S01001
	Pesticides & PCBs	ND	All samples in SDG WF13
WF014	Toluene	1 ug/Kg	31B00301
	Bis(2-ethylhexyl)phthalate	38 ug/Kg	31B00501
	Pesticides & PCBs	ND	All samples in SDG WF14
WF015	Volatiles	ND	All samples in SDG WF15
	Pesticides & PCBs	ND	All samples in SDG WF15
	Bis(2-ethylhexyl)phthalate	1 ug/L	COR00101 COF00101

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF006	**Client ID:** 01T00101 **Laboratory ID:** G8864001 **Collection Date:** 12/5/95 **Type:** Trip Blank		
	Acetone	9 ug/L	None
WF006	**Client ID:** 02T00101 **Laboratory ID:** G8876001 **Collection Date:** 12/6/95 **Type:** Trip Blank		
	Acetone	7 ug/L	None
WF006	**Client ID:** 01R00101 **Laboratory ID:** G8876012 **Collection Date:** 12/6/95 **Type:** Rinsate		
	Acetone	11 ug/L	None
	Di-n-butylphthalate	8 ug/L	None
	Bis(2-ethyhexyl)phthalate	2 ug/L	None
	Pesticides & PCBs	ND	None
WF006	**Client ID:** 01F00101 **Laboratory ID:** G8776013 **Collection Date:** 12/6/95 **Type:** Source Blank		
	Acetone	12 ug/L	None
	2-Butanone	2 ug/L	None
	Di-n-butylphthalate	15 ug/L	None
	Pesticides & PCBs	ND	None
WF007	**Client ID:** 10T00101 **Laboratory ID:** G8889001 **Collection Date:** 12/7/95 **Type:** Trip Blank		
	Acetone	8 ug/L	None
WF007	**Client ID:** 13T00101 **Laboratory ID:** G8895001 **Collection Date:** 12/8/95 **Type:** Trip Blank		
	Acetone	4 ug/L	None
WF007	**Client ID:** 10R00101 **Laboratory ID:** G8889009 **Collection Date:** 12/7/95 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	15 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF008	**Client ID:**	**15T00101**		
	Laboratory ID:	**G8913001**		
	Collection Date:	**12/9/95**		
	Type:	**Trip Blank**		
	Acetone		8 ug/L	None
WF008	**Client ID:**	**15R00101**		
	Laboratory ID:	**G8913020**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		3 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF009	**Client ID:**	**15T00201**		
	Laboratory ID:	**G8914001**		
	Collection Date:	**12/11/95**		
	Trip Blank:	**Trip Blank**		
	Acetone		19 ug/L	None
WF009	**Client ID:**	**15R00201**		
	Laboratory ID:	**G8914012**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Acetone		12 ug/L	None
	Di-n-butylphthalate		4 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF010	**Client ID:**	**31T00101**		
	Laboratory ID:	**G8924005**		
	Collection Date:	**12/12/95**		
	Type:	**Trip Blank**		
	Acetone		10 ug/L	None
WF010	**Client ID:**	**31T00201**		
	Laboratory ID:	**G8938001**		
	Collection Date:	**12/13/95**		
	Type:	**Trip Blank**		
	Acetone		12 ug/L	None
WF010	**Client ID:**	**31R00101**		
	Laboratory ID:	**G8924006**		
	Collection Date:	**12/12/965**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		7 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF11B	**Client ID:** 12R00101 **Laboratory ID:** RA847012 **Collection Date:** 1/5/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	4 ug/L	None
	Pesticides &PCBs	ND	None
WF11B	**Client ID:** 12T00101 **Laboratory ID:** RA847001 **Collection Date:** 1/5/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF11B	**Client ID:** 11T00101 **Laboratory ID:** RA847013 **Collection Date:** 1/6/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF012	**Client ID:** 31R00201 **Laboratory ID:** RA855021 **Collection Date:** 1/8/96 **Type:** Rinsate		
	Volatiles	ND	None
	Semivolatiles	ND	None
	Pesticides & PCBs	ND	None
WF013	**Client ID:** 16T00101 **Laboratory ID:** RA856016 **Collection Date:** 1/9/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF013	**Client ID:** 24T00101 **Laboratory ID:** RA871001 **Collection Date:** 1/10/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF013	**Client ID:** 16R00101 **Laboratory ID:** RA856017 **Collection Date:** 1/9/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	5 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF014	**Client ID:** BKT00101 **Laboratory ID:** RA870002 **Collection Date:** 1/10/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF014	**Client ID:** 31T00201 **Laboratory ID:** RA870018 **Collection Date:** 1/11/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF014	**Client ID:** BKR00101 **Laboratory ID:** RA870001 **Collection Date:** 1/10/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	5 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF015	**Client ID:** COT00101 **Laboratory ID:** RA908003 **Collection Date:** 1/18/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF015	**Client ID:** COR00101 **Laboratory ID:** RA908001 **Collection Date:** 1/18/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	5 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF015	**Client ID:** COF00101 **Laboratory ID:** RA908002 **Collection Date:** 1/18/96 **Type:** Source Blank		
	Volatiles	ND	None
	Di-n-butylphthalate	7 ug/L	None
	Pesticides & PCBs	ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF006	02S00401	Calcium	-	±2205 mg/Kg	-	-	9780 mg/Kg	J
		Nickel	-	±17.6 mg/Kg	-	-	40.8 mg/Kg	J
		Antimony	75-125	-	73.8	-	-	J
		Manganese	75-125	-	73.8	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF007	10S00101	Antimony	75-125	-	65.6	-	-	J
		Barium	75-125	±88.10 mg/Kg	171.0	-	1221 mg/Kg	J
		Manganese	75-125	±6.6 mg/Kg	130.0	-	34.30 mg/Kg	J
		Lead	75-125	-	128.7	-	-	J
		Selenium	75-125	-	56.1	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF008	15S02001	Antimony	75-125	-	68.2	-	-	J
		Mercury	75-125	-	125.3	-	-	J
		Cyanide	-	-	-	-	-	None
WF009	15S00101	Antimony	75-125	-	53.5	-	-	J
WF010	31S01501	Antimony	75-125	-	73.8	-	-	None
		Cyanide	-	-	-	-	-	None
WF11A	09W00101	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF11B	10S00201	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None

Table X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF012	31S00501	All metals	-	-	-	-	-	None
		All TCLP metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF013	16S01001	Aluminum	-	≤35	-	-	71.0	J
		Iron	-	≤35	-	-	42.3	J
		Lead	75-125	-	127	-	-	J
		Cyanide	-	-	-	-	-	None
WF014	BKS00201	Aluminum	-	≤35	-	-	35.6	J
		Cyanide	-	-	-	-	-	None
WF015	COS00101	Lead	75-125	-	-46.5	-	-	J
		Cyanide	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF006	**Client ID**	**02S00401**	**02S00401D**	
	Laboratory ID	**G8864007**	**G8864008**	
	Collection Date	**12/5/95**	**12/5/95**	
	Aluminum	9580 mg/Kg	7580 mg/Kg	23
	Arsenic	3.9 mg/Kg	4.0 mg/Kg	3
	Barium	27.7 mg/Kg	15.9 mg/Kg	54
	Beryllium	0.31 mg/Kg	0.13 mg/Kg	81
	Calcium	14900 mg/Kg	9900 mg/Kg	40
	Chromium	13.6 mg/Kg	14.0 mg/Kg	3
	Cobalt	0.53 mg/Kg	ND	Not calculable
	Copper	4.3 mg/Kg	3.8 mg/Kg	12
	Iron	4010 mg/Kg	3880 mg/Kg	3
	Lead	10.9 mg/Kg	11.6 mg/Kg	6
	Magnesium	926 mg/Kg	403 mg/Kg	79
	Manganese	188 mg/Kg	164 mg/Kg	14
	Mercury	0.03 mg/Kg	0.05 mg/Kg	50
	Nickel	3.9 mg/Kg	3.8 mg/Kg	1
	Potassium	377 mg/Kg	142 mg/Kg	91
	Sodium	104 mg/Kg	70.2 mg/Kg	38
	Vanadium	12.9 mg/Kg	11.7 mg/Kg	10
	Zinc	13.1 mg/Kg	12.5 mg/Kg	5
	Cyanide	0.15 mg/Kg	ND	Not calculable
WF006	**Client ID**	**09S00301**	**09S00301D**	
	Laboratory ID	**G8876010**	**G8876011**	
	Collection Date	**12/6/96**	**12/6/96**	
	Aluminum	25200 mg/Kg	33100 mg/Kg	27
	Arsenic	8.5 mg/Kg	7.1 mg/Kg	18
	Barium	8.9 mg/Kg	21.7 mg/Kg	83
	Beryllium	0.12 mg/Kg	0.22 mg/Kg	59
	Calcium	176 mg/Kg	384 mg/Kg	74
	Chromium	21.7 mg/Kg	29.5 mg/Kg	30
	Cobalt	0.52 mg/Kg	0.55 mg/Kg	6
	Copper	6.8 mg/Kg	9.0 mg/Kg	28
	Iron	17800 mg/Kg	26500 mg/Kg	40
	Lead	11.2 mg/Kg	6.6 mg/Kg	52
	Magnesium	143 mg/Kg	227 mg/Kg	45
	Manganese	28.2 mg/Kg	52.9 mg/Kg	61
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	ND	6.1 mg/Kg	Not calculable
	Potassium	ND	212 mg/Kg	Not calculable
	Selenium	0.33 mg/Kg	ND	Not calculable
	Sodium	8.4 mg/Kg	10.4 mg/Kg	21
	Vanadium	43.5 mg/Kg	65.1 mg/Kg	40
	Zinc	6.3 mg/Kg	14.4 mg/Kg	78
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF007	**Client ID**	**10S00101**	**10S00101D**	
	Laboratory ID	**G8889002**	**G8889003**	
	Collection Date	**12/7/95**	**12/7/95**	
	Aluminum	8760 mg/Kg	8920 mg/Kg	2
	Arsenic	2.5 mg/Kg	2.6 mg/Kg	4
	Barium	361 mg/Kg	1320 mg/Kg	114
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Cadmium	0.91 mg/Kg	ND	Not calculable
	Calcium	23200 mg/Kg	17800 mg/Kg	26
	Chromium	18.2 mg/Kg	16.8 mg/Kg	8
	Cobalt	0.83 mg/Kg	2.0 mg/Kg	82
	Copper	7.9 mg/Kg	7.9 mg/Kg	0
	Iron	6520 mg/Kg	6780 mg/Kg	4
	Lead	38.0 mg/Kg	33.1 mg/Kg	14
	Magnesium	5910 mg/Kg	5600 mg/Kg	5
	Manganese	56.6 mg/Kg	66.0 mg/Kg	15
	Mercury	0.07 mg/Kg	0.07 mg/Kg	0
	Nickel	6.8 mg/Kg	3.0 mg/Kg	77
	Potassium	219 mg/Kg	ND	Not calculable
	Sodium	35.6 mg/Kg	46.2 mg/Kg	26
	Vanadium	18.9 mg/Kg	18.7 mg/Kg	1
	Zinc	37.7 mg/Kg	34.1 mg/Kg	5
	Cyanide	0.10 mg/Kg	0.20 mg/Kg	67
	TRPH	240 mg/Kg	180 mg/Kg	29
WF007	**Client ID**	**14S00101**	**14S00101D**	
	Laboratory ID	**G8895007**	**G8895008**	
	Collection Date	**12/8/95**	**12/8/95**	
	Aluminum	11600 mg/Kg	11500 mg/Kg	1
	Arsenic	1.5 mg/Kg	1.9 mg/Kg	23
	Barium	23.3 mg/Kg	26.6 mg/Kg	13
	Beryllium	0.15 mg/Kg	0.16 mg/Kg	6
	Calcium	120 mg/Kg	183 mg/Kg	6
	Chromium	7.8 mg/Kg	7.8 mg/Kg	0
	Cobalt	1.8 mg/Kg	1.6 mg/Kg	12
	Copper	3.8 mg/Kg	4.3 mg/Kg	12
	Iron	6310 mg/Kg	6630 mg/Kg	5
	Lead	7.7 mg/Kg	11.9 mg/Kg	42
	Magnesium	177 mg/Kg	162 mg/Kg	9
	Manganese	521 mg/Kg	597 mg/Kg	14
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	4.1 mg/Kg	4.6 mg/Kg	12
	Potassium	144 mg/Kg	ND	Not calculable
	Sodium	16.4 mg/Kg	14.0 mg/Kg	16
	Vanadium	16.8 mg/Kg	17.4 mg/Kg	6
	Zinc	6.0 mg/Kg	6.6 mg/Kg	10
	Cyanide	0.07 mg/Kg	ND	Not calculable

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Aluminum	4630 mg/Kg	5470 mg/Kg	17
	Arsenic	1.2 mg/Kg	1.1 mg/Kg	9
	Barium	5.6 mg/Kg	6.6 mg/Kg	16
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Calcium	22.2 mg/Kg	25.2 mg/Kg	13
	Chromium	3.0 mg/Kg	3.7 mg/Kg	21
	Copper	1.9 mg/Kg	2.4 mg/Kg	23
	Iron	2500 mg/Kg	2950 mg/Kg	17
	Lead	5.9 mg/Kg	5.9 mg/Kg	0
	Magnesium	85.0 mg/Kg	107 mg/Kg	23
	Manganese	75.2 mg/Kg	87.1 mg/Kg	15
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	2.4 mg/Kg	9.1 mg/Kg	117
	Selenium	0.26 mg/Kg	ND	Not calculable
	Vanadium	5.7 mg/Kg	7.1 mg/Kg	22
	Zinc	3.0 mg/Kg	4.1 mg/Kg	31
	Cyanide	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Aluminum	13700 mg/Kg	9290 mg/Kg	38
	Arsenic	3.7 mg/Kg	4.3 mg/Kg	15
	Barium	4.4 mg/Kg	3.8 mg/Kg	15
	Beryllium	0.11 mg/Kg	0.11 mg/Kg	0
	Calcium	23.7 mg/Kg	20.4 mg/Kg	15
	Chromium	14.8 mg/Kg	14.0 mg/Kg	6
	Copper	2.6 mg/Kg	2.5 mg/Kg	4
	Iron	11900 mg/Kg	10400 mg/Kg	13
	Lead	4.7 mg/Kg	4.1 mg/Kg	14
	Magnesium	51.2 mg/Kg	41.8 mg/Kg	20
	Manganese	10.8 mg/Kg	6.8 mg/Kg	45
	Nickel	ND	3.0 mg/Kg	Not calculable
	Selenium	ND	0.25 mg/Kg	Not calculable
	Vanadium	35.9 mg/Kg	31.8 mg/Kg	12
	Zinc	1.5 mg/Kg	1.1 mg/Kg	31
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Aluminum	9280 mg/Kg	10800 mg/Kg	15
	Arsenic	2.0 mg/Kg	1.9 mg/Kg	5
	Barium	6.6 mg/Kg	7.8 mg/Kg	17
	Beryllium	0.12 mg/Kg	0.13 mg/Kg	8
	Calcium	21.6 mg/Kg	23.9 mg/Kg	10
	Chromium	8.4 mg/Kg	8.0 mg/Kg	5
	Copper	3.4 mg/Kg	3.9 mg/Kg	14
	Iron	5120 mg/Kg	5700 mg/Kg	11
	Lead	4.7 mg/Kg	3.6 mg/Kg	26
	Magnesium	109 mg/Kg	132 mg/Kg	19
	Manganese	36.4 mg/Kg	39.9 mg/Kg	9
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	5.0 mg/Kg	2.4 mg/Kg	70
	Potassium	169 mg/Kg	ND	Not calculable
	Vanadium	13.3 mg/Kg	15.1 mg/Kg	13
	Zinc	4.1 mg/Kg	5.0 mg/Kg	22
	Cyanide	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Aluminum	9620 mg/Kg	8270 mg/Kg	15
	Arsenic	1.4 mg/Kg	1.9 mg/Kg	30
	Barium	14.6 mg/Kg	12.2 mg/Kg	18
	Beryllium	0.17 mg/Kg	0.15 mg/Kg	13
	Calcium	112 mg/Kg	103 mg/Kg	8
	Chromium	6.7 mg/Kg	6.0 mg/Kg	11
	Cobalt	0.80 mg/Kg	1.2 mg/Kg	40
	Copper	5.5 mg/Kg	4.2 mg/Kg	27
	Iron	4730 mg/Kg	4380 mg/Kg	8
	Lead	5.3 mg/Kg	5.4 mg/Kg	2
	Magnesium	154 mg/Kg	114 mg/Kg	30
	Manganese	183 mg/Kg	172 mg/Kg	6
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	3.9 mg/Kg	3.4 mg/Kg	13
	Potassium	ND	197 mg/Kg	Not calculable
	Vanadium	12.8 mg/Kg	11.3 mg/Kg	12
	Zinc	6.8 mg/Kg	5.0 mg/Kg	30
	Cyanide	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	123 mg/L	129 mg/L	5
	Arsenic	0.60 mg/L	ND	Not calculable
	Barium	1.1 mg/L	1.3 mg/L	17
	Calcium	760 mg/L	726 mg/L	5
	Iron	118 mg/L	105 mg/L	12
	Magnesium	234 mg/L	236 mg/L	1
	Manganese	12.2 mg/L	12.0 mg/L	2
	Potassium	313 mg/L	298 mg/L	2
	Sodium	904 mg/L	893 mg/L	1
	Zinc	5.4 mg/L	3.8 mg/L	34
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	8960 mg/Kg	5890 mg/Kg	41
	Arsenic	3.6 mg/Kg	2.4 mg/Kg	40
	Barium	9.2 mg/Kg	8.1 mg/Kg	13
	Beryllium	0.10 mg/Kg	0.06 mg/Kg	50
	Cadmium	1.4 mg/Kg	1.3 mg/Kg	7
	Calcium	1320 mg/Kg	779 mg/Kg	51
	Chromium	16.0 mg/Kg	12.2 mg/Kg	27
	Cobalt	0.79 mg/Kg	0.82 mg/Kg	4
	Copper	10.8 mg/Kg	11.5 mg/Kg	6
	Iron	9660 mg/Kg	8650 mg/Kg	11
	Lead	32.5 mg/Kg	29.0 mg/Kg	11
	Magnesium	200 mg/Kg	100 mg/Kg	66
	Manganese	39.3 mg/Kg	36.4 mg/Kg	8
	Nickel	2.0 mg/Kg	ND	Not calculable
	Potassium	69.4 mg/Kg	ND	Not calculable
	Sodium	181 mg/Kg	192 mg/Kg	6
	Vanadium	24.5 mg/Kg	20.8 mg/Kg	16
	Zinc	50.0 mg/Kg	42.9 mg/Kg	15
	Cyanide	0.20 mg/Kg	0.13 mg/Kg	42
	TRPH	105 mg/Kg	66.1 mg/Kg	46
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Aluminum	4500 mg/Kg	6050 mg/Kg	29
	Arsenic	1.3 mg/Kg	1.2 mg/Kg	8
	Barium	6.6 mg/Kg	8.6 mg/Kg	26
	Calcium	143 mg/Kg	146 mg/Kg	2
	Chromium	2.8 mg/Kg	3.8 mg/Kg	30
	Cobalt	ND	1.2 mg/Kg	Not calculable
	Copper	2.2 mg/Kg	3.0 mg/Kg	31
	Iron	2470 mg/Kg	2840 mg/Kg	14
	Lead	3.2 mg/Kg	2.9 mg/Kg	10
	Magnesium	80.1 mg/Kg	138 mg/Kg	53
	Manganese	87.0 mg/Kg	95.3 mg/Kg	9
	Nickel	1.9 mg/Kg	2.2 mg/Kg	15
	Potassium	81.9 mg/Kg	115 mg/Kg	34
	Selenium	0.18 mg/Kg	ND	Not calculable
	Sodium	192 mg/Kg	175 mg/Kg	9
	Vanadium	5.9 mg/Kg	7.2 mg/Kg	20
	Zinc	3.9 mg/Kg	5.2 mg/Kg	28
	Barium, TCLP	0.393 mg/L	0.574 mg/L	37
	Chromium, TCLP	0.0017U mg/L	0.0018 mg/L	Not calculable
	Selenium, TCLP	0.0217U mg/L	0.2351 mg/L	Not calculable
	Cyanide	0.09 mg/Kg	ND	Not calculable
WF012	**Client ID**	**11S00601**	**11S00601D**	
	Laboratory ID	**RA855001**	**RA855002**	
	Collection Date	**1/7/96**	**11/7/96**	
	Lead	19.3 mg/Kg	25.0 mg/Kg	26

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Aluminum	4250 mg/Kg	5480 mg/Kg	25
	Arsenic	0.94 mg/Kg	1.2 mg/Kg	24
	Barium	13.2 mg/Kg	13.6 mg/Kg	3
	Beryllium	0.09 mg/Kg	ND	Not calculable
	Cadmium	0.28 mg/Kg	0.30 mg/Kg	7
	Calcium	210 mg/Kg	173 mg/Kg	19
	Chromium	4.0 mg/Kg	5.8 mg/Kg	37
	Copper	4.8 mg/Kg	3.0 mg/Kg	46
	Iron	2340 mg/Kg	2910 mg/Kg	22
	Lead	7.8 mg/Kg	7.5 mg/Kg	4
	Magnesium	103 mg/Kg	150 mg/Kg	37
	Manganese	185 mg/Kg	151 mg/Kg	20
	Nickel	ND	1.9 mg/Kg	Not calculable
	Potassium	99.6 mg/Kg	141 mg/Kg	34
	Selenium	0.19 mg/Kg	ND	Not calculable
	Sodium	129 mg/Kg	108 mg/Kg	18
	Vanadium	6.8 mg/Kg	8.6 mg/Kg	23
	Zinc	6.4 mg/Kg	6.9 mg/Kg	8
	Cyanide	0.12 mg/Kg	0.12 mg/Kg	0
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Aluminum	2000 mg/Kg	1780 mg/Kg	12
	Arsenic	0.76 mg/Kg	0.64 mg/Kg	17
	Barium	4.9 mg/Kg	4.0 mg/Kg	20
	Cadmium	ND	0.23 mg/Kg	Not calculable
	Calcium	101 mg/Kg	99.8 mg/Kg	1
	Chromium	3.9 mg/Kg	3.3 mg/Kg	16
	Copper	10.2 mg/Kg	8.6 mg/Kg	17
	Iron	1470 mg/Kg	1310 mg/Kg	12
	Lead	13.5 mg/Kg	12.4 mg/Kg	9
	Magnesium	38.5 mg/Kg	29.9 mg/Kg	25
	Manganese	5.6 mg/Kg	4.9 mg/Kg	13
	Mercury	0.20 mg/Kg	0.17 mg/Kg	16
	Potassium	ND	77.6 mg/Kg	Not calculable
	Selenium	0.13 mg/Kg	ND	Not calculable
	Silver	4.1 mg/Kg	3.6 mg/Kg	13
	Sodium	139 mg/Kg	118 mg/Kg	16
	Vanadium	3.4 mg/Kg	3.2 mg/Kg	6
	Zinc	4.1 mg/Kg	3.4 mg/Kg	19
	Cyanide	0.10 mg/Kg	0.17 mg/Kg	52

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF014	**Client ID**	**BKS00201**	**BKS00201D**	
	Laboratory ID	**RA870008**	**RA870009**	
	Collection Date	**1/10/96**	**1/10/96**	
	Aluminum	6640 mg/Kg	4230 mg/Kg	44
	Arsenic	1.6 mg/Kg	0.99 mg/Kg	47
	Barium	11.4 mg/Kg	8.9 mg/Kg	34
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	ND	Not calculable
	Calcium	132 mg/Kg	215 mg/Kg	48
	Chromium	3.4 mg/Kg	2.0 mg/Kg	52
	Cobalt	1.0 mg/Kg	ND	Not calculable
	Copper	3.4 mg/Kg	2.3 mg/Kg	39
	Iron	3340 mg/Kg	2220 mg/Kg	40
	Lead	5.9 mg/Kg	5.1 mg/Kg	15
	Magnesium	124 mg/Kg	72.5 mg/Kg	52
	Manganese	249 mg/Kg	217 mg/Kg	14
	Mercury	0.04 mg/Kg	0.05 mg/Kg	1
	Nickel	2.6 mg/Kg	ND	Not calculable
	Potassium	96.8 mg/Kg	65.8 mg/Kg	38
	Selenium	0.16 mg/Kg	0.14 mg/Kg	13
	Sodium	184 mg/Kg	346 mg/Kg	61
	Thallium	0.16 mg/Kg	ND	Not calculable
	Vanadium	8.1 mg/Kg	5.0 mg/Kg	47
	Zinc	5.6 mg/Kg	3.2 mg/Kg	55
	Cyanide	0.11 mg/Kg	ND	Not calculable
WF014	**Client ID**	**31B00201**	**31B00201D**	
	Laboratory ID	**RA870014**	**RA870015**	
	Collection Date	**1/11/96**	**1/11/96**	
	Aluminum	4360 mg/Kg	4050 mg/Kg	7
	Arsenic	1.0 mg/Kg	1.2 mg/Kg	18
	Barium	4.7 mg/Kg	4.3 mg/Kg	9
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	0.34 mg/Kg	47
	Calcium	107 mg/Kg	121 mg/Kg	12
	Chromium	2.6 mg/Kg	2.1 mg/Kg	21
	Cobalt	0.76 mg/Kg	ND	Not calculable
	Copper	8.5 mg/Kg	8.4 mg/Kg	1
	Iron	2960 mg/Kg	2750 mg/Kg	7
	Lead	2.9 mg/Kg	2.9 mg/Kg	0
	Magnesium	81.1 mg/Kg	72.0 mg/Kg	12
	Manganese	8.0 mg/Kg	7.5 mg/Kg	7
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	1.8 mg/Kg	1.6 mg/Kg	12
	Potassium	88.8 mg/Kg	114 mg/Kg	25
	Sodium	175 mg/Kg	183 mg/Kg	5
	Vanadium	6.0 mg/Kg	5.3 mg/Kg	12
	Zinc	7.1 mg/Kg	6.4 mg/Kg	10

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF015	**Client ID**	**COS00101**	**COS00101D**	
	Laboratory ID	**RA908004**	**RA908005**	
	Collection Date	**1/18/96**	**1/18/96**	
	Aluminum	1770 mg/Kg	1620 mg/Kg	9
	Arsenic	0.57 mg/Kg	0.29 mg/Kg	65
	Barium	17.3 mg/Kg	11.6 mg/Kg	39
	Beryllium	0.07 mg/Kg	0.10 mg/Kg	35
	Calcium	521 mg/Kg	200 mg/Kg	89
	Chromium	2.0 mg/Kg	1.5 mg/Kg	29
	Copper	5.1 mg/Kg	5.0 mg/Kg	2
	Iron	906 mg/Kg	919 mg/Kg	1.4
	Lead	19.4 mg/Kg	8.9 mg/Kg	74
	Magnesium	142 mg/Kg	51.4 mg/Kg	94
	Manganese	4.9 mg/Kg	5.6 mg/Kg	13
	Sodium	120 mg/Kg	95.6 mg/Kg	23
	Vanadium	2.6 mg/Kg	2.8 mg/Kg	7
	Zinc	11.5 mg/Kg	3.3 mg/Kg	111
	Cyanide	0.12 mg/Kg	0.20 mg/Kg	50

Table XII
Summary of Analytes Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF006	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF007	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF008	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF009	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF010	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF11A	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF11B	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF012	All	All metals	-	-	None
	All	All TCLP metals	-	-	None
	All	Cyanide	-	-	None
WF013	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF014	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF015	All	All metals	-	-	None
	All	Cyanide	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF006	Aluminum	-5.056 mg/Kg	All soil samples in SDG WF006
	Calcium	-5.002 mg/Kg	
	Copper	0.482 mg/Kg	
	Iron	-1.408 mg/Kg	
	Magnesium	-5.504 mg/Kg	
	Selenium	0.660 mg/Kg	
	Sodium	2.840 mg/Kg	
	Zinc	0.344 mg/Kg	
	Aluminum	-7.772 mg/Kg	All soil samples in SDG WF006
	Cobalt	-0.518 mg/Kg	
	Iron	-1.702 mg/Kg	
	Magnesium	-5.232 mg/Kg	
	Copper	2.690 ug/L	All water samples in SDG WF006
	Iron	-5.220 ug/L	
	Magnesium	-37.720 ug/L	
	Mercury	-0.029 ug/L	
	Selenium	2.300 ug/L	
	Sodium	51.840 ug/L	
	Cyanide	ND	All samples in SDG WF006
	TRPH	ND	All samples in SDG WF006
WF007	Barium	0.174 mg/Kg	All soil samples in SDG WF007
	Calcium	6.280 mg/Kg	
	Iron	1.776 mg/Kg	
	Sodium	6.856 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF007
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF007
	TRPH	ND	All samples in SDG WF007
WF008	Aluminum	10.014 mg/Kg	All soil samples in SDG WF008
	Beryllium	0.068 mg/Kg	
	Copper	0.454 mg/Kg	
	Iron	3.440 mg/Kg	
	Sodium	-72.604 mg/Kg	
	Aluminum	5.768 mg/Kg	All soil samples in SDG WF008
	Beryllium	0.060 mg/Kg	
	Cobalt	-0.428 mg/Kg	
	Copper	0.728 mg/Kg	
	Iron	1.184 mg/Kg	
	Nickel	2.284 mg/Kg	
	Sodium	-74.238 mg/Kg	
	Thallium	-0.470 mg/Kg	

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF008	Aluminum	47.800 ug/L	All water samples in SDG WF008
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF008
WF009	Aluminum	10.014 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Copper	0.454 mg/Kg	
	Iron	3.440 mg/Kg	
	Sodium	-72.604 mg/Kg	
	Aluminum	5.768 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Cobalt	-0.428 mg/Kg	
	Copper	0.728 mg/Kg	
	Iron	1.184 mg/Kg	
	Nickel	2.284 mg/Kg	
	Sodium	-74.238 mg/Kg	
	Thallium	-0.470 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF009
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF009
WF010	Aluminum	6.602 mg/Kg	All soil samples in SDG WF010
	Beryllium	0.066 mg/Kg	
	Copper	0.482 mg/Kg	
	Iron	1.828 mg/Kg	
	Mercury	-0.008 mg/Kg	
	Sodium	-74.902 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF010
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF010

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF11A	Iron	14.610 ug/L	All samples in SDG WF11A
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	ND	All samples in SDG WF11A
	TRPH	ND	All samples in SDG WF11A
WF11B	Iron	14.610 ug/L	All water samples in SDG WF11B
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Aluminum	2.922 mg/Kg	All soil samples in SDG WF11B
	Calcium	10.253 mg/Kg	
	Iron	1.620 mg/Kg	
	Sodium	11.866 mg/Kg	
	Zinc	0.512 mg/Kg	
	Cyanide	ND	All samples in SDG WF11B
	TRPH	ND	All samples in SDG WF11B
WF012	Iron	14.610 ug/L	All water samples in SDG WF12
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.081 mg/Kg	All soil samples in SDG WF12
	Calcium	6.408 mg/Kg	
	Iron	0.684 mg/Kg	
	Sodium	9.938 mg/Kg	
	Zinc	0.321 mg/Kg	
	Arsenic, TCLP	-0.01539 mg/L	All samples in SDG WF12
	Barium, TCLP	0.00054 mg/L	
	Lead, TCLP	-0.02157 mg/L	
	Silver, TCLP	-0.00215 mg/L	
WF013	Iron	14.610 ug/L	All water samples in SDG WF13
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.082 mg/Kg	All soil samples in SDG WF13
	Calcium	9.329 mg/Kg	
	Iron	0.799 mg/Kg	
	Lead	0.120 mg/Kg	
	Magnesium	4.111 mg/Kg	
	Potassium	56.814 mg/Kg	
	Sodium	8.614 mg/Kg	
	Zinc	0.240 mg/Kg	

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF014	Iron	14.610 ug/L	All water samples in SDG WF14
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	2.034 ug/L	All water samples in SDG WF14
	Beryllium	-0.049 mg/Kg	All soil samples in SDG WF14
	Calcium	15.945 mg/Kg	
	Iron	0.701 mg/Kg	
	Manganese	0.103 mg/Kg	
	Sodium	14.786 mg/Kg	
	Zinc	0.601 mg/Kg	
WF015	Iron	4.210 ug/L	All water samples in SDG WF15
	Sodium	30.690 ug/L	
	Thallium	0.700 ug/L	
	Zinc	1.400 ug/L	
	Cyanide	2.034 ug/L	
	Aluminum	2.553 mg/Kg	All soil samples in SDG WF15
	Barium	0.093 mg/Kg	
	Beryllium	0.043 mg/Kg	
	Calcium	6.248 mg/Kg	
	Iron	0.759 mg/Kg	
	Sodium	4.452 mg/Kg	
	Zinc	0.365 mg/Kg	

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF006	**Client ID:**	**01R00101**		
	Laboratory ID:	**G8876012**		
	Collection Date:	**12/6/95**		
	Type:	**Rinsate**		
	Calcium		178 ug/L	J
	Sodium		60.6 ug/L	UJ
	Zinc		2.9 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF006	**Client ID:**	**01F00101**		
	Laboratory ID:	**G8776013**		
	Collection Date:	**12/6/95**		
	Type:	**Source Blank**		
	Copper		3.3 ug/L	UJ
	Sodium		113 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF007	**Client ID:**	**10R00101**		
	Laboratory ID:	**G8889009**		
	Collection Date:	**12/7/95**		
	Type:	**Rinsate**		
	Aluminum		52.3 ug/L	UJ
	Barium		0.70 ug/L	J
	Beryllium		0.25 ug/L	UJ
	Calcium		23.0 ug/L	UJ
	Copper		7.1 ug/L	UJ
	Iron		67.3 ug/L	UJ
	Zinc		17.6 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF008	**Client ID:**	**15R00101**		
	Laboratory ID:	**G8913020**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		54.6 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.21 ug/L	UJ
	Calcium		22.6 ug/L	UJ
	Copper		5.0 ug/L	UJ
	Iron		45.4 ug/L	UJ
	Zinc		1.5 ug/L	UJ
	Cyanide		ND	None

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF009	**Client ID:**	**15R00201**		
	Laboratory ID:	**G8914012**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		69.8 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.29 ug/L	UJ
	Calcium		58.5 ug/L	UJ
	Copper		6.5 ug/L	UJ
	Iron		29.2 ug/L	UJ
	Nickel		48.7 ug/L	U
	Zinc		2.7 ug/L	J
	Cyanide		ND	None
WF010	**Client ID:**	**31R00101**		
	Laboratory ID:	**G8924006**		
	Collection Date:	**12/12/965**		
	Type:	**Rinsate**		
	Aluminum		56.5 ug/L	UJ
	Barium		0.86 ug/L	J
	Beryllium		0.42 ug/L	UJ
	Calcium		18.7 ug/L	UJ
	Copper		5.2 ug/L	UJ
	Iron		35.6 ug/L	UJ
	Zinc		3.2 ug/L	UJ
WF11B	**Client ID:**	**12R00101**		
	Laboratory ID:	**RA847012**		
	Collection Date:	**1/5/96**		
	Type:	**Rinsate**		
	Barium		0.30 ug/L	J
	Calcium		42.3 ug/L	J
	Iron		11.6 ug/L	UJ
	Sodium		24.6 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF012	**Client ID:**	**31R00201**		
	Laboratory ID:	**RA855021**		
	Collection Date:	**1/8/96**		
	Type:	**Rinsate**		
	Copper		1.3 ug/L	UJ
	Iron		21.2 ug/L	UJ
	Sodium		40.3 ug/L	UJ
	Zinc		3.0 ug/L	UJ
WF013	**Client ID:**	**16R00101**		
	Laboratory ID:	**RA856017**		
	Collection Date:	**1/9/96**		
	Type:	**Rinsate**		
	Iron		7.0 ug/L	UJ
	Sodium		30.0 ug/L	UJ
	Zinc		3.4ug/L	UJ

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF014	**Client ID:**	**BKR00101**		
	Laboratory ID:	**RA870001**		
	Collection Date:	**1/10/96**		
	Type:	**Rinsate**		
	Calcium		42.3 ug/L	J
	Iron		7.8 ug/L	UJ
	Sodium		31.9 ug/L	UJ
	Zinc		1.8 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COR00101**		
	Laboratory ID:	**RA908001**		
	Collection Date:	**1/18/96**		
	Type:	**Rinsate**		
	Iron		9.1 ug/L	UJ
	Lead		0.60 ug/L	J
	Sodium		58.6 ug/L	UJ
	Thallium		0.70 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COF00101**		
	Laboratory ID:	**RA908002**		
	Collection Date:	**1/18/96**		
	Type:	**Source Blank**		
	Iron		8.9 ug/L	UJ
	Sodium		55.0 ug/L	UJ
	Zinc		2.0 ug/L	UJ

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF006	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF007	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF008	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF009	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	99.5[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF010	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11A	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF012	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF013	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	94.4[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF014	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	99.7[3]	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF015	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	80.0[3]	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]A few samples have results whose concentrations were rejected.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent
TRPH = Total Recoverable Petroleum Hydrocarbons

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2C, Carlsbad, CA 92009 Phone: 619/634-0437 Fax: 619/634-0439

APPENDIX A

Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

08/30/96

APPENDIX A

Table of Contents

Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

Table	Title	Page No.
I	Sample Delivery Group Versus Sample Identification	A-1
II	Summary of Rejected Data (Organics)	A-11
III	Summary of Rejected Data (Inorganics)	A-12
Organics		
IV	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates	A-13
V	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-14
VI	Summary of Surrogate Recoveries	A-16
VII	Summary of Compounds Exceeding Instrument Calibration	A-17
VIII	Summary of Method Blank Contamination	A-19
IX	Summary of Field Blank Contamination	A-22
Inorganics		
X	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples	A-25
XI	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-26
XII	Summary of Analytes Exceeding Instrument Calibration	A-29
XIII	Summary of Method Blank Contamination	A-30
XIV	Summary of Field Blank Contamination	A-31
XV	Sample Event PARCC Summary	A-33

SDG#: WF016 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
BKB00101	RB583001		soil	5-20-96	X	X	X	X	X
BKB00102	RB583002		soil	5-20-96	X	X	X	X	X
BKB00401	RB583003	FD	soil	5-20-96	X	X	X	X	X
BKB00401D	RB583004	FD	soil	5-20-96	X	X	X	X	X
BKB00402	RB583005		soil	5-20-96	X	X	X	X	X
BKB00201	RB583006		soil	5-20-96	X	X	X	X	X
BKB00202	RB583007		soil	5-20-96	X	X	X	X	X
BKR00201	RB583008	R	water	5-20-96	X	X	X	X	X
BKF00101	RB583009	SB	water	5-20-96	X	X	X	X	X
BKT00201	RB583010	TB	water	5-20-96	X				
BKB00301	RB583011		soil	5-21-96	X	X	X	X	X
BKB00302	RB583012		soil	5-21-96	X	X	X	X	X
BKB00501	RB583013		soil	5-21-96	X	X	X	X	X
BKB00502	RB583014		soil	5-21-96	X	X	X	X	X
BKB00601	RB583015		soil	5-21-96	X	X	X	X	X
BKB00602	RB583016	FD	soil	5-21-96	X	X	X	X	X
BKB00602D	RB583017	FD	soil	5-21-96	X	X	X	X	X
BKB00701	RB583018		soil	5-21-96	X	X	X	X	X
BKB00702	RB583019		soil	5-21-96	X	X	X	X	X
BKB00401MS	RB583003MS	MS	soil	5-20-96	X	X	X	X	X
BKB00401MSD	RB583003MSD	MSD	soil	5-20-96	X	X	X	X	X
BKR00201MS	RB583008MS	MS	water	5-20-96				X	
BKR00201MSD	RB583008MSD	MSD	water	5-20-96				X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF016 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
BKF00101MS	RB583009MS	MS	water	5-20-96					X
BKF00101MSD	RB583009MSD	MSD	water	5-20-96					X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF017 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876B

