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VOLUME 3, SITE SCREENING WORKPLAN
APPENDIX C,
SAMPLING EVENT REPORTS, 2 OF 2

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

UNIT IDENTIFICATION CODE: N00207
CONTRACT NO.: N62467-89-D-0317/040

FEBRUARY 1999

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

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SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 39
POSSIBLE TRANSFORMER BURIAL AREA

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Unit Identification Code: N00207

Contract No.: N62467-89-D-0317/040

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Department of the Navy, Southern Division
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Dana Gaskins, Engineer-in-Charge

February 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-0317/040 are complete and accurate and comply with all requirements of this contract.

DATE: February 11, 1999

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Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Alex C. Olis, Ph.D. CPSS
Project Technical Lead

(DFAR 252.227-7036)

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Possible Transformer Burial Area
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Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CLP	Contract Laboratory Program
CompuChem	CompuChem Environmental Corporation
EDS	Environmental Data Services
FDEP	Florida Department of Environmental Protection
FRE	focused risk evaluations
GPR	ground-penetrating radar
μg/kg	micrograms per kilogram
NAS	Naval Air Station
NFESC	Naval Facilities Engineering Service Center
PARCC	precision, accuracy, representativeness, completeness, and comparability
PSC	potential source of contamination
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RRDS	Remedial Response Decision System
SDG	sample delivery group
SSW	site screening workplan
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Harding Lawson Associates, under contract to the Department of Navy (Contract No. N62467-89-D-0317, Task Order No. 040), is submitting this Sampling Event Report for Potential Source of Contamination (PSC) 39, the Possible Transformer Burial Area at Naval Air Station (NAS) Jacksonville, Jacksonville, Florida. PSC 39 is an area suspected to be a disposal site for electrical gear items, including transformers buried during the period from 1943 to 1945. PSC 39 is located on the east side of Macon Road and southeast of Building 164 in the Defense Distribution Depot near the western boundary of NAS Jacksonville (Figures 1-1 and 1-2).

This Sampling Event Report summarizes the methods and results of the field investigation and transmits the field and analytical data.

1.1 PURPOSE AND SCOPE. The purpose of the sampling event at PSC 39 was to gather sufficient information to support the next phase of the Remedial Response Decision System (RRDS) process (ABB Environmental Services, Inc. [ABB-ES], 1995). The scope of the sampling event, detailed in the Site Screening Workplan (SSW) (ABB-ES, 1997), at PSC 39 included the following:

- ground-penetrating radar (GPR) survey;
- collection of up to 10 soil samples (surface and subsurface);
- laboratory analysis of the soil for U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) polychlorinated biphenyls (PCBs).

Fieldwork for this sampling event was completed between August and October 1997.

1.2 SITE DESCRIPTION. PSC 39 occupies approximately 1.5 acres and encompasses an asphalt-paved storage area and a covered storage shed and woodshop. The Possible Transformer Burial Area was identified as a PSC between 1983 and 1985 based on information provided by Mr. Roy Durham, a former Public Works Department employee. Mr. Durham (now deceased) was involved with the disposal of hazardous wastes at NAS Jacksonville from the 1940s to the 1970s. According to Mr. Durham, hundreds of electrical gear items, including transformers, were buried between Building 164 and the railroad tracks to the east (Figure 1). The items were buried in a ditch 10 feet wide and 5 feet deep from 1943 to 1945 (ABB-ES, 1995). A verification study conducted at PSC 39 (Geraghty & Miller, Inc., 1985) included 27 soil borings drilled along two east-to-west lines, as indicated on Figure 1-2. Continuous split-spoon samples were collected to a depth of 10 feet below land surface (bls) at each boring and inspected for evidence of electrical gear items. None were found.

Examination of aerial photographs (obtained from the Florida Department of Transportation) spanning 1943 to 1988 indicates that the suspected burial ditch may have been located incorrectly during the verification study. A 1943 aerial photograph, which was taken within the reported disposal period, shows a northwest-to-southeast trending drainage ditch east of Building 164. The ditch

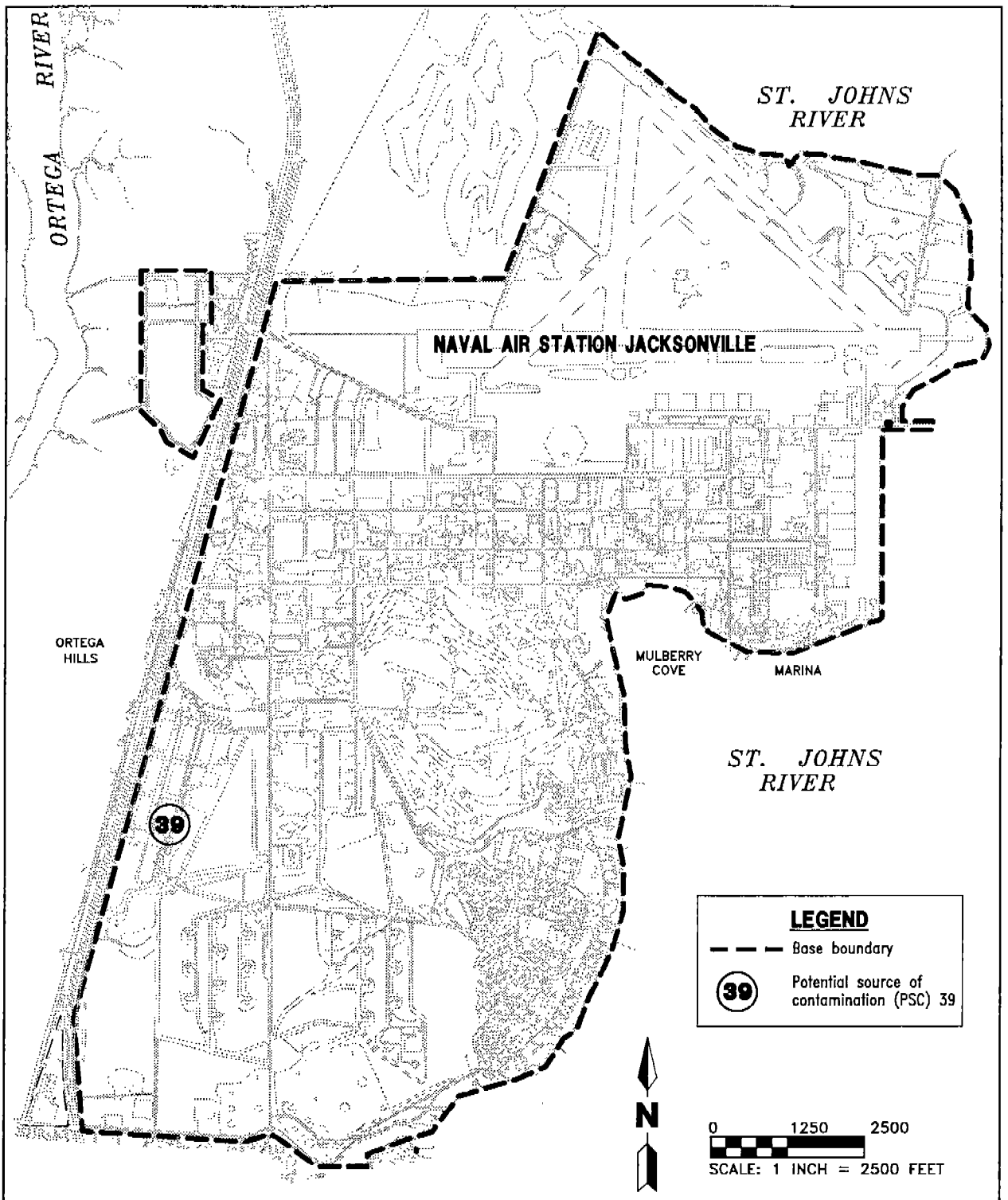

FIGURE 1-1
LOCATION OF PSC 39 AT NAVAL AIR STATION JACKSONVILLE

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SAMPLING EVENT REPORT
PSC 39

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

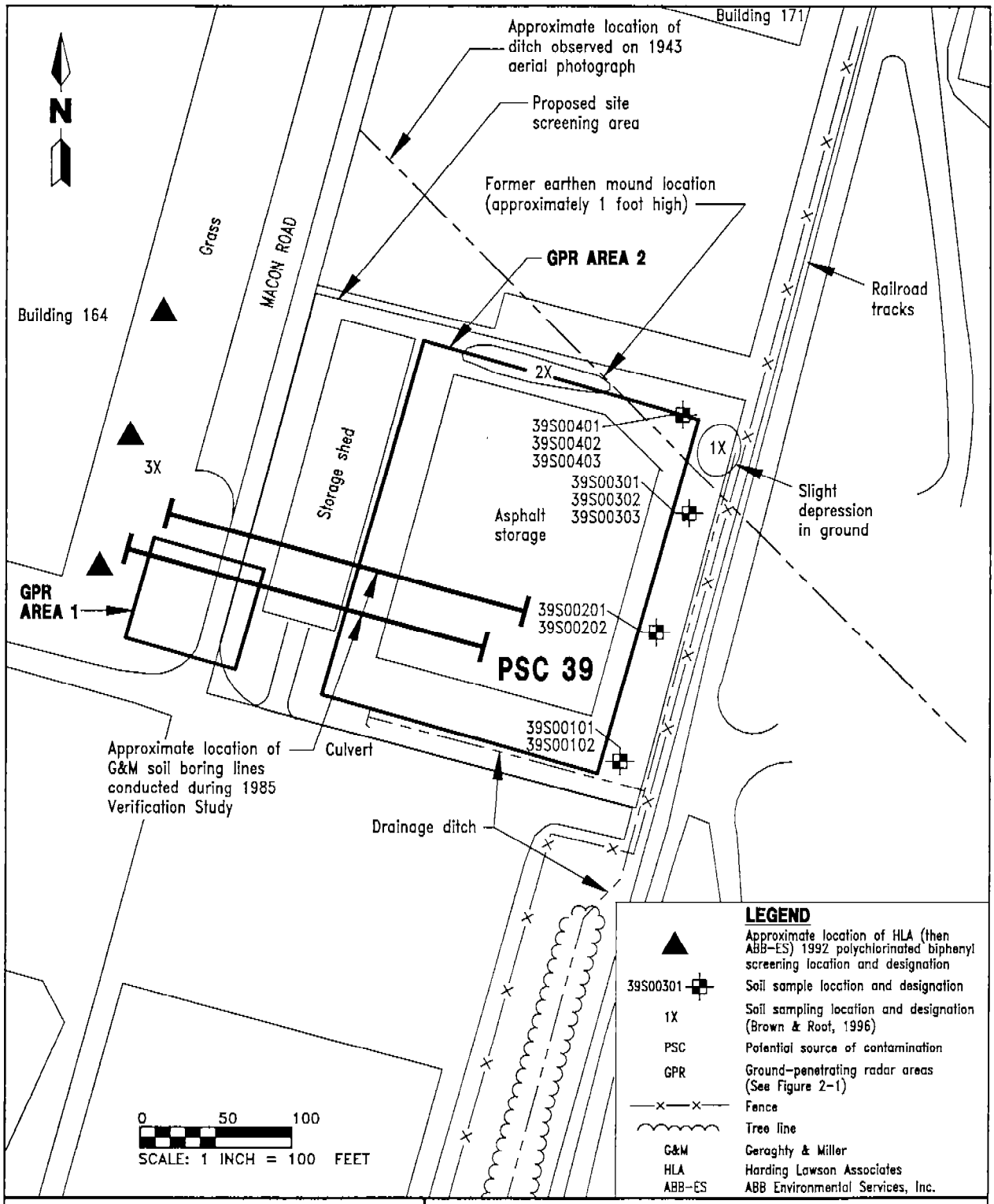

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 39
POSSIBLE TRANSFORMER BURIAL AREA

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SAMPLING EVENT REPORT
PSC 39

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

in the photograph is more than 400 feet long and appears to be deeper than a typical drainage ditch. The ditch terminates in a clump of trees to the southeast. A short dead-end roadway south of this ditch was also observed on the 1943 aerial photographs. This feature is located within the north end of GPR Area 2 (Figure 1-2). In a 1959 photograph, the area appears to have been graded and the ditch backfilled; however, a slight trace of the ditch is still evident. Mr. Durham did not mention the drainage ditch or imply that a drainage ditch was used for disposal. The currently existing asphalt-paved staging area for equipment is present in the 1959 aerial photograph, and the former ditch apparently was located along its northeast corner. All evidence of the former ditch is gone in subsequent photographs. In 1992 the covered storage shed and woodshop were constructed at PSC 39 just south of the former ditch.

Currently, crates of airplane parts are stored on pallets on the paved area and inside the shed. The area is generally flat; however, there is a slight earthen mound about 1 foot high along the north side of the paved storage area. There is also a slight depression in the ground east of the mound and near the eastern end of the former ditch (Figure 1-2). The location of these features correspond approximately to the ditch evident in the 1943 aerial photograph, but could be a result of grading and earth-moving activities during the construction of the shed and woodshop. Additional background information including the findings of previous studies at PSC 39, is presented in the SSW (ABB-ES, 1997).

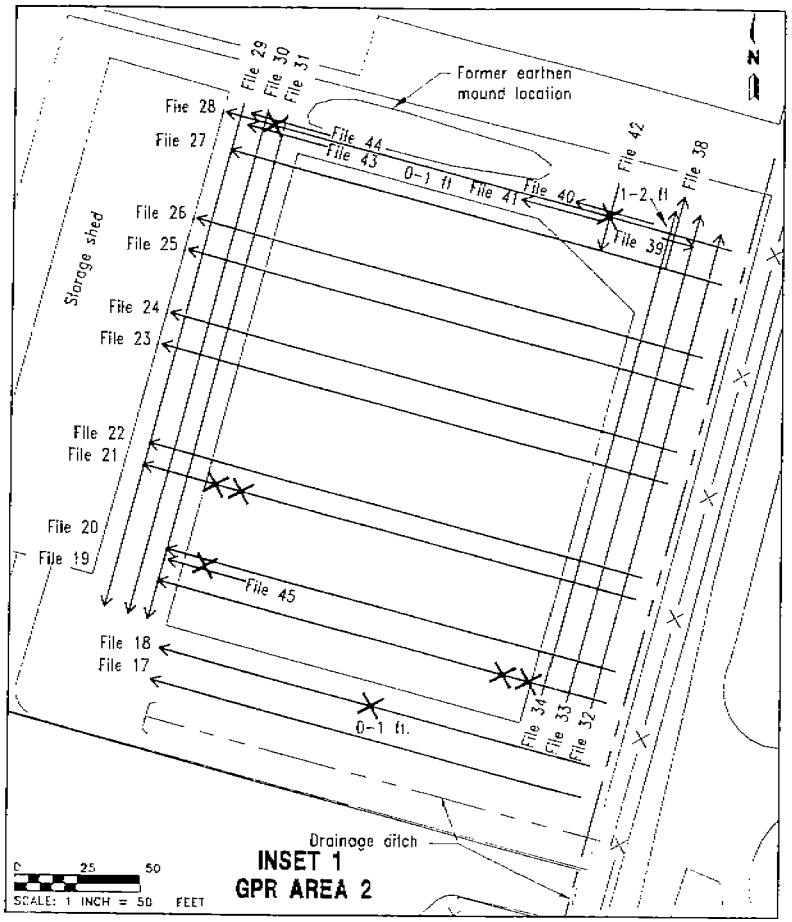
2.0 SAMPLING APPROACH AND FIELD CHANGES

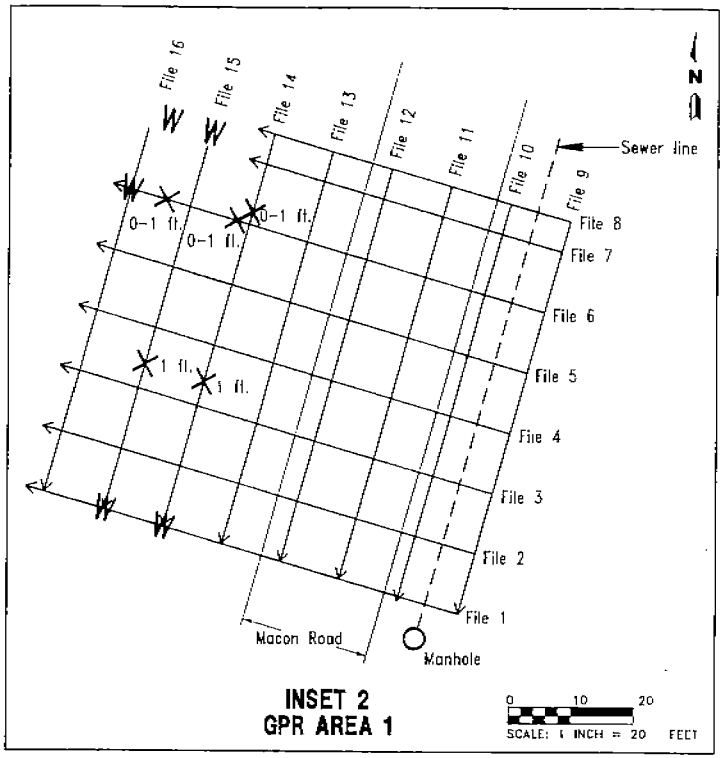
The work described herein was performed in accordance with the SSW (ABB-ES, 1997). A GPR survey was conducted in two areas at PSC 39 (Figure 2-1). The depth of observation for the survey was approximately 6 to 8 feet bls. GPR Area 1 is located west of the southwest corner of the storage shed and extends to the west across Macon Road. The grid spacing used in Area 1 was 10 feet. The GPR survey of this area was requested not only to explore for the possibility of buried transformers but to assist in the location of buried utilities prior to proposed construction, including subsurface excavation, in the area. The only substantial subsurface feature detected was a sewer line, as shown in Inset 2 of Figure 2-1.