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31B00601	RB592001	FD	soil	5-21-96	X	X	X	X	X
31B00602	RB592002		soil	5-21-96	X	X	X	X	X
31B00603	RB592003		soil	5-21-96	X	X	X	X	X
31B00604	RB592004		soil	5-21-96	X	X	X	X	X
31B00605	RB592005		soil	5-21-96	X	X	X	X	X
31B00601D	RB592006	FD	soil	5-21-96	X	X	X	X	X
12B00101	RB592007	FD	soil	5-21-96	X	X	X	X	X
12B00101D	RB592008	FD	soil	5-21-96	X	X	X	X	X
12B00102	RB592009		soil	5-21-96	X	X	X	X	X
31B00701	RB592010		soil	5-22-96	X	X	X	X	X
31B00702	RB592011		soil	5-22-96	X	X	X	X	X
31B00703	RB592012		soil	5-22-96	X	X	X	X	X
31B00704	RB592013		soil	5-22-96	X	X	X	X	X
31B00705	RB592014		soil	5-22-96	X	X	X	X	X
31B00801	RB592015		soil	5-22-96	X	X	X	X	X
31B00801DL	RB592015DL		soil	5-22-96	X				
31B00802	RB592016		soil	5-22-96	X	X	X	X	X
31B00803	RB592017		soil	5-22-96	X	X	X	X	X
31B00803DL	RB592017DL		soil	5-22-96	X				
31B00804	RB592018		soil	5-22-96	X	X	X	X	X
31B00804DL	RB592018DL		soil	5-22-96	X				
31B00805	RB592019		soil	5-22-96	X	X	X	X	X
31R00101	RB592020	R	water	5-22-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF017 | **VALIDATION SAMPLE TABLE** | **LDC#: 1876B**

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#: 8532-20**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31T00301	RB592021	TB	water	5-22-96	X				
12R00101	RB592022	R	water	5-21-96	X	X	X	X	X
BKT00301	RB592023	TB	water	5-21-96	X				
31B00601MS	RB592001MS	MS	soil	5-21-96	X	X	X	X	X
31B00601MSD	RB592001MSD	MSD	soil	5-21-96	X	X	X	X	X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF018 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876C

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
30B00201	RB602001		soil	5-23-96	X	X	X
30B00202	RB602002	FD	soil	5-23-96	X	X	X
30B00203	RB602003		soil	5-23-96	X	X	X
30B00202D	RB602005	FD	soil	5-23-96	X	X	X
30B00101	RB602006		soil	5-23-96	X	X	X
30B00102	RB602007		soil	5-23-96	X	X	X
30B00103	RB602008		soil	5-23-96	X	X	X
30R00101	RB602010	R	water	5-23-96	X	X	X
30T00101	RB602011	TB	water	5-23-96	X		
30B00202MS	RB602002MS	MS	soil	5-23-96	X	X	X
30B00202MSD	RB602002MSD	MSD	soil	5-23-96	X	X	X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF019 **VALIDATION SAMPLE TABLE** **LDC#:** 1876D

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
30B00501	MB047001		soil	6-4-96	X	X	X
30B00502	MB047002	FD	soil	6-4-96	X	X	X
30B00503	MB047003		soil	6-4-96	X	X	X
30B00502D	MB047005	FD	soil	6-4-96	X	X	X
30B00401	MB047006		soil	6-4-96	X	X	X
30B00402	MB047007		soil	6-4-96	X	X	X
30B00403	MB047008		soil	6-4-96	X	X	X
30R00201	MB047010	R	water	6-4-96	X	X	X
30T00201	MB047011	TB	water	6-4-96	X		
30R00301	MB068001	R	water	6-5-96	X	X	X
30T00301	MB068002	TB	water	6-5-96	X		
30F00101	MB068003	SB	water	6-5-96	X	X	X
30B00601	MB068004		water	6-5-96	X	X	X
30B00602	MB068005	FD	soil	6-5-96	X	X	X
30B00603	MB068006		soil	6-5-96	X	X	X
30B00602D	MB068009	FD	soil	6-5-96	X	X	X
30B00301	MB068010		soil	6-5-96	X	X	X
30B00302	MB068011		soil	6-5-96	X	X	X
30B00303	MB068012		soil	6-5-96	X	X	X
30B00303DL	MB068012DL		soil	6-5-96		X	
30B00305	MB068015		soil	6-5-96	X	X	X
30B00502MS	MB047002MS	MS	soil	6-4-96	X	X	X
30B00502MSD	MB047002MSD	MSD	soil	6-4-96	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF019 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1876D

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
30F00101MS	MB068003MS	MS	soil	6-4-96			X
30F00101MSD	MB068003MSD	MSD	soil	6-4-96			X
30B00601MS	MB068004MS	MS	water	6-5-96			X
30B00601MSD	MB068004MSD	MSD	water	6-5-96			X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF020 **VALIDATION SAMPLE TABLE** **LDC#:** 1883A

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
33B00301	MB080001		soil	6-6-96	X	X	X
33B00302	MB080002	FD	soil	6-6-96	X	X	X
33B00303	MB080003		soil	6-6-96	X	X	X
33B00304	MB080004		soil	6-6-96	X	X	X
33B00305	MB080005		soil	6-6-96	X	X	X
33B00305RE	MB080005RE		soil	6-6-96		X	
33B00306	MB080006		soil	6-6-96			X
33B00302D	MB080007	FD	soil	6-6-96	X	X	X
33B00201	MB080008		soil	6-6-96	X	X	X
33B00202	MB080009		soil	6-6-96	X	X	X
33B00203	MB080010		soil	6-6-96	X	X	X
33B00205	MB080011		soil	6-6-96			X
33B00101	MB080012		soil	6-6-96	X	X	X
33B00102	MB080013	FD	soil	6-6-96	X	X	X
33B00103	MB080014		soil	6-6-96	X	X	X
33B00102D	MB080015	FD	soil	6-6-96	X	X	X
33R00101	MB080016	R	water	6-6-96	X	X	X
33T00101	MB080017	TB	water	6-6-96	X		
33B00302MS	MB080002MS	MS	soil	6-6-96	X	X	
33B00302MSD	MB080002MSD	MSD	soil	6-6-96	X	X	
33B00302MSRE	MB080002MSRE	MS	soil	6-6-96		X	
33B00302MSDRE	MB080002MSDRE	MSD	soil	6-6-96		X	
33B00302S	MB080002S	MS	soil	6-6-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF020 **VALIDATION SAMPLE TABLE** **LDC#:** 1883A

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
33B00302D	MB080002D	DUP	soil	6-6-96			X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WHF021 **VALIDATION SAMPLE TABLE** **LDC#:** 1883B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	TCLP Metals
30U00101	MB107001		soil	6-11-96	X
30U00201	MB107002		soil	6-11-96	X
30U00301	MB107003		soil	6-11-96	X
30U00401	MB107004		soil	6-11-96	X
33U00101	MB107005		soil	6-11-96	X
33U00201	MB107006		soil	6-11-96	X
33U00301	MB107007		soil	6-11-96	X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF016	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF017	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF018	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF019	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF020	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -

DRAFT

Table III
Summary of Rejected Data (Inorganics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	Fraction	Sample	Analyte	Reason
WF016	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF017	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF018	Lead	All samples	No rejected results	-
WF019	Lead	All samples	No rejected results	-

DRAFT

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds								
			Criteria		% Recovery			
SDG	Client ID	Compound	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF016	BKB00401	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF017	31B00601	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	≤38	33	-	45	None
		1,2,4-Trichlorobenzene	38-107	≤23	33	-	43	None
		Phenol	-	≤35	-	-	40	None
		1,4-Dichlorobenzene	-	≤27	-	-	44	None
		4-Chloro-3-methylphenol	-	≤33	-	-	38	None
		Acenaphthene	-	≤19	-	-	30	None
		Pesticides/PCBs	-	-	-	-	-	None
WF018	30B00203	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	-	33	34	-	UJ
		1,2,4-Trichlorobenzene	38-107	-	35	35	-	UJ
		Pyrene	35-142	-	33	-	-	UJ
WF019	30B00502	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	-	≤27	-	-	40	UJ
		1,2,4-Trichlorobenzene	-	≤23	-	-	34	UJ
		Acenaphthene	-	≤19	-	-	25	UJ
WF020	33B00302	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF016	**Client ID**	**BKB00401**	**BKB00401D**	
	Laboratory ID	**RB583003**	**RB583004**	
	Collection Date	**5/20/96**	**5/20/96**	
	Acetone	6 ug/Kg	17 ug/Kg	96
	Di-n-butylphthalate	1000 ug/Kg	970 ug/Kg	3
	Pesticides/PBs	ND	ND	-
WF016	**Client ID**	**BKB00602**	**BKB00602D**	
	Laboratory ID	**RB583016**	**RB583017**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	47 ug/Kg	6 ug/Kg	155
	Di-n-butylphthalate	580 ug/Kg	310 ug/Kg	61
	Pesticides/PCBs	ND	ND	-
WF017	**Client ID**	**31B00601**	**31B00601D**	
	Laboratory ID	**RB592001**	**RB592006**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	3 ug/Kg	11 ug/Kg	114
	Di-n-butylphthalate	39 ug/Kg	350U ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	110 ug/Kg	79 ug/Kg	33
	Gamma-chlordane	1.5 ug/Kg	1.1 ug/Kg	31
WF017	**Client ID**	**12B00101**	**12B00101D**	
	Laboratory ID	**RB592007**	**RB592008**	
	Collection Date	**5/21/96**	**5/21/96**	
	Acetone	8 ug/Kg	3 ug/Kg	91
	Diethylphthalate	830 ug/Kg	370U ug/Kg	Not calculable
	Pesticides/PCBs	ND	ND	-
WF018	**Client ID**	**30B00202**	**30B00202D**	
	Laboratory ID	**RB602002**	**RB602005**	
	Collection Date	**5/23/96**	**5/23/96**	
	Acetone	7 ug/Kg	9 ug/Kg	25
	Methylene chloride	1 ug/Kg	2 ug/Kg	67
	Di-n-butylphthalate	380U ug/Kg	360 ug/Kg	Not calculable
WF019	**Client ID**	**30B00502**	**30B00502D**	
	Laboratory ID	**MB047002**	**MB047005**	
	Collection Date	**6/4/96**	**6/4/96**	
	Acetone	16 ug/Kg	14 ug/Kg	13
	Methylene chloride	2 ug/Kg	2 ug/Kg	0
	Trichloroethene	ND	1 ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	1000 ug/Kg	970 ug/Kg	3
	2-Methylnaphthalene	1900U ug/Kg	210 ug/Kg	Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Acetone	23 ug/Kg	31 ug/Kg	30
	Methylene chloride	5 ug/Kg	4 ug/Kg	22
	Trichloroethene	ND	1	Not calculable
	Di-n-butylphthalate	51 ug/Kg	43 ug/Kg	17
	Bis(2-ethylhexyl)phthalate	99 ug/Kg	42 ug/Kg	81
WF020	**Client ID**	**33B00302**	**33B00302D**	
	Laboratory ID	**MB080002**	**MB08007**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	7 ug/Kg	8 ug/Kg	13
	Methylene chloride	ND	2 ug/Kg	Not calculable
	1,2-Dichloroethene (total)	ND	4 ug/Kg	Not calculable
	Trichloroethene	ND	13 ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	48 ug/Kg	380U ug/Kg	Not calculable
WF020	**Client ID**	**33B00102**	**33B00102D**	
	Laboratory ID	**MB080013**	**MB080015**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	5 ug/Kg	5 ug/Kg	0
	Methylene chloride	ND	1 ug/Kg	Not calculable
	Di-n-butylphthalate	66 ug/Kg	45 ug/Kg	21
	Bis(2-ethylhexyl)phthalate	760 ug/Kg	370U ug/Kg	Not calculable

Table VI
Summary of Surrogate Recoveries
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF016	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides/PCBs	All within QC limits	-	-	None
WF017	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			6	
	12R00101	Decachlorobiphenyl	57	60-150		UJ (all detects)
		Decachlorobiphenyl	56	60-150		UJ (all detects)
	31R00101	Decachlorobiphenyl	27	60-150		UJ (all detects)
		Decachlorobiphenyl	27	60-150		UJ (all detects)
	12B00101D	Tetrachloro-m-xylene	58	60-150		UJ (all detects)
	12B00102	Tetrachloro-m-xylene	55	60-150		UJ (all detects)
		Tetrachloro-m-xylene	56	60-150		UJ (all detects)
	31B00603	Tetrachloro-m-xylene	46	60-150		UJ (all detects)
		Decachlorobiphenyl	54	60-150		UJ (all detects)
		Tetrachloro-m-xylene	49	60-150		UJ (all detects)
		Decachlorobiphenyl	53	60-150		UJ (all detects)
	31B00604	Tetrachloro-m-xylene	52	60-150		UJ (all detects)
		Decachlorobiphenyl	58	60-150		UJ (all detects)
		Tetrachloro-m-xylene	54	60-150		UJ (all detects)
WF018	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF019	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF020	All samples	Volatiles	All within QC limits	-	-	None
	33B00305	Semivolatiles			1	
		2-Fluorophenol	0	25-121		R (all compounds)
		Phenol-d5	0	24-113		R (all compounds)
		2-Chlorophenol-d4	0	20-130		R (all compounds)
		1,2-Dichlorobenzene-d4	0	20-130		R (all compounds)
		Nitrobenzene-d5	0	23-120		R (all compounds)
		2-Fluorobiphenyl	0	30-115		R (all compounds)
		2,4,6-Tribromophenol	0	19-122		R (all compounds)
		Terphenyl-d14	0	18-137		R (all compounds)

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF016	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF017	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/4/96	Chloromethane	-	62.2	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/7/96	Butylbenzylphthalate	-	26.8	UJ
		3,3'-Dichlorobenzidine	-	32.9	UJ
		Bis(2-ethylhexyl)phthalate	-	27.4	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF018	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
WF019	All	Volatiles	-	-	None
	6/11/96	Hexachlorobenzene	-	30.8	UJ

DRAFT

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF020	All	Volatiles	-	-	None
	6/26/96	Bis(2-ethylhexyl)phthalate	-	28.6	UJ
		Di-n-octylphthalate	-	33.8	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

DRAFT

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF016	Acetone	2 ug/Kg	BKB00101 BKB00401 BKB00401D BKB00402 BKB00201 BKB00202 BKB00301 BKB00302 BKB00501 BKB00502 BKB00601 BKB00602
	Acetone	1 ug/Kg	BKB00602D
	Bis(2-ethylhexyl)phthalate	12 ug/L	BKR00201 BKF00101
	Pestcides/PCBs	ND	-
WF017	Acetone	1 ug/Kg	31B00601 31B00605 12B00101 12B00101D 12B00102 31B00702 31B00703 31B00704 31B00705 31B00801 31B00802 31B00803
	Acetone	2 ug/Kg	31B00701 31B00804 31B00805
	Acetone	2 ug/Kg	31B00803DL 31B00804DL
	Bis(2-ethylhexylphthalate	2 ug/L	31R00101
	Bis(2-ethylhexylphthalate	2 ug/L	12R00101
	Pesticides/PCBs	ND	-

DRAFT

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF018	Acetone	2 ug/Kg	30B00201 30B00203
	Acetone	2 ug/Kg	30B00202 30B00202D 30B00101 30B00102 30B00103
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	30B00201 30B00202 30B00203 30B00202D 30B00101 30B00102 30B00103
WF019	Methylene chloride	5 ug/Kg	30B00501
	Acetone	5 ug/Kg	30B00502 30B00503 30B00502D 30B00401 30B00402 30B00403
	Acetone	5 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00305
	Bis(2-ethylhexyl)phthalate	1 ug/L	30R00201
	Bis(2-ethylhexyl)phthalate	59 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00303DL 30B00305

DRAFT

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF020	Acetone	5 ug/Kg	33B00301 33B00302 33B00303 33B00304 33B00305 33B00302D 33B00201 33B00202 33B00203 33B00101 33B00102 33B00103 33B00102D
	Bis(2-ethylhexyl)phthalate	6 ug/L	33R00101
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	33B00301 33B00302 33B00303 33B00304 33B00302D 33B00201 33B00202 33B00203 33B00101 33B00102 33B00103 33B00102D
	Bis(2-ethylhexylphthalate	300 ug/Kg	33B00305RE

DRAFT

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF016	**Client ID:** BKR00201 **Laboratory ID:** RB583008 **Collection Date:** 5/20/96 **Type:** Equipment Rinsate		
	Acetone	2 ug/L	None
	Di-n-butylphthalate	8 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF016	**Client ID:** BKT00201 **Laboratory ID:** RB583010 **Collection Date:** 5/20/96 **Type:** Trip Blank		
	Methylene chloride	1 ug/L	None
	Acetone	13 ug/L	None
WF016	**Client ID:** BKF00101 **Laboratory ID:** RB583009 **Collection Date:** 5/20/96 **Type:** Source Blank		
	Acetone	23 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 12R00101 **Laboratory ID:** RB592022 **Collection Date:** 5/21/96 **Type:** Rinsate		
	Acetone	8 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	15 ug/L	15U ug/L[1]
	Butylbenzylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 31R00101 **Laboratory ID:** RB592020 **Collection Date:** 5/22/96 **Type:**		
	Acetone	17 ug/L	None
	Di-n-butylphthalate	6 ug/L	None
	Bis(2-ethylhexyl)phthalate	6 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None

DRAFT

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF017	**Client ID:** 31T00301 **Laboratory ID:** RB592021 **Collection Date:** 5/22/96 **Type:** Trip Blank		
	Acetone	4 ug/L	None
WF017	**Client ID:** BKT00301 **Laboratory ID:** RB592023 **Collection Date:** 5/21/96 **Type:** Trip Blank		
	Acetone	3 ug/L	None
WF018	**Client ID:** 30T00101 **Laboratory ID:** RB602011 **Collection Date:** 5/23/96 **Type:** Trip Blank		
	Methylene chloride	3 ug/L	None
	Acetone	10 ug/L	None
WF018	**Client ID:** 30R00101 **Laboratory ID:** RB602010 **Collection Date:** 5/23/96 **Type:** Rinsate		
	Acetone	6 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
WF019	**Client ID:** 30T00201 **Laboratory ID:** MB047011 **Collection Date:** 6/4/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF019	**Client ID:** 30T00301 **Laboratory ID:** MB068002 **Collection Date:** 6/5/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF019	**Client ID:** 30R00201 **Laboratory ID:** MB047010 **Collection Date:** 6/4/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	3 ug/L	None
	Bis(2-ethylhexyl)phthalate	4 ug/L	10U ug/L[1]

DRAFT

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF019	**Client ID:** 30R00301 **Laboratory ID:** MB068001 **Collection Date:** 6/5/96 **Type:** Rinsate		
	Methylene chloride	3 ug/L	None
	Di-n-butylphthalate	7 ug/L	None
	Bis(2-ethylhexyl)phthalate	4 ug./L	None
WF019	**Client ID:** 30F00101 **Laboratory ID:** MB068003 **Collection Date:** 6/5/96 **Type:** Source Blank		
	Acetone	29 ug/L	None
	Di-n-butylphthalate	13 ug/L	None
WF020	**Client ID:** 33T00101 **Laboratory ID:** MB080017 **Collection Date:** 6/6/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF020	**Client ID:** 33R00101 **Laboratory ID:** MB080016 **Collection Date:** 6/6/96 **Type:** Rinsate		
	Acetone	15 ug/L	None
	Di-n-butylphthalate	13 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF016	BKB00401	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF016	BKR00201	Metals	-	-	-	-	-	None
WF016	BKF00101	Cyanide	-	-	-	-	-	None
WF017	31B00601	Lead	75-125	≤35	179.2	-	49.3	J
		Cyanide	-	-	-	-	-	None
WF018	30B00202	Lead	-	-	-	-	-	None
WF019	30B00502	Lead	-	-	-	-	-	None
WF019	30F00101	Lead	-	-	-	-	-	None
WF019	30B00601	Lead	75-125	-	66.4	-	-	J
WF020	33B00302	Lead	-	-	-	-	-	None

DRAFT

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF016	**Client ID**	**BKB00401**	**BKB00401D**	
	Laboratory ID	**RB583003**	**RB583004**	
	Collection Date	**5/20/96**	**5/20/96**	
	Aluminum	3600 mg/Kg	2290 mg/Kg	44
	Arsenic	0.54 mg/Kg	0.79 mg/Kg	38
	Barium	7.2 mg/Kg	6.4 mg/Kg	12
	Beryllium	ND	0.07 mg/Kg	Not calculable
	Calcium	194 mg/Kg	203 mg/Kg	5
	Chromium	3.2 mg/Kg	2.4 mg/Kg	29
	Cobalt	0.77 mg/Kg	0.58 mg/Kg	28
	Copper	1.8 mg/Kg	1.7 mg/Kg	6
	Iron	2220 mg/Kg	1660 mg/Kg	29
	Lead	1.4 mg/Kg	2.4 mg/Kg	53
	Magnesium	114 mg/Kg	93.0 mg/Kg	20
	Manganese	19.5 mg/Kg	14.5 mg/Kg	29
	Nickel	1.5 mg/Kg	ND	Not calculable
	Potassium	84.5 mg/Kg	ND	Not calculable
	Sodium	27.6 mg/Kg	22.5 mg/Kg	20
	Vavadium	4.9 mg/Kg	3.4 mg/Kg	36
	Zinc	3.9 mg/Kg	2.7 mg/Kg	36
	Cyanide	0.10 mg/Kg	0.13 mg/Kg	26
WF016	**Client ID**	**BKB00602**	**BKB00602D**	
	Laboratory ID	**RB583016**	**RB583017**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	5040 mg/Kg	6050 mg/Kg	18
	Arsenic	1.4 mg/Kg	0.95 mg/Kg	38
	Barium	5.2 mg/Kg	5.9 mg/Kg	13
	Calcium	210 mg/Kg	195 mg/Kg	7
	Chromium	4.5 mg/Kg	4.7 mg/Kg	4
	Copper	2.0 mg/Kg	2.3 mg/Kg	14
	Iron	3430 mg/Kg	3820 mg/Kg	11
	Lead	1.8 mg/Kg	1.7 mg/Kg	6
	Magnesium	97.6 mg/Kg	111 mg/Kg	13
	Manganese	9.5 mg/Kg	11.1 mg/Kg	16
	Nickel	1.6 mg/Kg	ND	Not calculable
	Sodium	28.6 mg/Kg	26.2 mg/Kg	9
	Vanadium	10.3 mg/Kg	11.3 mg/Kg	9
	Zinc	3.2 mg/Kg	3.1 mg/Kg	3
	Cyanide	0.13 mg/Kg	0.16 mg/Kg	21

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF017	**Client ID**	**31B00601**	**31B00601D**	
	Laboratory ID	**RB295001**	**RB592006**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	1580 mg/Kg	1760 mg/Kg	11
	Arsenic	0.44 mg/Kg	0.29 mg/Kg	41
	Barium	7.4 mg/Kg	9.6 mg/Kg	26
	Beryllium	0.07 mg/Kg	0.07 mg/Kg	0
	Cadmium	0.52 mg/Kg	0.68 mg/Kg	27
	Calcium	237 mg/Kg	297 mg/Kg	22
	Chromium	3.9 mg/Kg	5.4 mg/Kg	32
	Copper	11.4 mg/Kg	13.6 mg/Kg	18
	Iron	1120 mg/Kg	1310 mg/Kg	16
	Lead	6.3 mg/Kg	7.0 mg/Kg	11
	Magnesium	83.5 mg/Kg	98.7 mg/Kg	17
	Manganese	9.2 mg/Kg	11.3 mg/Kg	20
	Mercury	0.07 mg/Kg	0.08 mg/Kg	13
	Selenium	0.14 mg/Kg	ND mg/Kg	Not calculable
	Silver	1.1 mg/Kg	1.7 mg/Kg	43
	Sodium	23.5 mg/Kg	26.3 mg/Kg	11
	Vanadium	2.2 mg/Kg	2.4 mg/Kg	9
	Zinc	11.0 mg/Kg	15.9 mg/Kg	36
	Cyanide	0.10 mg/Kg	ND	Not calculable
WF017	**Client ID**	**12B00101**	**12B00101D**	
	Laboratory ID	**RB592007**	**RB592008**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	25400 mg/Kg	8890 mg/Kg	96
	Arsenic	5.3 mg/Kg	1.2 mg/Kg	126
	Barium	18.0 mg/Kg	14.5 mg/Kg	22
	Beryllium	0.20 mg/Kg	ND	Not calculable
	Cadmium	0.57 mg/Kg	ND	Not calculable
	Calcium	495 mg/Kg	552 mg/Kg	11
	Chromium	19.9 mg/Kg	9.1 mg/Kg	74
	Copper	6.3 mg/Kg	2.9 mg/Kg	74
	Iron	16100 mg/Kg	8620 mg/Kg	61
	Lead	4.7 mg/Kg	3.4 mg/Kg	32
	Magnesium	170 mg/Kg	96.7 mg/Kg	55
	Manganese	7.7 mg/Kg	4.9 mg/Kg	44
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	2.5 mg/Kg	ND	Not calculable
	Potassium	81.2 mg/Kg	ND	Not calculable
	Sodium	49.8 mg/Kg	33.4 mg/Kg	39
	Vanadium	41.7 mg/Kg	26.5 mg/Kg	45
	Zinc	3.6 mg/Kg	3.7 mg/Kg	3
	Cyanide	ND	ND	None
WF018	**Client ID**	**30B00202**	**30B00202D**	
	Laboratory ID	**RB602002**	**RB602005**	
	Collection Date	**5/23/96**	**5/23/96**	
	Lead	1.8 mg/Kg	1.9 mg/Kg	5
WF019	**Client ID**	**30B00502**	**30B00502D**	
	Laboratory ID	**MB047002**	**MB047005**	
	Collection Date	**6/4/96**	**6/4/96**	
	Lead	4.3 mg/Kg	3.9 mg/Kg	10
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Lead	4.5 mg/Kg	5.0 mg/Kg	11

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF020	**Client ID** **Laboratory ID** **Collection Date** Lead	**33B00302** **MB080002** **6/6/96** 7.8 mg/Kg	**33B00302D** **MB080007** **6/6/96** 7.1 mg/Kg	9
WF020	**Client ID** **Laboratory ID** **Collection Date** Lead	**33B00102** **MB080013** **6/6/96** 7.2 mg/Kg	**33B00102D** **MB080015** **6/6/96** 8.0 mg/Kg	11

DRAFT

Table XII
Summary of Analytes Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes					
SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF016	All	All metals Cyanide	- -	- -	None None
WF017	All	All metals Cyanide	- -	- -	None None
WF018	All	Lead	-	-	None
WF019	All	Lead	-	-	None
WF020	All	Lead	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF016	Barium	1.760 ug/L	All water samples in SDG WF016
	Iron	31.120 ug/L	
	Sodium	88.880 ug/L	
	Zinc	16.920 ug/L	
	Aluminum	3.309 mg/Kg	All soil samples in SDG WF016
	Calcium	11.435 mg/Kg	
	Copper	0.249 mg/Kg	
	Iron	1.650 mg/Kg	
	Sodium	5.214 mg/Kg	
	Thallium	0.001 mg/Kg	
	Zinc	1.342 mg/Kg	
	Cyanide	ND	All samples in SDG WF016
WF017	Barium	1.760 ug/L	All water samples in SDG WF017
	Iron	31.120 ug/L	
	Sodium	88.880 ug/L	
	Zinc	16.920 ug/L	
	Aluminum	3.309 mg/Kg	All soil samples in SDG WF017
	Calcium	11.435 mg/Kg	
	Cobalt	0.249 mg/Kg	
	Copper	1.650 mg/Kg	
	Sodium	5.214 mg/Kg	
	Zinc	1.342 mg/Kg	
	Cyanide	ND	All samples in SDG WF017
WF018	Lead	ND	All samples in SDG WF018
WF019	Lead	2.260 ug/L	All water samples in SDG WF019
WF020	Lead	ND	All samples in SDG WF020

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter	Concentration	Qualifier
WF016	**Client ID:** BKR00201		
	Laboratory ID: RB583008		
	Collection Date: 5/20/96		
	Type: Rinsate		
	Barium	1.8 ug/L	1.7U ug/L[1]
	Iron	5.6 ug/L	5.6U ug/L[1]
	Lead	2.3 ug/L	None
	Sodium	57.5 ug/L	57.5U ug/L[1]
	Zinc	3.0 ug/L	3.0U ug/L[1]
	Cyanide	1.8 ug/L	None
WF016	**Client ID:** BKF00101		
	Laboratory ID: RB583009		
	Collection Date: 5/20/96		
	Type: Source Blank		
	Iron	6.4 ug/L	6.4U ug/L[1]
	Sodium	52.9 ug/L	52.9U ug/L[1]
	Zinc	3.8 ug/L	3.8U ug/L[1]
	Cyanide	ND	None
WF017	**Client ID:** 31R00101		
	Laboratory ID: RB592020		
	Collection Date: 5/22/96		
	Type: Rinsate		
	Aluminum	86.5 ug/L	None
	Barium	2.3 ug/L	2.3U ug/L[1]
	Calcium	503 ug/L	None
	Chromium	11.3 ug/L	None
	Copper	1.4 ug/L	None
	Iron	132 ug/L	132U ug/L[1]
	Lead	0.60 ug/L	None
	Magnesium	66.2 ug/L	None
	Manganese	3.8 ug/L	None
	Sodium	264 ug/L	None
	Zinc	7.8 ug/L	7.8U ug/L[1]
	Cyanide	ND	None
WF017	**Client ID:** 12R00101		
	Laboratory ID: RB592022		
	Collection Date: 5/21/96		
	Type: Rinsate		
	Aluminum	19.1 ug/L	None
	Barium	1.8 ug/L	1.8U ug/L[1]
	Calcium	86.5 ug/L	None
	Iron	15.6 ug/L	15.6U ug/L[1]
	Lead	0.60 ug/L	None
	Magnesium	30.5 ug/L	None
	Sodium	59.8 ug/L	None
	Zinc	3.8 ug/L	3.8U ug/L[1]
	Cyanide	ND	None

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter	Concentration	Qualifier
WF018	**Client ID:** 30R00101 **Laboratory ID:** RB602010 **Collection Date:** 5/23/96 **Type:** Rinsate		
	Lead	ND	None
WF019	**Client ID:** 30R00201 **Laboratory ID:** MB047010 **Collection Date:** 6/4/96 **Type:** Rinsate		
	Lead	ND	None
WF019	**Client ID:** 30R00301 **Laboratory ID:** MB068001 **Collection Date:** 6/5/96 **Type:** Rinsate		
	Lead	ND	None
WF019	**Client ID:** 30F00101 **Laboratory ID:** MB068003 **Collection Date:** 6/5/96 **Type:** Source Blank		
	Lead	2.1 ug/L	2.1U ug/L[1]
WF020	**Client ID:** 33R00101 **Laboratory ID:** MB080016 **Collection Date:** 6/6/96 **Type:** Rinsate		
	Lead	1.6 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

DRAFT

Table XV
Sample Event PARCC Summary
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF016	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF017	Volatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF018	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF019	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF020	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

APPENDIX A

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

12/12/97

APPENDIX A

Table of Contents

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

Table	Title	Page No.
I	Sample Delivery Group Versus Sample Identification	A-1
II	Summary of Rejected Data (Organics)	A-42
III	Summary of Rejected Data (Inorganics)	A-45
Organics		
IV	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates	A-47
V	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-52
VI	Summary of Surrogate Recoveries	A-60
VII	Summary of Compounds Exceeding Instrument Calibration	A-68
VIII	Summary of Method Blank Contamination	A-76
IX	Summary of Field Blank Contamination	A-84
Inorganics		
X	Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples	A-100
XI	Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples	A-102
XII	Summary of Analytes Exceeding Instrument Calibration	A-112
XIII	Summary of Method Blank Contamination	A-114
XIV	Summary of Field Blank Contamination	A-130
XV	Sample Event PARCC Summary	A-135

ble 1

SDG#: WF022 | VALIDATION SAMPLE TABLE | LDC#: 1932A

Project Name: NAS Whiting Field | Parameters/Analytical Method | Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
BKT01001	RB858001	TB	water	7-16-96	X				
BKR01001	RB858002	R	water	7-16-96	X	X	X	X	X
BKG00101	RB858003		water	7-16-96	X	X	X	X	X
BKG00101D	RB858004	FD	water	7-16-96	X	X	X	X	X
BKG00102	RB858005		water	7-16-96	X	X	X	X	X
BKG00102F	RB858006		water	7-16-96				X	
BKG00103	RB858007		water	7-16-96	X	X	X	X	X
BKG00202	RB858008		water	7-17-96	X	X	X	X	X
BKG00201	RB858009		water	7-17-96	X	X	X	X	X
BKF01001	RB858010	SB	water	7-17-96	X	X	X	X	X
17T01101	RB873001	TB	water	7-18-96	X				
17G00102	RB873002		water	7-18-96	X	X	X	X	X
17G00101	RB873003		water	7-18-96	X	X	X	X	X
17G00201	RB873004		water	7-18-96	X	X	X	X	X
17G00301	RB873005		water	7-18-96	X	X	X	X	X
17G00201F	RB873006		water	7-18-96				X	
01G00101	RB873007		water	7-19-96	X	X	X	X	X
01G00102	RB873008		water	7-19-96	X	X	X	X	X
01G00102D	RB873009		water	7-19-96	X	X	X	X	X
BKG00101MS	RB858003MS	MS	water	7-16-96	X	X	X	X	X
BKG00101MSD	RB858003MSD	MSD	water	7-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF023 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1942A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
01T01201	RB887001	TB	water	7-22-96	X				
01G00401	RB887002		water	7-22-96	X	X	X	X	X
01G00201	RB887003		water	7-22-96	X	X	X	X	X
01G00201F	RB887004		water	7-22-96				X	
01R01101	RB887005	R	water	7-23-96	X	X	X	X	X
01G00301	RB887006		water	7-23-96	X	X	X	X	X
BKG00301	RB887007		water	7-23-96	X	X	X	X	X
02G00201	RB887008		water	7-23-96	X	X	X	X	X
02G00101	RB887009		water	7-23-96	X	X	X	X	X
02G00101F	RB887010		water	7-23-96				X	
18G00301	RB887011		water	7-24-96	X	X	X	X	X
02G00301	RB887012		water	7-24-96	X	X	X	X	X
02G00301D	RB887013	FD	water	7-24-96	X	X	X	X	X
16T01301	RB887014		water	7-25-96	X				
16G00701	RB887015		water	7-25-96	X	X	X	X	X
16G00702	RB887016		water	7-25-96	X	X	X	X	X
16G00702DL	RB887016DL		water	7-25-96	X				
16G00703	RB887017		water	7-25-96	X	X	X	X	X
16G00703DL	RB887017DL		water	7-25-96	X				
18G00201	RB887018		water	7-26-96	X	X	X	X	X
02G00301MS	RB887012MS	MS	water	7-24-96	X	X	X	X	X
02G00301MSD	RB887012MSD	MSD	water	7-24-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF024 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1943A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
18T01401	RB920001	TB	water	7-29-96	X				
18G00101	RB920002		water	7-29-96	X	X	X	X	X
15G00401	RB920003		water	7-30-96	X	X	X	X	X
BKG00203	RB920004		water	7-30-96	X	X	X	X	X
15R01201	RB920005	R	water	7-31-96	X	X	X	X	X
BKG00203F	RB920006		water	7-30-96				X	
15G00702	RB920007		water	7-31-96	X	X	X	X	X
15G00702F	RB920008		water	7-31-96				X	
15G00701	RB920009		water	7-31-96	X	X	X	X	X
15G00701D	RB920010	FD	water	7-31-96	X	X	X	X	X
15G00701MS	RB920009MS	MS	water	7-31-96	X	X	X	X	X
15G00701MSD	RB920009MSD	MSD	water	7-31-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF025 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1956A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
15T01501	RB956001	TB	water	8-5-96	X				
15G00703	RB956002		water	8-5-96	X	X	X	X	X
15G00503	RB956003		water	8-6-96	X	X	X	X	X
15G00503DL	RB956003DL		water	8-6-96	X				
15G00502	RB956004		water	8-6-96	X	X	X	X	X
15G00501	RB956005		water	8-6-96	X	X	X	X	X
15G00601	RB956006		water	8-7-96	X	X	X	X	X
15G00603	RB956007		water	8-7-96	X	X	X	X	X
15G00601D	RB956008	FD	water	8-7-96	X	X	X	X	X
15G00503F	RB956009		water	8-6-96				X	
15G00501F	RB956010		water	8-6-96				X	
15R01301	RB956011	R	water	8-7-96	X	X	X	X	X
15T01601	RB956012	TB	water	8-8-96	X				
15G00301	RB956013		water	8-8-96	X	X	X	X	X
15G00302	RB956014		water	8-8-96	X	X	X	X	X
15G00303	RB956015		water	8-9-96	X	X	X	X	X
15G00101	RB956016		water	8-8-96	X	X	X	X	X
15G00203	RB956017		water	8-9-96	X	X	X	X	X
15G00301F	RB956018		water	8-8-96				X	
15G00203F	RB956019		water	8-9-96				X	
15G00601MS	RB956006MS	MS	water	8-7-96	X	X	X	X	X
15G00601MSD	RB956006MSD	MSD	water	8-7-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF026 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1957A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
15T01701	RB980001	TB	water	8-12-96	X				
15G00202	RB980002		water	8-12-96	X	X	X	X	X
15G00201	RB980003		water	8-13-96	X	X	X	X	X
15G00802	RB980004		water	8-13-96	X	X	X	X	X
15G00802R	RB980004R		water	8-13-96		X			
15G00801	RB980005		water	8-13-96	X	X	X	X	X
16G00201	RB980006		water	8-14-96	X	X	X	X	X
15G00803	RB980007		water	8-14-96	X	X	X	X	X
16G00803D	RB980008	FD	water	8-14-96	X	X	X	X	X
15G00202F	RB980009		water	8-12-96				X	
15G00201F	RB980010		water	8-13-96				X	
15G00802F	RB980011		water	8-13-96				X	
15R01401	RB980012	R	water	8-14-96	X	X	X	X	X
15G00803F	RB980013		water	8-14-96				X	
16G00201F	RB980014		water	8-14-96				X	
16T01801	RB980015	TB	water	8-15-96	X				
16G00202	RB980016		water	8-15-96	X	X	X	X	X
16G00202DL	RB980016DL		water	8-15-96	X				
16G00203	RB980017		water	8-15-96	X	X	X	X	X
16G00602	RB980018		water	8-15-96	X	X	X	X	X
16G00601	RB980019		water	8-16-96	X	X	X	X	X
16G00403	RB980020		water	8-16-96	X	X	X	X	X
16G00403DL	RB980020DL		water	8-16-96	X				
16G00403D	RB980021		water	8-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF026 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1957A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
16G00403DDL	RB980021DL		water	8-16-96	X				
16G00601F	RB980022		water	8-16-96				X	
16G00403F	RB980023		water	8-16-96				X	
15G00803MS	RB980007MS	MS	water	8-14-96	X	X	X	X	X
15G00803MSD	RB980007MSD	MSD	water	8-14-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF025 | VALIDATION SAMPLE TABLE | LDC#: 1970A

Project Name: NAS Whiting Field | Parameters/Analytical Method | Job#: 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	Pesticides/PCBs
15G00502RE	RB956004RE		water	8-6-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF027 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1970B

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
16T01901	RC016001	TB	water	8-19-96	X				
16G00401	RC016002		water	8-19-96	X	X	X	X	X
16G00402	RC016003		water	8-19-96	X	X	X	X	X
16G00101	RC016004		water	8-19-96	X	X	X	X	X
16G00301	RC016005		water	8-20-96	X	X	X	X	X
16G00302	RC016006		water	8-20-96	X	X	X	X	X
16G00304	RC016007		water	8-20-96	X	X	X	X	X
16G00303	RC016008		water	8-21-96	X	X	X	X	X
16G00501	RC016009		water	8-21-96	X	X	X	X	X
16G00303F	RC016010		water	8-21-96				X	
16G00501F	RC016011		water	8-21-96				X	
16R01501	RC016012	R	water	8-21-96	X	X	X	X	X
16G00501D	RC016013	FD	water	8-21-96	X	X	X	X	X
66T02001	RC016014	TB	water	8-22-96	X				
66G02101	RC016015		water	8-22-96	X	X	X	X	X
66G02103	RC016016		water	8-22-96	X	X	X	X	X
66G02102	RC016017		water	8-22-96	X	X	X	X	X
09G00101	RC016018		water	8-23-96	X	X	X	X	X
09G00301	RC016019		water	8-23-96	X	X	X	X	X
09G00301D	RC016020	FD	water	8-23-96	X	X	X	X	X
66G02102F	RC016021		water	8-23-96				X	
09G00301F	RC016022		water	8-23-96				X	
16G00501MS	RC016009MS	MS	water	8-21-96	X	X	X	X	X
16G00501MSD	RC016009MSD	MSD	water	8-21-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF028 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1974A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
10T02101	RC044001	TB	water	8-26-96	X				
09G00201	RC044002		water	8-26-96	X	X	X	X	X
10G00101	RC044003		water	8-26-96	X	X	X	X	X
10G00201	RC044004		water	8-26-96	X	X	X	X	X
11G00402	RC044005		water	8-26-96	X	X	X	X	X
11G00102	RC044006		water	8-27-96	X	X	X	X	X
11G00401	RC044007		water	8-27-96	X	X	X	X	X
11T02201	RC044008	TB	water	8-28-96	X				
11G00301	RC044009		water	8-28-96	X	X	X	X	X
11G00101	RC044010		water	8-28-96	X	X	X	X	X
11G00201	RC044011		water	8-28-96	X	X	X	X	X
12G00101	RC044012		water	8-27-96	X	X	X	X	X
12G00201	RC044013		water	8-27-96	X	X	X	X	X
11G00201F	RC044014		water	8-28-96				X	
11G00301F	RC044015		water	8-28-96				X	
11R01601	RC044016		water	8-28-96	X	X	X	X	X
12G00101D	RC044017	FD	water	8-27-96	X	X	X	X	X
11G00201D	RC044018	FD	water	8-28-96	X	X	X	X	X
12G00101MS	RC044012MS	MS	water	8-27-96	X	X	X	X	X
12G00101MSD	RC044012MSD	MSD	water	8-27-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF029 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1989A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
13T02301	RC092001	TB	water	9-9-96	X				
13G00101	RC092002		water	9-9-96	X	X	X	X	X
13G00102	RC092003		water	9-9-96	X	X	X	X	X
13G00201	RC092004		water	9-10-96	X	X	X	X	X
13G00103	RC092005		water	9-10-96	X	X	X	X	X
14G00201	RC092006		water	9-10-96	X	X	X	X	X
14G00101	RC092007		water	9-11-96	X	X	X	X	X
13R01701	RC092008	R	water	9-11-96	X	X	X	X	X
14G00101D	RC092009	FD	water	9-11-96	X	X	X	X	X
13G00103F	RC092010		water	9-10-96				X	
66T02401	RC092011	TB	water	9-12-96	X				
66G00901	RC092012		water	9-12-96	X	X	X	X	X
66G00904	RC092013		water	9-12-96	X	X	X	X	X
66G00902	RC092014		water	9-13-96	X	X	X	X	X
66G00903	RC092015		water	9-13-96	X	X	X	X	X
66G00903F	RC092016		water	9-13-96				X	
14G00101MS	RC092007MS	MS	water	9-11-96	X	X	X	X	X
14G00101MSD	RC092007MSD	MSD	water	9-11-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF030 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2000A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
66T02501	RC121001	TB	water	9-16-96	X				
66G00801	RC121002		water	9-16-96	X	X	X	X	X
66G00802	RC121003		water	9-16-96	X	X	X	X	X
66G00803	RC121004		water	9-17-96	X	X	X	X	X
66G00804	RC121005		water	9-17-96	X	X	X	X	X
66G00602	RC121006		water	9-17-96	X	X	X	X	X
66G00601	RC121007		water	9-18-96	X	X	X	X	X
66G00603	RC121008		water	9-18-96	X	X	X	X	X
66G00804F	RC121009		water	9-17-96				X	
66R01801	RC121010		water	9-18-96	X	X	X	X	X
66G00601D	RC121011	FD	water	9-18-96	X	X	X	X	X
66T02601	RC121012	TB	water	9-19-96	X				
66G00604	RC121013		water	9-19-96	X	X	X	X	X
66G02201	RC121014		water	9-19-96	X	X	X	X	X
66G02202	RC121015		water	9-19-96	X	X	X	X	X
66G02203	RC121016		water	9-20-96	X	X	X	X	X
66G02203D	RC121017	FD	water	9-20-96	X	X	X	X	X
66G00601MS	RC121007MS	MS	water	9-18-96	X	X	X	X	X
66G00601MSD	RC121007MSD	MSD	water	9-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF031 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2031A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
05T02701	MB928001	TB	water	9-23-96	X				
05G00801	MB928002		water	9-23-96	X	X	X	X	X
05G00802	MB928003		water	9-23-96	X	X	X	X	X
05G00901	MB928004		water	9-24-96	X	X	X	X	X
05G00902	MB928005		water	9-24-96	X	X	X	X	X
05G01002	MB928006		water	9-24-96	X	X	X	X	X
05G01001	MB928007		water	9-25-96	X	X	X	X	X
05G00301	MB928008		water	9-25-96	X	X	X	X	X
05G00301RE	MB928008RE		water	9-25-96		X			
05G00801F	MB928009		water	9-23-96				X	
05G00902F	MB928010		water	9-24-96				X	
05R01901	MB928011	R	water	9-25-96	X	X	X	X	X
05G01001D	MB928012	FD	water	9-25-96	X	X	X	X	X
33T02801	MB958001	TB	water	9-26-96	X				
05G00101	MB958002		water	9-26-96	X	X	X	X	X
33G00501	MB958003		water	9-26-96	X	X	X	X	X
33G00201	MB958004		water	9-26-96	X	X	X	X	X
33G00101	MB958005		water	9-27-96	X	X	X	X	X
33G00301	MB958006		water	9-27-96	X	X	X	X	X
33G00301D	MB958007	FD	water	9-27-96	X	X	X	X	X
05G01001MS	MB928007MS	MS	water	9-25-96	X	X	X	X	X
05G01001MSD	MB928007MSD	MSD	water	9-25-96	X	X	X		
05G01001DUP	MB928007DUP	DUP	water	9-25-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF031B | **VALIDATION SAMPLE TABLE** | **LDC#:** 2121A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals (CLP-2.1)	Cyanide
05G01002	MC447001		water	11-21-96	X	X	X	X	X
16T04001	MC447002	TB	water	11-21-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF032 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2046A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
06T02901	MC011001	TB	water	9-30-96	X				
33G00401	MC011002		water	9-30-96	X	X	X	X	X
06G00102	MC011003		water	10-1-96	X	X	X	X	X
06G00101	MC011004		water	10-1-96	X	X	X	X	X
06G00301	MC011005		water	10-2-96	X	X	X	X	X
06R02001	MC011006	R	water	10-2-96	X	X	X	X	X
29G00501	MC011007		water	10-2-96	X	X	X	X	X
29G00501D	MC011008	FD	water	10-2-96	X	X	X	X	X
29T03001	MC037001	TB	water	10-3-96	X				
29G00101	MC037002		water	10-3-96	X	X	X	X	X
66G01201	MC037003		water	10-3-96	X	X	X	X	X
66G00102	MC037004		water	10-4-96	X	X	X	X	X
29G00501MS	MC011007MS	MS	water	10-2-96	X	X	X	X	X
29G00501MSD	MC011007MSD	MSD	water	10-2-96	X	X	X		
29G00501DUP	MC011007DUP	DUP	water	10-2-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF033 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2069A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
29T03101	MC085001	TB	water	10-7-96	X				
26G00401	MC085002		water	10-7-96	X	X	X	X	X
26G00301	MC085003		water	10-8-96	X	X	X	X	X
66G00202	MC085004		water	10-8-96	X	X	X	X	X
29G00201	MC085005		water	10-8-96	X	X	X	X	X
66G01901	MC085006		water	10-9-96	X	X	X	X	X
66R02101	MC085007	R	water	10-9-96	X	X	X	X	X
66T03201	MC118001	TB	water	10-10-96	X				
66G00201	MC118002		water	10-9-96	X	X	X	X	X
66G00201D	MC118003	FD	water	10-9-96	X	X	X	X	X
07G00101	MC118004		water	10-10-96	X	X	X	X	X
30G00501	MC118005		water	10-10-96	X	X	X	X	X
66G00301	MC118006		water	10-11-96	X	X	X	X	X
66G00201MS	MC118002MS	MS	water	10-9-96	X	X	X	X	X
66G00201MSD	MC118002MSD	MSD	water	10-9-96	X	X	X		
66G00201DUP	MC118002DUP	DUP	water	10-9-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF034 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2070A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03301	MC153001	TB	water	10-14-96	X				
66G02001	MC153002		water	10-14-96	X	X	X	X	X
66G00302	MC153003		water	10-15-96	X	X	X	X	X
66G01801	MC153004		water	10-16-96	X	X	X	X	X
30G00301	MC153005		water	10-16-96	X	X	X	X	X
30G00401	MC153006		water	10-16-96	X	X	X	X	X
66R02201	MC153007	R	water	10-16-96	X	X	X	X	X
30G00301D	MC153008	FD	water	10-16-96	X	X	X	X	X
66T03401	MC176001	TB	water	10-17-96	X				
66G01101	MC176002		water	10-17-96	X	X	X	X	X
66G01301	MC176003		water	10-17-96	X	X	X	X	X
66G00501	MC176004		water	10-18-96	X	X	X	X	X
66G00501F	MC176005		water	10-18-96				X	
30G00301MS	MC153005MS	MS	water	10-16-96	X	X	X	X	X
30G00301MSD	MC153005MSD	MSD	water	10-16-96	X	X	X		
30G00301DUP	MC153005DUP	DUP	water	10-16-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF035 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2076A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03501	MC214001	TB	water	10-21-96	X				
66G00401	MC214002		water	10-21-96	X	X	X	X	X
66G01601	MC214003		water	10-22-96	X	X	X	X	X
66G01501	MC214004		water	10-22-96	X	X	X	X	X
66G01701	MC214005		water	10-23-96	X	X	X	X	X
66R02301	MC214006	R	water	10-23-96	X	X	X	X	X
66G01701D	MC214007	FD	water	10-23-96	X	X	X	X	X
66T03601	MC231001	TB	water	10-24-96	X				
66G00101	MC231002		water	10-24-96	X	X	X	X	X
08G00101	MC231003		water	10-24-96	X	X	X	X	X
66G01001	MC231004		water	10-25-96	X	X	X	X	X
66G01701MS	MC214005MS	MS	water	10-23-96	X	X	X	X	X
66G01701MSD	MC214005MSD	MSD	water	10-23-96	X	X	X		
66G01701DUP	MC214005DUP	DUP	water	10-23-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF036 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2077A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
66T03701	MC262001	TB	water	10-28-96	X				
66G00701	MC262002		water	10-29-96	X	X	X	X	X
54G00201	MC262003		water	10-29-96	X	X	X	X	X
54G00101	MC262004		water	10-30-96	X	X	X	X	X
31G00201	MC262005		water	10-30-96	X	X	X	X	X
31G00201F	MC262006		water	10-30-96				X	
54R02401	MC262007	R	water	10-30-96	X	X	X	X	X
54G00101D	MC262008	FD	water	10-30-96	X	X	X	X	X
31T03801	MC284001	TB	water	10-31-96	X				
31G00301	MC284002		water	10-31-96	X	X	X	X	X
31G00402	MC284003		water	10-31-96	X	X	X	X	X
31G00403	MC284004		water	11-1-96	X	X	X	X	X
54G00101MS	MC262004MS	MS	water	10-30-96	X	X	X	X	X
54G00101MSD	MC262004MSD	MSD	water	10-30-96	X	X	X		
54G00101DUP	MC262004DUP	DUP	water	10-30-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF037 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2071A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
15T03901	MC424001	TB	water	11-18-96	X				
15G00502	MC424002		water	11-18-96	X				
15G00503	MC424003		water	11-18-96	X				
16G00202	MC424004		water	11-19-96	X				
16G00203	MC424005		water	11-19-96	X				
15G00802	MC424006		water	11-20-96	X				
15G00803	MC424007		water	11-20-96	X				
15G00803D	MC424008	FD	water	11-20-96	X				
15R02501	MC424009	R	water	11-20-96	X				
15F00201	MC424010		water	11-20-96	X	X	X	X	X
16G00702	MC448001		water	11-21-96	X				
16G00703	MC448002		water	11-21-96	X				
16G00403	MC448003		water	11-22-96	X				
16T04001	MC448004	TB	water	11-21-96	X				
15G00803MS	MC424007MS	MS	water	11-20-96	X				
15G00803MSD	MC424007MSD	MSD	water	11-20-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF038 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2099A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
36T04101	MC687001	TB	water	12-17-96	X
36BO0101	MC687002		soil	12-17-96	X
36BO0102	MC687003		soil	12-17-96	X
36BO0103	MC687004		soil	12-17-96	X
36BO0201	MC687005		soil	12-17-96	X
36BO0202	MC687006		soil	12-17-96	X
36BO0203	MC687007		soil	12-17-96	X
36BO0301	MC687008		soil	12-17-96	X
36BO0302	MC687009		soil	12-17-96	X
36BO0303	MC687010		soil	12-17-96	X
36BO0303D	MC687011	FD	soil	12-17-96	X
36BO0401	MC687012		soil	12-18-96	X
36BO0401DL	MC687012DL		soil	12-18-96	X
36BO0402	MC687013		soil	12-18-96	X
36BO0403	MC687014		soil	12-18-96	X
36BO0403D	MC687015	FD	soil	12-18-96	X
36RO2601	MC687016	R	water	12-18-96	X
36BO0303MS	MC687011MS	MS	soil	12-17-96	X
36BO0303MSD	MC687011MSD	MSD	soil	12-17-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF039 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2102A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4201	MC698001	TB	water	12-19-96	X
35BO0101	MC698002		soil	12-20-96	X
35BO0102	MC698003		soil	12-20-96	X
35BO0102DL	MC698003DL		soil	12-20-96	X
35BO0103	MC698004		soil	12-20-96	X
35BO0104	MC698005		soil	12-20-96	X
35BO0105	MC698006		soil	12-20-96	X
35BO0106	MC698007		soil	12-21-96	X
35BO0201	MC698008		soil	12-21-96	X
35BO0202	MC698009		soil	12-21-96	X
35BO0203	MC698010		soil	12-21-96	X
35RO2701	MC698011	R	water	12-21-96	X
35BO0301	MC698012		soil	12-21-96	X
35BO0302	MC698013		soil	12-21-96	X
35BO0303	MC698014		soil	12-21-96	X
35BO0302D	MC698015	FD	soil	12-21-96	X
35BO0203D	MC698016	FD	soil	12-21-96	X
35BO0203MS	MC698010MS	MS	soil	12-21-96	X
35BO0203MSD	MC698010MSD	MSD	soil	12-21-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF040 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2120A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4301	MC783001	TB	water	1-7-97	X
35BO0401	MC783002		soil	1-7-97	X
35BO0402	MC783003		soil	1-7-97	X
35BO0403	MC783004		soil	1-7-97	X
35BO0501	MC783005		soil	1-7-97	X
35BO0501DL	MC783005DL		soil	1-7-97	X
35BO0502	MC783006		soil	1-7-97	X
35BO0503	MC783007		soil	1-7-97	X
35BO0201	MC783008		soil	1-8-97	X
35BO0202	MC783009		soil	1-8-97	X
35BO0203	MC783010		soil	1-8-97	X
35BO0101	MC783011		soil	1-8-97	X
35BO0102	MC783012		soil	1-8-97	X
35BO0103	MC783013		soil	1-8-97	X
35BO0301	MC783014		soil	1-9-97	X
35BO0302	MC783015		soil	1-9-97	X
35BO0303	MC783016		soil	1-9-97	X
35R02801	MC783017	R	water	1-9-97	X
35BO0203D	MC783018	FD	soil	1-8-97	X
35BO0103D	MC783019	FD	soil	1-8-97	X
35BO0203MS	MC783010MS	MS	soil	1-8-97	X
35BO0203MSD	MC783010MSD	MSD	soil	1-8-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF041 | VALIDATION SAMPLE TABLE | LDC#: 2323A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)
35T04501	MD908001	TB	water	6-11-97	X			
35F00301	MD908002		water	6-11-97	X	X	X	X
35R03001	MD908003	R	water	6-11-97	X	X	X	X
35G00101	MD908004		water	6-11-97	X	X	X	X
35G00101D	MD908005	FD	water	6-11-97	X	X	X	X
35G00101DRE	MD908005RE	FD	water	6-11-97		X		
35G00103	MD908006		water	6-11-97	X	X	X	X
35G00103F	MD908007		water	6-11-97				X
35G00102	MD908008		water	6-12-97	X	X	X	X
37G00102	MD908009		water	6-12-97	X	X	X	X
37T04601	MD926001	TB	water	6-12-97	X			
36G00101	MD926002		water	6-12-97	X	X	X	X
36G00101F	MD926003		water	6-12-97				X
37G00101	MD926004		water	6-12-97	X	X	X	X
36G00102	MD926005		water	6-13-97	X	X	X	X
36G00102RE	MD926005RE		water	6-13-97		X		
36G00103	MD926006		water	6-13-97	X	X	X	X
36G00103RE	MD926006RE		water	6-13-97		X		
35T04701	MD950001	TB	water	6-15-97	X			
35G00202	MD950002		water	6-15-97	X	X	X	X
35G00202D	MD950003	FD	water	6-15-97	X	X	X	X
35G00203	MD950004		water	6-15-97	X	X	X	X
35G00201	MD950005		water	6-16-97	X	X	X	X
35G00201F	MD950006		water	6-16-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF041 **VALIDATION SAMPLE TABLE** **LDC#:** 2323A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)
13T04801	MD985001	TB	water	6-16-97	X			
13G00301	MD985002		water	6-16-97	X	X	X	X
13G00301F	MD985003		water	6-16-97				X
13G00401	MD985004		water	6-16-97	X	X	X	X
35G00101MS	MD908004MS	MS	water	6-11-97	X	X	X	X
35G00101MSD	MD908004MSD	MSD	water	6-11-97	X	X	X	
35G00101DUP	MD908004DUP	DUP	water	6-11-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF042 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2311A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
05T04901	ME007001	TB	water	6-18-97	X
05G00301	ME007002		water	6-17-97	X
05G00901	ME007003		water	6-18-97	X
05G00902	ME007004		water	6-19-97	X
05G00902D	ME007005	FD	water	6-19-97	X
05R03101	ME007006	R	water	6-17-97	X
05T05001	ME021001		water	6-20-97	X
05G01001	ME021002		water	6-20-97	X
05G01002	ME021003		water	6-20-97	X
05G00902MS	ME007004MS	MS	water	6-19-97	X
05G00902MSD	ME007004MSD	MSD	water	6-19-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF043 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2315A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
05T05101	ME042001	TB	water	6-23-97	X
05R03201	ME042002	R	water	6-23-97	X
05G00801	ME042003		water	6-24-97	X
05G00802	ME042004		water	6-24-97	X
05G00802D	ME042005	FD	water	6-24-97	X
33T05201	ME053001	TB	water	6-24-97	X
33G00501	ME053002		water	6-24-97	X
33G00101	ME053003		water	6-24-97	X
33G00201	ME053004		water	6-25-97	X
33G00301	ME053005		water	6-25-97	X
33G00301DL	ME053005DL		water	6-25-97	X
33T05301	ME073001	TB	water	6-25-97	X
06G00102	ME073002		water	6-26-97	X
06G00301	ME073003		water	6-26-97	X
33G00401	ME073004		water	6-26-97	X
30T05401	ME087001	TB	water	6-26-97	X
07G00101	ME087002		water	6-26-97	X
07G00101D	ME087003	FD	water	6-26-97	X
30G00501	ME087004		water	6-26-97	X
30G00301	ME087005		water	6-27-97	X
30G00401	ME087006		water	6-27-97	X
05G00802MS	ME042004MS	MS	water	6-24-97	X
05G00802MSD	ME042004MSD	MSD	water	6-24-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF044 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2322A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
06T05501	ME100001	TB	water	6-29-97	X
06R03301	ME100002	R	water	6-29-97	X
66G00201	ME100003		water	6-29-97	X
06G00101	ME100004		water	6-29-97	X
66G00202	ME100005		water	6-30-97	X
66T05601	ME110001	TB	water	6-30-97	X
66G01201	ME110002		water	6-30-97	X
66G01201D	ME110003	FD	water	6-30-97	X
66G00102	ME110004		water	7-1-97	X
66G01301	ME110005		water	7-1-97	X
66T05701	ME133001	TB	water	7-2-97	X
66G00401	ME133002		water	7-2-97	X
66G02001	ME133003		water	7-2-97	X
66T05801	ME135001	TB	water	7-2-97	X
66G00603	ME135002		water	7-2-97	X
66G00603D	ME135003	FD	water	7-2-97	X
66G00604	ME135004		water	7-2-97	X
66G00601	ME135005		water	7-3-97	X
66G00602	ME135006		water	7-3-97	X
66G01201MS	ME110002MS	MS	water	6-30-97	X
66G01201MSD	ME110002MSD	MSD	water	6-30-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF045 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2345A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide
OWT05901	ME149001	TB	water	7-7-97	X				
OWR03401	ME149002	R	water	7-7-97	X	X	X	X	X
OWG00501	ME149003		water	7-8-97	X	X	X	X	X
OWG00502	ME149004		water	7-8-97	X	X	X	X	X
OWG00502D	ME149005	FD	water	7-8-97	X	X	X	X	X
OWG00503	ME149006		water	7-8-97	X	X	X	X	X
OWG00503F	ME149007		water	7-8-97				X	
OWT06001	ME159001	TB	water	7-8-97	X				
OWG00101	ME159002		water	7-9-97	X	X	X	X	X
OWG00101RE	ME159002RE		water	7-9-97		X			
OWG00102	ME159003		water	7-9-97	X	X	X	X	X
OWG00102RE	ME159003RE		water	7-9-97		X			
OWG00103	ME159004		water	7-9-97	X	X	X	X	X
OWG00103RE	ME159004RE		water	7-9-97		X			
66T06101	ME175001	TB	water	7-9-97	X				
66G02301	ME175002		water	7-9-97	X	X	X	X	X
66G02301RE	ME175002RE		water	7-9-97		X			
66G02302	ME175003		water	7-9-97	X	X	X	X	X
66G02303	ME175004		water	7-10-97	X	X	X	X	X
OWT06201	ME190001	TB	water	7-10-97	X				
OWG00302	ME190002		water	7-10-97	X	X	X	X	X
OWG00302D	ME190003	FD	water	7-10-97	X	X	X	X	X
OWG00303	ME190004		water	7-10-97	X	X	X	X	X
OWG00301	ME190005		water	7-11-97	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF045 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2345A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)	Cyanide
OWG00301F	ME190006		water	7-11-97				X	
OWT06401	ME226001	TB	water	7-14-97	X				
OWT06401DL	ME226001DL		water	7-14-97	X				
OWG00401	ME226002		water	7-14-97	X	X	X	X	X
OWG00201	ME226003		water	7-15-97	X	X	X	X	X
OWG00502MS	ME149004MS	MS	water	7-8-97	X	X	X	X	X
OWG00502MSD	ME149004MSD	MSD	water	7-8-97	X	X	X		
OWG00502DUP	ME149004DUP	DUP	water	7-8-97				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF046 **VALIDATION SAMPLE TABLE** **LDC#:** 2377A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (4.0)	Cyanide
OWT06501	ME241001	TB	water	7-15-97	X				
31R03301	ME241002	R	water	7-15-97	X	X	X	X	X
31G00101	ME241003		water	7-15-97	X	X	X	X	X
31G00101D	ME241004	FD	water	7-15-97	X	X	X	X	X
OWT06601	ME261001	TB	water	7-16-97	X				
31G00401	ME261002		water	7-16-97	X	X	X	X	X
31G00402	ME261003		water	7-16-97	X				
31G00403	ME261004		water	7-16-97	X				
31G00301	ME261005		water	7-16-97	X				
31T06701	ME305001	TB	water	7-21-97	X				
31G00201	ME305002		water	7-21-97	X				
31G00101MS	ME241003MS	MS	water	7-15-97	X	X	X	X	
31G00101MSD	ME241003MSD	MSD	water	7-15-97	X	X	X		
31G00101DUP	ME241003DUP	DUP	water	7-15-97				X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF047 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2346A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA OLV01.0	Metals (2.1)
39W028	ME243001		water	7-15-97	X	
39W027	ME243002		water	7-15-97	X	
39W024	ME243003		water	7-15-97	X	
39W032	ME243004		water	7-15-97	X	X
39W034	ME243005		water	7-15-97	X	X
39W034D	ME243006		water	7-15-97	X	X
39W031	ME243007		water	7-15-97	X	
STOR_BLK	ME243008		water	7-17-97	X	
39T10001	ME244001	TB	water	7-15-97	X	
39W001	ME244002		water	7-15-97	X	
39W002	ME244003		water	7-15-97	X	X
39W003	ME244004		water	7-15-97	X	
39W004	ME244005		water	7-15-97	X	
39W005	ME244006		water	7-15-97	X	
39W006	ME244007		water	7-15-97	X	
39W007	ME244008		water	7-15-97	X	
39W008	ME244009		water	7-15-97	X	
39W014	ME267001		water	7-16-97	X	
39W015	ME267002		water	7-16-97	X	
39W016	ME267003		water	7-16-97	X	X
39W012	ME267004		water	7-16-97	X	
39W012D	ME267005	FD	water	7-16-97	X	
39W013	ME267006		water	7-16-97	X	
39W017	ME267007		water	7-16-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF047 **VALIDATION SAMPLE TABLE** **LDC#:** 2346A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA OLV01.0	Metals (2.1)
STOR_BLK2	ME267008		water	7-18-97	X	
39W034MS	ME243005MS	MS	water	7-15-97	X	X
39W034MSD	ME243005MSD	MSD	water	7-15-97	X	
39W034DUP	ME243005DUP	DUP	water	7-15-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF048 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2338A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
39D002	ME245001		soil	7-15-97	X
39D001	ME245002		soil	7-15-97	X
39D007	ME245003		soil	7-15-97	X
39D023	ME264001		soil	7-16-97	X
39D026	ME264002		soil	7-16-97	X
39D016	ME264003		soil	7-16-97	X
39D013	ME264004		soil	7-16-97	X
39D019	ME264005		soil	7-17-97	X
39D018	ME264006		soil	7-17-97	X
39D018D	ME264007	FD	soil	7-17-97	X
39D022	ME264008		soil	7-17-97	X
39R03401	ME264009	R	water	7-16-97	X
39D018MS	ME264006MS	MS	soil	7-17-97	X
39D018MSD	ME264006MSD	MSD	soil	7-17-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF049 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2347A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)
39T10201	ME262001	TB	water	7-15-97	X	
39W023	ME262002		water	7-16-97	X	
39W026	ME262003		water	7-16-97	X	
39W025	ME262004		water	7-16-97	X	
39W029	ME262005		water	7-16-97	X	
39W030	ME262006		water	7-16-97	X	
39U001	ME262007		water	7-16-97	X	X
39W018	ME263001		water	7-17-97	X	
39W019	ME263002		water	7-17-97	X	
39W020	ME263003		water	7-17-97	X	
39W021	ME263004		water	7-17-97	X	
39W021D	ME263005	FD	water	7-17-97	X	
39W022	ME263006		water	7-17-97	X	
39T10401	ME263007	TB	water	7-17-97	X	
39W021MS	ME263004MS	MS	water	7-17-97	X	
39W021MSD	ME263004MSD	MSD	water	7-17-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF051 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2360A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16T06801	ME306001	TB	water	7-21-97	X	
16R03501	ME306002	R	water	7-21-97	X	
16G00401	ME306003		water	7-22-97	X	
16G00401D	ME306004	FD	water	7-22-97	X	
16G00402	ME306005		water	7-22-97	X	
16G00403	ME306006		water	7-22-97	X	
16T06901	ME322001	TB	water	7-22-97	X	
16G00302	ME322002		water	7-22-97	X	X
16G00303	ME322003		water	7-22-97	X	X
16G00202	ME322004		water	7-23-97	X	X
16G00203	ME322005		water	7-23-97	X	X
16T07001	ME340001	TB	water	7-23-97	X	
16G00601	ME340002		water	7-23-97	X	X
16G00601F	ME340003		water	7-23-97		X
16G00602	ME340004		water	7-23-97	X	X
16R03601	MW340005	R	water	7-23-97		X
16G00304	ME340006		water	7-24-97	X	X
16G00304F	ME340007		water	7-24-97		X
16G00301	ME340008		water	7-24-97	X	X
16G00101	ME340009		water	7-24-97	X	X
16G00101D	ME340010	FD	water	7-24-97	X	X
16T07101	ME348001	TB	water	7-25-97	X	
16G00702	ME348002		water	7-25-97	X	X
16G00702DL	ME348002DL		water	7-25-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF051 **VALIDATION SAMPLE TABLE** **LDC#:** 2360A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16G00703	ME348003		water	7-25-97	X	X
16G00703DL	ME348003DL		water	7-25-97	X	
16G00701	ME348004		water	7-25-97	X	X
16G00401MS	ME306003MS	MS	water	7-22-97	X	
16G00401MSD	ME306003MSD	MSD	water	7-22-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

ble 1

SDG#: WF052 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2354A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (OLV01.0)
39018	ME346001		water	7-25-97	X
39019	ME346002		water	7-25-97	X
39020	ME346003		water	7-25-97	X
39021	ME346004		water	7-25-97	X
39020D	ME346005	FD	water	7-25-97	X
39029	ME346006		water	7-25-97	X
39T10501	ME346007	TB	water	7-25-97	X
STORAGEBLK	ME346008		water	7-26-97	X
39020MS	ME346003MS	MS	water	7-25-97	X
39020MSD	ME346003MSD	MSD	water	7-25-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053 **VALIDATION SAMPLE TABLE** **LDC#:** 2384A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15T07201	ME367001	TB	water	7-27-97	X	
15R03701	ME367002	R	water	7-27-97	X	X
15G00601	ME367003		water	7-27-97	X	X
15G00602	ME367004		water	7-27-97	X	X
15G00602D	ME367005	FD	water	7-27-97	X	X
15T07301	ME377001	TB	water	7-28-97	X	
15G00201	ME377002		water	7-28-97	X	X
15G00101	ME377003		water	7-28-97	X	X
15G00202	ME377004		water	7-29-97	X	X
15G00203	ME377005		water	7-29-97	X	X
15T07401	ME390001	TB	water	7-29-97	X	
15G00301	ME390002		water	7-29-97	X	X
15G00302	ME390003		water	7-29-97	X	X
15G00701	ME390004		water	7-30-97	X	X
15G00702	ME390005		water	7-30-97	X	X
15T07501	ME404001	TB	water	7-30-97	X	
15G00401	ME404002		water	7-30-97	X	X
15G00703	ME404003		water	7-30-97	X	X
15G00703D	ME404004	FD	water	7-30-97	X	X
15G00501	ME404005		water	7-31-97	X	X
15G00501F	ME404006		water	7-31-97		X
15G00502	ME404007		water	7-31-97	X	X
15G00503	ME404008		water	7-31-97	X	X
15G00602MS	ME367004MS	MS	water	7-27-97	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

le 1

SDG#: WF053 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2384A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15G00602MSD	ME367004MSD	MSD	water	7-27-97	X	
15G00602DUP	ME367004DUP	DUP	water	7-27-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF054 **VALIDATION SAMPLE TABLE** **LDC#:** 2399A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15T07601	ME441001	TB	water	8-4-97	X	
15G00801	ME441002		water	8-4-97	X	X
15G00801D	ME441003	FD	water	8-4-97	X	X
15G00802	ME441004		water	8-4-97	X	X
15R03801	ME441005	R	water	8-5-97	X	X
15G00803	ME441006		water	8-5-97	X	X
15G00303	ME441007		water	8-5-97	X	X
30T07701	ME450001	TB	water	8-5-97	X	
30R03901	ME450002	R	water	8-6-97	X	X
30G00302	ME450003		water	8-6-97	X	X
15G00801MS	ME441002MS	MS	water	8-4-97	X	X
15G00801MSD	ME441002MSD	MSD	water	8-4-97	X	
15G00801DUP	ME441002DUP	DUP	water	8-4-97		X