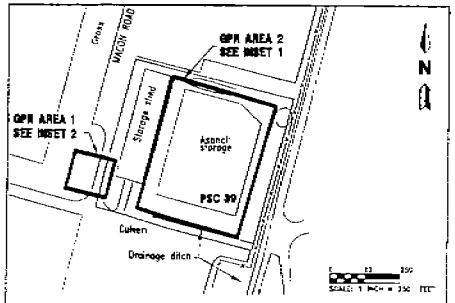
The GPR survey in Area 2 was conducted over much of the asphalt-paved storage area located to the east of the storage shed. The survey lines were located between crates of aircraft parts stacked on the pavement; hence the grid spacing varied in GPR Area 2 (Inset 1, Figure 2-1). No evidence of buried transformers was detected on the GPR recordings in GPR Area 2.

A total of 10 soil samples were collected from four locations. The soil samples were collected in a grassy area off of the east edge of the asphalt-paved area. Sampling depths ranged from ground surface to 3 feet bls. A summary of the sample identifications and corresponding sample delivery group (SDG), sampling dates, depths, and analyses performed is presented in the Off-Site Sample Tracking Log presented in Appendix A.

The 10 soil samples collected for laboratory analysis were sent by overnight carrier to the subcontract laboratory, CompuChem Environmental Corporation (CompuChem), Cary, North Carolina. The samples were analyzed for CLP target compound list PCBs. Following the laboratory analysis all data were validated in accordance with the Naval Facilities Engineering Service Center (NFESC) Level D protocol. The validated laboratory analytical results are included in Appendix B.







LOCATION MAP FOR GPR AREAS 1 AND 2

LEGEND

—X—	Fence line
ft.	Foot
W	Wet ground
X 0-1 ft.	Location and depth of small anomaly
GPR	Ground-penetrating radar areas

FIGURE 2-1
GROUND-PENETRATING RADAR SURVEY AREAS

SAMPLING EVENT REPORT
PSC 39

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field samples and associated quality assurance and quality control (QA/QC) samples were collected and analyzed according to USEPA CLP and NFESC requirements by an NFESC certified laboratory, CompuChem. The analytical data packages, submitted in SDGs, were independently validated by a subcontract data validation company, Environmental Data Services (EDS), (Concord, New Hampshire), in accordance with validation requirements contained in NFESC document *Navy Installation Restoration Laboratory Quality Assurance Guide*, (NFESC, 1996). Other documents utilized in the data validation and review include the USEPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, (USEPA, 1994a) and the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, (USEPA, 1994b).

A detailed QA/QC evaluation can be found in the EDS report (EDS, 1997), which summarizes the results of the data quality assessment according to the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters for the entire site screening activity. The EDS report was issued as Appendix B of the SSW. The generated analytical data were found to be acceptable according to the PARCC criteria, with less than 5 percent of the data requiring qualification (primarily estimated "J" qualifier).

4.0 ANALYTICAL RESULTS

4.1 ANALYTICAL RESULTS FOR SOIL SAMPLES. Ten soil samples were collected at multiple depths from four locations. Eight of the samples represent surface soils (0 to 2 feet bls) and two of the samples represent subsurface soils (greater than 2 feet bls). The complete validated analytical data are included in Appendix B.

4.1.1 Surface Soil Aroclor-1254 was detected at a concentration of 360 J micrograms per kilogram (μg/kg) in one of eight surface soil samples submitted for chemical analysis. The PCBs were detected in sample 39S00301, which was collected from between 0 and 1 feet bls. No PCBs were detected in sample 39S00302, which was collected in the same location from 1 to 2 feet bls. The average concentration in surface soil (defined by Florida Department Environmental Protection [FDEP] as 0 to 2 feet bls) at sampling location 3 was, therefore, 190 μg/kg. (This value was calculated by averaging the 360 μg/kg detected at 39S00301 with one half the 39 μg/kg detection limit at 39S00302).

4.1.2 Subsurface Soil No PCBs were detected in the subsurface soil samples.

5.0 RISK EVALUATION

The purpose of performing focused risk evaluations (FREs) as part of the site screening evaluation is to assist in determining whether or not the existing risk at a PSC (1) supports a no further action decision; (2) indicates the need for an interim remedial action; or (3) requires additional investigation to make a decision. Documentation of the decision for PSC 39 may be found in the RRDS document for PSC 39 (ABB-ES 1995). An FRE is not intended to characterize "baseline" risk at a PSC, but rather is to be used as a decision making tool.

5.1 SURFACE SOIL. As described in Section 4.1, Aroclor-1254 was detected in only one surface soil sample (defined by FDEP as 0 to 2 feet bls) at a concentration of 190 μg/kg at sampling location 3. (This value was calculated by averaging the 360 μg/kg detected at 39S00301 with one half the 39 μg/kg detection limit at 39S00302). This value is below the FDEP residential soil cleanup goal of 900 μg/kg (FDEP, 1995) and the USEPA Region 3 residential risk-based concentration of 320 μg/kg.

5.2 SUBSURFACE SOIL. No PCBs were detected in the subsurface soil samples.

Based on the results of this risk screening, the risk from PCB exposure at PSC 39 is acceptable for future residential exposure.

6.0 REFERENCES

ABB Environmental Services, Inc. (ABB-ES). 1995. *Naval Installation Restoration Program Plan, Naval Air Station, Jacksonville, Florida, Volume 2, Appendix D, Remedial Action Objective*. Prepared for Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina.

ABB-ES. 1997. *Naval Installation Restoration Program Plan, Naval Air Station, Jacksonville, Florida, Volume 3, Site Screening Workplan*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

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Geraghty & Miller, Inc. 1985. *Verification Study, Assessment of Potential Groundwater Pollution at NAS Jacksonville, Jacksonville, Florida*. (December).

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USEPA. 1994b. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*. Washington, D.C. (February).

APPENDIX A

OFF-SITE SAMPLING TRACKING LOG

Appendix A

PSC 39
OFFSITE SAMPLE TRACKING LOG
SITE SCREENING, NAS JACKSONVILLE

SDG	SAMPLE ID	SAMP DATE	UDEPTH (ft bls)	LDEPTH (ft bls)	MATRIX	TCL PCB	DRFL	TAT	DSTV	DRFV
0026P	39S00101	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00101D	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00102	10/22/97	1	2	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00201	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00201MS	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00201MSD	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00202	10/22/97	1	2	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00301	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00302	10/22/97	1	2	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00303	10/22/97	2	3	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00401	10/22/97	0	1	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00402	10/22/97	1	2	soil	X	11/11/97	20	11/11/97	12/15/97
0026P	39S00403	10/22/97	2	3	soil	X	11/11/97	20	11/11/97	12/15/97

NOTES:

SDG	Sample Delivery Group (defined group of 20 samples or less collected not more than 14 days of each other).
SAMPLE ID	Sample Identifier
SAMP DATE	Date of Sample Collection
UDEPTH, LDEPTH	Depths, upper (UDEPTH) and lower (LDEPTH)
MATRIX	Media Sampled
TCL_PCB	Target Compound List Polychlorinated Biphenyls
TAT	Turnaround Time (days)
DSTV	Date Package Sent to Validators
DRFV	Date Package Received from Validators

APPENDIX B

VALIDATED LABORATORY ANALYTICAL DATA

APPENDIX B-1

Summary of Surface Soil Analytical Results Polychlorinated Biphenyls (PCBs)
PSC 39

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	39S00101		39S00101D		39S00102		39S00201		39S00202		39S00301		39S00302		39S00401		39S00402	
Sampling Date	22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97		22-Oct-97	
PCBs, ug/kg																		
Aroclor-1016	36	U	36	U	38	U	39	U	36	U	37	U	39	U	38	U	38	U
Aroclor-1221	73	U	74	U	78	U	79	U	74	U	75	U	80	U	76	U	76	U
Aroclor-1232	36	U	36	U	38	U	39	U	36	U	37	U	39	U	38	U	38	U
Aroclor-1242	36	U	36	U	38	U	39	U	36	U	37	U	39	U	38	U	38	U
Aroclor-1248	36	U	36	U	38	U	39	U	36	U	37	U	39	U	38	U	38	U
Aroclor-1254	36	U	36	U	38	U	39	U	36	U	360	J	39	U	38	U	38	U
Aroclor-1260	36	U	36	U	38	U	39	U	36	U	37	U	39	U	38	U	38	U

Sample ID = Sample Identifier
PCB = Polychlorinated Biphenyls

ug/kg = microgram per kilogram

The following standard validation qualifiers have the following definitions:

U = The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit
The number preceding the U qualifier is the reported sample quantitation limit.
J = The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.

Appendix B-2

Summary of Subsurface Soil Analytical Results
Polychlorinated Biphenyls (PCBs)
PSC 39

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	39S00303		39S00403	
Sampling Date	22-Oct-97		22-Oct-97	
PCBs, ug/kg				
Aroclor-1016	40	U	37	U
Aroclor-1221	80	U	75	U
Aroclor-1232	40	U	37	U
Aroclor-1242	40	U	37	U
Aroclor-1248	40	U	37	U
Aroclor-1254	40	U	37	U
Aroclor-1260	40	U	37	U

Sample ID = Sample Identifier
PCB = Polychlorinated Biphenyls

ug/kg = microgram per kilogram

U = The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit. The number preceding the U qualifier is the reported sample quantitation limit.

APPENDIX C

SUMMARY OF DETECTIONS IN ANALYTICAL RESULTS

Summary of Detections in Soil Analytical Results
Polychlorinated Biphenyls (PCBs)
PSC 39

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	39S00301	
Sampling Date	22-Oct-97	
PCBs, *ug/kg*		
Aroclor-1254	360	J

NOTES:
Sample ID = Sample Identifier
PCB = Polychlorinated Biphenyls

ug/kg = microgram per kilogram
J = The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the compound in the sample.

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 44
DRAINAGE DITCH WEST OF AJAX STREET

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

UNIT IDENTIFICATION CODE: N00207
CONTRACT NO.: N62467-89-D-0317/040

MARCH 1999

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

PRINTED ON RECYCLED PAPER

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 44
DRAINAGE DITCH WEST OF AJAX STREET

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Unit Identification Code: N00207

Contract No.: N62467-89-D-0317/040

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Dana Gaskins, Engineer-in-Charge

March 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-0317/040 are complete and accurate and comply with all requirements of this contract.

DATE: March 19, 1999

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Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Alex Olis, Ph.D., CPSS
Project Technical Lead

(DFAR 252.227-7036)

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Naval Air Station
Jacksonville, Florida

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Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
B&R	Brown & Root Environmental, Inc.
CompuChem	Compuchem Environmental Corporation
COPC	chemical of potential concern
EA	Engineering, Science, and Technology, Inc.
EDS	Environmental Data Services
FDEP	Florida Department of Environmental Protection
FERE	focused ecological risk evaluation
HLA	Harding Lawson Associates
mg/kg	milligrams per kilogram
mg/organism	milligrams per organism
NAS	Naval Air Station
NFESC	Naval Facilities Engineering Service Center
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PEL	probable effects level
PSC	potential source of contamination
QA/QC	quality assurance and quality control
RBC	risk-based concentration
RRDS	Remedial Response Decision System
SCG	soil cleanup goal
SER	sampling event report
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
TEL	threshold effects level
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Harding Lawson Associates (HLA), under contract to the Department of Navy (Contract No. N62467-89-D-0317, Task Order No. 040), is submitting this Sampling Event Report (SER) for Potential Source of Contamination (PSC) 44, the drainage ditch west of Ajax Street at Naval Air Station (NAS) Jacksonville, Jacksonville, Florida. PSC 44 is an approximately one-half mile long segment of drainage ditch located in the north-central region of the station (Figures 1-1 and 1-2).

This SER summarizes the methods and results of the field investigation and transmits the field and analytical data.

1.1 PURPOSE AND SCOPE. The purpose of the sampling event at PSC 44 was to gather sufficient information to support the next phase of the Remedial Response Decision System (RRDS) process. The original scope of the sampling event was summarized in the Naval Installation Restoration Program Plan, Volume 2, RRDS, Appendix D (ABB Environmental Services, Inc. [ABB-ES], 1995) and included the following:

- collection of sediment, surface soil, and surface water samples along the length of the ditch;
- collection of sediment and surface water samples near the outfall in Mulberry Cove;
- collection of liquid samples from the 20-inch drain line and the storm sewer north of Yorktown Avenue; and
- laboratory analysis of the sediment, surface soil, surface water, and liquid samples for U.S. Environmental Protection Agency (USEPA) target compound list (TCL) semivolatile organic compounds (SVOCs), TCL pesticides (only), and target analyte list (TAL) inorganic constituents.

Fieldwork for this sampling event was completed between December 17, 1997, and April 17, 1998.

1.2 SITE DESCRIPTION. PSC 44 is an approximately one-half-mile long segment of drainage ditch located between Yorktown Avenue on the north and the St. Johns River, south of Birmingham Avenue, to the south.

The sides of the drainage ditch are constructed of brick and concrete, much of which is in a state of disrepair. Several culverts from other smaller drainage areas next to the ditch drain into PSC 44 along its course. Dense grasses, reeds, and other vegetation grow in the ditch. Small fish were present in the north section of the ditch (south of Yorktown Avenue to Saratoga Avenue) during HLA's PSC reconnaissance in April 1994. In addition, several birds and insects were observed in the vegetated areas of the ditch. Rust-colored sediment was noted in the north section, and the submerged parts of vegetation in this section appeared rust colored. Sediment south of Saratoga Avenue was less rusty. Water in several parts of the ditch appeared to have an oily sheen.