TR = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

le 1

SDG#: WF055 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2511A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
OWT08001	MF004001	TB	water	10-27-97	X
OWR04101	MF004002	R	water	10-27-97	X
OWG00401	MF004003		water	10-27-97	X
OWG00401D	MF004004		water	10-27-97	X
13R04201	MF004005	R	water	10-28-97	X
13G00401	MF004006		water	10-28-97	X
OWG00401MS	MF004003MS	MS	water	10-27-97	X
OWG00401MSD	MF004003MSD	MSD	water	10-27-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF022	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBS	All samples	No rejected results	-
WF023	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF024	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF025	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF026	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF027	Volatiles	16G00501	2-Butanone	Initial & Continuing Calibration (RRF)
		16G00501D	2-Butanone	
		16R01501	2-Butanone	
		66G02101	2-Butanone	
		66G02103	2-Butanone	
		66T02001	2-Butanone	
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF028	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF029	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF030	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF031	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF031B	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF032	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	29G00501	Heptachlor epoxide	Target compound identification (RT)
		29G00501D	Heptachlor epoxide	
WF033	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF034	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF035	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF036	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF037	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF038	Volatiles	All samples	No rejected results	-
WF039	Volatiles	All samples	No rejected results	-
WF040	Volatiles	All samples	No rejected results	-
WF041	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF042	Volatiles	All samples	No rejected results	-
WF043	Volatiles	All samples	No rejected results	-
WF044	Volatiles	All samples	No rejected results	-
WF045	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF046	Volatiles	All samples	No rejected results	-
	Semivolatiles	All samples	No rejected results	-
	Pesticides & PCBs	All samples	No rejected results	-
WF047	Volatiles	39T10001	Acetone & 2-Butanone	Initial & Continuing Calibration (RRF)
		39W001	Acetone & 2-Butanone	
		39W002	Acetone & 2-Butanone	
		39W003	Acetone & 2-Butanone	
		39W004	Acetone & 2-Butanone	
		39W005	Acetone & 2-Butanone	
		39W006	Acetone & 2-Butanone	
		39W007	Acetone & 2-Butanone	
		39W008	2-Butanone	
		39W012	Acetone & 2-Butanone	
		39W012D	Acetone & 2-Butanone	
		39W013	Acetone & 2-Butanone	
		39W014	Acetone & 2-Butanone	
		39W015	Acetone & 2-Butanone	
		39W016	Acetone & 2-Butanone	
		39W017	Acetone & 2-Butanone	
		39W024	2-Butanone	
		39W027	2-Butanone	
		39W028	2-Butanone	
		39W031	2-Butanone	
		39W032	Acetone & 2-Butanone	
		39W034	2-Butanone	
		39W034D	Acetone & 2-Butanone	
		STOR_BLK	2-Butanone	
		STOR_BLK2	2-Butanone	
WF048	Volatiles	All samples	No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF049	Volatiles	39T10201 39T10401 39W018 39W019 39W020 39W021 39W021D 39W022 39W023 39W025 39W026 39W029 39W030	Acetone & 2-Butanone Acetone & 2-Butanone Acetone 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing calibration (RRF)
WF049	Semivolatiles	All samples	No rejected results	-
WF051	Volatiles	All samples	No rejected results	-
WF052	Volatiles	39G018 39G019 39G020 39G020D 39G021 39G029 39R10501 STORAGE BLK	Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone	Initial & Continuing Calibration (RRF)
WF053	Volatiles	All samples	No rejected results	-
WF054	Volatiles	All samples	No rejected results	-
WF055	Volatiles	All samples	No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF022	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF023	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF024	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF025	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF026	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF027	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF028	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF029	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF030	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF031	All metals	All samples	No rejected results	-
	Cyanide	05G00101	Cyanide	Matrix spike (%R)
		05G00301	Cyanide	
		05G00801	Cyanide	
		05G00802	Cyanide	
		05G00901	Cyanide	
		05G00902	Cyanide	
		05G01001	Cyanide	
		05G01001D	Cyanide	
		05G01002	Cyanide	
		05R01901	Cyanide	
		33G00101	Cyanide	
		33G00201	Cyanide	
		33G00301	Cyanide	
		33G00301D	Cyanide	
		33G00501	Cyanide	
WF031B	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF032	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF033	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF034	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF035	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF036	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-
WF037	All metals	All samples	No rejected results	-
	Cyanide	15F00201	Cyanide	Matrix spike (%R)
WF041	All metals	All samples	No rejected results	-
	Cyanide	All samples	No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF045	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF046	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF047	All metals	All samples	No rejected results	-
WF051	All metals	All samples	No rejected results	-
WF053	All metals	All samples	No rejected results	-
WF054	All metals	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF022	BKG00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	108	115	-	J (all detects)
		4-Nitrophenol	10-80	-	88	93	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	100	108	-	J (all detects)
		Pentachlorophenol	9-103	-	106	118	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF023	02G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	82	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	97	-	-	J (all detects)
		Pentachlorophenol	9-103	-	139	122	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF024	15G00701	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	100	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	102	106	-	J (all detects)
		Pentachlorophenol	9-103	-	147	148	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF025	15G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	99	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	101	103	-	J (all detects)
		Pentachlorophenol	9-103	-	124	130	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF026	15G00803	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	99	-	-	J (all detects)
		4-Nitrophenol	10-80	-	108	114	-	J (all detects)
		Pentachlorophenol	9-103	-	140	144	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF027	16G00501	Volatiles						
		Benzene	-	≤11	-	-	12	J
		Semivolatiles						
		4-Nitrophenol	10-80	-	91	91	-	J (all detects)
		Pentachlorophenol	9-103	-	104	104	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF028	12G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	83	-	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF029	14G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	91	-	J (all detects)
		Pentachlorophenol	9-103	-	-	106	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF030	66G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	85	89	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF031	05G01001	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Phenol	-	≤42	-	-	50	None
		2-Chlorophenol	-	≤40	-	-	50	None
		4-Chloro-3-methylphenol	-	≤42	-	-	51	None
		4-Nitrophenol	10-80	≤50	-	95	58	None
		Pentachlorophenol	-	≤50	-	-	52	None
		1,4-Dichlorobenzene	-	≤28	-	-	45	J
		N-Nitroso-di-n-propylamine	-	≤38	-	-	56	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	41	J
		Acenaphthene	-	≤31	-	-	84	J
		2,4-Dinitrotoluene	-	≤38	-	-	52	J
		Pyrene	-	≤31	-	-	54	J
		Pesticides/PCBs	-	-	-	-	-	None
WF031B	None	Volatiles	-	-	-	-	-	-
		Semivolatiles	-	-	-	-	-	-
		Pesticides/PCBs	-	-	-	-	-	-
WF032	29G00501	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF033	66G00201	Volatiles						
		1,1-Dichloroethene	-	≤14	-	-	16	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	-	83	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF034	30G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Acenaphthene	46-118	≤31	44	-	37	None
		1,4-Dichlorobenzene	-	≤28	-	-	33	None
		1,2,4-Trichlorobenzene	-	≤28	-	-	34	None
		2,4-Dinitrotoluene	-	≤38	-	-	40	None
		Pyrene	-	≤31	-	-	36	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF034 cont.	30G00301	Pesticides/PCBs	-	-	-	-	-	None
WF035	66G01701	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF036	54G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	101	81	-	None
		1,4-Dichlorobenzene	-	≤28	-	-	30	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	36	J
		Pesticides/PCBs	-	-	-	-	-	None
WF037	15G00803	Volatiles	-	-	-	-	-	None
WF038	36BO0303	Volatiles	-	-	-	-	-	None
WF039	35BO0203	Volatiles	-	-	-	-	-	None
WF040	37BO0203	Volatiles	-	-	-	-	-	None
WF041	35G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides & PCBs						
		Aldrin	40-120	-	124	121	-	J (all detects)
WF042	05G00902	Volatiles	-	-	-	-	-	None
WF043	05G00802	Volatiles	-	-	-	-	-	None
WF044	66G01201	Volatiles						
		Trichloroethene	-	≤14	-	-	40	None
WF045	OWG00502	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	96	109	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF045 cont.	OWG00502	Pesticides & PCBs						
		gamma-BHC	-	≤15	-	-	28	J
		Heptachlor	-	≤20	-	-	24	J
		Aldrin	40-120	≤22	-	128	29	J
		Dieldrin	52-126	≤18	-	134	22	J
		Endrin	56-121	≤21	-	144	22	J
WF046	31G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	96	-	J (all detects)
		Pesticides & PCBs						
		Endrin	56-121	-	127	-	-	J (all detects)
WF047	39W034	Volatiles	-	-	-	-	-	None
WF048	39D018	Volatiles	-	-	-	-	-	None
WF049	39W021	Volatiles	-	-	-	-	-	None
	None	Semivolatiles	-	-	-	-	-	None
WF051	16G00401	Volatiles	-	-	-	-	-	None
WF052	39020	Volatiles	-	-	-	-	-	None
WF053	15G00602	Volatiles	-	-	-	-	-	None
WF054	15G00801	Volatiles	-	-	-	-	-	None
WF055	13G00401	Volatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF022	**Client ID**	**BKG00101**	**BKG00101D**	
	Laboratory ID	**RB858003**	**RB858004**	
	Collection Date	**7/16/96**	**7/16/96**	
	Acetone	ND	8 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF022	**Client ID**	**01G00102**	**01G00102D**	
	Laboratory ID	**RB873008**	**RB873009**	
	Collection Date	**7/19/96**	**7/19/96**	
	Acetone	4 ug/L	2 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF023	**Client ID**	**02G00301**	**02G00301D**	
	Laboratory ID	**RB887012**	**RB887013**	
	Collection Date	**7/24/96**	**7/24/96**	
	Acetone	ND	10 ug/L	Not calculable
	Carbon disulfide	1 ug/L	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF024	**Client ID**	**15G00701**	**15G00701D**	
	Laboratory ID	**RB920009**	**RB920010**	
	Collection Date	**7/31/96**	**7/31/96**	
	Acetone	2	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF025	**Client ID**	**15G00601**	**15G00601D**	
	Laboratory ID	**RB956006**	**RB956008**	
	Collection Date	**8/7/96**	**8/7/96**	
	Acetone	5 ug/L	8 ug/L	46
	1,2-Dichloroethene (total)	1 ug/L	1 ug/L	0
	Chlorobenzene	5 ug/L	5 ug/L	0
	Ethylbenzene	10U ug/L	1 ug/L	Not calculable
	1,4-Dichlorobenzene	12 ug/L	12 ug/L	0
	Naphthalene	4 ug/L	4 ug/L	0
	Diethylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	-
WF026	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**RB980007**	**RB980008**	
	Collection Date	**8/14/96**	**8/14/96**	
	Acetone	25 ug/L	5 ug/L	133
	2-Butanone	7 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	4 ug/L	0
	Bis(2-ethylhexyl)phthalate	2 ug/L	1 ug/L	67
	4,4'-DDT	0.16 ug/L	0.079 ug/L	68

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF026	**Client ID**	**16G00403**	**16G00403D**	
	Laboratory ID	**RB980020**	**RB980021**	
	Collection Date	**8/16/96**	**8/16/96**	
	Acetone	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	1 ug/L	2 ug/L	67
	Benzene	600 ug/L	600 ug/L	0
	Phenol	8 ug/L	8 ug/L	0
	Naphthalene	1 ug/L	2 ug/L	67
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF026	**Client ID**	**16G00403DL**	**16G00403DDL**	
	Laboratory ID	**RB980020DL**	**RB9890021DL**	
	Collection Date	**8/16/96**	**8/16/96**	
	Acetone	18 ug/L	24 ug/L	29
	Benzene	700 ug/L	740 ug/L	6
WF027	**Client ID**	**16G00501**	**16G00501D**	
	Laboratory ID	**RC016009**	**RC016013**	
	Collection Date	**8/21/96**	**8/21/96**	
	Volatiles	ND	ND	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF027	**Client ID**	**09G00301**	**09G00301D**	
	Laboratory ID	**RC016019**	**RC016020**	
	Collection Date	**8/23/96**	**8/23/96**	
	Acetone	46 ug/L	18 ug/L	88
	2-Butanone	2 ug/L	10U ug/L	Not calculable
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF028	**Client ID**	**11G00201**	**11G00201D**	
	Laboratory ID	**RC044011**	**RC044018**	
	Collection Date	**8/28/96**	**8/28/96**	
	Acetone	5 ug/L	11 ug/L	75
	Phenol	4 ug/L	6 ug/L	40
	Bis(2-ethylhexyl)phthalate	5 ug/L	4 ug/L	22
	Pesticides/PCBs	ND	ND	None
WF028	**Client ID**	**12G00101**	**12G00101D**	
	Laboratory ID	**RC044012**	**RC044017**	
	Collection Date	**8/27/96**	**8/27/96**	
	Acetone	3 ug/L	6 ug/L	67
	Bis(2-ethylhexyl)phthalate	2 ug/L	2 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Acetone	8 ug/L	4 ug/L	67
	Carbon disulfide	3 ug/L	10U ug/L	Not calculable
	Methylene chloride	1 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	4 ug/L	4 ug/L	0
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Acetone	2 ug/L	8 ug/L	120
	Methylene chloride	2 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	3 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Acetone	4 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	1,1-Dichloroethene	5 ug/L	6 ug/L	18
	1,2-Dichloroethene (total)	4 ug/L	3 ug/L	29
	Trichloroethene	300 ug/L	300 ug/L	0
	Di-n-butylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Trichloroethene	1 ug/L	1 ug/L	0
	Toluene	1 ug/L	1 ug/L	0
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	1,2-Dichloroethene (total)	31 ug/L	31 ug/L	0
	Trichloroethene	340 ug/L	340 ug/L	0
	Di-n-butylphthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Volatiles	ND	ND	None
	Di-n-butylphthalate	3 ug/L	2 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Volatiles	ND	ND	None
	Diethylphthalate	1 ug/L	10U ug/L	Not calculable
	Di-n-butylphthalate	1 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF037	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**MC424007**	**MC424008**	
	Collection Date	**11/20/96**	**11/20/96**	
	Trichloroethene	5 ug/L	5 ug/L	0
WF038	**Client ID**	**36BO0303**	**36BO0303D**	
	Laboratory ID	**MC687010**	**MC687011**	
	Collection Date	**12/17/96**	**12/17/96**	
	Volatiles	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF038	**Client ID**	**36BO0403**	**36BO0403D**	
	Laboratory ID	**MC687014**	**MC687015**	
	Collection Date	**12/18/96**	**12/18/96**	
	Volatiles	ND	ND	None
WF039	**Client ID**	**35BO0302**	**35BO0302D**	
	Laboratory ID	**MC698013**	**MC698015**	
	Collection Date	**12/21/96**	**12/21/96**	
	Volatiles	ND	ND	None
WF039	**Client ID**	**35BO0203**	**35BO0203D**	
	Laboratory ID	**MC698010**	**MC698016**	
	Collection Date	**12/21/96**	**12/21/96**	
	Volatiles	ND	ND	None
WF040	**Client ID**	**37BO0203**	**37BO0203D**	
	Laboratory ID	**MC783010**	**MC783018**	
	Collection Date	**1/8/97**	**1/8/97**	
	Acetone	14 ug/Kg	12 ug/Kg	15
	Methylene chloride	2 ug/Kg	10 ug/Kg	133
WF040	**Client ID**	**37BO0103**	**37BO0103D**	
	Laboratory ID	**MC783013**	**MC783019**	
	Collection Date	**1/8/97**	**1/8/97**	
	Acetone	18 ug/Kg	22 ug/Kg	20
	Methylene chloride	3 ug/Kg	11 ug/Kg	114
WF041	**Client ID**	**35G00101**	**35G00101D**	
	Laboratory ID	**MD908004**	**MD908005**	
	Collection Date	**6/11/97**	**6/11/97**	
	Volatiles			
	1,1-Dichlcroethene	6 ug/L	7 ug/L	15
	1,1,1-Trichloroethane	2 ug/L	2 ug/L	0
	Xylene (total)	2 ug/L	1 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF041	**Client ID**	**35G00202**	**35G00202D**	
	Laboratory ID	**MD950002**	**MD950003**	
	Collection Date	**6/15/97**	**6/15/97**	
	Volatiles			
	Chloroform	3 ug/L	3 ug/L	0
	Semivolatiles			
	Bis(2-ethylhexyl)phthalate	10U ug/L	5 ug/L	Not calculable
	Pesticides & PCBs	ND	ND	-
WF042	**Client ID**	**05G00902**	**05G00902D**	
	Laboratory ID	**ME007004**	**ME007005**	
	Collection Date	**6/19/97**	**6/19/97**	
	Volatiles	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF043	**Client ID**	**05G00802**	**05G00802D**	
	Laboratory ID	**ME042004**	**ME042005**	
	Collection Date	**6/24/97**	**6/24/97**	
	Volatiles			
	Benzene	1 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	10U ug/L	Not calculable
	Xylenes (total)	1 ug/L	10U ug/L	Not calculable
WF043	**Client ID**	**07G00101**	**07G00101D**	
	Laboratory ID	**ME087002**	**ME087003**	
	Collection Date	**6/26/97**	**6/26/97**	
	Acetone	540 ug/L	490 ug/L	10
	Benzene	3900 ug/L	4400 ug/L	12
	Toluene	14000 ug/L	16000 ug/L	13
	Ethylbenzene	1800 ug/L	2000 ug/L	10
	Xylenes, total	3200 ug/L	3600 ug/L	12
WF044	**Client ID**	**66G01201**	**66G01201D**	
	Laboratory ID	**ME110002**	**ME110003**	
	Collection Date	**6/30/97**	**6/30/97**	
	Volatiles			
	1,1-Dichloroethene	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	3 ug/L	3 ug/L	0
	Trichloroethene	120 ug/L	96 ug/L	22
WF044	**Client ID**	**66G00603**	**66G00603D**	
	Laboratory ID	**ME135002**	**ME135003**	
	Collection Date	**7/2/97**	**7/2/97**	
	Volatiles			
	Trichloroethene	1 ug/L	1 ug/L	0
WF045	**Client ID**	**OWG00502**	**OWG00502D**	
	Laboratory ID	**ME149004**	**ME149005**	
	Collection Date	**7/8/97**	**7/8/97**	
	Volatiles			
	Acetone	3 ug/Kg	2 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF045	**Client ID**	**OWG00302**	**OWG00302D**	
	Laboratory ID	**ME190002**	**ME190003**	
	Collection Date	**7/10/97**	**7/10/97**	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	4 ug/L	6 ug/L	40
WF046	**Client ID**	**31G00101**	**31G00101D**	
	Laboratory ID	**ME241003**	**ME241004**	
	Collection Date	**7/15/97**	**7/15/97**	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	6 ug/L	3 ug/L	67

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF047	**Client ID**	**39W034**	**39W034D**	
	Laboratory ID	**ME243005**	**ME243006**	
	Collection Date	**7/15/97**	**7/15/97**	
	Volatiles			
	Acetone	4 ug/L	5U ug/L	Not calculable
	Carbon disulfide	1U ug/L	1 ug/L	Not calculable
WF047	**Client ID**	**39W012**	**39W012D**	
	Laboratory ID	**ME267004**	**ME267005**	
	Collection Date	**7/16/97**	**7/16/97**	
	Volatiles			
	Methylene chloride	2U ug/L	1 ug/L	Not calculable
	Benzene	2 ug/L	2 ug/L	0
WF048	**Client ID**	**39D018**	**39D018D**	
	Laboratory ID	**ME264006**	**ME264007**	
	Collection Date	**7/17/97**	**7/17/97**	
	Volatiles			
	Acetone	27 ug/Kg	27 ug/Kg	0
	Trichloroethene	2 ug/Kg	2 ug/Kg	0
WF049	**Client ID**	**39W021**	**39W021D**	
	Laboratory ID	**ME263004**	**ME263005**	
	Collection Date	**7/17/97**	**7/17/97**	
	Volatiles	ND	ND	-
WF051	**Client ID**	**16G00401**	**16G00401D**	
	Laboratory ID	**ME306003**	**ME306003**	
	Collection Date	**7/22/97**	**7/22/97**	
	Volatiles			
	Acetone	18 ug/L	14 ug/L	25
WF051	**Client ID**	**16G00101**	**16G00101D**	
	Laboratory ID	**ME340009**	**ME340010**	
	Collection Date	**7/24/97**	**7/24/97**	
	Volatiles	ND	ND	-
WF052	**Client ID**	**39020**	**39020D**	
	Laboratory ID	**ME346004**	**ME346005**	
	Collection Date	**7/25/97**	**7/25/97**	
	Volatiles	ND	ND	-
WF053	**Client ID**	**15G00602**	**15G00602D**	
	Laboratory ID	**ME367004**	**ME367005**	
	Collection Date	**7/27/97**	**7/27/97**	
	Volatiles			
	Trichloroethene	2 ug/L	2 ug/L	0
WF053	**Client ID**	**15G00703**	**15G00703D**	
	Laboratory ID	**ME404003**	**ME404004**	
	Collection Date	**7/30/97**	**7/30/97**	
	Volatiles			
	1,2-Trichloroethene (total)	1 ug/L	2 ug/L	67
	Trichloroethene	36 ug/L	38 ug/L	5
	1,1-Dichloroethene	2 ug/L	10U ug/L	Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF054	**Client ID**	**15G00801**	**15G00801D**	
	Laboratory ID	**ME441002**	**ME441003**	
	Collection Date	**8/4/97**	**8/4/97**	
	Volatiles			
	Chlorobenzene	4 ug/L	4 ug/L	0
WF055	**Client ID**	**OWG00401**	**OWG00401D**	
	Laboratory ID	**MF004003**	**MF004004**	
	Collection Date	**10/27/97**	**10/27/97**	
	Volatiles	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF022	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			10	
	BKR01001	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	BKG00101	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	57	60-150		J
	BKG00102	Decachlorobiphenyl	37	60-150		J
		Decachlorobiphenyl	37	60-150		J
	BKG00103	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	41	60-150		J
	BKG00202	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	BKG00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	43	60-150		J
	BKF01001	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	59	60-150		J
		Decachlorobiphenyl	51	60-150		J
		Decachlorobiphenyl	47	60-150		J
	17G00101	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	56	60-150		J
	17G00201	Decachlorobiphenyl	22	60-150		J
		Decachlorobiphenyl	21	60-150		J
	01G00102D	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	56	60-150		J
WF023	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	01G00201	Decachlorobiphenyl	32	60-150		J
		Decachlorobiphenyl	28	60-150		J
	01G00301	Decachlorobiphenyl	49	60-150		J
		Decachlorobiphenyl	47	60-150		J
	02G00101	Decachlorobiphenyl	41	60-150		J
		Decachlorobiphenyl	42	60-150		J
	16G00703	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	55	60-150		J
	18G00301	Decachlorobiphenyl	48	60-150		J
		Decachlorobiphenyl	46	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF024	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	BKG00203	Decachlorobiphenyl	52	60-150	-	J
		Decachlorobiphenyl	48	60-150	-	J
WF025	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	15G00101	Decachlorobiphenyl	21	60-150		J
		Decachlorobiphenyl	20	60-150		J
	15G00303	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
	15G00502	Tetrachloro-m-xylene	155	60-150		J (all detects)
		Tetrachloro-m-xylene	162	60-150		J (all detects)
	15R01301	Decachlorobiphenyl	59	60-150		J
	15G00502RE	Decachlorobiphenyl	53	60-150		J
		Decachlorobiphenyl	54	60-150		J
WF026	All	Volatiles	All within QC limits	-	-	None
		Semivolatiles			2	
	15G00802	2-Fluorobiphenyl	161	43-116		J (all detects) all B/N
		Terphenyl-d14	163	33-141		J (all detects) all B/N
	15G00802R	2-Fluorobiphenyl	182	43-116		J (all detects) all B/N
		Terphenyl-d14	153	33-141		J (all detects) all B/N

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF026 cont.		Pesticides/PCBs			9	
	15G00201	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	50	60-150		J
	15G00202	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	15G00801	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	38	60-150		J
	15G00803	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	16G00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	37	60-150		J
	16G00203	Decachlorobiphenyl	44	60-150		J
		Decachlorobiphenyl	43	60-150		J
	16G00403	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	39	60-150		J
	16G00403D	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	46	60-150		J
	16G00601	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	25	60-150		J
WF027	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			2	
	16G00304	Decachlorobiphenyl	46	60-150		J
		Decachlorobiphenyl	43	60-150		J
	66G02103	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
WF028	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	10G00101	Decachlorobiphenyl	50	60-150		J
		Decachlorobiphenyl	48	60-150		J
	11G00101	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	11G00301	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	24	60-150		J
	11G00401	Decachlorobiphenyl	29	60-150		J
		Decachlorobiphenyl	29	60-150		J
	11G00201D	Decachlorobiphenyl	59	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF029	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	13G00101	Decachlorobiphenyl	23	60-150		J
		Decachlorobiphenyl	23	60-150		J
	66G00901	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	42	60-150		J
	66G00903	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	52	60-150		J
WF030	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G00804	Decachlorobiphenyl	31	60-150		J
		Decachlorobiphenyl	31	60-150		J
WF031	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	05G00301	Tetrachloro-m-xylene	56	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	05G00101	Decachlorobiphenyl	164	60-150		J (all detects)
	05G01002	Tetrachloro-m-xylene	57	60-150		J
WF031B	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF032	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	29G00101	Pesticides/PCBs			1	
		Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	56	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF033	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	07G00101	Tetrachloro-m-xylene	174	60-150		J (all detects)
	30G00501	Tetrachloro-m-xylene	59	60-150		J
	66G00201D	Tetrachloro-m-xylene	25	60-150		J
		Tetrachloro-m-xylene	36	60-150		J
WF034	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G01801	Tetrachloro-m-xylene	164	60-150		J (all detects)
WF035	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	08G00101	Tetrachloro-m-xylene	59	60-150		J
WF036	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	54G00101	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF037	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF038	All	Volatiles	All within QC limits	-	-	None
WF039	All	Volatiles	All within QC limits	-	-	None
WF040	All	Volatiles	All within QC limits	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF041	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs			2	
	35G00201	Decachlorobiphenyl	58	60-150		J
	36G00103	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
WF042	All	Volatiles	-	-	-	None
WF043	All	Volatiles	-	-	-	None
WF044	All	Volatiles	-	-	-	None
WF045	All	Volatiles	-	-	-	None
		Semivolatiles			3	
	OWG00101	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
	OWG00102	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF045 cont.	OWG00103	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
		Pesticides & PCBs			4	
	OWG00101	Tetrachloro-m-xylene	45	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00103	Tetrachloro-m-xylene	59	60-150		J
	OWG00302	Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00302D	Tetrachloro-m-xylene	53	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF046	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
		Pesticides & PCBs			2	
	31G00101	Tetrachloro-m-xylene	48	60-150		J
		Tetrachloro-m-xylene	55	60-150		J
	31R03301	Tetrachloro-m-xylene	59	60-150		J
WF047	All	Volatiles	-	-	-	None
WF048	All	Volatiles	-	-	-	None
WF049	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
WF051	All	Volatiles	-	-	-	None
WF052	All	Volatiles	-	-	-	None
WF053	All	Volatiles	-	-	-	None
WF054	All	Volatiles	-	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF055	All	Volatiles	-	-	-	None

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF022		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/19/96	Chloromethane	-	28.8	J
		Chloroethane	-	48.7	J
	7/22/96	Chloroethane	-	30.6	J
		Semivolatiles			
	8/13/96	4,6-Dinitro-2-methylphenol	-	27.2	J
		Pentachlorophenol	-	25.4	J
	8/14/96	4-Chloroaniline	-	31.6	J
		2,4-Dinitrophenol	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	33.8	J
	All	Pesticides/PCBs	-	-	None
WF023		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/25/96	Acetone	-	33.2	J
	7/31/96	Acetone	-	30.4	J
		Methylene chloride	-	31.7	J
		Carbon disulfide	-	27.2	J
	8/1/96	Chloroethane	-	27.5	J
		Carbon disulfide	-	27.5	J
		Methylene chloride	-	37.8	J
		Semivolatiles			
	8/20/96	4-Nitroaniline	-	37.8	J
		Chrysene	-	27.8	J
	8/21/96	4-Nitroaniline	-	31.5	J
		Chrysene	-	28.5	J
		Benzo(g,h,i)perylene	-	32.7	J
	8/25/96	4,4'-DDT	23.6	-	J
WF024		Volatiles			
	6/25/96	Acetone	30.2	-	J
	8/5/96	Acetone	33.8	-	J
	8/2/96	Chloroethane	-	29.5	J
		Carbon disulfide	-	30.8	J
		Methylene chloride	-	41.0	J
		Semivolatiles			
	8/21/96	4-Nitroaniline	-	28.7	J
		Chrysene	-	29.5	J
		Indeno(1,2,3-cd)pyrene	-	28.1	J
		Dibenz(a,h)anthracene	-	34.0	J
		Benzo(g,h,i)perylene	-	37.6	J
	All	Pesticides/PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF025		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/14/96	Chloromethane	26.7	-	J
		Chloroethane	28.5	-	J
		Acetone	29.7	-	J
		Semivolatiles			
	9/9/96	2,4-Dinitrophenol	-	29.9	J
		4-Nitroaniline	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	30.7	J
		Pyrene	-	30.0	J
		3,3'-Dichlorobenzidine	-	37.0	J
		2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	8/25/96	4,4'-DDT	23.6	-	J
WF026		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/19/96	Chloromethane	-	46.5	J
		Chloroethane	-	77.1	J
		1,1-Dichloroethane	-	28.6	J
		2-Butanone	-	30.3	J
	8/20/96	Chloromethane	-	32.5	J
		Chloroethane	-	32.4	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
		Semivolatiles			
	9/10/96	2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
		Pesticides & PCBs			
	9/14/96	alpha-BHC	22.2	-	J
		delta-BHC	22.1	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF027		Volatiles			
	9/1/96	2-Butanone	39.1	-	J
		2-Butanone	0.014 (RRF)	-	J(detects) / R(ND)
	8/5/96	Acetone	33.8	-	J
	9/2/96	Acetone	-	102.4	J
		2-Butanone	-	36.3	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
	8/29/96	Bromomethane	-	31.0	J
		Chloroethane	-	63.9	J
		Acetone	-	37.2	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
		2-Butanone	-	0.019 (RRF)	J (detects) / R (ND)
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J
		Semivolatiles			
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	All	Pesticides/PCBs	-	-	None
WF028		Volatiles			
	8/5/96	Acetone	33.8	-	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF028 cont.	9/6/96	Chloromethane	-	35.4	J
		Acetone	-	41.0	J
		2-Butanone	-	41.8	J
		1,2-Dichloropropane	-	27.6	J
		4-Methyl-2-pentanone	-	40.5	J
		2-Hexanone	-	43.3	J
		Bromoform	-	26.2	J
		1,1,2,2-Tetrachloroethane	-	26.5	J
		Semivolatiles			
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	9/26/96	Benzo(k)fluoroanthene	-	28.5	J
	All	Pesticides/PCBs	-	-	None
WF029		Volatiles			
	9/17/96	Chloromethane	-	38.1	J
		Methylene chloride	-	33.6	J
	9/18/96	2-Hexanone	-	26.5	J
		Semivolatiles			
	9/26/96	Benzo(k)fluoranthene	-	28.5	J
	9/26/96	Benzo(k)fluoranthene	-	25.6	J
	All	Pesticides/PCBs	-	-	None
WF030		Volatiles			
	9/20/96	Methylene chloride	-	35.2	J
	9/23/96	Methylene chloride	-	30.2	J
		Semivolatiles			
	10/16/96	2,4-Dinitrophenol	-	25.8	J
		4-Nitrophenol	-	28.0	J
	All	Pesticides/PCBs	-	-	None
WF031	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF031B	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
	12/9-10/97	Alpha-BHC	23.9	-	J
WF032		Volatiles			
	10/10/96	1,1,2,2-Tetrachloroethane	-	27.8	J
		Semivolatiles			
	11/3/96	Hexachlorobutadiene	-	33.5	J
		Hexachlorocyclopentadiene	-	31.5	J
		Di-n-octylphthalate	-	27.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF033		Volatiles			
	10/16/96	Acetone	-	25.3	J
		Semivolatiles			
	11/4/96	Hexachlorobutadiene	-	31.2	J
		Hexachlorocyclopentadiene	-	27.9	J
	All	Pesticides/PCBs	-	-	None
WF034	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Di-n-octylpthalate	-	33.9	J
	All	Pesticides/PCBs	-	-	None
WF035	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Bis(2-ethylhexyl)phthalate	-	25.6	J
		Di-n-octylphthalate	-	32.1	J
	11/27/96	Di-n-octylphthalate	-	30.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF036	All	Volatiles	-	-	None
		Semivolatiles			
		Di-n-octylphthalate	-	30.0	J
		Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
		alpha-BHC	23.9	-	J
WF037	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
	12/9-10/96	alpha-BHC	23.9	-	J
WF038		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF039		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF040	All	Volatiles	-	-	None
WF041	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	6/11-12/97	Methoxychlor	24.2	-	J
		delta-BHC	21.5	-	J
WF042	All	Volatiles	-	-	None
WF043	All	Volatiles	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF044		Volatiles			
	7/7/97	Bromomethane	-	33.5	J
WF045	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF046	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF047		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 RRF	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 RRF	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/29/97	Bromomethane	-	30.5	J
		Acetone	-	30.9	J
	7/21/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	7/29/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF048		Volatiles			
	7/25/97	Bromomethane	36.5	-	J
	7/26/97	Bromomethane	-	28.7	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF049	7/21/97	Volatiles Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	All	Semivolatiles	-	-	None
WF051	All	Volatiles	-	-	None
WF052		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/29/97	Bromomethane	-	30.5	J
		Acetone	-	30.9	J
	7/29/97	Acetone	-	0.016 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF053		Volatiles			
	8/8/97	Acetone	-	36.4	J
WF054		Volatiles			
	8/19/97	Acetone	39.1	-	J
	8/8/97	Acetone	-	36.4	J
	8/19/97	Acetone	-	30.3	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds					
SDG	**Date**	**Compound**	**Initial Calibration %RSD**	**Continuing Calibration %D**	**Qualifier**
WF055	All	Volatiles	-	-	None

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF022	Volatiles		BKT01001
	Acetone	8 ug/L	BKR01001
			BKG00101
			BKG00101D
			BKG00102
			BKG00103
	Methylene chloride	1 ug/L	BKG00202
	Acetone	16 ug/L	BKG00201
			BKF01001
	Acetone	14 ug/L	17T01101
			17G00102
			17G00101
			17G00201
			17G00301
			01G00101
			01G00102
			01G00102D
		ND	
	Semivolatiles	ND	-
	Pesticides/PCBs		-
WF023	Volatiles		01T01201
	Methylene chloride	2 ug/L	01G00401
	Acetone	15 ug/L	01G00201
			01G00301
			BKG00301
			02G00201
			02G00101
			18G00301
			02G00301
			02G00301D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF024	Volatiles		18T01401
	Acetone	2 ug/L	18G00101
			15G00401
			BKG00203
			15R01201
			15G00701
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF025	Volatiles		15G00503DL
	Acetone	3 ug/L	15R01301
			15T01601
			15G00301
			15G00302
			15G00303
			15G00101
			15G00203
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF026	Volatiles		15T01701
	Acetone	11 ug/L	15G00202
			15G00201
			15G00802
			15G00801
			16G00201
			15G00803D
			15R01401
	Acetone	4 ug/L	15G00803
			16T01801
			16G00202
			16G00203
	Acetone	5 ug/L	16G00202DL
			16G00602
			16G00601
			16G00403
			16G00403DL
			16G00403D
			16G00403DDL
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF027	Volatiles		16G00401
	Acetone	5 ug/L	16G00402
			16G00101
			16G00301
	Acetone	5 ug/L	09G00301
	Acetone	6 ug/L	16G00501
	Trichloroethene	1 ug/L	16R01501
	Xylenes (total)	2 ug/L	16G00501D
			66T02001
			66G02101
			66G02103
	Acetone	11 ug/L	16G00303
			66G02102
			09G00101
			09G00301D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF028	Volatiles		10T02101
	Acetone	5 ug/L	09G00201
			10G00201
			11G00102
			11G00401
			11T02201
			11G00301
	Acetone	11 ug/L	10G00101
			11G00402
			11G00201
			12G00201

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF028 cont.	Acetone	5 ug/L	11G00101
	Carbon disulfide	6 ug/L	12G00101
			11R01601
			12G00101D
			11G00201D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF029	Volatiles		13T02301
	Acetone	3 ug/L	13G00101
			13R01701
	Acetone	3 ug/L	13G00102
			13G00201
			13G00103
			14G00201
			14G00101
			14G00101D
			66T02401
			66G00901
			66G00904
			66G00902
			66G00903
	Semivolatiles		
	Bis(2-ethylhexyl)phthalate	1 ug/L	All samples in SDG WF029
	Pesticides/PCBs	ND	-
WF030	Volatiles		66T02501
	Acetone	3 ug/L	66G00801
			66G00802
			66G00803
			66G00804
	Semivolatiles		
	Bis(2-ethylhexyl)phthalate	2 ug/L	All samples in SDG WF030
	Pesticides/PCBs	ND	-
WF031	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	05G00801
	Bis(2-ethylhexyl)phthalate	3 ug/L	05G00802
			05G00901
			05G00902
	Di-n-butylphthalate	2 ug/L	05G01001
	Bis(2-ethylhexyl)phthalate	2 ug/L	05G00301
			05R01901
			05G01001D
	Di-n-butylphthalate	2 ug/L	05G00101
			33G00501
			33G00201
			33G00101
			33G00301
			33G00301D
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF031B	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF032	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	1 ug/L	33G00401 06G00102 06G00101 06G00301 06R02001 29G00501 29G00501D
	Di-n-butylphthalate	3 ug/L	29G00101 66G01201 66G00102
	Pesticides/PCBS	ND	-
WF033	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF034	Volatiles	ND	-
	Semivolatiles		
	Bis(2-ethylhexyl)phthalate	2 ug/L	66G01101 66G01301 66G00501
	Pesticides/PCBs	ND	-
WF035	Volatiles	ND	-
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF036	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	66G00701 54G00201 54G00101 31G00201 54R02401 54G00101D
	Pesticides/PCBs	ND	-
WF037	Volatiles	ND	-
	Semivolatiles		
	Di-n-butylphthalate	4 ug/L	All samples in SDG WF037
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF038	Volatiles Acetone	 7 ug/Kg	36BO0101 36BO0102 36BO0103 36BO0201 36BO0202 36BO0203 36BO0301 36BO0302 36BO0303 36BO0303D 36BO0401 36BO0402 36BO0403 36BO0403D
WF039	Volatiles Acetone Methylene chloride	 7 ug/Kg 4 ug/Kg	35BO0203D 35BO0102DL 35BO0105 35BO0201
WF040	Volatiles Acetone Bromomethane Acetone	 3 ug/L 2 ug/L 3 ug/Kg	All water samples in SDG WF040 35BO0402 35BO0501 35BO0501DL 35BO0502 37BO0201 37BO0202 37BO0101 37BO0102 37BO0103 37BO0301 37BO0302 37BO0303 37BO0203D 37BO0103D
WF041	Volatiles Pesticides & PCBs Semivolatiles Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	ND ND 1 ug/L 2 ug/L	- - 13G00301 13G00401
WF042	Volatiles	ND	-
WF043	Volatiles Acetone	 6 ug/L	 33T05301 06G00102 06G00301 33G00401
WF044	Volatiles Acetone	 3 ug/L	66T05601 66G01201 66G01201D 66G00102 66G01301

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF044 cont.	Acetone	11 ug/L	66T05701 66G00401 66G02001 66T05801 66G00603 66G00603D 66G00604 66G00601 66G00602
WF045	Volatiles Acetone	5ug/L	OWT05901 OWR03401 OWG00501 OWG00502 OWG00502D OWG00503 OWT06001 OWG00101 OWG00102 OWG00103 66T06101 66G02301 66G02302 66G02303
	Acetone	5 ug/L	OWT06201 OWG00302 OWG00302D OWG00303 OWG00301 OWT06401 OWT06401DL OWG00401 OWG00201
	Semivolatiles Di-n-butylphthalate	2 ug/L	OWR03401 OWG00501 OWG00502 OWG00502D OWG00503
	Phenol	72 ug/L	OWG00101
	2-Chlorophenol	67 ug/L	OWG00102
	1,4-Dichlorobenzene	33 ug/L	OWG00103
	N-Nitroso-di-n-propylamine	49 ug/L	
	1,2,4-Trichlorobenzene	36 ug/L	
	4-Chloro-3-methylphenol	62 ug/L	
	Acenaphthylene	12 ug/L	
	Acenaphthene	39 ug/L	
	4-Nitrophenol	69 ug/L	
	2,4-Dinitrotoluene	43 ug/L	
	Pentachlorophenol	65 ug/L	
	Pyrene	42 ug/L	
	Di-n-butylphthalate	5 ug/L	66G02301 66G02302 66G02303
	Di-n-butylphthalate	4 ug/L	OWG00401 OWG00201
	Pesticides & PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF046	Volatiles 2-Butanone	4 ug/L	All samples in SDG WF046
	Semivolatiles Di-n-butylphthalate	3 ug/L	31R03301 31G00101 31G00101D
	Pesticides & PCBs	ND	-
WF047	Volatiles Acetone	4 ug/L	39W028 39W027 39W024 39W032 39W034D 39W031 39T10001 39W001 39W002 39W003 39W004 39W005
WF048	Volatiles 2-Butanone	4 ug/L	39R03401
	Acetone 2-Butanone	3 ug/Kg 4 ug/Kg	39D002 39D001 39D007 39D023 39D026 39D016 39D013 39D019 39D018 39D018D 39D022
WF049	Volatiles 2-Butanone	4 ug/L	39U001
	Semivolatiles	ND	-
WF051	Volatiles 2-Butanone	4 ug/L	16T06801 16R03501
WF052	Volatiles	ND	-
WF053	Volatiles Methylene chloride	8 ug/L	15G00602D 15T07501 15G00401 15G00703 15G00703D 15G00501 15G00502 15G00503
WF054	Volatiles Acetone	4 ug/L	30T07701 30R03901 30G00302

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF054 cont.	Methylene chloride	8 ug/L	15T07601 15G00801 15G00801D 15G00802 15R03801 15G00803 15G00303
WF055	Volatiles	ND	-

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF022	**Client ID:** BKF01001		
	Laboratory ID: RB858010		
	Collection Date: 7/17/96		
	Type: Source blank		
	Volatiles		
	Acetone	4 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBs	ND	None
WF022	**Client ID:** BKR01001		
	Laboratory ID: RB858002		
	Collection Date: 7/16/96		
	Type: Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF022	**Client ID:** BKT01001		
	Laboratory ID: RB858001		
	Collection Date: 7/16/96		
	Type: Trip blank		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
WF022	**Client ID:** 17T01101		
	Laboratory ID: RB873001		
	Collection Date: 7/18/96		
	Type: Trip blank		
	Volatiles		
	Acetone	8 ug/L	10U ug/L[1]
WF023	**Client ID:** 01R01101		
	Laboratory ID: RB887005		
	Collection Date: 7/23/96		
	Type: Equipment rinsate		
	Volatiles		
	Acetone	4 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBS	ND	None
WF023	**Client ID:** 01T01201		
	Laboratory ID: RB887001		
	Collection Date: 7/22/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	10U ug/L[1]
	Acetone	3 ug/L	10U ug/L[1]

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF023	**Client ID:**	16T01301		
	Laboratory ID:	RB887014		
	Collection Date:	7/25/96		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		2 ug/L	None
WF024	**Client ID:**	18T01401		
	Laboratory ID:	RB92001		
	Collection Date:	7/29/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	10U ug/L[1]
	Chloroform		1 ug/L	None
WF024	**Client ID:**	15R01201		
	Laboratory ID:	RB920005		
	Collection Date:	7/31/96		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		6 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	15R01301		
	Laboratory ID:	RB956011		
	Collection Date:	8/7/96		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	15T01501		
	Laboratory ID:	RB956001		
	Collection Date:	8/5/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	None
WF025	**Client ID:**	15T01601		
	Laboratory ID:	RB956012		
	Collection Date:	8/8/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		2 ug/L	10U ug/L

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF026	**Client ID:** 15T01701 **Laboratory ID:** RB980001 **Collection Date:** 8/12/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF026	**Client ID:** 16T01801 **Laboratory ID:** RB980015 **Collection Date:** 8/15/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	10U ug/L[1]
WF026	**Client ID:** 15R01401 **Laboratory ID:** RB980012 **Collection Date:** 8/14/96 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	6 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBS	ND	None
WF027	**Client ID:** 16T01901 **Laboratory ID:** RC016001 **Collection Date:** 8/19/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	5 ug/L	None
	Acetone	6 ug/L	None
WF027	**Client ID:** 66T02001 **Laboratory ID:** RC016014 **Collection Date:** 8/22/96 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
WF027	**Client ID:** 16R01501 **Laboratory ID:** RC016012 **Collection Date:** 8/21/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Pesticides/PCBs	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF028	**Client ID:** 11T02201		
	Laboratory ID: RC044008		
	Collection Date: 8/28/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	None
	Acetone	8 ug/L	10U ug/L[1]
WF028	**Client ID:** 10T02101		
	Laboratory ID: RC044001		
	Collection Date: 8/26/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	None
WF028	**Client ID:** 11R01601		
	Laboratory ID: RC044016		
	Collection Date: 8/28/96		
	Type: Equipment rinsate		
	Volatiles		
	Acetone	9 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Pesticides/PCBs	ND	None
WF029	**Client ID:** 13R01701		
	Laboratory ID: RC092008		
	Collection Date: 9/11/96		
	Type: Equipment rinsate		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF029	**Client ID:** 13T02301		
	Laboratory ID: RC092001		
	Collection Date: 9/9/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	2 ug/L	10U ug/L[1]
WF029	**Client ID:** 66T02401		
	Laboratory ID: RC092011		
	Collection Date: 9/12/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Acetone	3 ug/L	10U ug/L[1]

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF030	**Client ID:** 66R01801		
	Laboratory ID: RC121010		
	Collection Date: 9/18/96		
	Type: Equipment rinsate		
	Volatiles		
	Acetone	4 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	None
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF030	**Client ID:** 66T02501		
	Laboratory ID: RC121001		
	Collection Date: 9/16/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Acetone	3 ug/L	10U ug/L[1]
WF030	**Client ID:** 66T02601		
	Laboratory ID: RC121012		
	Collection Date: 9/19/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Acetone	3 ug/L	None
WF031	**Client ID:** 05T02701		
	Laboratory ID: MB928001		
	Collection Date: 9/23/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	None
WF031	**Client ID:** 33T02801		
	Laboratory ID: MB958001		
	Collection Date: 9/26/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
WF031	**Client ID:** 05R01901		
	Laboratory ID: MB928011		
	Collection Date: 9/25/96		
	Type: Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF031B	**Client ID:** 16T04001 **Laboratory ID:** MC447002 **Collection Date:** 11/21/96 **Type:** Trip blank		
	Volatiles	ND	None
WF032	**Client ID:** 06T02901 **Laboratory ID:** MC011001 **Collection Date:** 9/30/96 **Type:** Trip blank		
	Volatiles	ND	None
WF032	**Client ID:** 29T03001 **Laboratory ID:** MC037001 **Collection Date:** 10/3/96 **Type:** Trip blank		
	Volatiles	ND	None
WF032	**Client ID:** 06R02001 **Laboratory ID:** MC011006 **Collection Date:** 10/2/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF033	**Client ID:** 29T03101 **Laboratory ID:** MC085001 **Collection Date:** 10/7/96 **Type:** Trip blank		
	Volatiles	ND	None
WF033	**Client ID:** 66T03201 **Laboratory ID:** MC118001 **Collection Date:** 10/10/96 **Type:** Trip blank		
	Volatiles		
	Acetone	26 ug/L	None
WF033	**Client ID:** 66R02101 **Laboratory ID:** MC02101 **Collection Date:** 10/9/96 **Type:** Equipment rinsate		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBs	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF034	**Client ID:** 66T03301 **Laboratory ID:** MC153001 **Collection Date:** 10/14/96 **Type:** Trip blank		
	Volatiles	ND	None
WF034	**Client ID:** 66T03401 **Laboratory ID:** MC176001 **Collection Date:** 10/17/96 **Type:** Trip blank		
	Volatiles	ND	None
WF034	**Client ID:** 66R02201 **Laboratory ID:** MC153007 **Collection Date:** 10/16/96 **Type:** Equipment rinsate		
	Volatiles		
	Toluene	8 ug/L	None
	Ethylbenzene	1 ug/L	None
	Xylenes (total)	2 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF035	**Client ID:** 66T03501 **Laboratory ID:** MC214001 **Collection Date:** 10/21/96 **Type:** Trip blank		
	Volatiles	ND	None
WF035	**Client ID:** 66T03601 **Laboratory ID:** MC231001 **Collection Date:** 10/24/96 **Type:** Trip blank		
	Volatiles	ND	None
WF035	**Client ID:** 66R02301 **Laboratory ID:** MC214006 **Collection Date:** 10/23/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	None
	Pesticides/PCBs	ND	None
WF036	**Client ID:** 66T03701 **Laboratory ID:** MC262001 **Collection Date:** 10/28/96 **Type:** Trip blank		
	Volatiles	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF036	**Client ID:** 31T03801 **Laboratory ID:** MC284001 **Collection Date:** 10/31/96 **Type:** Trip blank		
	Volatiles	ND	None
WF036	**Client ID:** 54R02401 **Laboratory ID:** MC262007 **Collection Date:** 10/30/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	ND
WF037	**Client ID:** 15T03901 **Laboratory ID:** MC424001 **Collection Date:** 11/18/96 **Type:** Trip blank		
	Volatiles	ND	None
WF037	**Client ID:** 16T04001 **Laboratory ID:** MC448004 **Collection Date:** 11/21/96 **Type:** Trip blank		
	Volatiles	ND	None
WF037	**Client ID:** 15R02501 **Laboratory ID:** MC424009 **Collection Date:** 11/20/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF037	**Client ID:** 15F00201 **Laboratory ID:** MC424010 **Collection Date:** 11/20/96 **Type:** Source blank		
	Volatiles		
	Xylenes (total)	2 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF038	**Client ID:** 36RO2601 **Laboratory ID:** MC687016 **Collection Date:** 12/18/96 **Type:** Rinsate		
	Volatiles	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF038	**Client ID:** 36TO4101 **Laboratory ID:** MC687001 **Collection Date:** 12/17/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF039	**Client ID:** 35TO4201 **Laboratory ID:** MC698001 **Collection Date:** 12/19/97 **Type:** Trip Blank		
	Volatiles	ND	None
WF039	**Client ID:** 35RO2701 **Laboratory ID:** MC698011 **Collection Date:** 12/21/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF040	**Client ID:** 35TO4301 **Laboratory ID:** MC783001 **Collection Date:** 1/7/97 **Type:** Trip blank		
	Volatiles		
	Bromomethane	1 ug/L	10U ug/L[1]
WF040	**Client ID:** 37RO2801 **Laboratory ID:** MC783017 **Collection Date:** 1/9/97 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	5 ug/L	10U ug/L[1]
	Carbon disulfide	2 ug/L	None
WF041	**Client ID:** 35T04501 **Laboratory ID:** MD908001 **Collection Date:** 6/11/97 **Type:** Trip blank		
	Volatiles		
	Acetone	6 ug/L	None
WF041	**Client ID:** 37T04601 **Laboratory ID:** MD926001 **Collection Date:** 6/12/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF041	**Client ID:** 35T04701 **Laboratory ID:** MD950001 **Collection Date:** 6/15/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	3 ug/L	None
	Xylene (total)	1 ug/L	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF041	**Client ID:** 13T04801 **Laboratory ID:** MD985001 **Collection Date:** 6/16/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	None
	Acetone	6 ug/L	None
WF041	**Client ID:** 35F00301 **Laboratory ID:** MD908002 **Collection Date:** 6/11/97 **Type:** Source blank		
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	None
	Pesticides & PCBs	**ND**	-
WF041	**Client ID:** 35R03001 **Laboratory ID:** MD908003 **Collection Date:** 6/11/97 **Type:** Equipment rinsate		
	Semivolatiles		
	Di-n-butylphthalate	4 ug/L	None
	Bis(2-ethylhexyl)phthalate	8 ug/L	None
	Pesticides & PCBs	ND	None
WF042	**Client ID:** 05T04901 **Laboratory ID:** ME007001 **Collection Date:** 6/18/97 **Type:** Trip blank		
	Volatiles	ND	None
WF042	**Client ID:** 05T05001 **Laboratory ID:** ME021001 **Collection Date:** 6/20/97 **Type:** Trip blank		
	Volatiles		
	Acetone	2 ug/L	None
WF042	**Client ID:** 05R03101 **Laboratory ID:** ME007006 **Collection Date:** 6/17/97 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF043	**Client ID:** 05R03201 **Laboratory ID:** ME042002 **Collection Date:** 6/23/97 **Type:** Equipment rinsate		
	Volatiles		
	1,2-Dichloropropane	1 ug/L	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF043	**Client ID:**	05T05101		
	Laboratory ID:	MW042001		
	Collection Date:	6/23/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF043	**Client ID:**	33T05201		
	Laboratory ID:	MW053001		
	Collection Date:	6/24/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		3 ug/L	None
WF043	**Client ID:**	33T05301		
	Laboratory ID:	ME073001		
	Collection Date:	6/25/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF043	**Client ID:**	30T05401		
	Laboratory ID:	ME087001		
	Collection Date:	6/26/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		4 ug/L	None
WF044	**Client ID:**	06R03301		
	Laboratory ID:	ME100002		
	Collection Date:	6/29/97		
	Type:	Equipment rinsate		
	Volatiles			
	Acetone		7 ug/L	None
	Trichloroethene		6 ug/L	None
	Toluene		3 ug/L	None
	Ethylbenzene		1 ug/L	None
	Xylene (total)		2 ug/L	None
WF044	**Client ID:**	06T05501		
	Laboratory ID:	ME100001		
	Collection Date:	6/29/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF044	**Client ID:**	66T05601		
	Laboratory ID:	ME110001		
	Collection Date:	6/30/97		
	Type:	Trip blank		
	Volatiles			
	Acetone		5 ug/L	10U ug/L[1]
WF044	**Client ID:**	66T05701		
	Laboratory ID:	ME133001		
	Collection Date:	7/2/97		
	Type:	Trip blank		
	Volatiles		ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF044	**Client ID:** 66T05801 **Laboratory ID:** ME135001 **Collection Date:** 7/2/97 **Type:** Trip blank		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
WF045	**Client ID:** OWR03401 **Laboratory ID:** ME149002 **Collection Date:** 7/7/97 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
	1,2-Dichloropropane	1 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF045	**Client ID:** OWT05901 **Laboratory ID:** ME149001 **Collection Date:** 7/7/97 **Type:** Trip blank		
	Volatiles		
	Acetone	2 ug/L	10U ug/L[1]
WF045	**Client ID:** OWT06001 **Laboratory ID:** ME159001 **Collection Date:** 7/8/97 **Type:** Trip blank		
	Volatiles	ND	None
WF045	**Client ID:** 66T06101 **Laboratory ID:** ME175001 **Collection Date:** 7/9/97 **Type:** Trip blank		
	Volatiles		
	Acetone	2 ug/L	10U ug/L[1]
WF045	**Client ID:** OWT06201 **Laboratory ID:** ME190001 **Collection Date:** 7/10/97 **Type:** Trip blank		
	Volatiles	ND	None
WF045	**Client ID:** OWT06401 **Laboratory ID:** ME226001 **Collection Date:** 7/14/97 **Type:** Trip blank		
	Volatiles		
	Acetone	250 ug/L	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF045	**Client ID:** OWT06401DL **Laboratory ID:** ME226001DL **Collection Date:** 7/14/97 **Type:** Trip blank		
	Volatiles		
	Acetone	250 ug/L	None
WF046	**Client ID:** 31R03301 **Laboratory ID:** MW241002 **Collection Date:** 7/15/97 **Type:** Equipment rinsate		
	Volatiles		
	1,2-Dichloropropane	1 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	12 ug/L	12U ug/L[1]
	Pesticides & PCBs	ND	None
WF046	**Client ID:** 31T06501 **Laboratory ID:** ME241001 **Collection Date:** 7/15/97 **Type:** Trip blank		
	Volatiles		
	Acetone	4 ug/L	None
WF046	**Client ID:** 31T06601 **Laboratory ID:** ME261001 **Collection Date:** 7/16/97 **Type:** Trip blank		
	Volatiles		
	Toluene	1 ug/L	None
WF046	**Client ID:** 31T06701 **Laboratory ID:** ME305001 **Collection Date:** 7/21/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF047	**Client ID:** STOR_BLK **Laboratory ID:** ME243008 **Collection Date:** 7/15/97 **Type:** Storage blank		
	Volatiles	ND	None
WF047	**Client ID:** STOR_BLK2 **Laboratory ID:** ME267008 **Collection Date:** 7/16/97 **Type:** Storage blank		
	Volatiles		
	Acetone	4 ug/L	None
	Toluene	0.4 ug/L	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF047	**Client ID:** 39T10001 **Laboratory ID:** ME244001 **Collection Date:** 7/15/97 **Type:** Trip blank		
	Volatiles		
	Carbon disulfide	0.40 ug/L	None
	Toluene	0.50 ug/L	None
WF048	**Client ID:** 39R03401 **Laboratory ID:** ME264009 **Collection Date:** 7/17/97 **Type:** Equipment rinsate		
	Volatiles		
	1,2-Dichloropropane	1 ug/L	None
WF049	**Client ID:** 39T10201 **Laboratory ID:** ME262001 **Collection Date:** 7/15/97 **Type:** Trip blank		
	Volatiles		
	Toluene	0.90 ug/L	None
WF049	**Client ID:** 39T10401 **Laboratory ID:** ME263007 **Collection Date:** 7/17/97 **Type:** Trip blank		
	Volatiles		
	Toluene	0.40 ug/L	None
WF051	**Client ID:** 16R03501 **Laboratory ID:** ME306002 **Collection Date:** 7/21/97 **Type:** Equipment rinsate		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF051	**Client ID:** 16T06801 **Laboratory ID:** ME306001 **Collection Date:** 7/21/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	None
WF051	**Client ID:** 16T06901 **Laboratory ID:** ME322001 **Collection Date:** 7/22/97 **Type:** Trip blank		
	Volatiles	ND	None
WF051	**Client ID:** 16T07001 **Laboratory ID:** ME340001 **Collection Date:** 7/23/97 **Type:** Trip blank		
	Volatiles	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF051	**Client ID:** 16T07101 **Laboratory ID:** ME348001 **Collection Date:** 7/25/97 **Type:** Trip blank		
	Volatiles	ND	None
WF052	**Client ID:** STORAGEBLK **Laboratory ID:** ME346008 **Collection Date:** 7/25/97 **Type:** Storage blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	None
WF052	**Client ID:** 39T10501 **Laboratory ID:** ME346007 **Collection Date:** 7/25/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15R03701 **Laboratory ID:** ME367002 **Collection Date:** 7/27/97 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF053	**Client ID:** 15T07201 **Laboratory ID:** ME367001 **Collection Date:** 7/27/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07301 **Laboratory ID:** ME377001 **Collection Date:** 7/28/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07401 **Laboratory ID:** ME390001 **Collection Date:** 7/29/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07501 **Laboratory ID:** ME404001 **Collection Date:** 7/30/97 **Type:** Trip blank		
	Volatiles	ND	None
WF054	**Client ID:** 15R03801 **Laboratory ID:** ME441005 **Collection Date:** 8/5/97 **Type:** Equipment rinsate		
	Volatiles	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF054	**Client ID:** 30R03901 **Laboratory ID:** ME450002 **Collection Date:** 8/6/97 **Type:** Equipment rinsate		
	Volatiles		
	1,2-Dichloropropane	1 ug/L	None
WF054	**Client ID:** 15T07601 **Laboratory ID:** ME441001 **Collection Date:** 8/4/97 **Type:** Trip blank		
	Volatiles	ND	None
WF054	**Client ID:** 30T07701 **Laboratory ID:** ME450001 **Collection Date:** 8/5/97 **Type:** Trip blank		
	Volatiles	ND	None
WF055	**Client ID:** OWR04101 **Laboratory ID:** MF004002 **Collection Date:** 10/27/97 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF055	**Client ID:** 13R04201 **Laboratory ID:** MF004005 **Collection Date:** 10/28/97 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF055	**Client ID:** OWT08001 **Laboratory ID:** MF004001 **Collection Date:** 10/27/97 **Type:** Trip blank		
	Volatiles	ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF022	BKG00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF023	02G00301	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF024	15G00701	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF025	15G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF026	15G00803	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF027	16G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF028	12G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF029	14G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF030	66G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF031	05G01001	Iron	-	±100	-	-	124.8 ug/L	J
		Lead	-	±3.0	-	-	9.2 ug/L	J
		Sodium	-	±5000	-	-	5978 ug/L	J
		Zinc	-	±20.0	-	-	174 ug/L	J
		Cyanide	75-125	-	3.7	-	-	J (det) R (ND)
WF031B	None	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF032	29G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF033	66G00201	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF034	30G00301	Antimony	75-125	-	126.7	-	-	J (all detects)
		Cyanide	-	-	-	-	-	None
WF035	66G01701	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF036	54G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF037	15F00201	Metals	-	-	-	-	-	None
		Cyanide	75-125	-	3.7	-	-	J (det) R (ND)
WF041	35G00101	Aluminum	-	≤100	-	-	402 ug/L	J
		Iron	-	≤100	-	-	309 ug/L	J
		Manganese	-	≤10	-	-	75.2 ug/L	J
		Cyanide	-	-	-	-	-	None
WF045	OWG00502	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF046	31G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF047	39W034	Metals	-	-	-	-	-	None
WF051	None	Metals	-	-	-	-	-	None
WF053	15G00602	Metals	-	-	-	-	-	None
WF054	15G00801	Metals	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF022	**Client ID**	**BKG00101**	**BKG00101D**	
	Laboratory ID	**RB858003**	**RB858004**	
	Collection Date	**7/16/96**	**7/16/96**	
	Aluminum	43.4 ug/L	54.4 ug/L	22
	Barium	15.6 ug/L	15.6 ug/L	0
	Calcium	536 ug/L	558 ug/L	4
	Iron	54.0 ug/L	57.9 ug/L	7
	Lead	ND	0.80 ug/L	Not calculable
	Magnesium	499 ug/L	521 ug/L	4
	Manganese	1.7 ug/L	1.9 ug/L	11
	Selenium	0.67 ug/L	ND	Not calculable
	Sodium	1080 ug/L	1080 ug/L	0
	Zinc	2.4 ug/L	ND	Not calculable
	Cyanide	3.8 ug/L	6.5 ug/L	52
WF022	**Client ID**	**01G00102**	**01G00102D**	
	Laboratory ID	**RB873008**	**RB873009**	
	Collection Date	**7/19/96**	**7/19/96**	
	Aluminum	19.1 ug/L	10.3 ug/L	50
	Barium	15.6 ug/L	15.6 ug/L	0
	Beryllium	0.53 ug/L	ND	Not calculable
	Calcium	5850 ug/L	6250 ug/L	7
	Copper	ND	1.4 ug/L	Not calculable
	Iron	12.2 ug/L	8.8 ug/L	32
	Lead	1.3 ug/L	1.5 ug/L	14
	Magnesium	337 ug/L	331 ug/L	2
	Manganese	6.7 ug/L	9.0 ug/L	29
	Potassium	938 ug/L	842 ug/L	11
	Sodium	2100 ug/L	2070 ug/L	1
	Vanadium	ND	1.6 ug/L	Not calculable
	Zinc	10.2 ug/L	11.4 ug/L	11
	Cyanide	1.9 ug/L	ND	Not calculable
WF023	**Client ID**	**02G00301**	**02G00301D**	
	Laboratory ID	**RB887012**	**RB887013**	
	Collection Date	**7/24/96**	**7/24/96**	
	Aluminum	79.3 ug/L	84.6 ug/L	6
	Barium	128 ug/L	129 ug/L	0.8
	Beryllium	0.39 ug/L	ND	Not calculable
	Calcium	113000 ug/L	113000 ug/L	0
	Iron	36.2 ug/L	38.7 ug/L	7
	Lead	1.4 ug/L	1.3 ug/L	7
	Magnesium	9560 ug/L	9590 ug/L	0.3
	Manganese	13.5 ug/L	13.7 ug/L	1
	Nickel	7.8 ug/L	9.6 ug/L	21
	Potassium	4610 ug/L	4580 ug/L	0.7
	Selenium	1.2 ug/L	0.66 ug/L	58
	Sodium	2200 ug/L	2240 ug/L	2
	Vanadium	3.0 ug/L	2.8 ug/L	7
	Zinc	1.8 ug/L	2.0 ug/L	11
	Cyanide	4.5 ug/L	2.0 ug/L	77

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF024	**Client ID**	**15G00701**	**15G00701D**	
	Laboratory ID	**RB920009**	**RB950010**	
	Collection Date	**7/31/96**	**7/31/96**	
	Aluminum	161 ug/L	173 ug/L	7
	Barium	15.6 ug/L	19.3 ug/L	21
	Calcium	356 ug/L	360 ug/L	1
	Chromium	2.9 ug/L	2.0 ug/L	37
	Iron	183 ug/L	202 ug/L	10
	Lead	0.70 ug/L	0.60 ug/L	15
	Magnesium	433 ug/L	422 ug/L	3
	Manganese	2.8 ug/L	2.6 ug/L	7
	Sodium	1530 ug/L	1610 ug/L	5
	Vanadium	ND	1.2 ug/L	Not calculable
	Zinc	3.4 ug/L	3.6 ug/L	6
	Cyanide	2.6 ug/L	3.2 ug/L	21
WF025	**Client ID**	**15G00601**	**15G00601D**	
	Laboratory ID	**RB956006**	**RB956008**	
	Collection Date	**8/7/96**	**8/7/96**	
	Aluminum	89.4 ug/L	55.8 ug/L	46
	Arsenic	8.0 ug/L	7.8 ug/L	2
	Barium	67.6 ug/L	63.7 ug/L	6
	Calcium	3690 ug/L	3620 ug/L	2
	Iron	31000 ug/L	30500 ug/L	2
	Lead	0.90 ug/L	0.50U ug/L	Not calculable
	Magnesium	1940 ug/L	1900 ug/L	2
	Manganese	139 ug/L	136 ug/L	2
	Potassium	2460 ug/L	2340 ug/L	5
	Sodium	2630 ug/L	2590 ug/L	2
	Zinc	3.4 ug/L	3.3 ug/L	3
	Cyanide	1.5U ug/L	8.1 ug/L	Not calculable
WF026	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**RB980007**	**RB980008**	
	Collection Date	**8/14/96**	**8/14/96**	
	Aluminum	187 ug/L	146 ug/L	25
	Barium	10.6 ug/L	10.8 ug/L	2
	Calcium	1440 ug/L	1170 ug/L	21
	Chromium	2.9 ug/L	2.0U ug/L	Not calculable
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Copper	4.0 ug/L	2.4 ug/L	50
	Iron	194 ug/L	175 ug/L	10
	Lead	0.80 ug/L	0.50 ug/L	46
	Magnesium	322 ug/L	296 ug/L	8
	Manganese	33.1 ug/L	32.9 ug/L	0.6
	Potassium	522 ug/L	316U ug/L	Not calculable
	Sodium	5350 ug/L	5380 ug/L	0.6
	Vanadium	2.0 ug/L	1.5 ug/L	29
	Zinc	176 ug/L	178 ug/L	1
	Cyanide	1.6 ug/L	4.2 ug/L	90

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF026	**Client ID**	**16G00403**	**16G00403D**	
	Laboratory ID	**RB980020**	**RB980021**	
	Collection Date	**8/16/96**	**8/16/96**	
	Aluminum	278 ug/L	290 ug/L	4
	Arsenic	1.0 ug/L	0.50U ug/L	Not calculable
	Barium	28.6 ug/L	27.5 ug/L	4
	Calcium	3110 ug/L	3300 ug/L	6
	Chromium	2.3 ug/L	2.9 ug/L	23
	Copper	1.1U ug/L	1.3 ug/L	Not calculable
	Iron	1370 ug/L	879 ug/L	44
	Lead	4.0 ug/L	2.7 ug/L	39
	Magnesium	1320 ug/L	987 ug/L	29
	Manganese	41.3 ug/L	33.5 ug/L	21
	Potassium	540 ug/L	713 ug/L	28
	Sodium	2570 ug/L	2590 ug/L	0.8
	Vanadium	2.2 ug/L	1.2U ug/L	Not calculable
	Zinc	103 ug/L	945 ug/L	161
	Cyanide	2.9 ug/L	1.6 ug/L	58
WF027	**Client ID**	**16G00501**	**16G00501D**	
	Laboratory ID	**RC016009**	**RC016013**	
	Collection Date	**8/21/96**	**8/21/96**	
	Aluminum	12.6 ug/L	16.7 ug/L	28
	Barium	10 ug/L	10 ug/L	0
	Calcium	239 ug/L	234 ug/L	2
	Cobalt	3.2 ug/L	2.3U ug/L	Not calculable
	Iron	9.2 ug/L	5.3 ug/L	54
	Magnesium	276 ug/L	261 ug/L	6
	Manganese	1.0U ug/L	2.1 ug/L	Not calculable
	Sodium	1550 ug/L	1450 ug/L	7
	Zinc	2.6 ug/L	1.6 ug/L	48
WF027	**Client ID**	**09G00301**	**09G00301D**	
	Laboratory ID	**RC016019**	**RC016020**	
	Collection Date	**8/23/96**	**8/23/96**	
	Aluminum	407 ug/L	372 ug/L	9
	Antimony	8.6U ug/L	9.3 ug/L	Not calculable
	Arsenic	2.6 ug/L	2.8 ug/L	7
	Barium	27.1 ug/L	25.8 ug/L	5
	Calcium	15300 ug/L	14600 ug/L	5
	Chromium	4.0 ug/L	2.4 ug/L	50
	Iron	173 ug/L	148 ug/L	16
	Lead	0.50U ug/L	0.60 ug/L	Not calculable
	Magnesium	158 ug/L	160 ug/L	1
	Manganese	1.5 ug/L	1.7 ug/L	12
	Potassium	2390 ug/L	2010 ug/L	17
	Sodium	2070 ug/L	1950 ug/L	6
	Vanadium	16.4 ug/L	14.3 ug/L	14
	Zinc	14.8 ug/L	1.2 ug/L	170

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF028	**Client ID**	**12G00101**	**12G00101D**	
	Laboratory ID	**RC044012**	**RC044017**	
	Collection Date	**8/27/96**	**8/27/96**	
	Aluminum	14.0 ug/L	15.1 ug/L	8
	Barium	14.5 ug/L	14.5 ug/L	0
	Calcium	1840 ug/L	1870 ug/L	2
	Lead	0.60 ug/L	0.50U ug/L	Not calculable
	Magnesium	320 ug/L	327 ug/L	2
	Manganese	1.0U ug/L	1.4 ug/L	Not calculable
	Potassium	2220 ug/L	2290 ug/L	3
	Sodium	2310 ug/L	2360 ug/L	2
	Thallium	0.70 ug/L	0.60U ug/L	Not calculable
	Zinc	6.7 ug/L	5.5 ug/L	20
	Cyanide	1.8U ug/L	2.1 ug/L	Not calculable
WF028	**Client ID**	**11G00201**	**11G00201D**	
	Laboratory ID	**RC044011**	**RC044018**	
	Collection Date	**8/28/96**	**8/28/96**	
	Aluminum	2770 ug/L	2320 ug/L	18
	Arsenic	1.7 ug/L	2.0 ug/L	16
	Barium	50.3 ug/L	51.6 ug/L	3
	Beryllium	0.40 ug/L	0.30U ug/L	Not calculable
	Calcium	35400 ug/L	41800 ug/L	17
	Chromium	20.4 ug/L	19.2 ug/L	6
	Copper	2.0 ug/L	3.1 ug/L	43
	Iron	232 ug/L	337 ug/L	37
	Lead	0.50U ug/L	0.90 ug/L	Not calculable
	Magnesium	388 ug/L	538 ug/L	32
	Manganese	2.2 ug/L	4.8 ug/L	74
	Potassium	12900 ug/L	9610 ug/L	29
	Sodium	3420 ug/L	2950 ug/L	15
	Vanadium	11.0 ug/L	11.0 ug/L	0
	Zinc	3.4 ug/L	24.3 ug/L	151
	Cyanide	1.5U ug/L	3.3 ug/L	Not calculable
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Aluminum	33.1 ug/L	26.5 ug/L	22
	Arsenic	0.50 ug/L	0.50U ug/L	Not calculable
	Barium	22.3 ug/L	22.3 ug/L	0
	Calcium	3060 ug/L	2870 ug/L	6
	Iron	22.0 ug/L	27.3 ug/L	22
	Lead	1.3 ug/L	0.80 ug/L	48
	Magnesium	702 ug/L	691 ug/L	2
	Manganese	1.9 ug/L	1.9 ug/L	0
	Mercury	0.12 ug/L	0.10U ug/L	Not calculable
	Sodium	1590 ug/L	1570 ug/L	1
	Vanadium	1.2U ug/L	1.4 ug/L	Not calculable
	Zinc	89.5 ug/L	96.8 ug/L	8

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Aluminum	39.9 ug/L	39.7 ug/L	0.5
	Barium	38.1 ug/L	36.2 ug/L	5
	Calcium	863 ug/L	770 ug/L	11
	Copper	1.8 ug/L	1.1U ug/L	**Not calculable**
	Iron	8.2 ug/L	41.9 ug/L	134
	Lead	0.90 ug/L	0.50U ug/L	**Not calculable**
	Magnesium	1130 ug/L	1110 ug/L	2
	Manganese	5.0 ug/L	4.6 ug/L	8
	Potassium	860 ug/L	689 ug/L	22
	Selenium	0.64 ug/L	0.60U ug/L	**Not calculable**
	Sodium	1280 ug/L	1160 ug/L	10
	Zinc	2.9 ug/L	4.8 ug/L	49
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Aluminum	44.0 ug/L	51.9 ug/L	16
	Barium	6.4 ug/L	6.4 ug/L	0
	Calcium	751 ug/L	731 ug/L	3
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Iron	35.6 ug/L	38.9 ug/L	9
	Magnesium	271 ug/L	242 ug/L	11
	Manganese	9.7 ug/L	9.7 ug/L	0
	Potassium	491 ug/L	316U ug/L	Not calculable
	Sodium	2810 ug/L	2760 ug/L	2
	Zinc	1.2 ug/L	2.2 ug/L	59
	Cyanide	1.8U ug/L	12.0 ug/L	Not calculable
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Barium	27.6 ug/L	27.1 ug/L	2
	Calcium	854 ug/L	803 ug/L	6
	Chromium	0.61 ug/L	0.36 ug/L	52
	Cobalt	0.85 ug/L	0.72 ug/L	17
	Copper	35.6 ug/L	1.7U ug/L	Not calculable
	Iron	40.1 ug/L	31.8U ug/L	Not calculable
	Lead	4.4 ug/L	1.8U ug/L	Not calculable
	Magnesium	874 ug/L	871 ug/L	0.6
	Manganese	3.3 ug/L	2.5 ug/L	28
	Mercury	0.03 ug/L	0.04 ug/L	29
	Nickel	1.4 ug/L	1.4 ug/L	0
	Potassium	3.1U ug/L	825 ug/L	Not calculable
	Selenium	5.4 ug/L	3.9U ug/L	Not calculable
	Sodium	15100 ug/L	14900 ug/L	1
	Thallium	7.4 ug/L	1.9U ug/L	Not calculable
	Vanadium	0.58U ug/L	0.63 ug/L	Not calculable
	Zinc	13.7 ug/L	3.8 ug/L	113

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	Aluminum	156	98.7	45
	Antimony	3.5	3.4U	Not calculable
	Barium	59.3	59.9	1
	Calcium	2230	2230	0
	Chromium	0.88	0.34U	Not calculable
	Cobalt	0.70	0.49	35
	Iron	107	50.6	72
	Magnesium	1750	1760	0.6
	Manganese	21.2	21.5	1
	Potassium	31.8	1040	188
	Sodium	5370	5550	3
	Thallium	2.9	3.4	16
	Vanadium	1.0	0.58U	Not calculable
	Zinc	7.4	7.2	3
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Barium	89.7 ug/L	84.2 ug/L	6
	Beryllium	0.14 ug/L	0.19 ug/L	30
	Calcium	1580 ug/L	1470 ug/L	7
	Chromium	2.1 ug/L	2.8 ug/L	29
	Cobalt	0.94 ug/L	0.98 ug/L	4
	Copper	2.7 ug/L	4.4 ug/L	48
	Magnesium	2500 ug/L	2320 ug/L	7
	Manganese	8.4 ug/L	8.0 ug/L	5
	Mercury	0.04 ug/L	0.04 ug/L	0
	Sodium	5040 ug/L	5030 ug/L	0.2
	Zinc	5.1 ug/L	3.8 ug/L	29
	Cyanide	1.0 ug/L	1.2 ug/L	18
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Barium	20.8 ug/L	20.7 ug/L	0.5
	Calcium	3250 ug/L	3100 ug/L	5
	Chromium	0.75 ug/L	0.44 ug/L	52
	Copper	1.7U ug/L	2.7 ug/L	Not calculable
	Iron	73.8 ug/L	31.8U ug/L	Not calculable
	Magnesium	456 ug/L	457 ug/L	0.2
	Manganese	3.4 ug/L	3.2 ug/L	6
	Mercury	0.03 ug/L	0.03 ug/L	0
	Potassium	648 ug/L	1920 ug/L	99
	Sodium	3040 ug/L	3020 ug/L	0.7
	Zinc	3.6 ug/L	6.0 ug/L	50

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	Barium	28.0 ug/L	27.8 ug/L	0.7
	Beryllium	0.20 ug/L	0.13U ug/L	Not calculable
	Calcium	1530 ug/L	1480 ug/L	3
	Copper	11.0 ug/L	3.2 ug/L	110
	Iron	626 ug/L	634 ug/L	1
	Lead	3.8 ug/L	2.4 ug/L	45
	Magnesium	642 ug/L	650 ug/L	1
	Manganese	20.7 ug/L	21.0 ug/L	1
	Mercury	0.04 ug/L	0.05 ug/L	22
	Potassium	1880 ug/L	2680 ug/L	35
	Sodium	4600 ug/L	4490 ug/L	2
	Zinc	5.5 ug/L	4.4 ug/L	22
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Aluminum	24.3 ug/L	30.9 ug/L	24
	Barium	10.2 ug/L	10.7 ug/L	5
	Calcium	766 ug/L	816 ug/L	6
	Copper	1.7U ug/L	22.5 ug/L	Not calculable
	Iron	343 ug/L	348 ug/L	1
	Lead	2.0U ug/L	2.6 ug/L	Not calculable
	Magnesium	320 ug/L	324 ug/L	1
	Manganese	4.2 ug/L	5.4 ug/L	25
	Mercury	0.03 ug/L	0.03 ug/L	0
	Selenium	4.0 ug/L	3.9U ug/L	Not calculable
	Sodium	7660 ug/L	7790 ug/L	2
	Zinc	2.5 ug/L	26.3 ug/L	165
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Aluminum	87.6 ug/L	91.6 ug/L	4
	Barium	75.2 ug/L	74.3 ug/L	1
	Beryllium	0.18 ug/L	0.18 ug/L	0
	Calcium	1680 ug/L	1660 ug/L	1
	Chromium	1.2 ug/L	1.0 ug/L	2
	Cobalt	0.90 ug/L	1.4 ug/L	43
	Magnesium	1950 ug/L	1920 ug/L	2
	Manganese	13.9 ug/L	12.9 ug/L	7
	Mercury	0.02 ug/L	0.01U ug/L	Not calculable
	Potassium	2410 ug/L	2530 ug/L	5
	Sodium	2110 ug/L	2070 ug/L	2
	Zinc	4.5 ug/L	3.5 ug/L	25