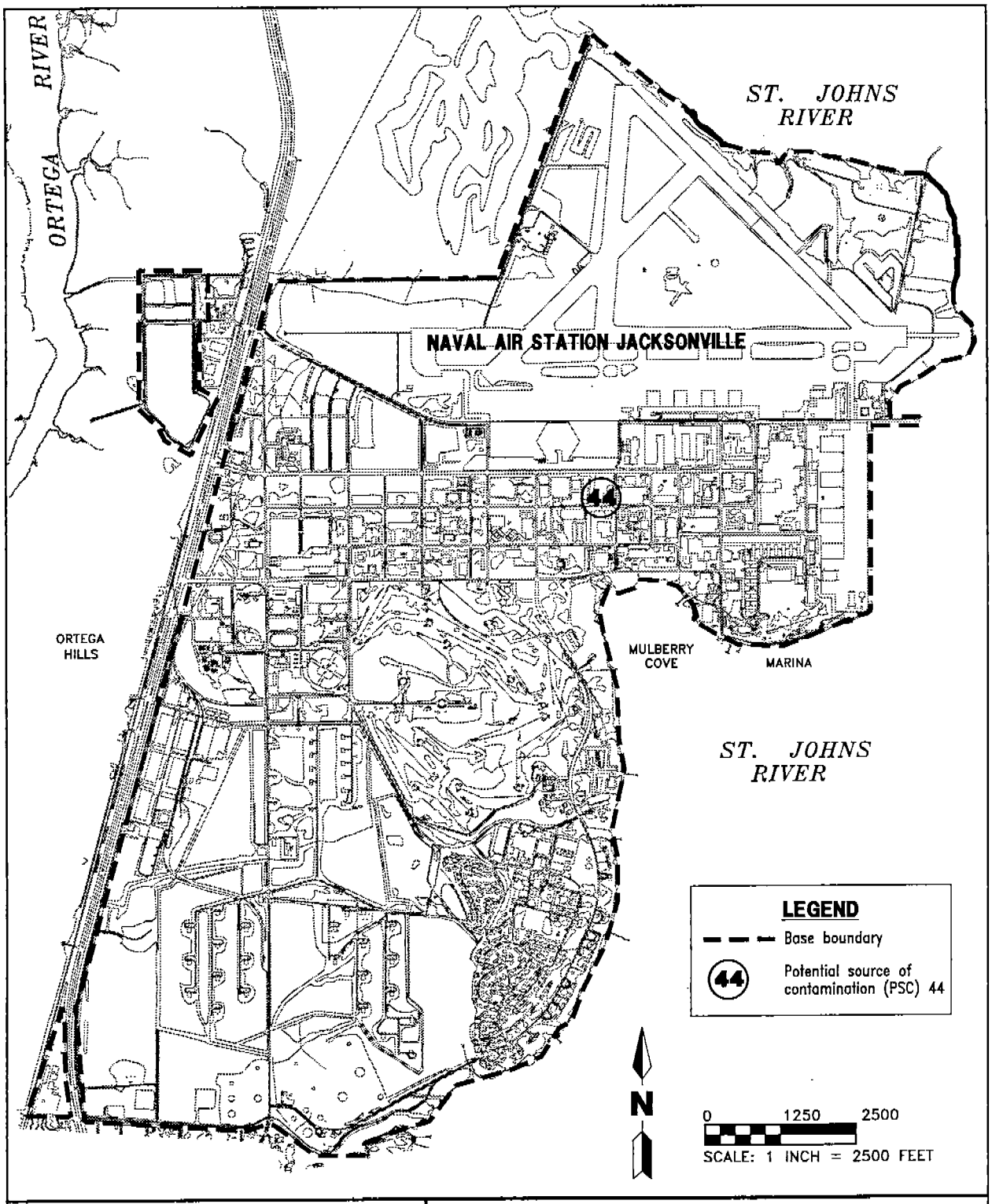

FIGURE 1-1
LOCATION OF PSC 44
AT NAVAL AIR STATION JACKSONVILLE

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SAMPLING EVENT REPORT
PSC 44

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

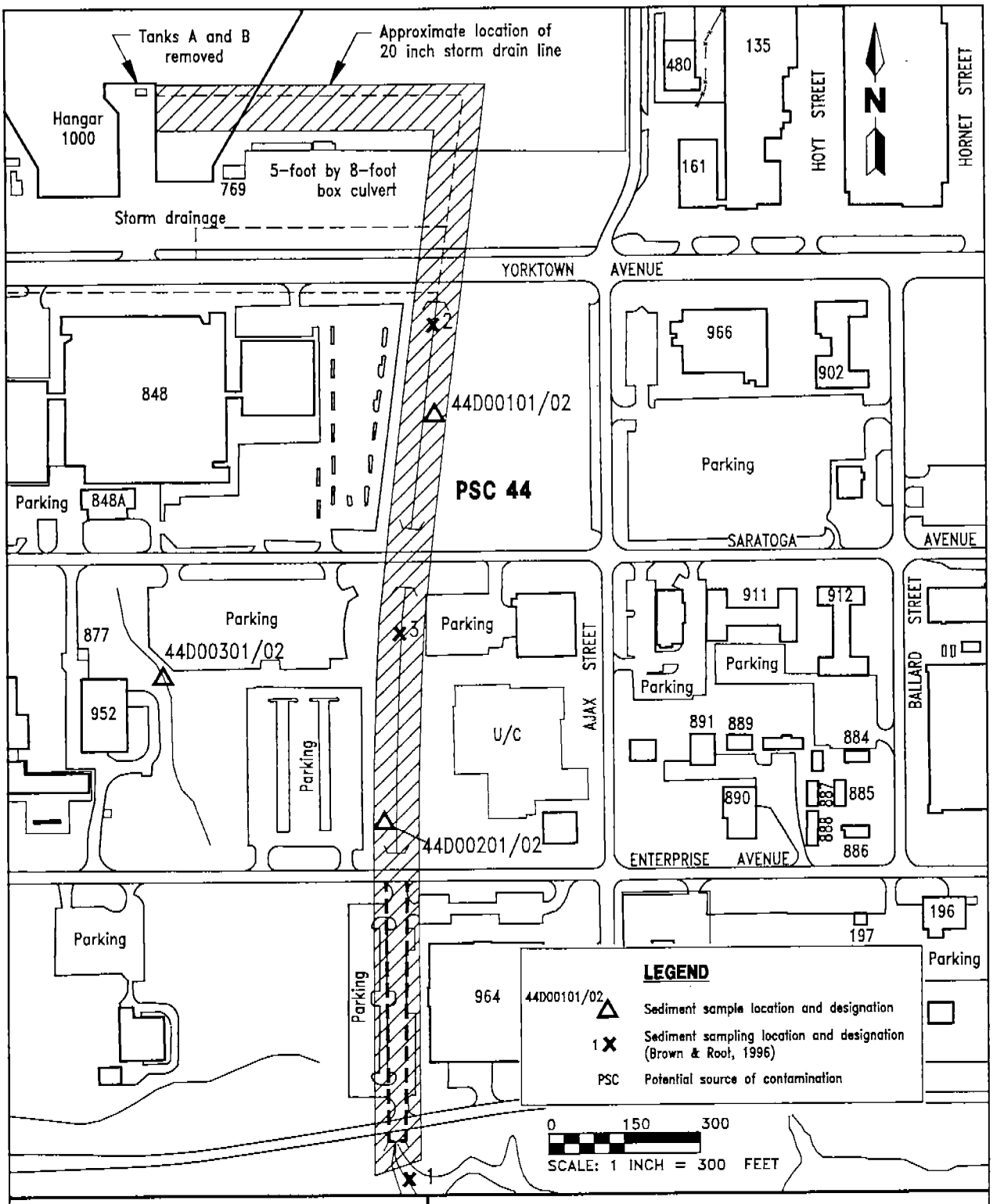

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 44
DRAINAGE DITCH WEST OF AJAX STREET

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SAMPLING EVENT REPORT
PSC 44

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

In 1991, NAS Jacksonville proposed to add PSC 44 to the hazardous and solid waste amendment permit as a PSC after testing of the sediment in the ditch revealed potential metal and organic contamination (NAS Jacksonville, 1991). Based on the results of three sediment samples collected by Brown & Root Environmental, Inc. (B&R), in 1995, it was unclear whether the detected contaminants were the result of a release from tanks at Hangar 1000 (located north of Yorktown Avenue) or due to storm water runoff from the adjacent parking lots and/or roads (B&R, 1996). Therefore, the NAS Jacksonville Partnering Team recommended that further analytical testing and concurrent toxicity testing of the ditch sediment be completed in order to facilitate the RRDS process.

2.0 SAMPLING APPROACH AND FIELD CHANGES.

The actual sampling program conducted at PSC 44 is significantly different from the sampling plan recommended in the RRDS report (ABB-ES, 1995). In December of 1995, B&R sampled sediment at the upper end of the ditch near the storm sewer discharge south of Yorktown Avenue and at the outfall area in the St. Johns River. A third sediment sample was collected along the ditch between these two samples. The results of the B&R sediment sampling showed that detected concentrations of polynuclear aromatic hydrocarbons (PAHs), pesticides, and several metals exceeded the Florida Sediment Quality Assessment Guidelines (MacDonald, 1994). The NAS Jacksonville Partnering Team concurred with recommendations to not collect surface water as part of the sampling program. Due to the dynamic nature of surface water movement in the PSC 44 drainage ditch, site-related constituents are more likely to be detected in the sediment. The actual field sampling program conducted by HLA at PSC 44 is summarized below.

A total of six sediment samples were collected by HLA at three locations in the drainage ditch during two separate rounds of sampling. The first round of sampling was completed on December 17 and 18, 1997. Sediment was collected from two locations in the PSC 44 drainage ditch (44D001 and 44D002) and one background location (44D003) from a drainage ditch located approximately 400 feet west of PSC 44. The samples were analyzed for the TCL and TAL analyses described in Section 1.1 and were also submitted for toxicity testing using the saltwater amphipod *Ampelisca abdita*. This saltwater amphipod was chosen as the test organism for toxicity testing because a portion of the ditch is tidally influenced by the brackish St. Johns River, and previous HLA investigations during 1993 had indicated that the river water was marine in nature. However, upon receipt of the sediment samples by the toxicity testing laboratory, the salinity of the samples was measured and classified as freshwater. Although natural seawater with a salinity of approximately 32 parts per thousand was added to the sediment prior to the initiation of the toxicity test, the results from the testing was inconclusive and it was determined that the freshwater amphipod *Hyalella azteca* should have been used as the appropriate test organism. Based on recommendations from the NAS Jacksonville Partnering Team, sediment from the same three locations (44D001, 44D002, and 44D003) was resampled on April 17, 1998, and analyzed for cadmium and concurrent toxicity testing using the freshwater amphipod *Hyalella azteca*.

The six sediment samples were sent by overnight carrier to the subcontracting analytical and toxicity testing laboratories. CompuChem Environmental Corporation (CompuChem) (Cary, North Carolina) analyzed the first set of sediment samples for TCL SVOCs, pesticides, and TAL inorganic constituents, and QST Environmental (Newberry, Florida) conducted the toxicity tests. The second round of sediment samples was sent to EA Engineering, Science, and Technology, Inc. (EA) (Sparks, Maryland), who performed the toxicity tests and analyzed the sediment for cadmium. A sample tracking log, including the sample identifier and parameters analyzed, is included in Appendix A. The validated laboratory analytical results are presented in Appendix B. A summary of sediment analytical results is presented in Appendix C. The results of the sediment toxicity testing using *Ampelisca abdita* are shown in Appendix D, and results using *Hyalella azteca* are presented in Appendix E.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field samples and associated quality assurance and quality control (QA/QC) samples were collected and analyzed according to USEPA Contract Laboratory Program and Naval Facilities Engineering Service Center (NFESC) requirements by an NFESC certified laboratory, CompuChem. The analytical data packages, submitted by sample delivery groups, were independently validated by a subcontract data validation company, Environmental Data Services (EDS) (Concord, New Hampshire), in accordance with validation requirements contained in NFESC document *Navy Installation Restoration Laboratory Quality Assurance Guide* (NFESC, 1996). Other documents utilized in the data validation and review include the USEPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (USEPA, 1994a) and the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, 1994b).

A detailed QA/QC evaluation can be found in the EDS report (EDS, 1997), which summarizes the results of the data quality assessment according to the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters for the entire site screening activity. The EDS report was issued as Appendix B of the Site Screening Workplan (ABB-ES, 1997). The generated analytical data were found to be acceptable according to the PARCC criteria, with less than 5 percent of the data requiring qualification (primarily estimated "J" qualifier).

EA performed reference toxicant tests (EA, 1998) on cultured test species. The *Hyalella azteca* were exposed to the reference toxicant, copper sulfate, in a graded concentration series to determine the 96-hour LC_{50} value. The results of the reference toxicant test were compared to control chart limits established by EA according to USEPA methodology (USEPA, 1993).

4.0 ANALYTICAL RESULTS

4.1 ANALYTICAL RESULTS FOR SEDIMENT. A summary of the sediment analytical data from the two sampling events is summarized in Appendix B. As shown in Figure 1-2, three samples were collected during each of the two sampling events. Two sediment samples were collected in the PSC 44 drainage ditch and one background sample was collected in a nearby drainage ditch located approximately 400 feet west of the PSC 44 ditch. Samples collected during the first round of sampling contain a -01 suffix in the sample identification, while those collected during the second round of sampling contain a -02 suffix.

4.1.1 Semivolatile Organic Compounds Twenty SVOCs were detected in the sediment samples collected during the first round of sampling. Maximum concentrations of SVOCs were detected at sampling location 44D001. Based on concurrence from the NAS Jacksonville Partnering Team, the samples collected during the second phase of sediment sampling were not analyzed for SVOCs.

4.1.2 Pesticides Thirteen pesticides were identified in sediment samples collected during the first round of sampling. The presence of pesticides in the PSC 44 drainage ditch is likely the result of stationwide pesticide use. Based on concurrence from the NAS Jacksonville Partnering Team, the samples collected during the second phase of sediment sampling were not analyzed for pesticides.

4.1.3 Inorganic Parameters Nineteen inorganic constituents were detected in sediment samples collected during the first round of sampling. Based on concurrence from the NAS Jacksonville Partnering Team, the samples collected during the second phase of sediment sampling were only analyzed for cadmium. The results of the second phase of sampling show that concentrations of cadmium in the PSC 44 drainage ditch have decreased over time.

5.0 RISK EVALUATION

The purpose of performing risk evaluations as part of the site screening evaluation is to assist in determining whether or not the existing risk at PSC 44

1. supports a no further action decision,
2. indicates the need for an interim remedial action, or
3. requires additional investigation to make a decision.

5.1 HUMAN HEALTH RISK SCREENING. Human health risk screening involves comparing concentrations of detected analytes to background screening levels (inorganic analytes only) and then comparing the concentrations of those analytes present above background screening levels to risk-based concentrations (RBCs) developed by the USEPA and soil cleanup goals (SCGs) developed by the Florida Department of Environmental Protection (FDEP). The USEPA and FDEP have not developed human health RBCs and SCGs for sediment. The maximum detected concentrations in sediment were, therefore, compared to RBCs and SCGs developed for soils. Because exposure to soil is considerably more likely than exposure to sediment, the screening is very conservative. Contaminants present below the RBCs are considered to pose no or only insignificant risk. Analytes that are detected above both the background screening concentrations and the RBCs are considered chemicals of potential concern (COPCs).

Analytes were excluded as COPCs if they met the following criteria:

- The detected concentration of a contaminant did not exceed two times the arithmetic mean (with one-half the reported quantitation limit averaged for nondetections) of background concentrations. (For PSC 44, the background screening concentrations presented in Appendix F were the data set used to support the Operable Unit 3 remedial investigation.)

- The detected concentration did not exceed USEPA Region 3 RBCs (USEPA, 1998).

The maximum detected concentration of an analyte in sediment was first screened against the background screening levels presented in Appendix F. Those chemicals present below background were dropped from further consideration. Appendix C presents a comparison of all detected analytes and the USEPA Region 3 RBCs and FDEP SCGs. Table 5-1 presents those chemicals present above background screening levels, if appropriate, and their respective RBCs and SCGs. Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene had maximum detected concentrations above both the residential and industrial screening values. The maximum detected concentration of indeno(1,2,3-cd)pyrene and arsenic were above the residential screening values.

These compounds were selected as COPCs and a more detailed risk evaluation was performed. Under current conditions, it is unlikely that anyone would be exposed to sediment at PSC 44. The drainage ditch is not maintained, and grasses and other plants are allowed to grow in the ditch. Workers entering the ditch will most likely be wearing shoes. Potential future exposure could involve residents

Table 5-1
Contaminants of Potential Concern

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Analyte	Maximum Detected Concentration	FDEP Soil Cleanup Goals		Region 3 Risk-Based Concentrations		Background Screening Levels
		Residential	Industrial	Residential	Industrial	
Semivolatile Organic Compounds (μg/kg)						
Benzo(a)anthracene	10,000	1,400	4,900	870	7,800	NA
Benzo(a)pyrene	8,500	100	500	87	780	NA
Benzo(b)fluoranthene	14,000	1,400	500	870	7,800	NA
Indeno(1,2,3-cd)pyrene	2,800	1,400	5,000	870	7,800	NA
Inorganic Analytes (mg/kg)						
Arsenic	1.7	0.7	3.1	0.43	3.8	1.26

Notes: FDEP = Florida Department of Environmental Protection.
μg/kg = micrograms per kilogram.
NA = not available.
mg/kg = milligrams per kilogram.

or trespassers if the station were closed and land use were changed to residential or recreational. A residential exposure was evaluated because it is the most conservative.

Risk to child and adult residents were evaluated assuming exposure to sediment due to wading in the drainage ditch. Because the depth of water at the northern end of the ditch (where the maximum detected concentration of contaminants is located) is shallow, it was assumed that the water would be from the knees down (which is a conservative estimate of water depth). Adults were assumed to wade approximately 1 day per week (50 times per year) and children were assumed to wade approximately 2 days per week (100 times per year). A separate calculation was performed for children 6 years and under. It was assumed that children within this group and between the ages of 4 and 6 would play in the ditch, and that children less than 4 years old would not be allowed to play in the drainage ditch because of the danger of drowning. Because the sediment is always covered with water, it has been assumed that ingestion of sediment would be an unlikely pathway. (See Appendix G for risk calculations.)

Using the above assumptions, risks were calculated as shown in the following table:

Scenario	Cancer Risk	Hazard Index
Future Adult Resident	5×10^{-6}	0.00003
Future Child Resident	3×10^{-6}	0.0002

The cancer risk for potential future adult and child residents are within the USEPA acceptable range of 10^{-4} to 10^{-6}. The hazard index for both adult and child are well below the pathway-acceptable limit of 1. Even so, it is likely that these risk calculations overestimate the risk at PSC 44 if the site were to become residential. Most of the risk at PSC 44 is due to the presence of PAHs in the sediment. The most likely source of PAHs in the sediment are runoff from

the tarmac, roads, and parking lots that drain into the drainage ditch. If NAS Jacksonville were to close and the land use converted from industrial to residential, most of these sources would be eliminated or reduced significantly. In addition, if the area were to be converted to residential use, it is likely that the drainage ditch would be enclosed in a culvert as a mosquito control measure. In that case, there would be no exposure to sediment.

Based on these calculations, human health risk is acceptable at PSC 44 based on current land use and potential future residential land use.

5.2 FOCUSED ECOLOGICAL RISK EVALUATION. A focused ecological risk evaluation (FERE) has been prepared for PSC 44 in response to the initial findings from the RRDS for PSC 44 at NAS Jacksonville (B&R, 1996).

As previously discussed, B&R collected three sediment samples in the PSC 44 drainage ditch in December 1995. Detected concentrations of pesticides, PAHs, and several metals exceeded the Florida Sediment Quality Assessment Guidelines (MacDonald, 1994). Based on the results of the B&R data, it was unclear whether the detected contaminants were the result of a release from tanks at Hangar 1000 (located upgradient of PSC 44) or due to storm water runoff from adjacent parking lots and roads surrounding the ditch. Therefore, further evaluation of the potential ecological impacts associated with exposure to the sediment is required before making a remedial decision about PSC 44. As part of the FERE, HLA completed the following tasks, which are described in further detail in Chapter 2.0:

- collection of additional sediment analytical data, and
- evaluation of sediment toxicity testing results.

The results of the chemical analyses and concurrent toxicity testing results were used to determine if chemical concentrations in the sediment of the PSC 44 drainage ditch are associated with adverse effects to aquatic receptors including benthic invertebrates.

The FERE is presented in the following sections:

- 5.2.1 Identification of Exposure Pathways
- 5.2.2 Sediment Analytical Data
- 5.2.3 Sediment Toxicity Testing Results
- 5.2.4 Summary of Focused Ecological Risk Evaluation

5.2.1 Identification of Exposure Pathways Exposure pathways were considered for two groups of ecological receptors including terrestrial wildlife and aquatic receptors. Because the area surrounding PSC 44 is industrialized and little, if any, ecological habitat exists, the presence of terrestrial wildlife at the PSC 44 drainage ditch is unlikely. It is anticipated that only small birds may occasionally drink surface water from the ditch. However, given the low water solubility of the major contaminants, it is unlikely that birds would be adversely affected from drinking surface water out of the PSC 44 drainage ditch.

The ecological exposure route believed to contribute the highest potential contaminant exposures is direct contact of aquatic receptors with the sediment in the drainage ditch. Because the drainage ditch is very shallow, it is

that aquatic receptors would primarily include sediment-dwelling benthic macroinvertebrates and small fish.

5.2.2 Sediment Analytical Data As recommended by the NAS Jacksonville Partnering Team, additional sediment samples were collected to evaluate potential ecological exposures to aquatic receptors. As previously discussed in Chapter 2.0, two sets of three sediment samples (two site-related and one background) were collected during December 1997 and April 1998. During the December 1997 sampling event, sediment was analyzed for TCL SVOCs, pesticides, and TAL inorganic constituents. During the April 1998 sampling event, sediment was analyzed for cadmium only.

A summary of the sediment analytical data for both sampling events is provided in Table 5-2. This table includes the frequency of detection, range of detected concentrations, average of all concentrations, and the applicable sediment quality guidelines from USEPA Region IV (USEPA, 1995) and the FDEP (MacDonald, 1994). Maximum and average concentrations of analytes detected in the sediment are compared to the USEPA Region IV and FDEP threshold effects level (TEL) and probable effects level (PEL) sediment quality criteria. The USEPA Region IV values are derived from literature as reported in publications from the State of Florida and the National Oceanic and Atmospheric Administration (Long and Morgan, 1991). The FDEP TEL value represents concentrations of sediment-associated contaminants that are not considered to represent significant hazards to aquatic organisms. Within the range of concentrations between the TEL and PEL, adverse biological effects are possible; above the PEL range, concentrations of sediment-associated contaminants are considered to represent significant hazards to aquatic organisms.

As shown in Table 5-2, maximum detected concentrations of 11 PAHs in the sediment of the PSC 44 drainage ditch are elevated above the USEPA Region IV and FDEP PEL sediment screening values. The distribution of total PAHs in the sediment of the PSC 44 drainage ditch shows that a localized area of elevated PAHs occurs in the vicinity of sampling station 44D001. Total PAHs were detected at a concentration of 139 milligrams per kilogram (mg/kg) at station 44D001 as compared to concentrations ranging from 0 to 12.1 mg/kg at the other PSC 44 sampling locations. Concentrations of PAHs detected in the B&R sediment sampling location 2 (located directly upstream of 44D001) and 3 (located directly downstream of 44D001) were 3.7 mg/kg and 0 mg/kg, respectively. Therefore, it appears that the source of the PAHs is not from Hangar 1000, but rather is the result of storm water runoff from adjacent parking lots and roads.

Detected concentrations of several pesticides including 4,4'-dichlorodiphenyl-dichloroethene (DDE), 4,4'-dichlorodiphenyltrichloroethane (DDT), alpha-chlordane, and endrin are elevated above their respective screening values. However, the presence of these pesticides in the PSC 44 drainage ditch is likely the result of basewide pesticide use, rather than site-related.

With the exception of cadmium and lead, detected concentrations of all metals in sediment of the PSC 44 drainage ditch were less than the available sediment screening values. Both cadmium and lead were detected during the first round of sampling at concentrations that exceeded their respective FDEP PEL values. Maximum concentrations of cadmium (6.2 mg/kg) and lead (130 mg/kg) were both detected from sampling station 44D001. Based on recommendations from the NAS Jacksonville Partnering Team, it was decided that the sediment would be resampled

Table 5-2
Summary of Analytes Detected in Sediment[1]

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Chemical Name	Frequency of Detection[2]	Range of Detects	Average of all Concentrations[3]	Background Concentrations[4]	USEPA Region IV Sediment Guidelines[5]	FDEP Sediment TEL/PEL Guidelines[6]
Semivolatile Organic Compounds (µg/kg)						
2-Methylnaphthalene	1/2	600	413	ND	330	20.2/201
Acenaphthene	2/2	86 to 1,500	118	ND	330	6.71/88.9
Acenaphthylene	1/2	82	154	ND	330	5.87/128
Anthracene	2/2	140 to 2,400	190	ND	330	46.9/245
Benzo(a)anthracene	2/2	890 to 10,000	5,445	390	330	74.8/693
Benzo(a)pyrene	2/2	1,100 to 8,500	4,800	460	330	88.8/763
Benzo(b)fluoranthene	2/2	1,800 to 14,000	7,900	930	330	NA/NA
Benzo(g,h,i)perylene	2/2	460 to 2,400	1,430	290	330	NA/NA
Benzo(k)fluoranthene	2/2	650 to 16,000	8,325	330	330	NA/NA
bis(2-Ethylhexyl)phthalate	2/2	570 to 1,900	1,235	560	182	182/2647
Butylbenzylphthalate	2/2	73 to 350	212	72	NA	NA/NA
Carbazole	2/2	140 to 5,300	2,720	ND	330	NA/NA
Chrysene	2/2	960 to 11,000	5,980	640	330	108/846
Dibenzofuran	1/2	1400	813	ND	NA	NA/NA
Fluoranthene	2/2	2,100 to 21,000	11,550	890	330	113/1494
Fluorene	2/2	66 to 1,800	933	ND	330	21.2/144
Indeno(1,2,3-cd)pyrene	2/2	580 to 2,800	1,690	300	330	NA/NA
Naphthalene	1/2	1300	763	ND	330	34.6/391
Phenanthrene	2/2	940 to 17,000	8,970	180	330	86.7/544
Pyrene	2/2	1,600 to 20,000	10,800	650	330	153/1398

See notes at end of table.

Table 5-2 (Continued)
Summary of Analytes Detected in Sediment[1]

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Chemical Name	Frequency of Detection[2]	Range of Detects	Average of all Concentrations[3]	Background Concentrations[4]	USEPA Region IV Sediment Guidelines[5]	FDEP Sediment TEL/PEL Guidelines[6]
Pesticides and PCBs (µg/kg)						
4,4'-DDE	2/2	4.6 to 7	5.8	1.9	3.3	2.07/3.74
4,4'-DDT	2/2	1.2 to 22	11.6	ND	3.3	1.19/4.77
Aldrin	1/2	5.6	3.4	0.26	NA	NA/NA
alpha-BHC	1/2	0.55	0.88	0.3	[7]3.3	NA/NA
alpha-Chlordane	2/2	1 to 3.8	2.4	2.4	1.7	2.26/4.79
delta-BHC	1/2	1.6	1.4	ND	[7]3.3	[7]0.32/[7]0.99
Endosulfan II	1/2	1.5	2.3	1.2	NA	NA/NA
Endosulfan sulfate	1/2	0.87	1.9	1.4	NA	NA/NA
Endrin	1/2	23	12.7	ND	3.3	NA/NA
Endrin ketone	1/2	5.4	4.2	ND	NA	NA/NA
gamma-Chlordane	1/2	1.1	1.3	3.3	1.7	2.26/4.79
Heptachlor epoxide	1/2	1.3	1.4	ND	NA	NA/NA
Methoxychlor	1/2	10	11	ND	NA	NA/NA
Inorganic Analytes (mg/kg)						
Aluminum	2/2	525 to 1100	813	1,700	NA	NA/NA
Arsenic	1/2	1.7	1	0.73	7.24	7.24/41.6
Barium	2/2	7.3 to 25.6	16.5	21.5	NA	NA/NA
Beryllium	1/2	0.11	0.06	0.1	NA	NA/NA
Cadmium (1997 sampling)	2/2	1.9 to 6.2	4.1	2.2	1	0.676/4.21
Cadmium (1998 sampling)	2/2	0.22 to 1.6	0.91	0.31	1	0.676/4.21
Calcium	2/2	805 to 4,240	2,523	16,000	NA	NA/NA

See notes at end of table.

Table 5-2 (Continued)
Summary of Analytes Detected in Sediment[1]

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Chemical Name	Frequency of Detection[2]	Range of Detects	Average of all Concentrations[3]	Background Concentrations[4]	USEPA Region IV Sediment Guidelines[5]	FDEP Sediment TEL/PEL Guidelines[6]
Inorganic Analytes (mg/kg) (continued)						
Chromium	2/2	7.4 to 33.3	20.4	9	52.3	52.3/160
Cobalt	2/2	1.3 to 2	1.7	0.81	NA	NA/NA
Copper	2/2	5.8 to 17.5	11.7	13	18.7	18.7/108
Iron	2/2	1,330 to 2,280	1,805	6,090	NA	NA/NA
Lead	2/2	42 to 130	86	46.6	30.2	30.2/112
Magnesium	2/2	148 to 639	394	701	NA	NA/NA
Manganese	2/2	5.9 to 18.8	12.4	34	NA	NA/NA
Mercury	2/2	0.11 to 0.12	0.12	0.13	0.13	0.13/0.696
Nickel	2/2	1.4 to 3.3	2.4	3.3	15.9	15.9/42.8
Potassium	2/2	19 to 59	39	40.4	NA	NA/NA
Sodium	2/2	172 to 227	100	203	NA	NA/NA
Vanadium	2/2	3.1 to 7.6	5.4	8.5	NA	NA/NA
Zinc	2/2	38.6 to 137	87.8	159	124	124/271

[1] Sample locations include 44D001 and 44D002.
[2] Frequency of detection is equal to the number of samples in which the analyte is detected in relation to the total number of samples analyzed (excluding rejected data).
[3] The average of all concentrations assigns a value of 1/2 the detection limit to non-detects.
[4] Data from background location 44D003.
[5] USEPA Region IV Waste Management Division Sediment Screening Values for Hazardous Waste Sites (USEPA, 1995).
[6] TEL and PEL Sediment Quality Assessment Guidelines (MacDonald, 1994).
[7] Value for gamma-BHC used as a surrogate.

Notes: USEPA = U.S. Environmental Protection Agency.
FDEP = Florida Department of Environmental Protection.
TEL = threshold effects limit.
PEL = probable effects limit.
µg/kg = micrograms per kilogram.
ND = not detected.
NA = not analyzed.
PCB = polychlorinated biphenyl.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
BHC = benzene hexachloride.
mg/kg = milligrams per kilogram.

and analyzed for cadmium only. Analytical results from the second round of sampling show that detected concentrations of cadmium in the PSC 44 drainage ditch have decreased over time. The range of detected cadmium concentrations in the April 1998 sampling was 0.22 to 1.6 mg/kg, as compared to a range of 1.9 to 6.2 mg/kg detected during the December 1997 sampling event.