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF041	**Client ID**	**35G00101**	**35G00101D**	
	Laboratory ID	**MD908004**	**MD908005**	
	Collection Date	**6/11/97**	**6/11/97**	
	Aluminum	47.8 ug/L	45.2 ug/L	6
	Barium	78.8 ug/L	79.0 ug/L	0.2
	Calcium	3150 ug/L	3240 ug/L	3
	Copper	8.2 ug/L	6.8 ug/L	19
	Iron	15.9 ug/L	19.0 ug/L	18
	Lead	1.7 ug/L	0.93U ug/L	Not calculable
	Magnesium	2340 ug/L	2370 ug/L	1
	Manganese	28.7 ug/L	28.9 ug/L	0.7
	Sodium	4330 ug/L	4430 ug/L	2
	Thallium	1.9 ug/L	0.89U ug/L	Not calculable
	Zinc	12.1 ug/L	130 ug/L	166
	Cyanide	ND	ND	-
WF041	**Client ID**	**35G00202**	**35G00202D**	
	Laboratory ID	**MD950002**	**MD950003**	
	Collection Date	**6/15/97**	**6/15/97**	
	Aluminum	65.0 ug/L	50.7 ug/L	25
	Barium	24.8 ug/L	25.3 ug/L	2
	Calcium	973 ug/L	1030 ug/L	6
	Copper	5.6 ug/L	3.5 ug/L	46
	Iron	180 ug/L	196 ug/L	8
	Lead	0.93U ug/L	1.9 ug/L	Not calculable
	Magnesium	813 ug/L	819 ug/L	0.7
	Manganese	9.5 ug/L	9.3 ug/L	2
	Selenium	1.8U ug/L	2.6 ug/L	Not calculable
	Sodium	20900 ug/L	21700 ug/L	4
	Thallium	1.0 ug/L	0.89U ug/L	Not calculable
	Zinc	18.7 ug/L	15.4 ug/L	19
	Cyanide	ND	ND	-
WF045	**Client ID**	**OWG00502**	**OWG00502D**	
	Laboratory ID	**ME149004**	**ME149005**	
	Collection Date	**7/8/97**	**7/8/97**	
	Aluminum	175 ug/L	160 ug/L	9
	Barium	7.3 ug/L	7.1 ug/L	3
	Calcium	648 ug/L	585 ug/L	10
	Copper	2.9 ug/L	4.4 ug/L	41
	Iron	106 ug/L	97.1 ug/L	9
	Magnesium	308 ug/L	317 ug/L	3
	Manganese	3.3 ug/L	3.5 ug/L	6
	Nickel	7.8 ug/L	7.7U ug/L	Not calculable
	Sodium	1990 ug/L	2060 ug/L	3
	Zinc	4.5 ug/L	4.7 ug/L	4
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF045	**Client ID**	**OWG00302**	**OWG00302D**	
	Laboratory ID	**ME190002**	**ME190003**	
	Collection Date	**7/10/97**	**7/10/97**	
	Aluminum	31.5 ug/L	16.6U ug/L	Not calculable
	Barium	10.2 ug/L	10.5 ug/L	3
	Calcium	460 ug/L	454 ug/L	1
	Iron	83.3 ug/L	51.1 ug/L	48
	Lead	1.9 ug/L	1.2U ug/L	Not calculable
	Magnesium	286 ug/L	300 ug/L	5
	Manganese	3.0 ug/L	3.0 ug/L	0
	Sodium	1670 ug/L	1670 ug/L	0
	Zinc	3.4 ug/L	3.8 ug/L	11
	Cyanide	ND	ND	-
WF046	**Client ID**	**31G00101**	**31G00101D**	
	Laboratory ID	**ME241003**	**ME241004**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	96.0 ug/L	91.1 ug/L	5
	Barium	22.6 ug/L	22.5 ug/L	0.4
	Calcium	857 ug/L	851 ug/L	0.7
	Copper	1.3U ug/L	1.4 ug/L	Not calculable
	Iron	120 ug/L	103 ug/L	15
	Magnesium	662 ug/L	675 ug/L	2
	Manganese	9.7 ug/L	9.9 ug/L	2
	Potassium	1910 ug/L	2200 ug/L	15
	Sodium	1760 ug/L	1890 ug/L	7
	Vanadium	1.8 ug/L	1.7U ug/L	Not calculable
	Zinc	3.5 ug/L	9.8 ug/L	95
	Cyanide	ND	ND	-
WF047	**Client ID**	**39W034**	**39W034D**	
	Laboratory ID	**ME243005**	**ME243006**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	94.0 ug/L	76.3 ug/L	21
	Barium	22.9 ug/L	22.8 ug/L	0.4
	Calcium	1030 ug/L	1010 ug/L	2
	Copper	8.2 ug/L	1.3U ug/L	Not calculable
	Iron	747 ug/L	751 ug/L	0.5
	Magnesium	871 ug/L	854 ug/L	2
	Manganese	12.5 ug/L	12.6 ug/L	0.8
	Sodium	2210 ug/L	2090 ug/L	6
	Zinc	14.7 ug/L	3.0 ug/L	132
WF051	**Client ID**	**16G00101**	**16G00101D**	
	Laboratory ID	**ME340009**	**ME340010**	
	Collection Date	**7/24/97**	**7/24/97**	
	Barium	20.5 ug/L	20.7 ug/L	1
	Calcium	514 ug/L	520 ug/L	1
	Copper	1.7 ug/L	1.7 ug/L	0
	Iron	11.2 ug/L	14.7 ug/L	27
	Magnesium	617 ug/L	623 ug/L	1
	Manganese	3.2 ug/L	3.0 ug/L	6
	Sodium	2130 ug/L	2110 ug/L	1
	Zinc	3.2 ug/L	8.2 ug/L	88

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF053	**Client ID**	**15G00602**	**15G00602D**	
	Laboratory ID	**ME367004**	**ME367005**	
	Collection Date	7/27/97	7/27/97	
	Aluminum	16.6U ug/L	29.9 ug/L	Not calculable
	Barium	13.0 ug/L	13.0 ug/L	0
	Calcium	676 ug/L	675 ug/L	0.1
	Chromium	3.3 ug/L	4.2 ug/L	24
	Iron	33.8 ug/L	92.6 ug/L	93
	Magnesium	504 ug/L	490 ug/L	3
	Manganese	2.3 ug/L	2.7 ug/L	16
	Sodium	2870 ug/L	2740 ug/L	5
	Zinc	3.1 ug/L	3.4 ug/L	9
WF053	**Client ID**	**15G00703**	**15G00703D**	
	Laboratory ID	**ME404003**	**ME404004**	
	Collection Date	7/30/97	7/30/97	
	Aluminum	43.6 ug/L	108 ug/L	14
	Antimony	17.3U ug/L	21.2 ug/L	Not calculable
	Barium	6.6 ug/L	6.2 ug/L	6
	Calcium	587 ug/L	549 ug/L	7
	Chromium	10.6 ug/L	13.4 ug/L	23
	Copper	2.9 ug/L	4.5 ug/L	43
	Iron	107 ug/L	115 ug/L	7
	Lead	0.93U ug/L	5.1 ug/L	Not calculable
	Magnesium	280 ug/L	266 ug/L	5
	Manganese	6.9 ug/L	6.5 ug/L	6
	Nickel	10.9 ug/L	20.3 ug/L	60
	Sodium	2040 ug/L	1820 ug/L	11
	Zinc	5.2 ug/L	6.1 ug/L	16
WF054	**Client ID**	**15G00801**	**15G00801D**	
	Laboratory ID	**ME441002**	**ME441003**	
	Collection Date	8/4/97	8/4/97	
	Aluminum	143 ug/L	116 ug/L	21
	Arsenic	2.0 ug/L	1.1U ug/L	Not calculable
	Barium	34.7 ug/L	37.3 ug/L	7
	Calcium	1870 ug/L	2010 ug/L	7
	Copper	5.2 ug/L	2.6 ug/L	67
	Iron	4760 ug/L	4940 ug/L	4
	Magnesium	1370 ug/L	1470 ug/L	7
	Manganese	84.6 ug/L	91.4 ug/L	8
	Mercury	0.04U ug/L	0.07 ug/L	Not calculable
	Sodium	1830 ug/L	1960 ug/L	7
	Thallium	0.89U ug/L	0.90 ug/L	Not calculable
	Zinc	8.5 ug/L	6.6 ug/L	25

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF022	All	Metals Cyanide	- -	- -	None None
WF023	All	Metals Cyanide	- -	- -	None None
WF024	All	Metals Cyanide	- -	- -	None None
WF025	All	Metals Cyanide	- -	- -	None None
WF026	All	Metals Cyanide	- -	- -	None None
WF027	All	Metals Cyanide	- -	- -	None None
WF028	All	Metals Cyanide	- -	- -	None None
WF029	All	Metals Cyanide	- -	- -	None None
WF030	All	Metals Cyanide	- -	- -	None None
WF031	All	Metals Cyanide	- -	- -	None None
WF031B	All	Metals Cyanide	- -	- -	None None
WF032	All	Metals Cyanide	- -	- -	None None
WF033	All	Metals Cyanide	- -	- -	None None
WF034	All	Metals Cyanide	- -	- -	None None
WF035	All	Metals Cyanide	- -	- -	None None
WF036	All	Metals Cyanide	- -	- -	None None
WF037	All	Metals Cyanide	- -	- -	None None
WF041	All	Metals Cyanide	- -	- -	None None
WF045	All	Metals Cyanide	- -	- -	None None
WF046	All	Metals Cyanide	- -	- -	None None
WF047	All	Metals	-	-	None
WF051	All	Metals	-	-	None

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF053	All	Metals	-	-	None
WF054	All	Metals	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF022	Aluminum	6.240 ug/L	All samples in SDG WF022
	Iron	12.320 ug/L	
	Lead	0.500 ug/L	
	Sodium	38.890 ug/L	
	Zinc	3.660 ug/L	
WF023	Arsenic	-0.500 ug/L	All samples in SDG WF023
	Iron	5.980 ug/L	
	Lead	1.200 ug/L	
	Sodium	34.400 ug/L	
	Zinc	1.200 ug/L	
WF024	Aluminum	10.600 ug/L	All samples in SDG WF024
	Iron	13.190 ug/L	
	Lead	0.500 ug/L	
	Sodium	37.550 ug/L	
WF025	Aluminum	13.650 ug/L	All samples in SDG WF025
	Beryllium	-0.320 ug/L	
	Iron	7.390 ug/L	
	Selenium	0.650 ug/L	
	Zinc	1.610 ug/L	
WF026	Aluminum	17.380 ug/L	All samples in SDG WF026
	Calcium	119.520 ug/L	
	Iron	10.050 ug/L	
	Magnesium	22.940 ug/L	
	Mercury	0.140 ug/L	
	Sodium	41.280 ug/L	
	Zinc	2.510 ug/L	
	Mercury	0.20 ug/L	All samples in SDG WF026
WF027	Aluminum	18.000 ug/L	All samples in SDG WF027
	Antimony	9.280 ug/L	
	Arsenic	0.500 ug/L	
	Calcium	94.550 ug/L	
	Sodium	28.990 ug/L	
	Vanadium	1.280 ug/L	
	Mercury	0.21 ug/L	All samples in SDG WF027
WF028	Aluminum	51.600 ug/L	All samples in SDG WF028
	Antimony	-10.930 ug/L	
	Calcium	113.470 ug/L	
	Magnesium	45.540 ug/L	
	Mercury	0.140 ug/L	
	Potassium	498.120 ug/L	
	Sodium	43.870 ug/L	
	Zinc	1.230 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF029	Aluminum	10.6 ug/L	All samples in SDG WF029
	Barium	3.0 ug/L	
	Cobalt	2.7 ug/L	
	Iron	21.4 ug/L	
	Vanadium	1.4 ug/L	
	Cobalt	2.7 ug/L	All samples in SDG WF029
	Vanadium	1.6 ug/L	
	Mercury	-0.1 ug/L	All samples in SDG WF029
	Iron	5.3 ug/L	All samples in SDG WF029
	Vanadium	1.6 ug/L	
	Calcium	153.810 ug/L	All samples in SDG WF029
	Cobalt	2.390 ug/L	
	Iron	11.590 ug/L	
	Sodium	37.260 ug/L	
	Zinc	1.630 ug/L	
WF030	Calcium	59.580 ug/L	All samples in SDG WF030
	Iron	6.080 ug/L	
	Sodium	54.620 ug/L	
WF031	Mercury	0.030 ug/L	All samples in SDG WF031
	Potassium	-617.8 ug/L	
	Silver	-1.2 ug/L	
	Thallium	3.3 ug/L	
	Mercury	0.047 ug/L	All samples in SDG WF031
	Potassium	34.4 ug/L	
	Silver	-1.6 ug/L	
	Thallium	3.7 ug/L	
	Mercury	0.055 ug/L	All samples in SDG WF031
	Potassium	542.9 ug/L	
	Silver	-1.4 ug/L	
	Mercury	0.070 ug/L	All samples in SDG WF031
	Potassium	-21.4 ug/L	
	Silver	-1.3 ug/L	
	Thallium	3.5 ug/L	
	Mercury	0.047 ug/L	All samples in SDG WF031
	Potassium	-411.210 ug/L	
	Mercury	0.085 ug/L	All samples in SDG WF031
	Potassium	955.8 ug/L	
	Silver	-2.5 ug/L	
	Thallium	3.2 ug/L	
	Mercury	0.127 ug/L	All samples in SDG WF031
	Mercury	0.130 ug/L	All samples in SDG WF031
	Mercury	-0.030 ug/L	All samples in SDG WF031
	Potassium	-335.53 ug/L	
	Silver	-1.420 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF031 cont.	Arsenic	-6.4 ug/L	All samples in SDG WF031
	Chromium	-0.4 ug/L	
	Mercury	0.034 ug/L	
	Potassium	171.0 ug/L	
	Thallium	5.1 ug/L	
	Vanadium	1.4 ug/L	
	Mercury	0.016 ug/L	All samples in SDG WF031
	Potassium	342.4 ug/L	
	Silver	-1.2 ug/L	
	Thallium	5.2 ug/L	
	Vanadium	0.8 ug/L	
	Chromium	-0.7 ug/L	All samples in SDG WF031
	Mercury	0.011 ug/L	
	Potassium	308.7 ug/L	
	Thallium	6.2 ug/L	
	Vanadium	0.7 ug/L	
	Barium	-0.2 ug/L	All samples in SDG WF031
	Chromium	-0.6 ug/L	
	Mercury	-0.021 ug/L	
	Potassium	377.6 ug/L	
	Thallium	7.2 ug/L	
	Mercury	0.014 ug/L	All samples in SDG WF031
	Arsenic	-6.7 ug/L	All samples in SDG WF031
	Barium	-0.2 ug/L	
	Chromium	-0.8 ug/L	
	Mercury	-0.032 ug/L	
	Nickel	-1.4 ug/L	
	Potassium	441.5 ug/L	
	Thallium	5.7 ug/L	
	Vanadium	0.6 ug/L	
WF031B	Copper	604 ug/L	All samples in SDG WF031B
	Aluminum	-19.5 ug/L	All samples in SDG WF031B
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Manganese	0.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF031B
	Copper	6.6 ug/L	
	Iron	3.5 ug/L	
	Mercury	0.0 ug/L	
	Nickel	9.5 ug/L	
	Sodium	10.6 ug/L	
	Barium	25.130 ug/L	All samples in SDG WF031B
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF032	Copper	4.5 ug/L	All samples in SDG WF032
	Manganese	0.5 ug/L	
	Mercury	0.0242 ug/L	
	Potassium	-1595.8 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Cobalt	0.3 ug/L	
	Copper	5.5 ug/L	
	Manganese	0.7 ug/L	
	Mercury	0.0265 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	4.9 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.0255 ug/L	
	Potassium	1914.8 ug/L	
	Sodium	11.6 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF032
	Copper	5.6 ug/L	
	Manganese	0.6 ug/L	
	Mercury	-0.0178 ug/L	
	Sodium	17.4 ug/L	
	Barium	1.210 ug/L	All samples in SDG WF032
	Chromium	2.750 ug/L	
	Copper	3.390 ug/L	
	Manganese	0.410 ug/L	
	Mercury	0.015 ug/L	
	Sodium	856.490 ug/L	
	Zinc	2.310 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	-0.0874 ug/L	
	Nickel	2.0 ug/L	
	Sodium	11.5 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF032
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF032
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Nickel	1.4 ug/L	
	Thallium	4.3 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF032 cont.	Aluminum	107.660 ug/L	All samples in SDG WF032
	Antimony	4.320 ug/L	
	Barium	1.760 ug/L	
	Cadmium	1.660 ug/L	
	Calcium	105.840 ug/L	
	Cobalt	0.430 ug/L	
	Copper	12.450 ug/L	
	Iron	54.350 ug/L	
	Magnesium	103.090 ug/L	
	Manganese	0.280 ug/L	
	Sodium	154.770 ug/L	
	Zinc	9.120 ug/L	
	Antimony	4.3 ug/L	All samples in SDG WF032
	Barium	0.4 ug/L	
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Sodium	10.2 ug/L	All samples in SDG WF032
WF033	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Mercury	0.07 ug/L	
	Potassium	-1595.8 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	0.04 ug/L	
	Potassium	655.4 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.05 ug/L	
	Potassium	1914.8 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Potassium	425.8 ug/L	
	Thallium	4.3 ug/L	
	Aluminum	164.460 ug/L	All samples in SDG WF033
	Barium	1.220 ug/L	
	Calcium	107.040 ug/L	
	Copper	2.900 ug/L	
	Iron	33.430 ug/L	
	Magnesium	82.790 ug/L	
	Manganese	0.330 ug/L	
	Potassium	1602.780 ug/L	
	Sodium	221.450 ug/L	
	Zinc	1.660 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Mercury	0.06 ug/L	All samples in SDG WF033
	Barium	0.4 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.05 ug/L	
	Potassium	163.8 ug/L	
	Antimony	4.810 ug/L	All samples in SDG WF033
	Barium	0.460 ug/L	
	Copper	2.870 ug/L	
	Manganese	0.330 ug/L	
	Potassium	509.990 ug/L	
	Sodium	137.200 ug/L	
	Zinc	3.200 ug/L	
	Barium	0.8 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Potassium	1734.0 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Potassium	1605.5 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Potassium	768.8 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Potassium	314.6 ug/L	
	Vanadium	1.2 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Barium	1.0 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	684.9 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	722.1 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF034	Copper	5.8 ug/L	All samples in SDG WF034
	Mercury	0.023 ug/L	
	Copper	5.8 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Mercury	0.017 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.030 ug/L	
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Mercury	0.042 ug/L	
	Sodium	10.2 ug/L	
	Barium	0.460 ug/L	66G02001
	Copper	2.870 ug/L	66G00302
	Sodium	137.200 ug/L	66G01801
	Zinc	3.200 ug/L	30G00301
	Cyanide	-1.327 ug/L	30G00401
			66R02201
			30G00301D
	Mercury	0.024 ug/L	All samples in SDG WF034
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.026 ug/L	
	Mercury	0.040 ug/L	All samples in SDG WF034
	Mercury	0.033 ug/L	All samples in SDG WF034

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF034 cont.	Arsenic	-13.610 ug/L	66G01101
	Barium	1.700 ug/L	66G01301
	Beryllium	-0.710 ug/L	66G00501
	Calcium	108.610 ug/L	66G00501F
	Copper	1.700 ug/L	
	Lead	-8.620 ug/L	
	Manganese	0.790 ug/L	
	Selenium	10.810 ug/L	
	Sodium	70.400 ug/L	
	Zinc	3.200 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Silver	3.3 ug/L	
	Sodium	11.9 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Silver	2.2 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF034
	Copper	1.9 ug/L	
	Manganese	0.6 ug/L	
	Sodium	20.0 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Silver	2.6 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Sodium	9.7 ug/L	
WF035	Barium	0.8 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0239 ug/L	
	Thallium	2.4 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0256 ug/L	
	Thallium	3.4 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0401 ug/L	
	Thallium	3.2 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.334 ug/L	
	Aluminum	101.120 ug/L	All samples in SDG WF035
	Barium	0.410 ug/L	
	Iron	56.400 ug/L	
	Manganese	0.430 ug/L	
	Sodium	152.450 ug/L	
	Zinc	2.190 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF035 cont.	Barium	1.0 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0250 ug/L	
	Thallium	2.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Barium	0.570 ug/L	All samples in SDG WF035
	Beryllium	-0.910 ug/L	
	Calcium	109.820 ug/L	
	Copper	5.470 ug/L	
	Manganese	0.720 ug/L	
	Zinc	4.400 ug/L	
	Manganese	0.6 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	All samples in SDG WF035
	Barium	0.4 ug/L	All samples in SDG WF035
	Beryllium	-0.2 ug/L	
	Manganese	0.6 ug/L	
	Beryllium	-0.2 ug/L	All samples in SDG WF035
	Manganese	0.6 ug/L	
	Beryllium	-0.2 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	
WF036	Aluminum	17.7 ug/L	All samples in SDG WF036
	Barium	0.8 ug/L	
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0265 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Aluminum	18.4 ug/L	All samples in SDG WF036
	Barium	1.2 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0251 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF036 cont.	Aluminum	14.7 ug/L	All samples in SDG WF036
	Barium	1.1 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0165 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF036
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0157 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	63.950 ug/L	All samples in SDG WF036
	Barium	0.730 ug/L	
	Chromium	0.490 ug/L	
	Manganese	0.430 ug/L	
	Mercury	0.014 ug/L	
	Potassium	1817.440 ug/L	
	Cyanide	-1.333 ug/L	
	Barium	1.0 ug/L	All samples in SDG WF036
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	91.5 ug/L	All samples in SDG WF036
	Barium	0.9 ug/L	
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF037	Copper	6.4 ug/L	All samples in SDG WF037
	Aluminum	-19.5 ug/L	All samples in SDG WF037
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF037
	Copper	6.6 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF037 cont.	Barium	25.130 ug/L	All samples in SDG WF037
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	
WF041	Cyanide	-0.6 ug/L	All samples in SDG WF041
	Barium	0.5 ug/L	All samples in SDG WF041
	Sodium	12.2 ug/L	All samples in SDG WF041
	Cyanide	-0.4 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF041
	Sodium	16.3 ug/L	
	Beryllium	-1.010 ug/L	All samples in SDG WF041
	Calcium	133.200 ug/L	
	Copper	3.740 ug/L	
	Iron	9.490 ug/L	
	Lead	1.260 ug/L	
	Sodium	93.470 ug/L	
	Thallium	1.310 ug/L	
	Zinc	19.070 ug/L	
	Cyanide	-1.002 ug/L	
	Barium	-0.6 ug/L	All samples in SDG WF041
	Chromium	-2.9 ug/L	
	Copper	-1.7 ug/L	
	Magnesium	-22.9 ug/L	
	Silver	-2.8 ug/L	
	Vanadium	-3.0 ug/L	
	Copper	6.4 ug/L	All samples in SDG WF041
	Thallium	1.4 ug/L	
	Vanadium	-1.9 ug/L	
	Cobalt	8.9 ug/L	All samples in SDG WF041
	Thallium	1.6 ug/L	
	Cyanide	-0.4 ug/L	
	Beryllium	-0.830 ug/L	All samples in SDG WF041
	Calcium	105.800 ug/L	
	Iron	3.860 ug/L	
	Selenium	-3.230 ug/L	
	Sodium	15.150 ug/L	
	Vanadium	-2.240 ug/L	
	Zinc	0.940 ug/L	
	Selenium	-3.4 ug/L	All samples in SDG WF041
	Thallium	-1.3 ug/L	
	Lead	1.2 ug/L	All samples in SDG WF041
	Selenium	-2.6 ug/L	
	Cyanide	-0.4 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF041 cont.	Selenium	-3.1 ug/L	All samples in SDG WF041
	Thallium	1.3 ug/L	
	Selenium	-2.8 ug/L	All samples in SDG WF041
	Cyanide	-0.5 ug/L	
	Thallium	-1.0 ug/L	All samples in SDG WF041
	Cyanide	-0.4 ug/L	
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
WF045	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Manganese	0.4 ug/L	All samples in SDG WF045
	Vanadium	1.8 ug/L	All samples in SDG WF045
	Beryllium	-0.860 ug/L	All samples in SDG WF045
	Calcium	136.80 ug/L	
	Iron	5.390 ug/L	
	Sodium	32.780 ug/L	
	Vanadium	-1.730 ug/L	
	Zinc	3.340 ug/L	
	Cyanide	-1.013 ug/L	
	Mercury	0.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Thallium	1.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Aluminum	17.320 ug/L	All samples in SDG WF045
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Cyanide	-0.899 ug/L	
	Beryllium	0.2 ug/L	OWG00401
	Manganese	0.5 ug/L	OWG00201
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	OWG00401
	Manganese	0.7 ug/L	OWG00201
	Sodium	12.2 ug/L	
	Zinc	1.0 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF045 cont.	Barium	0.9 ug/L	OWG00401
	Beryllium	0.5 ug/L	OWG00201
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.2 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	
	Cyanide	-0.377 ug/L	OWG00401 OWG00201
	Beryllium	0.2 ug/L	OWG00401
	Sodium	11.0 ug/L	OWG00201
	Selenium	-2.2 ug/L	OWG00401 OWG00201
	Thallium	-1.0 ug/L	OWG00401 OWG00201
WF046	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Mercury	0.040 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF046
	Mercury	0.043 ug/L	
	Sodium	19.9 ug/L	
	Aluminum	17.320 ug/L	All samples in SDG WF046
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Boron	-0.377 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	11.0 ug/L	
WF047	Beryllium	0.2 ug/L	All samples in SDG WF047
	Manganese	0.5 ug/L	
	Mercury	0.1 ug/L	
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Manganese	0.7 ug/L	
	Sodium	12.2 ug/L	
	Zinc	1.0 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF047
	Beryllium	0.5 ug/L	
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.1 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF047 cont.	Aluminum	17.320 ug/L	All samples in SDG WF047
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Sodium	11.0 ug/L	
	Selenium	-2.2 ug/L	All samples in SDG WF047
WF051	Barium	1.0 ug/L	All samples in SDG WF051
	Beryllium	0.2 ug/L	
	Chromium	3.4 ug/L	
	Copper	1.5 ug/L	
	Manganese	0.5 ug/L	
	Silver	2.8 ug/L	
	Vanadium	2.4 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Vanadium	1.8 ug/L	
	Arsenic	1.1 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Selenium	-1.9 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.07 ug/L	
	Beryllium	-0.800 ug/L	All samples in SDG WF051
	Calcium	140.860 ug/L	
	Iron	5.470 ug/L	
	Sodium	36.740 ug/L	
	Zinc	1.980 ug/L	
	Mercury	0.08 ug/L	All samples in SDG WF051
	Silver	-2.4 ug/L	
	Aluminum	16.800 ug/L	All samples in SDG WF051
	Barium	0.600 ug/L	
	Beryllium	-0.680 ug/L	
	Calcium	127.440 ug/L	
	Chromium	3.050 ug/L	
	Cobalt	2.850 ug/L	
	Copper	2.120 ug/L	
	Iron	10.740 ug/L	
	Manganese	0.690 ug/L	
	Silver	3.040 ug/L	
	Sodium	54.160 ug/L	
	Vanadium	2.700 ug/L	
	Zinc	2.710 ug/L	
	Calcium	42.0 ug/L	All samples in SDG WF051

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF051 cont.	Barium	0.6 ug/L	All samples in SDG WF051
	Beryllium	0.4 ug/L	
	Cobalt	2.6 ug/L	
	Copper	1.7 ug/L	
	Manganese	0.9 ug/L	
	Zinc	1.2 ug/L	
	Manganese	0.7 ug/L	All samples in SDG WF051
	Arsenic	-1.130 ug/L	All samples in SDG WF051
	Beryllium	-0.720 ug/L	
	Calcium	131.080 ug/L	
	Iron	12.060 ug/L	
	Zinc	4.540 ug/L	
	Lead	-1.3 ug/L	All samples in SDG WF051
	Lead	-1.4 ug/L	All samples in SDG WF051
	Magnesium	0.5 ug/L	
	Lead	-1.6 ug/L	All samples in SDG WF051
	Aluminum	18.640 ug/L	All samples in SDG WF051
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.300 ug/L	
	Lead	-2.0 ug/L	All samples in SDG WF051
	Vanadium	2.0 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF051
	Beryllium	0.3 ug/L	
	Lead	-2.0 ug/L	
	Manganese	0.7 ug/L	
	Sodium	9.2 ug/L	
	Sodium	15.0 ug/L	All samples in SDG WF051
	Arsenic	-1.6 ug/L	All samples in SDG WF051
WF053	Aluminum	18.640 ug/L	All samples in SDG WF053
	Barium	0.490 ug/L	
	Beryllium	-0.760 ug/L	
	Calcium	134.210 ug/L	
	Chromium	3.850 ug/L	
	Iron	35.410 ug/L	
	Manganese	0.500 ug/L	
	Sodium	35.200 ug/L	
	Zinc	2.330 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF053 cont.	Barium	-0.760 ug/L	All samples in SDG WF053
	Calcium	138.650 ug/L	
	Chromium	3.750 ug/L	
	Copper	3.390 ug/L	
	Iron	14.500 ug/L	
	Manganese	0.490 ug/L	
	Nickel	8.370 ug/L	
	Sodium	42.790 ug/L	
	Zinc	2.940 ug/L	
	Aluminum	26.970 ug/L	All samples in SDG WF053
	Beryllium	-0.710 ug/L	
	Calcium	151.990 ug/L	
	Iron	16.430 ug/L	
	Manganese	0.580 ug/L	
	Silver	4.360 ug/L	
	Sodium	52.750 ug/L	
	Zinc	3.720 ug/L	
	Beryllium	-0.970 ug/L	All samples in SDG WF053
	Calcium	130.780 ug/L	
	Copper	1.480 ug/L	
	Iron	19.510 ug/L	
	Lead	-1.380 ug/L	
	Manganese	0.780 ug/L	
	Sodium	13.170 ug/L	
	Zinc	6.090 ug/L	
	Aluminum	52.990 ug/L	All samples in SDG WF053
	Arsenic	1.300 ug/L	
	Beryllium	-0.940 ug/L	
	Calcium	198.990 ug/L	
	Chromium	6.790 ug/L	
	Copper	2.230 ug/L	
	Iron	38.980 ug/L	
	Lead	-1.460 ug/L	
	Manganese	1.000 ug/L	
	Sodium	60.080 ug/L	
	Zinc	2.040 ug/L	
WF054	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Beryllium	-0.980 ug/L	All samples in SDG WF054
	Calcium	110.890 ug/L	
	Iron	9.300 ug/L	
	Mercury	0.052 ug/L	
	Vanadium	-2.660 ug/L	
	Zinc	2.260 ug/L	

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter	Concentration	Qualifier
WF022	**Client ID:** BKR01001		
	Laboratory ID: RB858002		
	Collection Date: 7/16/96		
	Type: Equipment rinsate		
	Sodium	43.4 ug/L	None
	Aluminum	55.9 ug/L	23.9U ug/L[1]
	Calcium	69.0 ug/L	None
	Iron	23.9 ug/L	43.4U ug/L[1]
	Magnesium	39.7 ug/L	None
	Mercury	0.10 ug/L	None
	Zinc	1.2 ug/L	1.2U ug/L[1]
WF022	**Client ID:** BKF01001		
	Laboratory ID: RB858010		
	Collection Date: 7/17/96		
	Type: Source blank		
	Sodium	61.3 ug/L	61.3U ug/L[1]
WF023	**Client ID:** 01R01101		
	Laboratory ID: RB887005		
	Collection Date: 7/23/96		
	Type: Equipment rinsate		
	Aluminum	13.3 ug/L	None
	Iron	10.8 ug/L	10.8U ug/L[1]
	Zinc	1.2 ug/L	1.2U ug/L[1]
	Cyanide	2.6 ug/L	None
WF024	**Client ID:** 15R01201		
	Laboratory ID: RB920005		
	Collection Date: 7/31/96		
	Type: Equipment rinsate		
	Aluminum	13.8 ug/L	13.8U ug/L[1]
	Iron	10.5 ug/L	10.5U ug/L[1]
	Sodium	55.4 ug/L	55.4U ug/L[1]
	Cyanide	2.6 ug/L	None
WF025	**Client ID:** 15R01301		
	Laboratory ID: RB956011		
	Collection Date: 8/7/96		
	Type: Equipment rinsate		
	Iron	5.3 ug/L	5.3U ug/L[1]
	Sodium	26.6 ug/L	None
	Zinc	1.8 ug/L	1.8U ug/L[1]
WF026	**Client ID:** 15R01401		
	Laboratory ID: RB980012		
	Collection Date: 8/14/96		
	Type: Equipment rinsate		
	Iron	14.8 ug/L	14.8U ug/L[1]
	Zinc	1.1 ug/L	1.1U ug/L[1]
	Cyanide	1.8 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF027	**Client ID:**	16R01501		
	Laboratory ID:	RC016012		
	Collection Date:	8/21/96		
	Type:	Equipment rinsate		
	Arsenic		0.50 ug/L	0.50U ug/L[1]
	Calcium		64.0 ug/L	64.0U ug/L[1]
	Lead		0.80 ug/L	None
	Sodium		26.9 ug/L	26.9U ug/L[1]
	Zinc		1.8 ug/L	None
WF028	**Client ID:**	11R01601		
	Laboratory ID:	RC044016		
	Collection Date:	8/28/96		
	Type:	Equipment rinsate		
	Calcium		67.2 ug/L	67.2U ug/L[1]
	Sodium		30.8 ug/L	30.8U ug/L[1]
	Cyanide		1.5 ug/L	None
WF029	**Client ID:**	13R01701		
	Laboratory ID:	RC092008		
	Collection Date:	9/11/96		
	Type:	Equipment rinsate		
	Calcium		66.4 ug/L	66.4U ug/L[1]
	Sodium		25.4 ug/L	25.4U ug/L[1]
	Zinc		1.8 ug/L	1.8U ug/L[1]
WF030	**Client ID:**	66R01801		
	Laboratory ID:	RC121010		
	Collection Date:	9/18/96		
	Type:	Equipment rinsate		
	Calcium		55.7 ug/L	55.7U ug/L[1]
	Iron		9.2 ug/L	9.2U ug/L[1]
	Selenium		0.68 ug/L	None
	Sodium		24.9 ug/L	24.9U ug/L[1]
	Zinc		2.0 ug/L	None
WF031	**Client ID:**	05R01901		
	Laboratory ID:	MB928011		
	Collection Date:	9/25/96		
	Type:	Equipment rinsate		
	Barium		0.34 ug/L	None
	Manganese		0.38 ug/L	None
	Mercury		0.06 ug/L	0.06U ug/L[1]
	Zinc		2.0 ug/L	None
WF032	**Client ID:**	06R02001		
	Laboratory ID:	MC011006		
	Collection Date:	10/2/96		
	Type:	Equipment rinsate		
	Barium		2.8 ug/L	2.8U ug/L[1]
	Chromium		2.5 ug/L	2.5U ug/L[1]
	Copper		2.9 ug/L	2.9U ug/L[1]
	Manganese		0.48 ug/L	0.48U ug/L[1]
	Mercury		0.01 ug/L	0.01U ug/L[1]
	Sodium		365 ug/L	None
	Zinc		3.0 ug/L	3.0U ug/L[1]
	Cyanide		1.4 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF033	**Client ID:**	66R02101		
	Laboratory ID:	MC085007		
	Collection Date:	10/9/96		
	Type:	**Equipment rinsate**		
	Barium		1.6 ug/L	1.6U ug/L[1]
	Beryllium		0.32 ug/L	0.32U ug/L[1]
	Chromium		0.55 ug/L	0.55U ug/L[1]
	Cobalt		0.84 ug/L	0.84U ug/L[1]
	Manganese		2.4 ug/L	2.4U ug/L[1]
	Potassium		777 ug/L	777U ug/L[1]
	Sodium		334 ug/L	334U ug/L[1]
	Vanadium		0.63 ug/L	0.63U ug/L[1]
	Zinc		1.4 ug/L	1.4U ug/L[1]
WF034	**Client ID:**	66R0201		
	Laboratory ID:	MC153007		
	Collection Date:	10/16/96		
	Type:	**Equipment rinsate**		
	Barium		0.56 ug/L	0.56 ug/L[1]
	Manganese		0.44 ug/L	0.44 ug/L[1]
	Mercury		0.02 ug/L	0.02 ug/L[1]
	Sodium		119 ug/L	119 ug/L[1]
	Zinc		2.2 ug/L	2.2 ug/L[1]
WF035	**Client ID:**	66R02301		
	Laboratory ID:	MC214006		
	Collection Date:	10/23/96		
	Type:	**Equipment rinsate**		
	Aluminum		30.7 ug/L	30.7 ug/L[1]
	Barium		1.3 ug/L	1.3 ug/L[1]
	Calcium		101 ug/L	101 ug/L[1]
	Manganese		0.94 ug/L	0.94 ug/L[1]
	Mercury		0.03 ug/L	0.03 ug/L[1]
	Sodium		100 ug/L	100 ug/L[1]
	Zinc		2.4 ug/L	2.4 ug/L[1]
WF036	**Client ID:**	54R02401		
	Laboratory ID:	MC262007		
	Collection Date:	10/30/96		
	Type:	**Equipment rinsate**		
	Aluminum		14.8 ug/L	14.8 ug/L[1]
	Barium		0.59 ug/L	0.59 ug/L[1]
	Chromium		0.48 ug/L	0.48 ug/L[1]
	Manganese		0.32 ug/L	0.32 ug/L[1]
	Potassium		756 ug/L	756 ug/L[1]
	Sodium		265 ug/L	None
	Zinc		1.4 ug/L	None
WF037	**Client ID:**	15F00201		
	Laboratory ID:	MC424010		
	Collection Date:	12/2/96		
	Type:	**Source blank**		
	Barium		1.2 ug/L	None
	Calcium		111 ug/L	None
	Copper		6.8 ug/L	None
	Manganese		0.43 ug/L	None
	Sodium		95.7 ug/L	None
	Zinc		2.6 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF041	**Client ID:**	**35F00301**		
	Laboratory ID:	**MD908002**		
	Collection Date:	**6/11/97**		
	Type:	**Source blank**		
	Barium		0.78 ug/L	None
	Calcium		164 ug/L	164U ug/L[1]
	Copper		10.3 ug/L	10.3U ug/L[1]
	Iron		35.6 ug/L	35.6U ug/L[1]
	Lead		1.0 ug/L	1.0U ug/L[1]
	Manganese		0.88 ug/L	None
	Sodium		129 ug/L	129U ug/L[1]
	Zinc		13.3 ug/L	13.3U ug/L[1]
WF041	**Client ID:**	**35R03001**		
	Laboratory ID:	**MD908003**		
	Collection Date:	**6/11/97**		
	Type:	**Equipment rinsate**		
	Barium		1.0 ug/L	None
	Calcium		165 ug/L	165U ug/L[1]
	Copper		4.9 ug/L	4.9U ug/L[1]
	Iron		10.7 ug/L	10.7U ug/L[1]
	Manganese		1.2 ug/L	None
	Sodium		148 ug/L	148U ug/L[1]
	Thallium		1.7 ug/L	1.7U ug/L[1]
	Zinc		15.8 ug/L	15.8U ug/L[1]
WF045	**Client ID:**	**OWR03401**		
	Laboratory ID:	**ME149002**		
	Collection Date:	**7/7/97**		
	Type:	**Equipment rinsate**		
	Barium		0.44 ug/L	0.44U ug/L[1]
	Calcium		133 ug/L	133U ug/L[1]
	Copper		1.8 ug/L	None
	Iron		7.1 ug/L	7.1U ug/L[1]
	Sodium		60.4 ug/L	60.4U ug/L[1]
	Zinc		1.7 ug/L	1.7U ug/L[1]
WF046	**Client ID:**	**31R03301**		
	Laboratory ID:	**MW241002**		
	Collection Date:	**7/15/97**		
	Type:	**Equipment rinsate**		
	Barium		1.1 ug/L	1.1U ug/L[1]
	Calcium		126 ug/L	126U ug/L[1]
	Iron		4.4 ug/L	4.4U ug/L[1]
	Manganese		0.40 ug/L	None
	Sodium		65.6 ug/L	65.6U ug/L[1]
	Zinc		5.4 ug/L	5.4U ug/L[1]