Because detected concentrations of PAHs, several pesticides, and two metals exceeded the available sediment screening criteria, sediment from the PSC 44 drainage ditch was also submitted for sediment toxicity testing. The results of the sediment toxicity tests are described in Subsection 5.2.3.

5.2.3 Sediment Toxicity Testing Results As previously discussed in Chapter 2.0, sediment from the PSC 44 drainage ditch and sediment from a background drainage ditch were submitted for toxicity testing. These toxicity tests represent exposure of test organisms to the actual mixture of contamination in the sediment and provide a measurement of contaminant bioavailability from the sediment to the receptor.

During the first round of sediment sampling, sediment was submitted for toxicity testing using the saltwater amphipod *Ampelisca abdita*. As discussed in Chapter 2.0, the toxicity test should have been completed using the freshwater amphipod *Hyalella azteca* because the salinity of the sample was classified as freshwater by the toxicity testing laboratory. The results of the sediment toxicity tests using the saltwater amphipod *Ampelisca abdita* are attached as Appendix C. Based on input from the NAS Jacksonville Partnering Team, the sediment was resampled in April 1998 and resubmitted for sediment toxicity testing using the freshwater amphipod *Hyalella azteca*.

The results of the 10-day *Hyalella azteca* sediment toxicity tests are summarized in Table 5-3; the full laboratory report is attached as Appendix E. At the completion of the toxicity tests, the site background sample location 44D003 had 96 percent survival with a mean dry weight of 0.112 milligrams per organism (mg/organism). Survival in the sample location 44D002 sediment was 99 percent, while survival in the sample location 44D001 sediment was 93 percent. Statistical analyses showed no significant ($P = 0.05$) decrease in survival of the sample location 44D001 organisms when compared to the site background sample location 44D003. Mean dry weights of the organisms exposed to sample locations 44D001 and 44D002 sediments were higher than the site background sediment. The sample location 44D001 sediment had a mean dry weight of 0.124 mg/organism, while the 44D002 sediment had a mean dry weight of 0.12 mg/organism. No statistical comparisons were made to the formulated laboratory sediment because all survival and growth values for the three field-collected samples were higher than the formulated laboratory sediment. The formulated laboratory sediment had an acceptable mean survival of 81 percent with a mean dry weight of 0.079 mg/organism.

In summary, neither the sample location 44D001 nor the 44D002 sediments were toxic to *Hyalella azteca* with respect to survival or growth when compared to the site background sample location 44D003 sediment. These results suggest that although concentrations of PAHs, pesticides, cadmium, and lead exceeded the available sediment screening criteria, benthic invertebrates are not adversely affected from exposure to sediment in the PSC 44 drainage ditch.

Table 5-3
Summary of Sediment Toxicity Testing Results

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Sample Location	Survival (percent)	Mean Dry Weight (mg)[1]
Formulated laboratory control sediment	81	0.079
44D001	93	0.124
44D002	99	0.12
44D003	96	0.112

[1] Growth was measured as dry weight in milligrams.

Note: mg = milligram.

5.2.4 Summary of the Focused Ecological Risk Evaluation Based on a comparison of maximum detected concentrations of analytes in the sediment of the PSC 44 drainage ditch with sediment screening criteria, detected concentrations of PAHs, several pesticides, and cadmium and lead exceeded the available criteria. The maximum concentrations of these contaminants were generally detected at sampling location 44D001, which is located approximately 200 feet south of Yorktown Avenue. Based on the distribution of contaminants along the PSC 44 drainage ditch, it is likely that the source of these contaminants is storm water runoff from adjacent parking lots and roads. In addition, the results of the sediment toxicity tests confirm that aquatic receptors in the PSC 44 drainage ditch are not adversely affected from exposure to sediment. Therefore, risks to aquatic receptors in the PSC 44 drainage ditch are not predicted.

6.0 REFERENCES

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APPENDIX A

OFF-SITE SAMPLE TRACKING LOG

Appendix A

PSC 44
OFFSITE SAMPLE TRACKING LOG
SITE SCREENING, NAS JACKSONVILLE

SAMPLE ID	LAB	SAMP DATE	MATRIX	TAL MET	Cadmium	TCL SVOC	TCL PEST	TOXICITY	DRFL	TAT	DSTV	DRFV
44D00101	COMPU/QST	12/17/97	S	X		X	X	X	1/16/98	30	NDV	NDV
44D00201	COMPU/QST	12/18/97	S	X		X	X	X	1/16/98	29	NDV	NDV
44D00301	COMPU/QST	12/17/97	S	X		X	X	X	1/16/98	30	NDV	NDV
44D00102	QST	4/17/98	S		X			X	5/15/98	28	NDV	NDV
44D00202	QST	4/17/98	S		X			X	5/15/98	28	NDV	NDV
44D00302	QST	4/17/98	S		X			X	5/15/98	28	NDV	NDV

NOTES:

SAMPLE ID	Sample Identifier
SAMP DATE	Date of Sample Collection
UDEPTH, LDEPTH	Depths, upper (UDEPTH) and lower (LDEPTH), feet below land surface
MATRIX	Media Sampled
TAL_MET	Target Analyte List Metals
TCL SVOC	Target Compound List Semivolatile Organics
TCL PEST	Target Compound List Pesticides
DRFL	Date Package Received from Laboratory
TAT	Turnaround Time (days)
DSTV	Date Package Sent to Validators
DRFV	Date Package Received from Validators
NDV	Internal review only; not subjected to full independent data validation.

APPENDIX B

VALIDATED LABORATORY ANALYTICAL RESULTS

Appendix B

Validated Laboratory Analytical Results
TAL Metals, TCL Semivolatile Organics and Pesticides
Sediment
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	44D00101		44D00102		44D00201		44D00202		44D00301		44D00302	
Sampling Date	12/17/97		4/17/98		12/17/97		4/17/98		12/17/97		4/17/98	
Semivolatile organics, ug/kg												
1,2,4-Trichlorobenzene	570	U	NA		450	U	NA		470	U	NA	
1,2-Dichlorobenzene	570	U	NA		450	U	NA		470	U	NA	
1,3-Dichlorobenzene	570	U	NA		450	U	NA		470	U	NA	
1,4-Dichlorobenzene	570	U	NA		450	U	NA		470	U	NA	
2,2'-oxybis(1-Chloropropane)	570	U	NA		450	U	NA		470	U	NA	
2,4,5-Trichlorophenol	1400	U	NA		1100	U	NA		1200	U	NA	
2,4,6-Trichlorophenol	570	U	NA		450	U	NA		470	U	NA	
2,4-Dichlorophenol	570	U	NA		450	U	NA		470	U	NA	
2,4-Dimethylphenol	570	U	NA		450	U	NA		470	U	NA	
2,4-Dinitrophenol	1400	U	NA		1100	U	NA		1200	U	NA	
2,4-Dinitrotoluene	570	U	NA		450	U	NA		470	U	NA	
2,6-Dinitrotoluene	570	U	NA		450	U	NA		470	U	NA	
2-Chloronaphthalene	570	U	NA		450	U	NA		470	U	NA	
2-Chlorophenol	570	U	NA		450	U	NA		470	U	NA	
2-Methylnaphthalene	600		NA		450	U	NA		470	U	NA	
2-Methylphenol	570	U	NA		450	U	NA		470	U	NA	
2-Nitroaniline	1400	U	NA		1100	U	NA		1200	U	NA	
2-Nitrophenol	570	U	NA		450	U	NA		470	U	NA	
3,3'-Dichlorobenzidine	570	U	NA		450	U	NA		470	U	NA	
3-Nitroaniline	1400	U	NA		1100	U	NA		1200	U	NA	
4,6-Dinitro-2-methylphenol	1400	U	NA		1100	U	NA		1200	U	NA	
4-Bromophenyl-phenylether	570	U	NA		450	U	NA		470	U	NA	
4-Chloro-3-methylphenol	570	U	NA		450	U	NA		470	U	NA	
4-Chloroaniline	570	U	NA		450	U	NA		470	U	NA	
4-Chlorophenyl-phenylether	570	U	NA		450	U	NA		470	U	NA	
4-Methylphenol	570	U	NA		450	U	NA		470	U	NA	
4-Nitroaniline	1400	U	NA		1100	U	NA		1200	U	NA	
4-Nitrophenol	1400	U	NA		1100	U	NA		1200	U	NA	
Acenaphthene	1500		NA		86	J	NA		470	U	NA	
Acenaphthylene	82	J	NA		450	U	NA		470	U	NA	
Anthracene	2400		NA		140	J	NA		470	U	NA	
Benzo(a)anthracene	10000	D	NA		890		NA		390	J	NA	
Benzo(a)pyrene	8500	D	NA		1100		NA		460	J	NA	
Benzo(b)fluoranthene	14000	DJ	NA		1800		NA		930		NA	
Benzo(g,h,i)perylene	2400		NA		460		NA		290	J	NA	
Benzo(k)fluoranthene	16000	DJ	NA		650		NA		330	J	NA	
bis(2-Chloroethoxy)methane	570	U	NA		450	U	NA		470	U	NA	
bis(2-Chloroethyl)ether	570	U	NA		450	U	NA		470	U	NA	
bis(2-Ethylhexyl)phthalate	1900		NA		570		NA		560		NA	
Butylbenzylphthalate	350	J	NA		73	J	NA		72	J	NA	
Carbazole	5300	DJ	NA		140	J	NA		470	U	NA	
Chrysene	11000	D	NA		960		NA		640		NA	
Di-n-butylphthalate	570	U	NA		450	U	NA		470	U	NA	
Di-n-octylphthalate	570	U	NA		450	U	NA		470	U	NA	
Dibenz(a,h)anthracene	570	U	NA		450	U	NA		470	U	NA	
Dibenzofuran	1400		NA		450	U	NA		470	U	NA	
Diethylphthalate	570	U	NA		450	U	NA		470	U	NA	
Dimethylphthalate	570	U	NA		450	U	NA		470	U	NA	
Fluoranthene	21000	D	NA		2100		NA		890		NA	
Fluorene	1800		NA		66	J	NA		470	U	NA	
Hexachlorobenzene	570	U	NA		450	U	NA		470	U	NA	

Appendix B

Validated Laboratory Analytical Results
TAL Metals, TCL Semivolatile Organics and Pesticides
Sediment
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	44D00101		44D00102		44D00201		44D00202		44D00301		44D00302	
Sampling Date	12/17/97		4/17/98		12/17/97		4/17/98		12/17/97		4/17/98	
Hexachlorobutadiene	570	U	NA		450	U	NA		470	U	NA	
Hexachlorocyclopentadiene	570	U	NA		450	U	NA		470	U	NA	
Hexachloroethane	570	U	NA		450	U	NA		470	U	NA	
Indeno(1,2,3-cd)pyrene	2800		NA		580		NA		300	J	NA	
Isophorone	570	U	NA		450	U	NA		470	U	NA	
N-Nitroso-di-n-propylamine	570	U	NA		450	U	NA		470	U	NA	
N-Nitrosodiphenylamine (1)	570	U	NA		450	U	NA		470	U	NA	
Naphthalene	1300		NA		450	U	NA		470	U	NA	
Nitrobenzene	570	U	NA		450	U	NA		470	U	NA	
Pentachlorophenol	1400	U	NA		1100	U	NA		1200	U	NA	
Phenanthrene	17000	D	NA		940		NA		180	J	NA	
Phenol	570	U	NA		450	U	NA		470	U	NA	
Pyrene	20000	D	NA		1600		NA		650		NA	
Pesticides/PCBs, ug/kg												
4,4'-DDD	6	U	NA		4.6	U	NA		4.7	U	NA	
4,4'-DDE	7	J	NA		4.6	J	NA		1.9	J	NA	
4,4'-DDT	22	J	NA		1.2	J	NA		4.7	U	NA	
Aldrin	5.6	J	NA		2.4	U	NA		0.26	J	NA	
alpha-BHC	0.55	J	NA		2.4	U	NA		0.3	J	NA	
alpha-Chlordane	1	J	NA		3.8		NA		2.4	J	NA	
beta-BHC	3.1	U	NA		2.4	U	NA		2.4	U	NA	
delta-BHC	1.6	J	NA		2.4	U	NA		2.4	U	NA	
Dieldrin	6	U	NA		4.6	U	NA		4.7	U	NA	
Endosulfan I	3.1	U	NA		2.4	U	NA		2.4	U	NA	
Endosulfan II	6	U	NA		1.5	J	NA		1.2	J	NA	
Endosulfan sulfate	6	U	NA		0.87	J	NA		1.4	J	NA	
Endrin	23	J	NA		4.6	U	NA		4.7	U	NA	
Endrin aldehyde	6	U	NA		4.6	U	NA		4.7	U	NA	
Endrin ketone	6	U	NA		5.4	J	NA		4.7	U	NA	
gamma-BHC (Lindane)	3.1	U	NA		2.4	U	NA		2.4	U	NA	
gamma-Chlordane	3.1	U	NA		1.1	J	NA		3.3		NA	
Heptachlor	3.1	U	NA		2.4	U	NA		2.4	U	NA	
Heptachlor epoxide	3.1	U	NA		1.3	J	NA		2.4	U	NA	
Methoxychlor	10	J	NA		24	U	NA		24	U	NA	
Inorganics, mg/kg												
Aluminum	1100		NA		525		NA		1700		NA	
Antimony	0.74	U	NA		0.56	U	NA		0.58	U	NA	
Arsenic	1.7	J	NA		0.62	U	NA		0.73	J	NA	
Barium	25.6	J	NA		7.3	J	NA		21.5	J	NA	
Beryllium	0.11	J	NA		0.03	U	NA		0.1	J	NA	
Cadmium	6.2	J	0.22		1.9	J	1.6		2.2	J	0.31	
Calcium	4240		NA		805	J	NA		16000		NA	
Chromium	33.3		NA		7.4		NA		9		NA	
Cobalt	2	J	NA		1.3	J	NA		0.81	J	NA	
Copper	17.5		NA		5.8	J	NA		13		NA	
Iron	2280	J	NA		1330	J	NA		6090	J	NA	
Lead	130	J	NA		42	J	NA		46.6	J	NA	
Magnesium	639	J	NA		148	J	NA		701	J	NA	
Manganese	18.8		NA		5.9		NA		34		NA	
Mercury	0.12	J	NA		0.11	J	NA		0.13	J	NA	
Nickel	3.3	J	NA		1.4	J	NA		3.3	J	NA	
Potassium	59	J	NA		19	J	NA		40.4	J	NA	

Appendix B

Validated Laboratory Analytical Results
TAL Metals, TCL Semivolatile Organics and Pesticides
Sediment
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	44D00101		44D00102		44D00201		44D00202		44D00301		44D00302	
Sampling Date	12/17/97		4/17/98		12/17/97		4/17/98		12/17/97		4/17/98	
Selenium	1.5	U	NA		1.1	U	NA		1.2	U	NA	
Silver	0.26	U	NA		0.2	U	NA		0.2	U	NA	
Sodium	227	J	NA		172	J	NA		203	J	NA	
Thallium	1.4	U	NA		1	U	NA		1.1	U	NA	
Vanadium	7.6	J	NA		3.1	J	NA		8.5	J	NA	
Zinc	137	J	NA		38.6	J	NA		159	J	NA	

Appendix B

Notes to Appendix B
Sediment
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID = Sample Identifier
Lab ID = Laboratory identifier
NA = Analyte/compound not analyzed.

Units:

mg/kg	milligram per kilogram
ug/kg	microgram per kilogram

The following standard qualifiers have the following definitions:

U	The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit The number preceding the U qualifier is the reported sample quantitation limit.
J	The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample. For most detected analytes and compounds, the J qualifier is also used to indicate that the reported concentration is below the contract required detection or quantitation limit.
UJ	The analyte/compound was not detected above the reported sample quantitation limit. The reported quantitation limit, however, is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte/compound in the sample.
D	The reported concentration is from a dilution/reanalysis of the sample.

APPENDIX C

SUMMARY OF SEDIMENT ANALYTICAL RESULTS

APPENDIX C

Summary of Sediment Analytical Results
Detections Only
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Analyte	FDEP Soil Cleanup Goals		Region 3 Risk-Based Concentrations		Background Screening Levels	44D00101		44D00102		44D00201		44D00202		44D00301		44D00302	
	Residential	Industrial	Residential	Industrial		12/17/97		4/17/98		12/17/97		4/17/98		12/17/97		4/17/98	
Semivolatile Organics, ug/kg																	
2-Methylnaphthalene	960,000	8,800,000	3,100,000	82,000,000		600		NA				NA				NA	
Acenaphthene	2,800,000	30,000,000	4,700,000	120,000,000		1,500		NA		86	J	NA				NA	
Acenaphthylene	670,000	5,600,000				82	J	NA				NA				NA	
Anthracene	20,000,000	300,000,000	23,000,000	610,000,000		2,400		NA		140	J	NA				NA	
Benzo(a)anthracene	1,400	4,900	870	7,800		10,000	D	NA		890		NA		390	J	NA	
Benzo(a)pyrene	100	600	87	780		8,500	D	NA		1100		NA		460	J	NA	
Benzo(b)fluoranthene	1,400	600	870	7,800		14,000	DJ	NA		1800		NA		930		NA	
Benzo(g,h,i)perylene	14,000	50,000				2,400		NA		460		NA		290	J	NA	
Benzo(k)fluoranthene	14,000	48,000	8,700	78,000		16,000	DJ	NA		650		NA		330	J	NA	
bis(2-Ethylhexyl)phthalate	48,000	110,000	46,000	410,000		1,900		NA		570		NA		560		NA	
Butylbenzylphthalate	15,000,000	310,000,000	16,000,000	410,000,000		350	J	NA		73	J	NA		72	J	NA	
Carbazole	42,000	120,000	32,000	290,000		5,300	DJ	NA		140	J	NA				NA	
Chrysene	140,000	500,000	87,000	780,000		11,000	D	NA		960		NA		640		NA	
Dibenzofuran	240,000	3,500,000	310,000	8,200,000		1,400		NA				NA				NA	
Fluoranthene	2,900,000	48,000,000	3,100,000	82,000,000		21,000	D	NA		2100		NA		890		NA	
Fluorene	2,400,000	30,000,000	3,100,000	82,000,000		1,800		NA		66	J	NA				NA	
Indeno(1,2,3-cd)pyrene	1,400	5,000	870	7,800		2,800		NA		580		NA		300	J	NA	
Naphthalene	1,300,000	12,000,000	3,100,000	82,000,000		1,300		NA				NA				NA	
Phenanthrene	1,700,000	21,000,000				17,000	D	NA		940		NA		180	J	NA	
Pyrene	2,200,000	41,000,000	2,300,000	61,000,000		20,000	D	NA		1600		NA		650		NA	
Pesticides, ug/kg																	
4,4'-DDE	3,000	11,000	1,900	17,000		7	J	NA		4.6	J	NA		1.9	J	NA	
4,4'-DDT	3,100	12,000	1,900	17,000		22	J	NA		1.2	J	NA				NA	
Aldrin	60	200	38	340		5.6	J	NA				NA		0.26	J	NA	
alpha-BHC	200	600	100	910		0.55	J	NA				NA		0.3	J	NA	
alpha-Chlordane	800	3,000	1,800	16,000		1	J	NA		3.8		NA		2.4	J	NA	
delta-BHC	23,000	470,000				1.6	J	NA				NA				NA	
Endosulfan II	390,000	5,900,000	470,000	12,000,000				NA		1.5	J	NA		1.2	J	NA	
Endosulfan sulfate	390,000	5,900,000	470,000	12,000,000				NA		0.87	J	NA		1.4	J	NA	
Endrin	230,000	470,000	23,000	610,000		23	J	NA				NA				NA	
Endrin ketone	23,000	470,000	23,000	610,000				NA		5.4	J	NA				NA	
gamma-Chlordane	800	3,000	1,800	16,000				NA		1.1	J	NA		3.3		NA	
Heptachlor epoxide	100	1,600	70	630				NA		1.3	J	NA				NA	
Methoxychlor	380,000	7,800,000	390,000	10,000,000		10	J	NA				NA				NA	

APPENDIX C

Summary of Sediment Analytical Results
Detections Only
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

Analyte	FDEP Soil Cleanup Goals		Region 3 Risk-Based Concentrations		Background Screening Levels	44D00101		44D00102		44D00201		44D00202		44D00301		44D00302	
	Residential	Industrial	Residential	Industrial		12/17/97		4/17/98		12/17/97		4/17/98		12/17/97		4/17/98	
Inorganics, mg/kg																	
Aluminum	75,000	>1,000,000	78,000	2,000,000	1,190	1,100		NA		525		NA		1,700		NA	
Arsenic	0.7	3.1	0.43	3.8	1.26	1.7	J	NA				NA		0.73	J	NA	
Barium	5,200	84,000	5,500	140,000	9.80	25.6	J	NA		7.3	J	NA		21.5	J	NA	
Beryllium	0.2	1	160	4,100	0.48	0.11	J	NA				NA		0.1	J	NA	
Cadmium	37	600	39	1,000	0.6	6.2	J	0.22		1.9	J	1.6		2.2	J	0.31	
Calcium					6,468	4,240		NA		805	J	NA		16,000		NA	
Chromium	290	430	390	10,000	3.8	33.3		NA		7.4		NA		9		NA	
Cobalt	4,700	110,000	4,700	120,000	3.8	2	J	NA		1.3	J	NA		0.81	J	NA	
Copper			3,100	82,000	7	17.5		NA		5.8	J	NA		13		NA	
Iron			23,000	610,000		2,280	J	NA		1,330	J	NA		6,090	J	NA	
Lead	500	1,000			2,300	130	J	NA		42	J	NA		46.6	J	NA	
Magnesium					131	639	J	NA		148	J	NA		701	J	NA	
Manganese	370	5,500	1,600	41,000	6.8	18.8		NA		5.9		NA		34		NA	
Mercury	23	480	23	610	0.1	0.12	J	NA		0.11	J	NA		0.13	J	NA	
Nickel	1,500	26,000	1,600	41,000	6.2	3.3	J	NA		1.4	J	NA		3.3	J	NA	
Potassium					218	59	J	NA		19	J	NA		40.4	J	NA	
Sodium					498	227	J	NA		172	J	NA		203	J	NA	
Vanadium	490	4,800	550	14,000	5.2	7.6	J	NA		3.1	J	NA		8.5	J	NA	
Zinc	23,000	560,000	23,000	610,000	18.4	137	J	NA		38.6	J	NA		159	J	NA	

APPENDIX C

Notes to Summary of Sediment Analytical Results
Detections Only
PSC 44

Naval Air Station, Jacksonville
Jacksonville, FL

NOTES:

NA = Not analyzed.

J The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample.

For most detected analytes and compounds, the J qualifier is also used to indicate that the reported concentration is below the contract required detection or quantitation limit.

D The reported concentration is from a dilution/reanalysis of the sample.

mg/kg = milligrams per kilogram
ug/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
J = Reported concentration is an estimated quantity.
Bold/shaded values indicate exceedance of sediment screening value.
Blank space indicates analyte/compound was not detected at the reporting limit.

APPENDIX D

RESULTS OF SEDIMENT TOXICITY TESTING WITH *AMPELISCA ABDITA*

QST ENVIRONMENTAL

January 27, 1998

ABB Environmental Services, Inc
(ATTN: Fred Bragdon)
1536 Kingsley Avenue
Orange Park, FL 32703

Dear Fred:

RE: Toxicity Test Report for the PSC 44 Drainage Ditch, NAS JAX

Please find enclosed, the final report for the above-referenced toxicity test conducted by QST. The tests went well without any major problems. After reviewing the reports, if you desire any changes, I will be happy to make them for you.

Please contact me at (352) 333-2626, if you have any questions.

Sincerely,
QST ENVIRONMENTAL

Joe Owusu-Yaw

Joe Owusu-Yaw, Ph.D.
Toxicology Lab Manager

Enclosures:

P.O. Box 1703, Gainesville, FL 32602-1703, Phone 352•332•3318, FAX 352•333•6622
A CILCORP COMPANY
Formerly Environmental Science & Engineering, Inc.

FINAL REPORT:

SUB-CHRONIC TOXICITY OF SEDIMENTS FROM THE PSC 44 DRAINAGE DITCH, NAS JACKSONVILLE, FLORIDA, WITH THE AMPHIPOD, *AMPELISCA ABDITA*

TEST GUIDE:

ASTM E 1367-92

SUBMITTED TO:

ABB Environmental Services, Inc.
1536 Kingsley Avenue
Orange Park, Florida 32703
Phone: (904) 269-7012

PREPARED BY:

QST Environmental
404 SW 140th Terrace
Newberry, Florida 32669-3000
Phone: (352) 332-3318
Fax: (352) 333-6622

STUDY ID:

ABB-ES Project No: 0855548
QST Project No: 3197250G-0100-3100

January 1998

EXECUTIVE SUMMARY

Whole sediment toxicity tests were conducted at QST Environmental with the saltwater amphipod, *Ampelisca abdita*, on samples collected from the PSC 44 Drainage Ditch, Naval Air Station (NAS), Jacksonville, Florida. The effect criteria for the tests were survival and growth. A total of three site sediments and one laboratory control sediment were used in the toxicity tests. After 10 days of exposure, survival of *Ampelisca abdita* in the laboratory control sediment was 91 percent. Survival of *Ampelisca abdita* in the site sediments ranged from 4 percent (44D00101) to 64 percent (44D00301). Survival of *Ampelisca abdita* in the laboratory control sediment was significantly different (P=0.05) from survival in sediments from all of the sample stations tested, 44D00101, 44D00201 and 44D00301. Growth, measured as mean length, of *Ampelisca abdita* in the laboratory control sediment was also significantly different (P=0.05) from growth in all of the site sediments.

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1.0 INTRODUCTION

Whole sediment toxicity tests were conducted at QST Environmental on samples collected from the PSC 44 Drainage Ditch, Naval Air Station (NAS) Jacksonville, Florida, to determine the potential toxicity of the test samples. The test organism used for the static, non-renewal sediment toxicity tests was the saltwater amphipod, *Ampelisca abdita*. The effect criteria for the sub-chronic toxicity tests were survival and growth, measured as mean length.

The tests were conducted following ASTM Guideline E 1367-92 entitled *Standard Guide for Conducting 10-Day Sediment Toxicity Tests with Marine and Estuarine Amphipods* (ASTM 1995). All of the original raw data pertaining to this study are maintained at QST, 404 SW 140th Terrace, Newberry, Florida 32669-3000.

2.0 MATERIALS AND METHODS

2.1 TEST SAMPLES

Test sediments were collected on December 17 and 18, 1997 by ABB Environmental Services, Inc. (ABB-ES) personnel and were received on ice at the QST Gainesville laboratory on December 19, 1997. The test samples, identified as 44D00101, 44D00201, and 44D00301, were received in quantities of approximately 3.75 Liters (1 gallon jars) each. Upon receipt, the coolers were opened and the contents checked against the chain-of-custody to ensure that all the recorded samples were present. The temperature of the cooler was then measured using the temperature blank provided in the cooler. Any observations made were recorded in the sample receipt logbook.

Laboratory control sediment was collected by a commercial test organism supplier from a marsh in Dillon Beach, California, where the test organisms were field collected. The site from which the control sediment was collected has been proven to be uncontaminated in previous tests. Prior to use in testing, the laboratory control sediment was sifted to remove any indigenous organisms present. Chain-of-custody records and other traffic information pertaining to the sediment samples are presented in Appendix A. All samples were stored in a refrigerator at 4 $\pm$ 2 °C during the testing period.

2.2 OVERLYING WATER

The water used as dilution or overlying water for the *A. abdita* tests was filtered natural seawater with a salinity of approximately 32 parts-per-thousand (ppt). The seawater was obtained from the Atlantic Ocean, near Marineland, Florida. The site was selected because it is relatively free of human activity, and has been shown to be uncontaminated in previous tests. Prior to use the water was diluted to a salinity of 28 ppt with deionized water.

2.3 TEST ORGANISMS

The whole sediment bioassays were conducted using juvenile (second or third instar) *A. abdita* (3-5 mm in length, with no mature males or females). The test organisms were obtained from Brezina & Associates, Dillon Beach, CA. The supplier's holding conditions, such as temperature and water salinity, were similar to those of the testing conditions, therefore, organisms were held for less than 24 hours prior to test initiation.

2.4 TEST DESIGN

The whole sediment toxicity tests were initiated on January 5, 1998, within 17 days of receiving the test samples. Prior to use in the toxicity tests, the sediment samples were allowed to equilibrate to room temperature and individually homogenized. Sediments were then hand-sorted to remove small stones and sticks, plant debris, and sieved to remove any indigenous organisms. The test vessels used for the bioassays were 2 L glass jars (23 cm height and 13 cm diameter). On day minus one, approximately 200 grams of site, reference, or control sediment were introduced into the test chambers and uniformly leveled. Eight-hundred milliliters (800 mL) of overlying seawater were added to each test chamber to provide a ratio of 1 part sediment to 4 parts overlying water. The test chambers were then allowed to settle overnight with aeration provided to maintain dissolved oxygen levels above 90 percent saturation. On day zero, the initial water quality measurements were taken and the test organisms were introduced into the test chambers. The test organisms were randomly added to the test chambers, loading one replicate at a time until loading was complete. The test vessels were examined one hour after loading to identify and replace any floaters and to ensure that the organisms had burrowed into the sediments.

The whole sediment tests were conducted using four replicates of 20 organisms per replicate for a total of 80 *A. abdita* per sample. The test vessels were labeled with the site I.D. number and replicate number (A through D), and the test area was identified by the QST project number, test type and schedule, and the name of the project manager.

The duration of the static non-renewal whole sediment toxicity tests was 10-days during which the test organisms received no supplemental feeding. The tests were conducted in a waterbath adjusted to maintain a temperature of 20 ± 1 °C under fluorescent lighting with a daily photoperiod of 24 hours continuous light (ambient laboratory illumination, 700 Lux). All test chambers were aerated at approximately 80 bubbles per minute throughout the testing period. Temperature, pH and dissolved oxygen (DO) concentrations, were measured daily. Ammonia and conductivity levels were measured at the beginning of the tests. The salinity of the overlying water was measured three times during the test. Water quality measurements were taken with the following instruments: temperature--Fisher Scientific digital thermocouple; pH--SA 290A Orion pH meter equipped with an Orion 91-57 triode; dissolved oxygen--YSI, Model 57 DO meter; salinity--Aquatic Biosystems refractometer, ammonia--SA 290A electrode with Orion Model 95-12 ammonia probe, and conductivity--YSI, Model 33 SCT conductivity meter. All instruments were calibrated daily during the testing period.

The test chambers were observed daily for organism mortality, entrapment at the surface of overlying water, and sediment avoidance. At test termination, the sediments were sieved through a 0.5 mm mesh Nytex screen to collect, observe, and enumerate test organisms. *A. abdita* were considered dead if they remained immobile, possessed no pigmentation, and did not respond to a gentle stimulus. Growth, as mean length in millimeters was measured with the aid of a dissecting microscope equipped with a micrometer.