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter	Concentration	Qualifier
WF051	**Client ID:** 16R03601		
	Laboratory ID: ME340005		
	Collection Date: 7/23/97		
	Type: Equipment rinsate		
	Calcium	166 ug/L	166U ug/L[1]
	Copper	1.7 ug/L	1.7U ug/L[1]
	Iron	12.7 ug/L	12.7U ug/L[1]
	Lead	1.2 ug/L	None
	Manganese	0.68 ug/L	0.68U ug/L[1]
	Sodium	48.9 ug/L	48.9U ug/L[1]
	Zinc	2.6 ug/L	2.6U ug/L[1]
WF053	**Client ID:** 15R03701		
	Laboratory ID: ME367002		
	Collection Date: 7/27/97		
	Type: Equipment rinsate		
	Barium	1.6 ug/L	None
	Calcium	134 ug/L	134U ug/L[1]
	Chromium	4.2 ug/L	4.2U ug/L[1]
	Copper	2.1 ug/L	2.1U ug/L[1]
	Iron	18.4 ug/L	None
	Manganese	0.69 ug/L	0.69U ug/L[1]
	Sodium	83.0 ug/L	83.0U ug/L[1]
	Zinc	5.0 ug/L	5.0U ug/L[1]
WF054	**Client ID:** 15R03801		
	Laboratory ID: ME441005		
	Collection Date: 8/5/97		
	Type: Equipment rinsate		
	Cadmium	4.7 ug/L	
	Calcium	159 ug/L	159U ug/L[1]
	Copper	1.3 ug/L	None
	Iron	13.3 ug/L	13.3U ug/L[1]
	Manganese	0.48 ug/L	None
	Mercury	0.05 ug/L	0.05U ug/L[1]
	Sodium	20.0 ug/L	None
	Zinc	1.8 ug/L	None
WF054	**Client ID:** 30R03901		
	Laboratory ID: ME450002		
	Collection Date: 8/6/97		
	Type: Equipment rinsate		
	Aluminum	16.7 ug/L	None
	Barium	0.78 ug/L	None
	Calcium	150 ug/L	150U ug/L
	Copper	3.7 ug/L	None
	Iron	14.0 ug/L	14.0U ug/L
	Manganese	0.58 ug/L	None
	Sodium	67.0 ug/L	None
	Zinc	4.4 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF022	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF023	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF024	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF025	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF026	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF027	Volatiles	Acceptable	Acceptable	Acceptable	99.0	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF028	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF029	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF030	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF031	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	**0**	Acceptable
WF031B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF032	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	99.3	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF033	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF034	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF035	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF036	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF037	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	**0**	Acceptable
WF038	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF039	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF040	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF041	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF042	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF043	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF044	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF045	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	**Unacceptable**	**Unacceptable**	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF046	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF047	Volatiles	Acceptable	Acceptable	Acceptable	97.0	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF048	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF049	Volatiles	Acceptable	Acceptable	Acceptable	95.2	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF051	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF052	Volatiles	Acceptable	Acceptable	Acceptable	94.3	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF053	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF054	Volatiles Metals	Acceptable Acceptable	Acceptable Acceptable	Acceptable Acceptable	100 100	Acceptable Acceptable
WF055	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

APPENDIX C

SOIL SAMPLE ANALYTICAL DATA

Naval Air Station Whiting Field - Milton, Florida
Site 14 - Surface Soil Data

Lab Sample Number:		S22454015			22454015			S22454016			22454016		
Site		WHITING			WHITING			WHITING			WHITING		
Locator		14-SL-01			14-SL-01			14-SL-02			14-SL-02		
Collect Date:		11-AUG-92			11-AUG-92			11-AUG-92			11-AUG-92		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg												
Methylene chloride		-	ug/kg		- UJ	ug/kg	6	-	ug/kg		- UJ	ug/kg	6
Xylenes (total)		-	ug/kg		2 J	ug/kg	6	-	ug/kg		- U	ug/kg	6
CLP SEMIVOLATILES 90-SOW	ug/kg												
bis(2-Ethylhexyl) phthalate		-	ug/kg		- U	ug/kg	370	-	ug/kg		40 J	ug/kg	380
CLP METALS AND CYANIDE	mg/kg												
Aluminum		20400	mg/kg	40	-	mg/kg		13500	mg/kg	40	-	mg/kg	
Arsenic		4.2	mg/kg	2	-	mg/kg		2.2 J	mg/kg	2	-	mg/kg	
Barium		12 J	mg/kg	40	-	mg/kg		6.2 J	mg/kg	40	-	mg/kg	
Beryllium		.15 J	mg/kg	1	-	mg/kg		.13 J	mg/kg	1	-	mg/kg	
Cadmium		- U	mg/kg	1	-	mg/kg		.94 J	mg/kg	1	-	mg/kg	
Calcium		118 J	mg/kg	1000	-	mg/kg		80.9 J	mg/kg	1000	-	mg/kg	
Chromium		17	mg/kg	2	-	mg/kg		17.6	mg/kg	2	-	mg/kg	
Cobalt		1.5 J	mg/kg	10	-	mg/kg		1.5 J	mg/kg	10	-	mg/kg	
Copper		4.9 J	mg/kg	5	-	mg/kg		5.1 J	mg/kg	5	-	mg/kg	
Iron		14300	mg/kg	20	-	mg/kg		15800	mg/kg	20	-	mg/kg	
Lead		5.7 J	mg/kg	1	-	mg/kg		5.1 J	mg/kg	1	-	mg/kg	
Magnesium		87.4 J	mg/kg	1000	-	mg/kg		48.6 J	mg/kg	1000	-	mg/kg	
Manganese		62.3	mg/kg	3	-	mg/kg		33.6	mg/kg	3	-	mg/kg	
Mercury		- U	mg/kg	.1	-	mg/kg		- U	mg/kg	.1	-	mg/kg	
Nickel		- U	mg/kg	8	-	mg/kg		- U	mg/kg	8	-	mg/kg	
Potassium		- U	mg/kg	1000	-	mg/kg		- U	mg/kg	1000	-	mg/kg	
Sodium		170 J	mg/kg	1000	-	mg/kg		179 J	mg/kg	1000	-	mg/kg	
Vanadium		37.4	mg/kg	10	-	mg/kg		42.1	mg/kg	10	-	mg/kg	
Zinc		7.7 J	mg/kg	4	-	mg/kg		11.1	mg/kg	4	-	mg/kg	
Cyanide		- U	mg/kg	1	-	mg/kg		- U	mg/kg	1	-	mg/kg	

Naval Air Station Whiting Field - Milton, Florida
Site 14 - Surface Soil Data

Lab Sample Number:		S22454017				22454017				G8895007				G8895008		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		14-SL-03				14-SL-03				14S00101				14S00101D		
Collect Date:		11-AUG-92				11-AUG-92				08-DEC-95				08-DEC-95		
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Methylene chloride		-		ug/kg		-	UJ	ug/kg	5	6	J	ug/kg	11	-	U	ug/kg	12
Xylenes (total)		-		ug/kg		-	U	ug/kg	5	-	U	ug/kg	11	-	UJ	ug/kg	12
CLP SEMIVOLATILES 90-SOW	ug/kg																
bis(2-Ethylhexyl) phthalate		-		ug/kg		-	U	ug/kg	350	-	U	ug/kg	380	-	U	ug/kg	380
CLP METALS AND CYANIDE	mg/kg																
Aluminum		11800		mg/kg	40	-		mg/kg		11600		mg/kg	40	11500		mg/kg	40
Arsenic		1.8	J	mg/kg	2	-		mg/kg		1.5	J	mg/kg	2	1.9	J	mg/kg	2
Barium		17.1	J	mg/kg	40	-		mg/kg		23.3	J	mg/kg	40	26.6	J	mg/kg	40
Beryllium		.12	J	mg/kg	1	-		mg/kg		-	UJ	mg/kg	1	-	UJ	mg/kg	1
Cadmium		-	U	mg/kg	1	-		mg/kg		-	U	mg/kg	1	-	U	mg/kg	1
Calcium		110	J	mg/kg	1000	-		mg/kg		120	J	mg/kg	1000	183	J	mg/kg	1000
Chromium		7.2		mg/kg	2	-		mg/kg		7.8		mg/kg	2	7.8		mg/kg	2
Cobalt		1.8	J	mg/kg	10	-		mg/kg		1.8	J	mg/kg	10	1.6	J	mg/kg	10
Copper		7.8		mg/kg	5	-		mg/kg		-	UJ	mg/kg	5	-	UJ	mg/kg	5
Iron		7120		mg/kg	20	-		mg/kg		6310		mg/kg	20	6630		mg/kg	20
Lead		4.3	J	mg/kg	1	-		mg/kg		7.7	J	mg/kg	.6	11.9	J	mg/kg	.6
Magnesium		106	J	mg/kg	1000	-		mg/kg		177	J	mg/kg	1000	162	J	mg/kg	1000
Manganese		113		mg/kg	3	-		mg/kg		521	J	mg/kg	3	597	J	mg/kg	3
Mercury		-	U	mg/kg	.1	-		mg/kg		.04	J	mg/kg	.1	.04	J	mg/kg	.1
Nickel		-	U	mg/kg	8	-		mg/kg		4.1	J	mg/kg	8	4.6	J	mg/kg	8
Potassium		-	U	mg/kg	1000	-		mg/kg		144	J	mg/kg	1000	-	U	mg/kg	1000
Sodium		180	J	mg/kg	1000	-		mg/kg		-	UJ	mg/kg	1000	-	UJ	mg/kg	1000
Vanadium		16.9		mg/kg	10	-		mg/kg		16.8		mg/kg	10	17.4		mg/kg	10
Zinc		7.8	J	mg/kg	4	-		mg/kg		-	U	mg/kg	4	-	U	mg/kg	4
Cyanide		-	U	mg/kg	1	-		mg/kg		.07	J	mg/kg	.5	-	U	mg/kg	.5

Naval Air Station Whiting Field - Milton, Florida
Site 14 - Surface Soil Data

Lab Sample Number:		G8895009				G8895010			
Site		WHITING				WHITING			
Locator		14S00201				14S00301			
Collect Date:		08-DEC-95				08-DEC-95			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg								
Methylene chloride		-	U	ug/kg	11	8	J	ug/kg	11
Xylenes (total)		-	U	ug/kg	11	-	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW	ug/kg								
bis(2-Ethylhexyl) phthalate		-	U	ug/kg	370	-	U	ug/kg	370
CLP METALS AND CYANIDE	mg/kg								
Aluminum		23800		mg/kg	40	10100		mg/kg	40
Arsenic		4.3		mg/kg	2	1.7	J	mg/kg	2
Barium		11.9	J	mg/kg	40	14.9	J	mg/kg	40
Beryllium		-	UJ	mg/kg	1	-	UJ	mg/kg	1
Cadmium		-	U	mg/kg	1	-	U	mg/kg	1
Calcium		56.6	J	mg/kg	1000	51.9	J	mg/kg	1000
Chromium		19.6		mg/kg	2	5.9		mg/kg	2
Cobalt		.65	J	mg/kg	10	1.3	J	mg/kg	10
Copper		-	U	mg/kg	5	-	UJ	mg/kg	5
Iron		15500		mg/kg	20	5470		mg/kg	20
Lead		6.2	J	mg/kg	.6	5.3	J	mg/kg	.6
Magnesium		142	J	mg/kg	1000	122	J	mg/kg	1000
Manganese		43.6	J	mg/kg	3	313	J	mg/kg	3
Mercury		.02	J	mg/kg	.1	.04	J	mg/kg	.1
Nickel		5	J	mg/kg	8	3.5	J	mg/kg	8
Potassium		174	J	mg/kg	1000	-	U	mg/kg	1000
Sodium		-	UJ	mg/kg	1000	-	UJ	mg/kg	1000
Vanadium		41.1		mg/kg	10	14.1		mg/kg	10
Zinc		-	U	mg/kg	4	-	UJ	mg/kg	4
Cyanide		-	U	mg/kg	.5	-	U	mg/kg	.5

Naval Air Station Whiting Field - Milton, Florida
Site 14 - Subsurface Soil Data

Lab Sample Number:		22935003				22935004				22935004DL			
Site		WHITING				WHITING				WHITING			
Locator		14SS0101				14SS0202				14SS0202_DL			
Collect Date:		08-OCT-92				08-OCT-92				08-OCT-92			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg												
Acetone		-	UJ	ug/kg	12	170	J	ug/kg	57	-	UJ	ug/kg	1400
Toluene		-	U	ug/kg	12	23	J	ug/kg	57	-	U	ug/kg	1400
Ethylbenzene		-	U	ug/kg	12	500		ug/kg	57	-	U	ug/kg	1400
Xylenes (total)		-	U	ug/kg	12	-	R	ug/kg	57	260	J	ug/kg	1400
CLP SEMIVOLATILES 90-SOW	ug/kg												
4-Methylphenol		-	U	ug/kg	410	60	J	ug/kg	380	-		ug/kg	
Naphthalene		-	U	ug/kg	410	1500		ug/kg	380	-		ug/kg	
bis(2-Ethylhexyl) phthalate		-	U	ug/kg	410	290	J	ug/kg	380	-		ug/kg	
CLP METALS AND CYANIDE	mg/kg												
Aluminum		14900		mg/kg	40	8830		mg/kg	40	-		mg/kg	
Arsenic		4.5		mg/kg	2	3.7		mg/kg	2	-		mg/kg	
Barium		7.9	J	mg/kg	40	7.7	J	mg/kg	40	-		mg/kg	
Beryllium		.21	J	mg/kg	1	.2	J	mg/kg	1	-		mg/kg	
Cadmium		-	U	mg/kg	1	1.7		mg/kg	1	-		mg/kg	
Calcium		126	J	mg/kg	1000	256	J	mg/kg	1000	-		mg/kg	
Chromium		18.6		mg/kg	2	18.4		mg/kg	2	-		mg/kg	
Cobalt		1.8	J	mg/kg	10	1.4	J	mg/kg	10	-		mg/kg	
Copper		7.5		mg/kg	5	4.6	J	mg/kg	5	-		mg/kg	
Iron		18800		mg/kg	20	15300		mg/kg	20	-		mg/kg	
Lead		7.3		mg/kg	1	5.6		mg/kg	1	-		mg/kg	
Magnesium		104	J	mg/kg	1000	71.6	J	mg/kg	1000	-		mg/kg	
Manganese		35		mg/kg	3	23.4		mg/kg	3	-		mg/kg	
Mercury		.12	J	mg/kg	.1	.14	J	mg/kg	.1	-		mg/kg	
Nickel		3.1	J	mg/kg	8	3.6	J	mg/kg	8	-		mg/kg	
Silver		-	U	mg/kg	2	.5	J	mg/kg	2	-		mg/kg	
Sodium		169	J	mg/kg	1000	190	J	mg/kg	1000	-		mg/kg	
Vanadium		47.7		mg/kg	10	38.8		mg/kg	10	-		mg/kg	
Zinc		9.8	J	mg/kg	4	15.4		mg/kg	4	-		mg/kg	

APPENDIX D

GROUNDWATER SAMPLE ANALYTICAL DATA

Naval Air Station Whiting Field - Milton, Florida
Sit 14 - Groundwater Data

Lab Sample Number:		90199002				RC092007				RC092009				90198004			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		WHF14-1				14G00101				14G00101D				WHF14-2			
Collect Date:		03-NOV-93				11-SEP-96				11-SEP-96				02-NOV-93			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/l																
Carbon disulfide		-	U	ug/l	10	3	J	ug/l	10	-	U	ug/l	10	-	U	ug/l	10
CLP SEMIVOLATILES 90-SOW	ug/l																
Butylbenzylphthalate		2	J	ug/l	10	-	U	ug/l	10	-	U	ug/l	10	-	U	ug/l	10
bis(2-Ethylhexyl) phthalate		7	J	ug/l	10	-	U	ug/l	10	-	U	ug/l	10	18		ug/l	10
CLP METALS AND CYANIDE	ug/l																
Aluminum		63.3	J	ug/l	200	-	U	ug/l		-	U	ug/l		1760		ug/l	200
Arsenic		-	U	ug/l	10	.5	J	ug/l		-	U	ug/l		-	U	ug/l	10
Barium		36.5	J	ug/l	200	22.3	J	ug/l		22.3	J	ug/l		23.9	J	ug/l	200
Calcium		13000		ug/l	5000	3060	J	ug/l		2870	J	ug/l		906	J	ug/l	5000
Chromium		-	U	ug/l	10	-	U	ug/l		-	U	ug/l		7.9	J	ug/l	10
Copper		12.9	J	ug/l	25	-	U	ug/l		-	U	ug/l		3.5	J	ug/l	25
Iron		26.1	J	ug/l	100	-	U	ug/l		-	U	ug/l		2770		ug/l	100
Lead		-	U	ug/l	3	1.3	J	ug/l		.8	J	ug/l		1.2	J	ug/l	3
Magnesium		676	J	ug/l	5000	702	J	ug/l		691	J	ug/l		827	J	ug/l	5000
Manganese		3.9	J	ug/l	15	1.9	J	ug/l		1.9	J	ug/l		7.5	J	ug/l	15
Mercury		-	U	ug/l	.2	.12	J	ug/l		-	U	ug/l		-	U	ug/l	.2
Potassium		933	J	ug/l	5000	-	U	ug/l		-	U	ug/l		1470	J	ug/l	5000
Sodium		2480	J	ug/l	5000	1590	J	ug/l		1570	J	ug/l		2320	J	ug/l	5000
Vanadium		-	U	ug/l	50	-	U	ug/l		-	U	ug/l		9.3	J	ug/l	50
Zinc		301		ug/l	20	89.5		ug/l		96.8		ug/l		12	J	ug/l	20

Naval Air Station Whiting Field - Milton, Florida
Sit 14 - Groundwater Data

Lab Sample Number:		RC092006		
Site		WHITING		
Locator		14G00201		
Collect Date:		10-SEP-96		
	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/l			
Carbon disulfide	-	U	ug/l	10
CLP SEMIVOLATILES 90-SOW	ug/l			
Butylbenzylphthalate	-	U	ug/l	10
bis(2-Ethylhexyl) phthalate	-	U	ug/l	10
CLP METALS AND CYANIDE	ug/l			
Aluminum	-	U	ug/l	
Arsenic	-	U	ug/l	
Barium	17.2	J	ug/l	
Calcium	766	J	ug/l	
Chromium	-	U	ug/l	
Copper	-	U	ug/l	
Iron	-	U	ug/l	
Lead	.6	J	ug/l	
Magnesium	618	J	ug/l	
Manganese	1.3	J	ug/l	
Mercury	-	U	ug/l	
Potassium	-	U	ug/l	
Sodium	1870	J	ug/l	
Vanadium	-	U	ug/l	
Zinc	-	U	ug/l	

Naval Air Station Whiti[illegible]ield - Milton, Florida
Sit 14 - Groundwater Data

Lab Sample Number:		RC093006			RC093005		
Site		WHITING			WHITING		
Locator		14G00101			14G00201		
Collect Date:		11-SEP-96			10-SEP-96		
		VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
Groundwater Quality	mg/l						
Alkalinity as CaCO3		15	mg/l	10	- U	mg/l	10
Hardness as CaCO3		18	mg/l	10	- U	mg/l	10
Nitrate-Nitrite		.94	mg/l	.1	.74	mg/l	.1
Sulfate		.22	mg/l	.1	.83	mg/l	.1
Total Dissolved Solids		33	mg/l	10	19	mg/l	10

APPENDIX E

HUMAN HEALTH RISK DATA

Table E-1
Screening Concentrations for Surface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Leaching Value[2]	Selected Screening Concentration[3]
Volatile Organic Compounds (µg/kg)				
Methylene chloride	85,000	16,000	20	16,000
Xylenes (total)	160,000,000	5,900,000	200	5,900,000
Semivolatile Organic Compounds (µg/kg)				
Bis (2-Ethylhexyl)phthalate	46,000	76,000	3,600,000	46,000
Chrysene	87,000	140,000	77,000	87,000
Inorganics (mg/kg)				
Aluminum	7,800	72,000	SPLP[9]	7,800
Arsenic	0.43[4]	0.8	29	0.43
Barium	550	110	1,600	110
Beryllium	16	120	63	16
Cadmium	3.9	75	8	3.9
Calcium	1,000,000[5]	NSC	NC	1,000,000
Chromium	23[6]	210[6]	38	23
Cobalt	470	4,700	SPLP[9]	470
Copper	310	110	SPLP[9]	110
Cyanide	160[7]	30	40	30
Iron	2,300	23,000	SPLP[9]	2,300
Lead	400[8]	400	SPLP[9]	400
Magnesium	460,468[5]	NSC	NC	460,468
Manganese	160	1,600	SPLP[9]	160
Mercury	2.3	3	2.1	3
Nickel	160	110	130	110
Potassium	1,000,000[5]	NSC	NC	1,000,000
Sodium	1,000,000[5]	NSC	NC	1,000,000
Vanadium	55	15	980	15
Zinc	2,300	23,000	6,000	2,300

See notes at end of table.

Table E-1
Screening Concentrations for Surface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Leaching Value[2]	Selected Screening Concentration[3]

NOTES:

μg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.
NC = not calculated.
NSC = no screening criteria available.
RBC = USEPA Region III Risk Based Concentration.

[1] For all chemicals except the essential nutrients, the USEPA Region III RBC Table for residential soil (October 1, 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Chapter 62-777, Florida Administrative Code, June, 1999. Cleanup goals are based on a target cancer risk of 10^{-6} or a target hazard quotient of 1.
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Target Level.
[4] RBC value is based on arsenic as a carcinogen.
[5] Essential nutrient screening value (see GIR Report.
[6] Values are based on Chromium VI.
[7] RBC value is based on hydrogen cyanide.
[8] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).
[9] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.

Table E-2
Screening Concentrations for Subsurface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk-Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Leaching Value[2]	Selected Screening Concentration[3]
Volatile Organic Compounds (µg/kg)				
Acetone	20,000,000	5,500,000	2,800	5,500,000
Ethylbenzene	20,000,000	8,400,000	600	8,400,000
Toluene	41,000,000	2,600,000	500	2,600,000
Xylenes (total)	410,000,000	40,000,000	200	40,000,000
Semivolatile Organic Compounds (µg/kg)				
4-Methylphenol	1,000,000	3,000,000	30	1,000,000
Bis(2-Ethylhexyl)phthalate	410,000	280,000	3,600,000	280,000
Naphthalene	4,100,000	270,000	1,700	270,000
Inorganics (mg/kg)				
Aluminum	200,000	1,000,000	SPLP[8]	200,000
Arsenic	3.8[4]	3.7[4]	29	3.7
Barium	14,000	87,000	1,600	14,000
Beryllium	410	800	63	410
Cadmium	100	1,300	8	100
Calcium	1,000,000[5]	NSC	NC	1,000,000
Chromium	610[6]	420[6]	38	420
Cobalt	12,000	110,000	SPLP[8]	12,000
Copper	8,200	76,000	SPLP[8]	8,200
Iron	61,000	480,000	SPLP[8]	61,000
Lead	400[7]	920	SPLP[8]	400
Magnesium	460,468[5]	NSC	NC	460,468
Manganese	4,100	22,000	SPLP[8]	4,100
Mercury	61	26	2.1	26
Nickel	4,100	28,000	130	4,100
Silver	1,000	9,100	17	1,000
Sodium	1,000,000[5]	NSC	NC	1,000,000
Vanadium	1,400	7,400	980	1,400
Zinc	61,000	560,000	6,000	61,000

See notes at end of table.

Table E-2
Screening Concentrations for Subsurface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk-Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Target Level Leaching Value[2]	Selected Screening Concentration[3]

[1] For all chemicals except the essential nutrients, the USEPA Region III RBC Table for industrial soil (October 1, 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Chapter 62-777, Florida Administrative Code, June, 1999.
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Target Level. .
[4] RBC value is based on arsenic's properties as a carcinogen.
[5] Essential nutrient screening value (see GIR Report).
[6] Values are based on Chromium VI.
[7] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).
[8] Leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels or may be determined using the toxicity characteristic leaching procedure in the event oily wastes are present.

Notes:

µg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.
NC = not calculated.
NSC = no screening criteria available.
RBC = Risk Based Concentration.

Table E-3
Screening Concentrations for Groundwater
For Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Federal MCL[2]	Florida Groundwater Cleanup Target Level[3]	Selected Screening Concentration[4]
Volatiles (μg/L)				
Carbon disulfide	100	NSC	[700]	100
Inorganics (μg/L)				
Arsenic	0.045[5]	50	50	0.045
Barium	260	2,000	2,000	260
Calcium	1,055,398[6]	NSC	NSC	1,055,398
Lead	NSC	15[7]	15	15
Magnesium	118,807[6]	NSC	NSC	118,807
Manganese	73	(50)	(50)	50
Mercury	1.1	2	2	1.1
Sodium	396,022[6]	NSC	160,000	160,000
Zinc	1,100	(5,000)	(5,000)	1,100

[1] For all chemicals except the essential nutrients, the USEPA Region III RBC Table for tap water (October, 1998) has been used. Screening values are based on a cancer risk of 10^{-6} and a hazard quotient of 1. Per USEPA Region IV Guidance (USEPA, 1995), the noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from February 1996. Primary MCLs have no marks, Secondary MCLs are indicated by parenthesis (), and Federal maximum contaminant level goals (MCLGs) are indicated by brackets []. The lowest of these nonzero values is presented.
[3] Chapter 62-777, Florida Administrative Code, June 1999. Primary Standards have no marks, Secondary Standards are indicated by parenthesis (), and other criteria (i.e., carcinogen, organoleptic, or a systemic toxicant) are indicated by brackets [].
[4] The selected screening concentration for the human health risk assessment is the lowest value of the RBC, Federal MCL value, and Florida Guidance Concentration values.
[5] Value is based on arsenic as a carcinogen.
[6] Essential nutrient screening value (see GIR Report).
[7] Treatment technology action level for lead in drinking water (USEPA Drinking Water Standards and Health Advisories, May 1996).

NOTES:
μg/L = micrograms per liter.
NSC = no screening concentration.
RBC = USEPA Region III Risk-Based concentration.
MCL = maximum contaminant level.

Table E-4
Oral Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

Chemical	Weight of Evidence	Oral Slope Factor (mg/kg/day)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
INORGANICS							
Aluminum	D	NE					
Arsenic	A	1.5e+00	IRIS	Human	Oral-drinking water	Skin	IRIS
Iron	D	NE					
Manganese	D	NE					

Notes:

NE = Not Evaluated

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of July 1997.

Weight of Evidence (route-specific):
- A = Human carcinogen
- B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
- C = Possible human carcinogen
- D = Not classifiable as to human carcinogenicity

Table E-5
Dermal Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

Compound	Weight of Evidence	Oral Slope Factor (mg/kg-day)-1	Oral Absorption Efficiency	Reference	Dermal Slope Factor (mg/kg-day)-1
INORGANICS					
Aluminum	D	NE			NE
Arsenic	A	1.5e+00	98%	Vahter, 1983	1.5e+00
Iron	D	NE			NE
Manganese	D	NE			NE

Notes:

NE = Not Evaluated
For documentation concerning oral slope factors, refer to Table E-4.

Vahter, M. 1983. Metabolism of Arsenic. In: Fowler, B.A., ed. Biological and Environmental Effect of Arsenic. NY: Elsevier. pp. 171-198.

Weight of Evidence (route-specific):

A	=	Human carcinogen
B	=	Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C	=	Possible human carcinogen
D	=	Not classifiable as to human carcinogenicity

Table E-6
Inhalation Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

Chemical	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu g/m^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
INORGANICS									
Aluminum	D	NE		NE					
Arsenic	A	15.	IRIS	4.3e-03	IRIS	Human	Inhalation	Lung	IRIS
Iron	D	NE		NE					
Manganese	D	NE		NE					

Notes:

NE = Not Evaluated
Integrated Risk Information System (IRIS) on-line database search, current as of February 1996.

Weight of Evidence (route-specific):
A = Human carcinogen
B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C = Possible human carcinogen
D = Not classifiable as to human carcinogenicity

Table E-7
Oral Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Oral RfD (mg/kg-day)	Source	Oral RfD (mg/kg-day)	Source						
INORGANICS										
Aluminum	1.0e+00	(1)	ND							
Arsenic	3.0e-04	IRIS	3.0e-04	HEAST	Oral-drinking water	Medium	Hyperpigmentation, keratosis	Human	3 D	IRIS
Iron	3.0e-01	(1)	ND							
Manganese	4.7e-02	IRIS	ND		Oral-diet	Medium	No effects observed	Human	1, 1 M	IRIS

Notes
ND = No Data

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of July 1997.
Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.
(1) This value was provided by the Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.

Uncertainty factors:
H = Variation in human sensitivity
A = Animal to human extrapolation
S = Extrapolation from subchronic to chronic NOAEL
L = Extrapolation from LOAEL to NOAEL
D = Inadequate data
M = Modifying factor

Table E-8
Dermal Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
INORGANICS						
Aluminum	1.0e+00	ND	20%	(1)	2.0e-01	ND
Arsenic	3.0e-04	3.0e-04	98%	Vahter, 1983	2.9e-04	2.9e-04
Iron	3.0e-01	ND	2%	Goyer, 1991	6.0e-03	ND
Manganese	4.7e-02	ND	4%	ATSDR, 1991	1.9e-03	ND

Notes: ND = No Data

For documentation concerning chronic and subchronic oral RfDs, refer to Table 3.

(1) Inorganics lacking specific information on absorption efficiency are assigned a default value of 20% (USEPA Region IV, 1993).

Table E-9
Inhalation Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 14
NAS, Whiting Field, Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Rfd (mg/kg-day)	Source	RfC ($\mu g/m^3$)	Source						
INORGANICS										
Aluminum	ND		ND							
Arsenic	ND		ND							
Iron	ND		ND							
Manganese	1.4e-05		5.0e-05	IRIS	Inhalation	Medium	Neurobehavioral impairment	Human	1,000 H,L,D	IRIS

Notes:

ND = No Data

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as July 1997.

Uncertainty factors:
- A = Animal to human extrapolation
- H = Variation in human sensitivity
- S = Extrapolation from subchronic to chronic NOAEL
- L = Extrapolation from LOAEL to NOAEL
- D = Inadequate data
- M = Modifying factor

HUMAN HEALTH TOXICITY PROFILES

Aluminum. Aluminum occurs naturally in the soil and makes up approximately 8 percent of the earths crust. Higher soil concentrations are associated with industries which burn coal and aluminum mining and smelting. Human exposures to aluminum may occur through ingestion of foods grown in soil that contains aluminum and use of antacids, antiperspirants, and other drug store items. Aluminum in antiperspirants can cause skin rashes in some people. Factory workers who inhale large amounts of aluminum dust may develop lung problems. Aluminum has caused lower birth weights in some animals. Studies have shown that aluminum accumulates in the brains of people with Alzheimer's disease. However, any causal link between aluminum exposure and this disease is yet to be demonstrated. Both human epidemiological studies and animal experiments strongly suggests that aluminum is not a carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. "Toxicological Profile for Aluminum"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1989.

Arsenic. Arsenic was once used in pesticide formulations and has industrial uses in tanneries, as well as the glass and wine making industries. Toxicity depends on its chemical form. Arsenic is an irritant of the skin, mucous membranes, and gastrointestinal tract. Symptoms of acute toxicity include vomiting, diarrhea, convulsions, and a severe drop in blood pressure. Subchronic effects include hyperpigmentation, sensory-motor polyneuropathy, persistent headache, and lethargy. Chronic oral exposure has caused skin lesions, peripheral vascular disease, and peripheral neuropathy. The USEPA has classified arsenic as Group A, human carcinogen, based on increased incidence of skin cancer and lung cancer in epidemiology studies.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for Arsenic"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1992.

Iron. Iron is a metal which is required for a variety of physiological functions such as heme biosynthesis, oxidative phosphorylation and mixed-function oxidase-mediated metabolic reactions. Only divalent forms of iron are absorbed. As absorption occurs, divalent iron is biochemically converted to trivalent iron, the biologically active form. Under normal conditions, absorbed dietary iron is complexed to hemoglobin and transported to the liver for storage until needed for physiological reactions. The balance of iron is regulated only by the amount of dietary intake and the degree of intestinal absorption. Intestinal absorption tends to be low (2 - 15%) except during periods of increased iron need when absorption efficiency increases dramatically.

Acute iron toxicity has been well characterized following the accidental ingestion of iron-containing preparations by children. Shortly after ingestion, the corrosive effects of iron cause vomiting and diarrhea, often bloody. Later signs include shock, metabolic acidosis, seizures, liver and/or kidney failure, coma, and death. Chronic iron overload manifests as disturbances in liver function, diabetes mellitus, and endocrine and cardiovascular effects. Inhalation of iron containing dust or fumes in occupational settings may result in deposition of iron particles in the lungs leading to interstitial fibrosis. Autopsies of hematite miners noted an increase in lung cancer. However, the etiology of the lung cancer may be related to factors other than iron exposure such as cigarette, silica or PAH exposures.

References:
Aisen, P., Cohen, G. and Kang, J.O., 1990. Iron Toxicosis. Int. Rev. Exp. Pathol. 31:1-46.

Goyer, R.A., 1991. Toxic Effects of Metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, 3rd edition. Eds. C.D. Klaassen, M.O. Amdur and J. Doull. Macmillan Publishing Co. N.Y.

Manganese. Manganese is a naturally occurring substance found in many types of rock. It does not generally occur in the environment as the pure metal, rather, it is found combined with other chemicals such as sulfur, oxygen, and chlorine. Manganese is mixed with iron to make various types of steel. Manganese is a component of some ceramics, pesticides, fertilizers, and in nutritional supplements. In small doses manganese is beneficial to human health. Manganese miners and steel workers exposed to elevated concentrations of manganese have evidenced mental and emotional disturbances,

and slow and clumsy body movements. Target organs of manganese are the lung and CNS. When inhaled, manganese dust can also cause lung irritation. EPA has classified manganese as a Class D, not classifiable as to human carcinogenicity.

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 1991. "Toxicological Profile for Manganese"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service. February 1991.

TABLE E-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	$DAevent$	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	inorganics
	CF	1.00E-09	kg/ug	organics
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = **INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$**

HAZARD QUOTIENT = **INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)**

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DAevent = AF \times ABS_d \times CF$

Note: **For noncarcinogenic effects: AT = ED**

TABLE E-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	2.2E-07	1.5E+00	3.2E-07	0.001	1.2E-08	1.5E+00	1.9E-08	3.4E-07
SUMMARY CANCER RISK						3E-07				2E-08	3E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	4.2E-03	1.0E+00	4.2E-03	0.001	2.4E-04	2.0E-01	1.2E-03	5.4E-03
Arsenic	I	4.3	mg/kg	7.6E-07	3.0E-04	2.5E-03	0.001	4.4E-08	2.9E-04	1.5E-04	2.7E-03
Iron	I	15800	mg/kg	2.8E-03	3.0E-01	9.3E-03	0.001	1.6E-04	6.0E-03	2.7E-02	3.6E-02
Manganese	I	559	mg/kg	9.8E-05	4.7E-02	2.1E-03	0.001	5.7E-06	1.9E-03	3.0E-03	5.1E-03
SUMMARY HAZARD INDEX						0.02				0.03	0.05

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	USEPA, 1991

[1] *Florida Soil Clean-Up Goal Variable. FDEP, 1995.*
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED

TABLE E-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)$^{-1}$	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	5.8E-12	1.5E+01	**8.7E-11**
						SUMMARY CANCER RISK	**9E-11**

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	1.1E-07	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	2.0E-11	ND	
Iron	I	15800	mg/kg	1.27E-05	7.5E-08	ND	
Manganese	I	559	mg/kg	4.51E-07	2.6E-09	1.4E-05	**1.9E-04**
						SUMMARY HAZARD INDEX	**2E-04**

TABLE E-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganics
	CF	1.00E-09	kg/mg	Organics
BODY WEIGHT	BW	45	kg	USEPA, 1995
AGE-SPECIFIC BODY WEIGHT	BW_i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	1013	cm²-year/kg	Per USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	Per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 10 age periods, age 7 through 16, per USEPA, 1992.

USEPA, 1989, Exposure Factors Handbook:EPA/600/8-89/043; May 1989.
USEPA, 1991, Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992, Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995, Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$SA_{soil/adj}$ = SUM $(SA_i \times ED_i / BW_i)$

DA_{event} = CS x AF x ABS_d x CF

Note: For noncarcinogenic effects: AT = ED.

TABLE E-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	1.7E-07	1.5E+00	2.5E-07	0.001	7.7E-09	1.5E+00	1.2E-08	2.6E-07
SUMMARY CANCER RISK						3E-07				1E-08	3E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	6.5E-03	1.0E+00	6.5E-03	0.001	3.0E-04	2.0E-01	1.5E-03	8.0E-03
Arsenic	I	4.3	mg/kg	1.2E-06	3.0E-04	3.9E-03	0.001	5.4E-08	2.9E-04	1.9E-04	4.1E-03
Iron	I	15800	mg/kg	4.3E-03	3.0E-01	1.4E-02	0.001	2.0E-04	6.0E-03	3.3E-02	4.7E-02
Manganese	I	559	mg/kg	1.5E-04	4.7E-02	3.3E-03	0.001	7.0E-06	1.9E-03	3.7E-03	6.9E-03
SUMMARY HAZARD INDEX						0.03				0.04	0.07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	45	kg	USEPA, 1995
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA 1995. Supplemental Guidance to RAGS, Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects: AT = ED

TABLE E-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	3.4E-12	1.5E+01	5.1E-11
						SUMMARY CANCER RISK	5E-11

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	1.3E-07	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	2.4E-11	ND	
Iron	I	15800	mg/kg	1.27E-05	8.7E-08	ND	
Manganese	I	559	mg/kg	4.51E-07	3.1E-09	1.4E-05	2.2E-04
						SUMMARY HAZARD INDEX	2E-04

TABLE E-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE E-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	2.0E-06	1.5E+00	3.0E-06	0.001	1.2E-07	1.5E+00	1.7E-07	3.2E-06
SUMMARY CANCER RISK						3E-06				2E-07	3E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	3.3E-02	1.0E+00	3.3E-02	0.001	1.9E-03	2.0E-01	9.4E-03	4.2E-02
Arsenic	I	4.3	mg/kg	5.9E-06	3.0E-04	2.0E-02	0.001	3.4E-07	2.9E-04	1.2E-03	2.1E-02
Iron	I	15800	mg/kg	2.2E-02	3.0E-01	7.2E-02	0.001	1.2E-03	6.0E-03	2.1E-01	2.8E-01
Manganese	I	559	mg/kg	7.7E-04	4.7E-02	1.6E-02	0.001	4.4E-05	1.9E-03	2.3E-02	3.9E-02
SUMMARY HAZARD INDEX						0.1				0.2	0.4

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

TABLE E-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note:

For noncarcinogenic effects: AT = ED

TABLE E-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	2.2E-10	1.5E+01	**3.3E-09**
					SUMMARY CANCER RISK		**3E-09**

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	3.5E-06	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	6.3E-10	ND	
Iron	I	15800	mg/kg	1.27E-05	2.3E-06	ND	
Manganese	I	559	mg/kg	4.51E-07	8.2E-08	1.4E-05	**5.9E-03**
					SUMMARY HAZARD INDEX		**6E-03**

TABLE E-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil\ adj}$	766	cm^2-year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[2] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook:EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. *Dermal Exposure Assessment: Principles and Applications*: EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR ($mg/kg\text{-}day^{-1}$)

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = (DA_{event} \times EF / AT \times 365\ days/year) \times SA_{soil\ adj}$$

Where:

$SA_{soil\ adj}$ = SUM (SA x ED / BW)

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED.