2.5 REFERENCE TOXICANT TEST

A 96-hour reference toxicant test was conducted concurrently with the whole sediment toxicity tests to determine the general health of the test organisms. The reference toxicant used was sodium dodecyl sulfate (SDS) at concentrations of 0, 0.62, 1.25, 2.5, 5.0 and 10.0 mg/L. The reference toxicant test was conducted in complete darkness and under similar conditions of temperature and salinity as the whole

sediment tests. Only 10 organisms were exposed per reference toxicant concentration without any replication.

3.0 STATISTICAL ANALYSIS

All toxicity data were evaluated by a statistical comparison of mean survival and growth of *A. abdita* in the site samples with mean survival and growth in the reference and laboratory control samples using appropriate statistical procedures. Analysis of variance and Dunnett's t-test (EPA/600/4-89/001) were used to determine statistical significance. The survival data were arc-sine square root transformed prior to performing the statistics. The 96-hour median lethal concentration (LC_{50}) for the reference toxicant test, the concentration of the reference toxicant causing 50 percent mortality of the test organisms under the specified conditions of exposure, was determined using the Trimmed Spearman-Karber Statistical Method (Hamilton et. al., 1977).

4.0 RESULTS AND DISCUSSION

4.1 SEDIMENT TOXICITY TESTS

Test conditions, including lighting, salinity, DO, conductivity, temperature, and pH levels remained at acceptable levels throughout the testing period. Test temperature remained in the range of 19.9 to 21.0 °C, pH ranged from 7.8 to 8.0 standard units, and dissolved oxygen remained above 90 percent saturation (ranged from 6.9 to 7.3 mg/L) for the duration of the tests (Table 1). Salinity of the overlying water remained in the range of 26-30 ppt, solution conductivities ranged from 39,000 to 45,000 μmhos/cm, and ammonia levels were all below the reporting limit of 0.10 (Table 1). There were no deviations from the test protocols in the ASTM Guidelines used to conduct this test (ASTM E1367-92; ASTM, 1995).

Survival and growth data of the whole sediment bioassays are presented in Table 2. After 10 days of exposure, survival of *A. abdita* in the laboratory control sediment was 91 percent. Survival of *A. abdita* in the PSC 44 Drainage Ditch sediments ranged from 4 percent (44D00101) to 64 percent (44D00301). Survival of *A. abdita* in the laboratory control sediment was significantly different (P=0.05) from survival in all of the site sediments tested.

Growth, measured as mean length in millimeters of surviving *A. abdita*, averaged 3.7 mm/organism in the laboratory control sediment (Table 2). The mean length of *A. abdita* in the site sediments ranged from 3.1 mm/organism (44D00101) to 3.6 mm/organism (44D00201). Growth of *A. abdita* in the laboratory control sediment was significantly different (P=0.05) from growth in all of the site sediments.

The recommended holding time of 14 days (ASTM, 1995) was exceeded by 3 days due to problems encountered in obtaining the test organisms. This deviation was not deemed serious enough to affect the outcome of the results. This is because different researchers have shown that sediments can be stored for up to 8 weeks or longer without any changes in their toxicity (USEPA-USCOE, 1994). No indigenous organisms were detected in the site sediments during the sieving and cleaning processes. Sample 44D00101 exhibited a strong petroleum odor. No adverse behavioral observations were recorded during the 10-day exposures. All of the exposed *A. abdita* were observed to burrow into the sediments and make tubes during the first hour of loading. At the end of the 10-day exposure period, all surviving *A. abdita* appeared to be normal and healthy.

4.2 REFERENCE TOXICANT TESTS

The 96-hour LC_{50} of the reference toxicant for *A. abdita* was determined to be 2.63 mg SDS/L with 95 percent confidence limits of 1.99 and 3.47 mg SDS/L. The LC_{50} value falls within the normal sensitivity ranges of test species used for testing at QST. The raw data pertaining to the reference toxicant test are provided in Appendix C.

5.0 CONCLUSION

The toxicity test results indicated that after 10 days of exposure to whole sediments from the PSC 44 Drainage Ditch, NAS Jacksonville, Florida, survival of *A. abdita* in the laboratory control sediment was significantly different (P=0.05) from survival in all of the site sediments tested. Growth of *A. abdita* in the laboratory control sediment was also significantly different (P=0.05) from growth of *A. abdita* in all of the site sediments.

6.0 REFERENCES

American Society for Testing and Materials. ASTM E 1367-92. *Standard Guide for Conducting 10-Day Sediment Toxicity Tests with Marine and Estuarine Amphipods*. Annual Book of ASTM Standards Vol. 11.05, 1995.

Gulley, D., and WEST, Inc. 1994. *Toxstat Version 3.4*. Department of Zoology and Physiology, University of Wyoming.

Hamilton, M.A., R.C. Russo, and R.V. Thurston. 1977. *Trimmed Spearman-Karber Method for Estimating Median Lethal Concentrations in Toxicity Bioassays*. Environmental Science and Technology. 11(7):714-719; Correction 12(4):417 (1978).

U.S. Environmental Protection Agency (EPA). 1994. *Methods for Assessing the Toxicity of Sediment-Associated Contaminants with Estuarine and Marine Amphipods*. EPA/600/R-94/025. June 1994.

USEPA-USCOE (U.S. Army Corps of Engineers). 1994. Evaluation of Dredged Material Proposed for Ocean Discharge in Inland and Near Coastal Waters. EPA-000/0-93/000.

U.S. Environmental Protection Agency (EPA). 1988. *Computer Program and Users Guide for Probit and Dunnett's Analysis of Data from Acute and Short Term Chronic Toxicity Tests with Aquatic Organisms*. Prepared by Statistical Support Staff, Computer Sciences Corporation. Prepared for the Biological Methods Branch, Environmental Monitoring and Support Laboratory, Cincinnati, OH, 1988.

Table 1. Water Quality Measurement Ranges[a] of Overlying Water During a 10-Day Toxicity Test of Whole Sediment From the PSC 44 Drainage Ditch, NAS Jacksonville, Florida, With the Amphipod, *Ampelisca abdita*

Site ID	Ammonia (ppm)	Salinity (ppt)	Temp (°C)	pH (s.u.)[b]	DO (mg/L)	Cond[c] (μmhos/cm)
Control	<0.10	27 - 29	19.9 - 21.0	7.9 - 8.0	7.0 - 7.3	43,000
44D00101	<0.10	26 - 30	20.0 - 21.0	7.7 - 7.9	6.9 - 7.3	45,000
44D00201	<0.10	27 - 29	19.9 - 21.0	7.8 - 7.9	7.0 - 7.3	39,000
44D00301	<0.10	27 - 30	20.0 - 21.0	7.8 - 8.0	7.0 - 7.3	44,000

[a]Range of 11 measurements for temperature, pH and DO.
[b]pH measured in standard units (s.u.).
[c]Conductivity.

Source: QST, 1998

Table 2. Survival and Growth of *Ampelisca abdita* After 10 Days of Exposure to Whole Sediments From the PSC 44 Drainage Ditch, NAS Jacksonville, Florida

Sample ID	Replicate[a]	Survival (Percent)	Mean Length (mm)[b]
Control	A	18	3.7
	B	19	3.7
	C	19	3.6
	D	17	3.7
		73 (91)	3.7
44D00101	A	0	NM[c]
	B	1	3.6
	C	1	NM
	D	1	3.5
		3 (4)[d]	3.6[d]
44D00201	A	11	3.2
	B	13	3.1
	C	13	3.0
	D	12	3.1
		49 (62)[d]	3.1[d]
44D00301	A	12	4.4
	B	14	3.3
	C	9	3.4
	D	16	3.4
		51 (64)[d]	3.4[d]

[a]Twenty organisms exposed per replicate (80 organisms/sample). Percent survival in parentheses.
[b]Growth was measured as length in millimeters.
[c]Not measured due to 100 percent mortality.
[d]Significantly different (P=0.05) from the laboratory control.

Source: QST 1998

Appendix A: Chain-of-Custody and Traffic Information

COMPUCHEM ENVIRONMENTAL
a division of Liberty Analytical Corp.
4600 Silicon Drive
Durham, NC 27703
1-800-833-5097

ABB-ES

CHAIN-OF-CUSTODY RECORD

No. 01021

Ship to: QST	Project Name: NASJAX PSC-44	Field Point-of-Contact:
	Sampler Name: F. Brogdon	Telephone No.:
		Sampling for project complete? Y or N (See Note 1)
Carrier: Airbill No.:	Sampler Signature: [signature]	Project-specific (PS) or Batch (B) QC: _____

BOX #1 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil / Sediment / Sludge 6. Trip Blank 7. Oil 8. Waste 9. Other _____

Box #2: A. HCl B. HNO_3 C. $NaHSO_4$ D. $Na_2S_2O_3$ E. Ice Only O. Other _____ N. Not Preserved

Box #3: F. Filtered U. Unfiltered

Box #4: C. CLP 3/90 S. SW-846 W. CWA 600-series L. Low Conc. CLP R. Radiological T. TCLP O. Other _____

Box #5: H. - High M. - Medium L. - Low

Sample ID (Organics: 9 characters max, Inorganics: 6 characters; See Note 2)	Date: Year: 1997	Time	Box #1 Matrix	Box #2 Preservative	Box #3 Filtered/Unfiltered	Box #4 Method	Box #5 Expect. Conc.	No. of Bottles	Use for Lab QC (MS or DUP)	Organic Analysis: VOA-GC / MS	SV-GC / MS	Pest / PCB-GC	Herb-GC	VOA-GC	Inorganics: Metals	Mercury	Cyanides	Other: Radiologicals	TOC / TOX	O&G / TPH	Phenols	Other	Remarks / Comments
44D0010 1	12/17	2:15	Sed	None				1 gal															Toxicity Test
44D0020 1	12/18	10:30	Sed	"				1 gal															" "
44D0030 1	12/17	1:40	Sed	"				1 gal															" "
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					
	/	:																					

Client's Special Instructions:

Lab: Received in Good Condition? Y or N Describe Problems, If Any:

#1 Relinquished By: (Sig) [signature]	Date: 12-18	#2 Relinquished By: (Sig)	Date:	#3 Relinquished By: (Sig)	Date:	Sample storage time requested? _____ (In days, see Note 3)
Company Name:	Time:	Company Name:	Time:	Company Name:	Time:	
#1 Received By: (Sig.) [signature]	Date: 12/19/97	#2 Received By: (Sig.)	Date:	#3 Received By: (Sig.)	Date:	DESTROY or RETURN data after five years of archival? (Circle choice; see Note 4)
Company Name: QST	Time: 1415	Company Name:	Time:	Company Name:	Time:	

Note (1): If "N" lab will hold samples to await remainder of project-maximizing batch size and minimizing QC ratio; if "Y" lab will begin processing batches now. Note (2): If CLP inorganics diskette required, ID limited to maximum of six characters.
Note (3): Samples stored 60 days after date report mailed at no extra charge. Note (4): All lab copies of data de[illegible]d after five years unless client requests and pays for return of copies; annual storage fee billed in January of year [illegible]

Appendix B: *Ampelisca abdita* Sediment Test Raw Data

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197250-0100-3100

DAILY LOG

1/05/98 mo - The three sediment samples were stored in a refrigerator at 4±2°C prior to use. For each sediment, the sample was placed in a glass pan, homogenized, + sifted by hand. Samples 101 and ~~10~~ NO 301 contained plant debris; sample 201 was sandy with no debris. No indigenous organisms were observed. 200 mL of sediment was placed into each replicate, and 800 mL of overlying water was added. Overlying water will be aerated using Tygon tubing + glass pipette tips; aeration was set at about 80 bubbles per minute. Test vessels were placed in waterbath 8. Control sediment was washed with DI water prior to use. Overlying water is filtered seawater collected near Marthelaud, FL, diluted with deionized water to a salinity of 28 ppt.

1/06/98 CP - water quality measured. Organisms received & acclimated to test conditions. 20 organisms loaded per replicate. Organisms in normal condition. Airlines checked.

A. abdita in normal condition at test initiation. Ammonia was measured in overlying water using SA290A meter and probe 95-12 Ammonia electrode.

1/07/98 water quality measured. Observations made. Airlines checked. Tube made by organisms in all samples.

1/08/98 mo - observed + monitored test. Checked airlines.

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form Number: 018
Effective: APR 1993

Project: 3197250-0100-3100

DAILY LOG

1/09/98 CR Test monitored + observed. Checked airlines
1/10/98 MO- Test monitored + observed - checked airlines.
1/11/98 MO- Test monitored + observed, checked airlines.
1/12/98 MO- Test monitored + observed, checked airlines.
1/13/98 CR Test monitered + observed. Checked airlines
1/14/98 CR Test monitered + observed - Checked airlines
1/15/98 CR Test monitered + observed. Airlines checked
1/16/98 CR Test monitered. Test ended by paring overlying water + sediment into sieve, rinsing + displacing the sediment in sieve by placing into Sorting pan. Organisms enumerated + preserved with 10% formalin to await measurement. Strong petroleum odor in Sample 101

Environmental Science & Engineering, Inc.
Aquatic Toxicology Laboratory
Gainesville, Florida

Page: ____
ESE QA Form: 097A
Effective: August 1994

SUBJECT: TOXICITY TEST DATA SHEET

Client: ABB-ES

Project Number: 3197250-0100-3100

Test Material

See Page 216 of Sample Receipt Log
Test Material Information

Test Conditions

[ ] Preliminary
[ ] Definitive
[X] Screening

[X] Static [ ] Flow-through

Duration : 10 Days

Test Animal History

Species : A. abdita
Batch Number : 98-01
Age / Life Stage : Adults
Date Acclimation / Maintenance Began : 1/06/98
See Page 204 of Invertebrate Holding Log for raw data.
Mortality (%) 48 Hrs prior to testing: 0 %

Dilution Water: Natural, Filtered seawater

Lighting : [X] Fluorescent [ ] Incandescent
Photoperiod : 24 ~~16~~ hr Light : 8 ~~0~~ hr Dark
MO 1/6/98 MO 1/6/98

Test Container Dimensions: 23 (10.5) L x — W x 15 (23) H
Test Solution Height : 10.5 cm
Test Containers : [X]Open [ ]Covered
Test Container Volume : 2.0 Liters
Diluent Volume : 0.8 Liters

Test Area Used	Temperature (C)	Salinity (ppt)
waterbath 8	20 +/- 1	28 +/- 2

Reps / Concentration : 4
Animals / Replicate : 20

Protocol Followed:

Concentrations Based on: [ ] A.I. [X] W.M.