TABLE E-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	4.7E-06	1.5E+00	7.1E-06	0.001	4.5E-08	1.5E+00	6.8E-08	7.1E-06
SUMMARY CANCER RISK						7E-06				7E-08	7E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	3.0E-01	1.0E+00	3.0E-01	0.001	2.9E-03	2.0E-01	1.5E-02	3.2E-01
Arsenic	I	4.3	mg/kg	5.5E-05	3.0E-04	1.8E-01	0.001	5.3E-07	2.9E-04	1.8E-03	1.9E-01
Iron	I	15800	mg/kg	2.0E-01	3.0E-01	6.7E-01	0.001	1.9E-03	6.0E-03	3.2E-01	1.0E+00
Manganese	I	559	mg/kg	7.1E-03	4.7E-02	1.5E-01	0.001	6.8E-05	1.9E-03	3.6E-02	1.9E-01
SUMMARY HAZARD INDEX						1				0.4	2

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION IN AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	m^3/hour	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	24	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors": OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note:

For noncarcinogenic effects: AT = ED

TABLE E-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	2.9E-10	1.5E+01	4.3E-09
						SUMMARY CANCER RISK	4E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	1.8E-05	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	3.3E-09	ND	
Iron	I	15800	mg/kg	1.27E-05	1.2E-05	ND	
Manganese	I	559	mg/kg	4.51E-07	4.3E-07	1.4E-05	3.1E-02
						SUMMARY HAZARD INDEX	3E-02

TABLE E-19

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED

TABLE E-19

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	9.0E-08	1.5E+00	1.4E-07	0.001	1.0E-08	1.5E+00	1.6E-08	1.5E-07
SUMMARY CANCER RISK						3E-07				3E-08	2E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.4E-03	1.0E+00	1.4E-03	0.001	1.6E-04	2.0E-01	8.0E-04	2.2E-03
Arsenic	I	4.3	mg/kg	2.5E-07	3.0E-04	8.4E-04	0.001	2.9E-08	2.9E-04	1.0E-04	9.4E-04
Iron	I	15800	mg/kg	9.3E-04	3.0E-01	3.1E-03	0.001	1.1E-04	6.0E-03	1.8E-02	2.1E-02
Manganese	I	559	mg/kg	3.3E-05	4.7E-02	7.0E-04	0.001	3.8E-06	1.9E-03	2.0E-03	2.7E-03
SUMMARY HAZARD INDEX						0.01				0.02	0.03

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	m^3/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$INTAKE = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED

TABLE E-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	2.9E-11	1.5E+01	4.4E-10
						SUMMARY CANCER RISK	4E-10

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	4.5E-07	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	8.1E-11	ND	
Iron	I	15800	mg/kg	1.27E-05	3.0E-07	ND	
Manganese	I	559	mg/kg	4.51E-07	1.1E-08	1.4E-05	7.6E-04
						SUMMARY HAZARD INDEX	8E-04

TABLE E-21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED

TABLE E-21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	7.5E-07	1.5E+00	1.1E-06	0.001	3.5E-08	1.5E+00	5.2E-08	1.2E-06
SUMMARY CANCER RISK						1E-06				5E-08	1E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.2E-02	1.0E+00	1.2E-02	0.001	5.4E-04	2.0E-01	2.7E-03	1.4E-02
Arsenic	I	4.3	mg/kg	2.1E-06	3.0E-04	7.0E-03	0.001	9.7E-08	2.9E-04	3.3E-04	7.3E-03
Iron	I	15800	mg/kg	7.7E-03	3.0E-01	2.6E-02	0.001	3.6E-04	6.0E-03	5.9E-02	8.5E-02
Manganese	I	559	mg/kg	2.7E-04	4.7E-02	5.8E-03	0.001	1.3E-05	1.9E-03	6.6E-03	1.2E-02
SUMMARY HAZARD INDEX						0.05				0.07	0.01

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-22

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	m^3/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED.

TABLE E-22

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	8.1E-11	1.5E+01	1.2E-09
						SUMMARY CANCER RISK	1E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	1.3E-06	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	2.3E-10	ND	
Iron	I	15800	mg/kg	1.27E-05	8.3E-07	ND	
Manganese	I	559	mg/kg	4.51E-07	2.9E-08	1.4E-05	2.1E-03
						SUMMARY HAZARD INDEX	2E-03

TABLE E-23

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED

TABLE E-23

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	3.5E-08	1.5E+00	5.2E-08	0.001	4.1E-10	1.5E+00	6.2E-10	5.3E-08
SUMMARY CANCER RISK						5E-08				6E-10	5E-08

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD [1] (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [3] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.3E-02	1.0E+00	1.3E-02	0.001	1.6E-04	2.0E-01	8.0E-04	1.4E-02
Arsenic	I	4.3	mg/kg	2.4E-06	3.0E-04	8.1E-03	0.001	2.9E-08	2.9E-04	1.0E-04	8.2E-03
Iron	I	15800	mg/kg	8.9E-03	3.0E-01	3.0E-02	0.001	1.1E-04	6.0E-03	1.8E-02	4.7E-02
Manganese	I	559	mg/kg	3.2E-04	4.7E-02	6.7E-03	0.001	3.8E-06	1.9E-03	2.0E-03	8.7E-03
SUMMARY HAZARD INDEX						0.01				0.02	0.01

[1] Subchronic Rfd values were used for the excavation worker due to short exposure scenario.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (USEPA, 1995).
[3] Calculated from oral RfDs.

TABLE E-24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	m^3/hour	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual. Supplemental Guidance:
Standard Default Exposure Factors; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV. Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogens, AT = ED.

TABLE E-24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	4.3	mg/kg	3.47E-09	1.2E-12	1.5E+01	1.7E-11
					SUMMARY CANCER RISK		2E-11

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.92E-05	4.5E-07	ND	
Arsenic	I	4.3	mg/kg	3.47E-09	8.1E-11	ND	
Iron	I	15800	mg/kg	1.27E-05	3.0E-07	ND	
Manganese	I	559	mg/kg	4.51E-07	1.1E-08	1.4E-05	7.6E-04
					SUMMARY HAZARD INDEX		8E-04

TABLE E-25

INGESTION OF GROUNDWATER AS DRINKING WATER UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 14
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE E-25

INGESTION OF GROUNDWATER AS DRINKING WATER UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 14
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	0.31	UG/LITER	2.9E-06	1.5	4.4E-06
				TOTAL CANCER RISK	9E-06

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Arsenic	0.31	UG/LITER	8.5E-06	3.0E-04	2.8E-02
				TOTAL HAZARD INDEX	0.03

ND = no data available.

TABLE E-26

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 14
MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1	liters/day	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE E-26

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 14
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	0.31	UG/LITER	1.7E-06	1.5	2.5E-06
				TOTAL CANCER RISK	3E-06

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Arsenic	0.31	UG/LITER	2.0E-05	3.0E-04	6.6E-02
				TOTAL HAZARD INDEX	0.07

TABLE E-27

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";
OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: *For noncarcinogenic effects, AT = ED.*

TABLE E-27

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION 4.3	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	2.9E-07	1.5	4.4E-07	0.001	5.9E-09	1.5	8.8E-09	4.5E-07
SUMMARY CANCER RISK						9E-07				2E-08	9E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	1.6E-02	1.0E+00	0.016	0.001	3.3E-04	2.0E-01	0.002	0.018
Arsenic	I	4.3	mg/kg	2.9E-06	3.0E-04	0.010	0.001	5.9E-08	2.9E-04	0.0002	0.010
Iron	I	15800	mg/kg	1.1E-02	3.0E-01	0.036	0.001	2.2E-04	6.0E-03	0.04	0.072
Manganese	I	559	mg/kg	3.8E-04	4.7E-02	0.008	0.001	7.7E-06	1.9E-03	0.004	0.012
SUMMARY HAZARD INDEX						0.1				0.04	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

TABLE E-28

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1992
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1996
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil\ adj}$	662.8	cm²-year/kg	GIR -Table C-5-5; USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
	AT	2	years	USEPA, 1992

[1] Air Force meterological data summary for Eglin AFB (close proximity to Milton) states that there is 0.01 inches of rain for 110 days per year. Exposure frequency assumes half of the rainy days require indoor restriction.

[2] In estimating the dermally absorbed dose for children age 1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

USEPA, 1996. Exposure Factors Handbook: 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = (DA_{event} \times EF / AT \times 365\ days/year) \times SA_{soil\ adj}$$

Where:

$SA_{soil\ adj}$ = SUM (SA x ED / BW)

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED.

TABLE E-28

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION 4.3	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	3.9E-07	1.5	5.9E-07	0.001	7.8E-09	1.5	1.2E-08	6.0E-07
					SUMMARY CANCER RISK	1E-06				2E-08	1E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	7.6E-02	1.0E+00	0.076	0.001	1.5E-03	2.0E-01	0.00756	0.084
Arsenic	I	4.3	mg/kg	1.4E-05	3.0E-04	0.046	0.001	2.7E-07	2.9E-04	0.00094	0.047
Iron	I	15800	mg/kg	5.1E-02	3.0E-01	0.168	0.001	1.0E-03	6.0E-03	0.16736	0.336
Manganese	I	559	mg/kg	1.8E-03	4.7E-02	0.038	0.001	3.6E-05	1.9E-03	0.01870	0.057
					SUMMARY HAZARD INDEX	0.3				0.19	0.5

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 14

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	50%	unitless	Assumption
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,000	cm²	USEPA, 1996
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	9	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	9	years	USEPA, 1992

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"*;

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED

TABLE E-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 14

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	4.3	mg/kg	1.4E-07	1.5	2.0E-07	0.001	2.2E-09	1.5	3.2E-09	2.1E-07
SUMMARY CANCER RISK						2E-07				3E-09	2E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	23800	mg/kg	5.8E-03	1.0E+00	5.8E-03	0.001	9.3E-05	2.0E-01	4.7E-04	6.3E-03
Arsenic	I	4.3	mg/kg	1.1E-06	3.0E-04	3.5E-03	0.001	1.7E-08	2.9E-04	5.8E-05	3.6E-03
Iron	I	15800	mg/kg	3.9E-03	3.0E-01	1.3E-02	0.001	6.2E-05	6.0E-03	1.0E-02	2.3E-02
Manganese	I	559	mg/kg	1.4E-04	4.7E-02	2.9E-03	0.001	2.2E-06	1.9E-03	1.2E-03	4.1E-03
SUMMARY HAZARD INDEX						0.03				0.01	0.04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE E-30

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 14
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1.4	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	7	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE E-30

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
ADULT RESIDENT
SITE 14
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	0.31	UG/LITER	5.9E-07	1.5	8.9E-07
				TOTAL CANCER RISK	9E-07

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Arsenic	0.31	UG/LITER	5.9E-06	3.0E-04	2.0E-02
				TOTAL HAZARD INDEX	0.02

ND = no data available.

TABLE E-31

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 14
MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	0.7	liters/day	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	2	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE E-31

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 14
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	0.31	UG/LITER	4.0E-07	1.5	5.9E-07
				TOTAL CANCER RISK	6E-07

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Arsenic	0.31	UG/LITER	1.4E-05	3.0E-04	4.6E-02
				TOTAL HAZARD INDEX	0.05

APPENDIX F

ECOLOGICAL RISK DATA

Table F - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Log K_{ow} [b]	Bioaccumulation Factor [a] Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
VOLATILES [g]					
Methylene chloride	1.3	NA	NA	NA	NA
SEMIVOLATILES					
Chrysene	5.7	3.5E-02	3.9E-03	7.5E-02	NA
bis(2-Ethylhexyl)phthalate	5.1	5.0E-02	8.7E-03	1.9E-01	NA
INORGANICS					
Aluminum	NA	7.5E-02 [i]	8.0E-04 [j]	7.5E-02 [k]	NA
Manganese	NA	2.0E-02 [i]	5.0E-02 [j]	2.0E-02 [k]	NA
Vanadium	NA	1.2E-01 [i]	1.1E-03 [j]	1.2E-01 [k]	NA

NOTES:

[a] Units for bioaccumulation factors (BAFs) are mg/kg (wet) tissue weight over mg/kg (dry) soil weight for invertebrates and plants. The BAF units for small mammals and small birds are mg/kg (wet) tissue weight over mg/kg (wet) food weight.

[b] Log K_{ow} values are from the Superfund Chemical Data Matrix (USEPA, 1993), unless otherwise noted.

[c] The value is an average BAF for semivolatiles measured in earthworms (Beyer, 1990) , unless otherwise noted. Dry weight values were converted to wet weight assuming earthworm are 80% water ($BAF_{wet\ weight} = BAF_{dry\ weight}/ 0.2$).

[d] Plant BAF were calculated using the following equation presented by Travis and Arms (1988) unless otherwise noted: log (Plant Bioaccumulation Factor) = 1.588-0.578 (log K_{ow}). The calculated plant BAF value was converted from dry weight to wet weight by dividing the BAF by a factor of 0.2 (assuming 80% water content of plants) ($BAF_{wet\ weight} = BAF_{dry\ weight}/ 0.2$).

[e] Mammalian BAFs were calculated using the following equation from Travis and Arms (1988), unless otherwise noted: log BTF (biotransfer factor) = Log K_{ow} - 7.6. To convert from BTF to BAF, the calculated log BTF is first transformed to base 10 than multiplied by the average ingestion rates for nonlactating and lactating test animals (12 kg/day). BAFs are converted from dry to wet feed weight by dividing the BAF by a factor of 0.2 ($BAF_{wet\ weight}$ = BTF *12 mg/day/0.2). There is an uncertainty involved in using this equation for PAHs because the study by Travis and Arms (1988) did not use PAHs in the regression analysis. For semivolate analytes with Log K_{ow} less than 5 (log $K_{ow} < 5$), the BAF was assigned a minimal value of 0.15.

[f] Bioaccumulation data are generally lacking for birds. Therefore, there is uncertainty associated with estimating body dose for birds without considering what chemicals may have bioacumulated in prey-item tissue.

[g] No BAFs were calculated for volatile organic compounds because available evidence suggests that these analytes do not bioaccumulate (Suter, 1993, Maughan, 1993).

[h] ATSDR (1993) Toxicological Profile for Naphthalene.

[i] Prey-specific value is not available. The value shown is the small mammal BAF for this chemical.

[j] Value from Baes et al. (1984) for leafy portions of plants multiplied by 0.2 to represent 80% water composition of plants.

[k] Value derived from BTFs, presented in Baes et al. (1984) for uptake into cattle. BTF converted to BAF by multiplying by food ingestion rate of 12 kg/day dry weight.

Table F - 1
Summary of Bioaccumulation Data

Remedial Investigation Report
Site 14
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

Notes:

Log Kow = Logarithm transformation of the octanol/water partitioning coefficient.
NA = not available.
BAF = bioaccumulation factor.
mg/kg = milligrams per kilogram.
BTF = biotransfer factor.
PAH = polynuclear aromatic hydrocarbons.
> = greater than.
< = less than.
% = percent.

References:

ATSDR, 1993, "Toxicological Profile for Naphthalene and 2-Methylnaphthalene," Agency for Toxic Substances and Disease Registry, U.S. Public Health Service.

Baes, C.F. III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor. 1984. "A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture." ORNL-5786. U.S. Department of Energy, Environmental Sciences Division Oak Ridge, Tennessee: Oak Ridge National Laboratory (September).

Beyer, W.N. 1990. "Evaluating Soil Contamination." Biological Report No. 90(2). U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.

Diercxsens, P., D. deWeck, N. Borsinger, B. Rosset, and J. Tarradellas. 1985. "Earthworm Contamination by PCBs and Heavy Metals." Chemosphere 14:511-522.

Levine, M.B., A.T. Hall, G.W. Barrett, and D.H. Taylor. 1989. "Heavy Metal Concentrations During Ten Years of Sludge Treatment to an Old-Field Community." Journal of Environ. Qual. 18:411-418.

Maughan, J.T. 1993. Ecological Assessment of Hazardous Waste Sites. New York: Van Nostrand Reinhold.

Pimentel, D.D., M.N. Culliney, G.S. Stoewsand, J.L. Anderson, C.A. Bache, W.H. Gutenmann, and D.J. Lisk. 1984. Cadmium in Japanese Quail Fed Earthworms Inhabiting a Golf Course. Nutr. Rep. Int. 30:475-481.

Suter, G. W. 1993. "Ecological Risk Assessment." Chelsea Michigan: Lewis Publishers.

Travis, C.C., and A.D. Arms. 1988. "Bioconcentration of Organics in Beef, Milk, and Vegetation." Environ. Sci. Tech. 22:271-274.

U.S. Environmental Protection Agency (USEPA). 1985. "Environmental Profiles and Hazard Indices for Constituents of Municipal Sludge: Lead." Office of Water Regulations and Standards. Washington, D.C.

U.S. Environmental Protection Agency (USEPA). 1993. Superfund Chemical Data Matrix (SCDM). Washington, D.C.

Table F-2
Ingestion Toxicity Information for Wildlife

RI/FS Report, Site 14
NAS Whiting Field
Milton, Florida

Chemical	Test Species	Test Type	Duration	Effect	Lethal RTV			Sublethal RTV			Reference
					Oral LD50	LOAEL	RTV [a]	LOAEL	NOAEL	RTV [a]	
VOLATILE ORGANIC COMPOUNDS											
Methylene chloride	Rat	Oral LD_{50}	NR	Mortality	1,600		320				RTECS, 1994
	Dog	Oral LD_{50}	NR	Mortality	3,000		600				RTECS, 1994
	Rabbit	Oral LD_{50}	NR	Mortality	1,900						RTECS, 1994
	Rat	Oral (chronic)	2 years	Liver toxicity				52.6		5.3	IRIS, 1991
	Rat	Oral (subchronic)	3 months	Mortality, blood chemistry, histopathology					12.5		USEPA, 1984a
SEMIVOLATILE ORGANIC COMPOUNDS											
Benzo(a)pyrene	Mouse	Oral	Multi-generational	Decreased fertility of F1 progeny; decreased F2 litter size.				10 [b]		10	MacKenzie and Angevine, 1981
	Mouse	Oral (subchronic)	6 months	Mortality		120 [b]	12				ATSDR, 1993
Chrysene	Rodents	Oral (chronic)	NS	Carcinogenicity				99			Eisler, 1987
bis(2-Ethylhexyl)phthalate	Rat	Oral LD_{50}	NR	Mortality	30,600						RTECS, 1993
	Rat	Oral	NR	Reproductive effects				7,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				35		3.5	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				6,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				17,200			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				10,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				9,766			RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	30,000						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				78,880			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,200			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				50			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,000			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				2,040			RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	34,000						RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	26,000						RTECS, 1993
	Guinea pig	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				509,000			RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	800		160				RTECS, 1993
	Mouse	Oral (subchronic)	13 weeks	Renal effects				125			RTECS, 1993
INORGANIC ANALYTES											
Aluminum	Mouse	Oral (chronic)	2-3 generations	Reduced body weight gain of newborns				425 [c]		425	NIOSH, 1985
	Rat	Oral (subchronic)	15 days	Reduced growth				100			Bernuzzi, V., et al., 1989
	Rat	Oral LD_{50}	NR	Mortality	3,700		740				Sax, N.I., 1984
Manganese	Mouse	Oral (subchronic)	90 days	Delayed growth of testes				140			ATSDR, 1990a
	Mouse	Oral (chronic)	103 weeks	Mortality				4,050			ATSDR, 1990a
	Rat	Oral LD_{50}	NR	Mortality	410						ATSDR, 1990a
	Rat	Oral LD_{50}	20 days	Mortality	225						ATSDR, 1990a
	Rat	Oral (subchronic)	20 days	Decreased litter weight during gestation					620	620	ATSDR, 1990a
	Rat	Oral (chronic)	103 weeks	Mortality				930			ATSDR, 1990a
	Guinea pig	Oral LD_{50}	NR	Mortality	400						USEPA, 1984b
	Monkey	Oral (chronic)	18 months	Weakness, rigidity				25			ATSDR, 1990a
	Rodents/livestock	Oral (subchronic)	10 days - 2 months	Decreased growth rate				100			Cunningham et al., 1966
	Mouse	Oral (subchronic)	180 days	NOAEL for mortality			2,300				Gianutsos and Murray, 1982
Vanadium	Japanese quail	Oral LD_{50}	5 days	Mortality		96	9.6				Hill, E.F., et al., 1986
	Mouse	Gavage LD50	One time	Mortality		31	3.1				ATSDR, 1990b
	Rat	Oral (subchronic)	2 months	Hypertension				15			Susic, D., et al., 1986
	Rat	Oral (subchronic)	35 days	Development effects					8.4	8.4	Domingo, J.L., et al., 1986
	Chicken	Oral (subchronic)	6 weeks	Decrease in egglaying				11		1.1	Berg, L.R., et al., 1963

Notes:
LD_{50} = Dose resulting in 50% mortality in test population
BW = Body weight
NOAEL = No Observed Adverse Effect Level
LOAEL = Lowest Observed Adverse Effect Level
NR = Not reported
[a] Selected RTVs are boxed. Lethal and sublethal RTVs are chosen based on the data hierarchy discussed in Section 7.5.1.
[b] Value for benzo(a)pyrene chosen as a surrogate for all PAHs. Chemical-specific toxicity studies for ecologically significant endpoints are lacking for other PAHs.
Sublethal RTV for benzo(a)pyrene is equal to the LOAEL value because the toxicity test is multi-generational
[c] Sublethal RTV for aluminum is equal to the LOAEL value because the toxicity test is multi-generational

Table F -3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kgBW/day)

RI/FS Report, Site 14
NAS Whiting Field
Milton, Florida

	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
Compound	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal
Volatile Organic Compounds								
Methylene chloride	320	5.3			600	5.3		
Semivolatile Organic Compounds								
bis(2-Ethylhexyl)phthalate	160	3.5			160	3.5		
Chrysene	12 [f]	10 [f]			12 [f]	10 [f]		
Inorganic Compounds								
Aluminum	740	425			740	425		
Manganese	2,300	620			2,300	620		
Vanadium	3.1	8.4	9.6	1.1	3.1	8.4	9.6	1.1

Notes:
[a] Lethal and sublethal RTVs correspond to the boxed values presented in Table F-2.
[b] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the cotton mouse or the short tailed shrew.
[c] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the eastern meadowlark.
[d] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red fox.
When no data were available, the small mammal values were used as a surrogate.
[e] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red-tailed hawk. When no data were available, the small bird values were used as a surrogate.
[f] The value for benzo(a)pyrene was used as a surrogate.

Table F-4
Summary of Toxicity Data for Plant Receptors

RI/RA Report, Site 14
NAS Whiting Field
Milton, Florida

Chemical	Reference [a]	RTV in soil (mg/kg)
VOLATILE ORGANICS		
Methylene chloride	Hulzebos *et al.*, 1993	>1,000
SEMI-VOLATILE ORGANICS		
bis(2-Ethylhexyl)phthalate	Hulzebos *et al.*, 1993	>1,000
Chrysene		25 [b]
INORGANICS		
Aluminum	Will and Suter, 1994	50
Manganese	Will and Suter, 1994	500
Vanadium	Will and Suter, 1994	2

Notes:
[a] Phytotoxicity benchmarks from Will and Suter (1994) are derived by rank ordering the LOEC values and then picking a number that approximates the 10th percentile. Values from Hulzebos et. al. (1993) represent 14-growth EC50s for Lactuca sativa in soil.
[b] Value for acenaphthene used as a surrogate.

Ta)-5
Summary of Toxicity Data for Terrestrial Invertebrates

RI/RA Report, Site 14
NAS Whiting Field
Milton, Florida

Chemical	Test Type	Test Duration	Test Species	Chemical Concentration (mg/kg)	Effect	RTV (mg/kg)	Reference
VOLATILE ORGANIC COMPOUNDS							
Methylene chloride	Soil Test	14 day	*E. foetida*	740	LC_{50}	150 [a]	Neuhauser et al., 1985.
SEMIVOLATILE ORGANIC COMPOUNDS							
bis(2-Ethylhexyl)phthalate	Soil Test	14 day	4 test species	2,390	LC_{50}	478 [b]	Neuhauser et al., 1986.
Chrysene	Soil Test	14 day	*E. foetida*	173	LC_{50}	34 [a]	Neuhauser et al., 1985.
INORGANIC ANALYTES							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA

NOTES:

[a] Equal to the lowest LC_{50} in each chemical class, multiplied by a safety factor of 0.2, as described in text. Value for fluorene used for PAHs.

[b] Mean of LC_{50}s for four test species (*A. tuberculata, E. foetida, E. eugeniae*, and *P. excavatus*) from artificial soil tests; values used for a whole chemical class are multiplied by a factor of 0.2 (Neuhauser et al., 1986). Value for dimethylphthalate used for phthalates.

NA = Not available.

Table F-6
Exposure Parameters and Assumptions for Terrestrial Receptors [a]
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

Representative Wildlife Species		Porcent Proy in Diet: Inverts	Plants	Small Mammals	Small Birds	Soil	Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Eastern meadowlark	(Small herb. bird)	75%	20%	0%	0%	5%	5	1	6.00E-01	0.0119	0.087
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	250	1	1.20E-02	0.24	4.69
Red-tailed hawk	(Predatory bird)	0%	0%	70%	27%	3%	800	1	3.75E-03	0.113	1.02

NOTES:

SITE AREA: 3.0 acres

[a] Documentation of exposure parameters presented in: Table 7-5

[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area). ED is assumed to be 1 for this risk assessment.

[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0)). SFF is assumed to be 1 for lethal exposure scenario.

Table F-7
Estimated Chr [illegible] xposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of [illegible] in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	REASONABLE MAXIMUM EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Methylene chloride	8.0E-03	NA	0.0E+00	NA	0.0E+00	NA	NA
Chrysene	3.8E-01	3.5E-02	2.9E-02	3.9E-03	2.9E-02	7.6E-01	NA
bis(2-ethylhexyl)phthalate	4.0E-02	5.0E-02	2.0E-03	8.7E-03	2.7E-04	1.9E-01	NA
Aluminum	2.4E+04	7.5E-02	1.8E+03	8.0E-04	1.9E+01	7.5E-02	NA
Manganese	5.6E+02	2.0E-02	1.1E+01	5.0E-02	2.8E+01	2.0E-02	NA
Vanadium	4.2E+01	1.3E-01	5.5E+00	1.1E-03	4.6E-02	1.3E-01	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix F, Table F-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant.

Table F-7
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Red-tailed hawk*
Methylene chloride	2.2E-05	1.1E-04	3.3E-05	1.5E-07	1.0E-07
Chrysene	5.0E-03	9.0E-03	3.8E-03	4.4E-05	3.1E-05
bis(2-ethylhexyl)phthalate	1.7E-04	7.9E-04	2.9E-04	5.2E-06	4.0E-06
Aluminum	9.3E+01	5.3E+02	2.1E+02	1.3E+00	8.2E-01
Manganese	5.1E+00	9.6E+00	3.4E+00	1.7E-02	1.0E-02
Vanadium	2.0E-01	1.2E+00	5.1E-01	3.4E-03	2.1E-03

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table F-8
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	2.2E-05	3.2E+02	6.9E-08	1.1E-04	3.2E+02	3.5E-07	3.3E-05		0.0E+00
Chrysene	5.0E-03	1.6E+02	3.1E-05	9.0E-03	1.6E+02	5.6E-05	3.8E-03		0.0E+00
bis(2-ethylhexyl)phthalate	1.7E-04	1.2E+01	1.4E-05	7.9E-04	1.2E+01	6.6E-05	2.9E-04		0.0E+00
Aluminum	9.3E+01	7.4E+02	1.3E-01	5.3E+02	7.4E+02	7.2E-01	2.1E+02		0.0E+00
Manganese	5.1E+00	2.3E+03	2.2E-03	9.6E+00	2.3E+03	4.2E-03	3.4E+00		0.0E+00
Vanadium	2.0E-01	3.1E+00	3.3E-03	1.2E+00	3.1E+00	2.0E-02	5.1E-01	9.6E+00	2.7E-02
SUMMARY HAZARD INDEX			1.3E-01			7.4E-01			2.7E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-8
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Red-tailed hawk		
	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	1.5E-07	6.0E+02	2.5E-10	1.0E-07		0.0E+00
Chrysene	4.4E-05	1.6E+02	2.8E-07	3.1E-05		0.0E+00
bis(2-ethylhexyl)phthalate	5.2E-06	1.2E+01	4.3E-07	4.0E-06		0.0E+00
Aluminum	1.3E+00	7.4E+02	1.7E-03	8.2E-01		0.0E+00
Manganese	1.7E-02	2.3E+03	7.5E-06	1.0E-02		0.0E+00
Vanadium	3.4E-03	6.0E+02	5.6E-06	2.1E-03	1.9E+01	1.1E-04
SUMMARY HAZARD INDEX			1.7E-03			1.1E-04

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-9
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of [illegible]Cs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	2.2E-05	5.3E+00	4.2E-06	1.1E-04	5.3E+00	2.1E-05	3.3E-05		0.0E+00
Chrysene	5.0E-03	3.5E+00	1.4E-03	9.0E-03	3.5E+00	2.6E-03	3.8E-03		0.0E+00
bis(2-ethylhexyl)phthalate	1.7E-04	1.0E+01	1.7E-05	7.9E-04	1.0E+01	7.9E-05	2.9E-04		0.0E+00
Aluminum	9.3E+01	4.3E+02	2.2E-01	5.3E+02	4.3E+02	1.3E+00	2.1E+02		0.0E+00
Manganese	5.1E+00	6.2E+02	8.2E-03	9.6E+00	6.2E+02	1.5E-02	3.4E+00		0.0E+00
Vanadium	2.0E-01	8.4E+00	2.4E-02	1.2E+00	8.4E+00	1.4E-01	5.1E-01	1.1E+00	4.6E-01
SUMMARY HAZARD INDEX			2.5E-01			1.4E+00			4.6E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-9
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Red fox*			*Red-tailed hawk*		
	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	1.5E-07	5.3E+00	2.8E-08	1.0E-07		0.0E+00
Chrysene	4.4E-05	3.5E+00	1.3E-05	3.1E-05		0.0E+00
bis(2-ethylhexyl)phthalate	5.2E-06	1.0E+01	5.2E-07	4.0E-06		0.0E+00
Aluminum	1.3E+00	4.3E+02	3.0E-03	8.2E-01		0.0E+00
Manganese	1.7E-02	6.2E+02	2.8E-05	1.0E-02		0.0E+00
Vanadium	3.4E-03	8.4E+00	4.0E-04	2.1E-03	1.1E+00	1.9E-03
SUMMARY HAZARD INDEX			3.5E-03			1.9E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-10
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPC in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	CENTRAL TENDENCY EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
Methylene chloride	4.8E-03	NA	0.0E+00	NA	0.0E+00	NA	NA
Chrysene	2.2E-01	3.5E-02	1.6E-02	3.9E-03	1.6E-02	7.6E-01	NA
bis(2-ethylhexyl)phthalate	4.0E-02	5.0E-02	2.0E-03	8.7E-03	2.7E-04	1.9E-01	NA
Aluminum	1.5E+04	7.5E-02	1.1E+03	8.0E-04	1.2E+01	7.5E-02	NA
Manganese	1.9E+02	2.0E-02	3.7E+00	5.0E-02	9.4E+00	2.0E-02	NA
Vanadium	2.8E+01	1.3E-01	3.7E+00	1.1E-03	3.1E-02	1.3E-01	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix F, Table F-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant

Table F-10
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Red-tailed hawk*
Methylene chloride	1.3E-05	6.8E-05	2.0E-05	1.4E-04	1.4E-04
Chrysene	1.0E-02	6.2E-03	3.2E-03	1.9E-02	1.6E-02
bis(2-ethylhexyl)phthalate	9.5E-04	9.0E-04	4.0E-04	2.8E-03	2.6E-03
Aluminum	5.8E+01	3.4E+02	1.3E+02	7.5E+02	5.3E+02
Manganese	5.7E-01	3.1E+00	1.0E+00	7.4E+00	5.8E+00
Vanadium	1.3E-01	8.0E-01	3.4E-01	1.8E+00	1.1E+00

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table F-11
Risk from Po[illegible]al Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations [illegible]PCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	1.3E-05	3.2E+02	4.1E-08	6.8E-05	3.2E+02	2.1E-07	2.0E-05		0.0E+00
Chrysene	1.0E-02	1.2E+01	8.4E-04	6.2E-03	1.2E+01	5.1E-04	3.2E-03		0.0E+00
bis(2-ethylhexyl)phthalate	9.5E-04	1.6E+02	6.0E-06	9.0E-04	1.6E+02	5.6E-06	4.0E-04		0.0E+00
Aluminum	5.8E+01	7.4E+02	7.8E-02	3.4E+02	7.4E+02	4.6E-01	1.3E+02		0.0E+00
Manganese	5.7E-01	2.3E+03	2.5E-04	3.1E+00	2.3E+03	1.3E-03	1.0E+00		0.0E+00
Vanadium	1.3E-01	6.2E+00	2.1E-02	8.0E-01	6.2E+00	1.3E-01	3.4E-01	1.9E+01	1.8E-02
SUMMARY HAZARD INDEX			1.0E-01			5.9E-01			1.8E-02

PDE = Potential Dietary Exposure (mg/kgBW/day)
RTV = Reference Toxicity Value (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-11
Risk from Potential Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Red-tailed hawk		
	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	1.4E-04	6.0E+02	2.4E-07	1.4E-04		0.0E+00
Chrysene	1.9E-02	1.2E+01	1.6E-03	1.6E-02		0.0E+00
bis(2-ethylhexyl)phthalate	2.8E-03	1.6E+02	1.7E-05	2.6E-03		0.0E+00
Aluminum	7.5E+02	7.4E+02	1.0E+00	5.3E+02		0.0E+00
Manganese	7.4E+00	2.3E+03	3.2E-03	5.8E+00		0.0E+00
Vanadium	1.8E+00	6.2E+00	2.9E-01	1.1E+00	1.9E+01	6.0E-02
SUMMARY HAZARD INDEX			1.3E+00			6.0E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-12
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	1.3E-05	5.3E+00	2.5E-06	6.8E-05	5.3E+00	1.3E-05	2.0E-05		0.0E+00
Chrysene	2.8E-03	3.5E+00	8.1E-04	5.2E-03	3.5E+00	1.5E-03	2.2E-03		0.0E+00
bis(2-ethylhexyl)phthalate	1.7E-04	1.0E+01	1.7E-05	7.9E-04	1.0E+01	7.9E-05	2.9E-04		0.0E+00
Aluminum	5.9E+01	4.3E+02	1.4E-01	3.4E+02	4.3E+02	8.0E-01	1.3E+02		0.0E+00
Manganese	1.7E+00	6.2E+02	2.7E-03	3.2E+00	6.2E+02	5.2E-03	1.2E+00		0.0E+00
Vanadium	1.3E-01	8.4E+00	1.6E-02	8.0E-01	8.4E+00	9.5E-02	3.4E-01	1.1E+00	3.1E-01
SUMMARY HAZARD INDEX			1.6E-01			9.0E-01			3.1E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table F-12
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 14
Remedial Investigation and Feasibility Study, Site 14
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Red fox*			*Red-tailed hawk*		
	PDE	RTV	HQ	PDE	RTV	HQ
Methylene chloride	8.8E-08	5.3E+00	1.7E-08	6.0E-08		0.0E+00
Chrysene	2.5E-05	3.5E+00	7.2E-06	1.8E-05		0.0E+00
bis(2-ethylhexyl)phthalate	5.2E-06	1.0E+01	5.2E-07	4.0E-06		0.0E+00
Aluminum	8.2E-01	4.3E+02	1.9E-03	5.2E-01		0.0E+00
Manganese	5.8E-03	6.2E+02	9.3E-06	3.4E-03		0.0E+00
Vanadium	2.2E-03	8.4E+00	2.7E-04	1.4E-03	1.1E+00	1.3E-03
SUMMARY HAZARD INDEX			2.2E-03			1.3E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

APPENDIX G

BORING LOGS

TITLE: NAS WHITING FIELD RI		**LOG of WELL:** WHF-14-1	**BORING NO.**
CLIENT: SOIV NAVY			**PROJECT NO:** 6500-01
CONTRACTOR: GERAGHTY & MILLER		**DATE STARTED:** NA	**COMPLTD:** NA
METHOD: MUD-ROTARY	**CASE SIZE:** 4-INCH	**BORING DIA.:** 10-INCH	**PROTECTION LEVEL:** D
TOC ELEV.: 139.73 FT.	**MONITOR INST.:** NA	**TOT DPTH:** 152.5FT.	**DPTH TO ∇** 85.03 FT.
LOGGED BY: NA	**WELL DEVELOPMENT DATE:** NA		**SITE:** WHITING FIELD

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5					CLAY-red clay w/ some fine to medium sand		CL		
10									
15									
20									
25									
30									
35									
40									
45									
50					SAND-buff fine to coarse sand		SW		
55									
60									
65									
70									
75					SAND-buff fine to medium sand w/ some orange/yellow/light gray clay		SW		
80									
85									
90							SW		
95									
100									
105									
110									
115									
120									
125					SAND-buff fine to coarse sand w/ some gravel, matics				
130									
135									
140									
145									
150									
155									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field		LOG of WELL: WHF-14-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 3/18/93	COMPLTD: 3/22/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 100-115	PROTECTION LEVEL: D
TOC ELEV.: 145.86 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ▽ 95.8 FT.
LOGGED BY: W. Colby-George	WELL DEVELOPMENT DATE:		SITE: 14

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					Continued from PAGE 1				
			12/24				SP		
45			15/24	0	Same as above - brown and white.		SP	NA	
50			12/24	0	Same as above.		SP	NA	
55			12/24	0	Same as above.		SP	NA	
60			8/24	0	Same as above.		SP	NA	
65			14/24	0	Same as above.		SP	NA	
70			10/24	0	Same as above - wet.		SP	NA	
75			24/24	0	CLAY (16") - purple, soft. SAND - yellow, coarse, poorly graded.		CL	NA	
			24/24	0	CLAYEY SAND and SANDY CLAY (alternating) - grey and yellow.			NA	
80			24/24	0	Same as above - grey clay, reddish brown sand, and yellow sand.			NA	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field		LOG of WELL: WHF-14-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 3/18/93	COMPLTD: 3/22/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 100-115	PROTECTION LEVEL: D
TOC ELEV.: 145.86 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ∇ 95.8 FT.
LOGGED BY: W. Colby-George	WELL DEVELOPMENT DATE:		SITE: 14

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
85			20/24	NA	SAND (Top 2") - medium. CLAY - reddish with grey streaking.		CL	NA	
			24/24	NA	CLAYEY SAND and SANDY CLAY (alternating) - yellow and grey.			NA	
90									
			22/24	NA	SAND (Top 2") - yellow brown, fine, poorly graded. CLAY (20") - grey and purple, medium plasticity.		CL	NA	
95			20/24	NA	Same as above.			NA	
			24/24	NA	Same as above - wet. CLAY (2") - fine to very fine.			NA	
100									
105			NA	NA	SAND - fine.		SP	NA	
110			NA	NA	Same as above.		SP	NA	
115			NA	NA	Same as above.		SP	NA	
120									

ABB ENVIRONMENTAL SERVICES, INC.