Container Composition: [X] Glass [ ] Plastic

Test Concentrations: (Units = %):	Control	44D00101	44D00201	44D00301				
Amount ~~Reference Soil~~ Overlying water Added (mL): MO 1/6/98	800	800	800	800				
Amount Test ~~Soil~~ Sediment Added (mL): MO 1/6/98	200 N/A	200	200	200				

Additional Observations:

Data By: MO Date: 1/06/98

FORM: Soil94

QST ENVIRONMENTAL
TOXICOLOGY LAB: GAINESVILLE, FL

QA FORM NO: 108C
EFFECTIVE: AUGUST 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET

SPONSOR: ABB ENVIRONMENTAL SERVICES
SAMPLE ID: CONTROL

PROJECT NUMBER: 3197250-1011-3100
TEST SPECIES: *Ampleisca abdita*

DATE-DAY	REP	TEMP (°C)	SALIN	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
1-6-98 0	A	20.8	27	<0.1	8.0	7.3	43000	none	CR 1500
1-7-98 1	B	21.0	—	—	7.9	7.2	—	—	CR 0800
1-8-98 2	C	20.9	—	—	7.9	7.3	—	—	MO 1100
1-9-98 3	D	20.9	—	—	7.9	7.3	—	—	CR 0900
1-10-98 4	A	20.7	—	—	7.9	7.1	—	—	MO 1145
1-11-98 5	B	19.9	27	—	7.9	7.3	—	—	MO 1015
1-12-98 6	C	20.5	—	—	8.0	7.2	—	—	MO 1600
1-13-98 7	D	21.0	—	—	7.9	7.0	—	—	CR 0915
1-14-98 8	A	21.0	—	—	7.9	7.1	—	—	CR 0915
1-15-98 9	B	20.9	—	—	7.9	7.2	—	—	CR 1600
1-16-98 10	C	20.9	29	—	7.9	7.1	—	—	CR 1500

OBSERV	REPLICATE				
DATE-DAY	A	B	C	D	Initial
1-6-98 0	20 A	20 A	20 A	20 A	CR
1-7-98 1	∩	∩	∩	∩	CR
1-8-98 2	N	N	N	N	MO
1-9-98 3	∩	∩	∩	∩	CR
1-10-98 4	N	N	N	N	MO
1-11-98 5	N	N	N	N	MO
1-12-98 6	N	N	N	N	MO
1-13-98 7	∩	∩	∩	∩	CR
1-14-98 8	∩	AS	∩	∩	CR
1-15-98 9	∩	∩	∩	∩	CR
1-16-98 10	18A 2NF	19A INF	19A INF	17A 3NF	CR

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

QST ENVIRONMENTAL
TOXICOLOGY LAB: GAINESVILLE, FL

QA FORM NO: 108C
EFFECTIVE: AUGUST 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET

SPONSOR: ABB ENVIRONMENTAL SERVICES
SAMPLE ID: 44D00101

PROJECT NUMBER: 3197250-1011-3100
TEST SPECIES: *Ampleisca abdita*

DATE-DAY	REP	TEMP (°C)	SALIN	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
1-6-98 0	A	20.9	27	<0.1	7.8	7.3	45000	none	CR 1500
1-7-98 1	B	21.0	—	—	7.8	7.1	—	—	CR 0800
1-8-98 2	C	20.8	—	—	7.7	6.9	—	—	MO 1100
1-9-98 3	D	20.9	—	—	7.9	7.2	—	—	CR 0900
1-10-98 4	A	20.7	—	—	7.8	7.1	—	—	MO 1145
1-11-98 5	B	20.0	26	—	7.9	7.2	—	—	MO 1045
1-12-98 6	C	20.6	—	—	7.8	7.1	—	—	MO 1600
1-13-98 7	D	21.0	—	—	7.9	7.2	—	—	CR 0915
1-14-98 8	A	20.9	—	—	7.8	7.0	—	—	CR 0915
1-15-98 9	B	21.0	—	—	7.7	7.1	—	—	CR 1000
1-16-98 10	C	21.0	30	—	7.8	7.1	—	—	CR 1500

OBSERV	REPLICATE				
DATE-DAY	A	B	C	D	Initial
1-6-98 0	20 A	20A	20A	20A	CR
1-7-98 1	∩	∩	∩	∩	CR
1-8-98 2	N	N	N	N	MO
1-9-98 3	∩	∩	∩	∩	MO
1-10-98 4	N	N	N	N	MO
1-11-98 5	N	N	N	N	MO
1-12-98 6	N	N	N	N	MO
1-13-98 7	∩	∩	∩	∩	CR
1-14-98 8	∩	∩	∩	∩	CR
1-15-98 9	∩	∩	∩	∩	CR
1-16-98 10	20 ∩ F	1A 19 ∩ F	1A 19 ∩ F	1A 19 ∩ F	CR

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

QST ENVIRONMENTAL
TOXICOLOGY LAB: GAINESVILLE, FL

QA FORM NO: 108C
EFFECTIVE: AUGUST 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET

SPONSOR: ABB ENVIRONMENTAL SERVICES
SAMPLE ID: 44D00201

PROJECT NUMBER: 3197250-1011-3100
TEST SPECIES: *Ampleisca abdita*

DATE-DAY	REP	TEMP (°C)	SALIN	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
1-6-98 0	A	20.9	27	<0.1	7.8	7.3	39000	none	CR 1500
1-7-98 1	B	21.0	—	—	7.8	7.0	—	—	CR 0800
1-8-98 2	C	20.8	—	—	7.9	7.1	—	—	MO 1100
1-9-98 3	D	20.8	—	—	7.9	7.2	—	—	CR 0900
1-10-98 4	A	20.6	—	—	7.8	7.2	—	—	MO 1148
1-11-98 5	B	19.9	27	—	7.8	7.1	—	—	MO 1015
1-12-98 6	C	20.6	—	—	7.9	7.0	—	—	MO 1600
1-13-98 7	D	20.9	—	—	7.9	7.0	—	—	CR 0915
1-14-98 8	A	21.0	—	—	7.9	7.0	—	—	CR 0915
1-15-98 9	B	21.0	—	—	7.9	7.1	—	—	CR 1000
1-16-98 10	C	21.0	29	—	7.8	7.1	—	—	CR 1500

OBSERV	REPLICATE				
DATE-DAY	A	B	C	D	Initial
1-6-98 0	20 A	20A	20A	20A	CR
1-7-98 1	∩	∩	∩	∩	CR
1-8-98 2	N	N	N	N	MO
1-9-98 3	∩	∩	∩	∩	CR
1-10-98 4	N	N	N	N	MO
1-11-98 5	N	N	N	N	MO
1-12-98 6	N	N	N	N	MO
1-13-98 7	∩	∩	∩	∩	CR
1-14-98 8	1 DEAD	∩	2 DEAD	1 DEAD	CR
1-15-98 9	∩	∩	∩	∩	CR
1-16-98 10	11A, 8 NF	13A, 7 NF	13A, 5 NF	12A, 7 NF	

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

QST ENVIRONMENTAL
TOXICOLOGY LAB: GAINESVILLE, FL

QA FORM NO: 108C
EFFECTIVE: AUGUST 1997

SUBJECT: SEDIMENT TOXICITY DATA SHEET

SPONSOR: ABB ENVIRONMENTAL SERVICES
SAMPLE ID: 44D00301

PROJECT NUMBER: 3197250-1011-3100
TEST SPECIES: *Ampleisca abdita*

DATE-DAY	REP	TEMP (°C)	SALIN	NH_3 (ppm)	pH (s.u.)	DO (mg/L)	COND (µmhos/cm)	FEEDING	INITIAL/TIME
1-6-98 0	A	20.8	27	<0.1	7.8	7.3	44000	none	CR 1500
1-7-98 1	B	21.0	—	—	7.9	7.0	—	—	CR 0800
1-8-98 2	C	20.9	—	—	7.9	7.0	—	—	MO 1100
1-9-98 3	D	20.8	—	—	8.0	7.2	—	—	CR 0900
1-10-98 4	A	20.6	—	—	7.9	7.2	—	—	MO 1145
1-11-98 5	B	20.0	27	—	7.9	7.2	—	—	MO 1015
1-12-98 6	C	20.7	—	—	7.9	7.1	—	—	MO 1600
1-13-98 7	D	20.9	—	—	7.9	7.0	—	—	CR 0915
1-14-98 8	A	20.9	—	—	7.9	7.1	—	—	CR 0915
1-15-98 9	B	21.0	—	—	7.9	7.2	—	—	CR 1000
1-16-98 10	C	21.0	30	-	7.9	7.1	—	—	CR 1500

OBSERV	REPLICATE				
DATE-DAY	A	B	C	D	Initial
1-6-98 0	20 A	20 A	20 A	20 A	CR
1-7-98 1	∩	∩	∩	∩	CR
1-8-98 2	N	N	N	N	MO
1-9-98 3	∩	∩	∩	∩	CR
1-10-98 4	N	N	N	N	MO
1-11-98 5	N	N	N	N	MO
1-12-98 6	N	N	N	N	MO
1-13-98 7	∩	∩	∩	∩	CR
1-14-98 8	1 DEAD	∩	∩	∩	CR
1-15-98 9	∩	∩	∩	∩	CR
1-16-98 10	12A, 7NF	14A, 6NF	9A, 11NF	16A, 4NF	

Comments:

KEY: AS = AT SURFACE N= NONE EMR = EMERGENCE A = ALIVE D = DEAD NF = NOT FOUND
REP = REPLICATE COND = CONDUCTIVITY ALK = ALKALINITY AMP = AMPLEXUS
TEMP = TEMPERATURE HARD = HARDNESS YTC = YEAST/ TROUT CHOW/CEROPHYLL

QST Environmental
Toxicology Department
Gainesville, Florida

QA FORM: 017D
EFFECTIVE: MAY 1997

SUBJECT: TEST ORGANISM GROWTH											
SPONSOR: ABB ENVIRONMENTAL						SAMPLE ID: CONTROL					
PROJECT NUMBER:						TEST SPECIES: *Ampelisca abdita*					
Boat	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**
1	A	3.1	2	B	4.0	3	C	3.3	4	D	3.3
		4.4			3.7			3.5			3.2
		3.2			3.3			3.3			3.9
		4.3			3.4			4.1			3.8
		4.2			3.3			3.8			3.9
		3.2			3.6			3.2			3.4
		3.3			3.8			3.6			3.7
		4.0			3.9			3.5			3.3
		3.8			3.6			3.3			3.2
		3.9			4.1			4.1			4.1
		4.0			3.4			4.2			3.8
		3.4			3.7			3.4			4.3
		3.5			3.6			3.5			4.0
		3.3			3.6			3.5			3.8
		3.8			4.0			3.8			3.9
		4.0			3.7			3.6			3.2
		3.9			3.5			3.2			3.4
		3.6			3.2			3.9			
					4.0			3.8			
AVERAGE STD. DEV. RANGE		3.7 0.40 3.1-4.4	AVERAGE STD. DEV. RANGE		3.7 0.27 3.2-4.1	AVERAGE STD. DEV. RANGE		3.6 0.31 3.2-4.2	AVERAGE STD. DEV. RANGE		3.7 0.35 3.2-4.3
NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)		
Measuring Device: micrometer slide						Calculator: RS-SAE					
Data By: MHO			Date: 1/23/98			Reviewed By: JY			Date: 1/23/98		

QST Environmental
Toxicology Department
Gainesville, Florida

QA FORM: 017D
EFFECTIVE: MAY 1997

SUBJECT: TEST ORGANISM GROWTH											
SPONSOR: ABB ENVIRONMENTAL						SAMPLE ID: 44D00101					
PROJECT NUMBER:						TEST SPECIES: *Ampelisca abdita*					
Boat	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**
—	A	~~3~~ mo	5	B	3.6	—	C		6	D	3.5
AVERAGE STD. DEV. RANGE		/	AVERAGE STD. DEV. RANGE		3.6 /	AVERAGE STD. DEV. RANGE		/	AVERAGE STD. DEV. RANGE		3.5 /
NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)		
Measuring Device: Micrometer						Calculator: TI-60					
Data By: MAD			Date: 1/23/98			Reviewed By: JRY			Date: 1/23/98		

QST Environmental
Toxicology Department
Gainesville, Florida

QA FORM: 017D
EFFECTIVE: MAY 1997

SUBJECT: TEST ORGANISM GROWTH											
SPONSOR: ABB ENVIRONMENTAL						SAMPLE ID: 44D00201					
PROJECT NUMBER:						TEST SPECIES: *Ampelisca abdita*					
Boat	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**
87	A	2.6	8	B	3.0	89	C	2.7	10	D	2.7
		3.5			3.1			2.8			3.1
		3.4			2.8			3.2			3.0
		2.7			2.7			3.0			2.8
		3.3			3.0			3.3			2.7
		2.8			3.2			3.0			3.0
		2.7			3.6			3.3			3.7
		3.2			2.8			3.0			3.1
		3.6			2.9			3.1			3.4
		3.4			3.3			3.1			3.5
		3.8			3.4			2.9			2.9
					3.1			2.8			2.7
					3.2			3.1			
AVERAGE STD. DEV. RANGE		3.2 0.41 2.6-3.8	AVERAGE STD. DEV. RANGE		3.1 0.26 2.7-3.4	AVERAGE STD. DEV. RANGE		3.0 0.19 2.7-3.3	AVERAGE STD. DEV. RANGE		3.1 0.33 2.7-3.7
NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)		
Measuring Device: Micrometer						Calculator: TI-60					
Data By: MAO			Date: 1/23/98			Reviewed By: JOY			Date: 1/23/98		

QST Environmental
Toxicology Department
Gainesville, Florida

QA FORM: 017D
EFFECTIVE: MAY 1997

SUBJECT: TEST ORGANISM GROWTH											
SPONSOR: ABB ENVIRONMENTAL						SAMPLE ID: 44D00301					
PROJECT NUMBER:						TEST SPECIES: *Ampelisca abdita*					
Boat	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**	**Boat**	**REP**	**Length (mm)**
7	A	3.1	8	B	3.0	9	C	3.2	10	D	3.5
		3.8			3.2			3.2			3.6
		3.2			3.2			3.5			3.5
		3.7			3.4			3.4			3.7
		3.5			3.3			3.3			3.2
		3.5			3.7			3.7			3.4
		3.2			3.7			3.2			3.5
		3.3			3.1			3.3			3.1
		3.6			3.2			3.5			3.6
		3.5			3.5						3.5
		3.1			3.3						3.4
		3.0			3.4						3.7
					3.3						3.2
					3.2						3.3
											3.1
											3.3
AVERAGE STD. DEV. RANGE		3.4 0.26 3.0-3.8	AVERAGE STD. DEV. RANGE		3.3 0.20 3.0-3.7	AVERAGE STD. DEV. RANGE		3.4 0.17 3.2-3.7	AVERAGE STD. DEV. RANGE		3.4 0.20 3.1-3.7
NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)			NET WT (g) GROSS WT (g) MEAN (mg)		
Measuring Device: Micrometer						Calculator: TI-60					
Data By: MAO			Date: 1/27/98			Reviewed By: JOY			Date: 1/23/98		

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:amp2 Transform: NO TRANSFORM

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	0.745	0.248	66.222
Within (Error)	12	0.045	0.004	
Total	15	0.790		

Critical F value = 3.49 (0.05,3,12)
Since F > Critical F REJECT Ho: All equal

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:amp2 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	3.675	3.675		
2	001	3.550	3.550	2.887	*
3	002	3.100	3.100	13.279	*
4	003	3.375	3.375	6.928	*

Dunnett table value = 2.29 (1 Tailed Value, P=0.05, df=12,3)

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:amp2 Transform: NO TRANSFORM

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	4			
2	001	4	0.099	2.7	0.125
3	002	4	0.099	2.7	0.575
	003	4	0.099	2.7	0.300

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:ampl Transform: NO TRANSFORMATION

ANOVA TABLE

SOURCE	DF	SS	MS	F
Between	3	2.450	0.817	103.882
Within (Error)	12	0.094	0.008	
Total	15	2.544		

Critical F value = 3.49 (0.05,3,12)
Since F > Critical F REJECT Ho: All equal

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:ampl Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG
1	Control	1.278	1.278		
2	001	0.198	0.198	17.234	*
3	002	0.899	0.899	6.041	*
4	003	0.915	0.915	5.794	*

Dunnett table value = 2.29 (1 Tailed Value, P=0.05, df=12,3)

NAS JAX Toxicity Tests-Ampelisca Survival
File: a:ampl Transform: NO TRANSFORMATION

DUNNETT'S TEST - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	Minimum Sig Diff (IN ORIG. UNITS)	% of CONTROL	DIFFERENCE FROM CONTROL
1	Control	4			
2	001	4	0.144	11.2	1.081
3	002	4	0.144	11.2	0.379
4	003	4	0.144	11.2	0.363

Appendix C: Reference Toxicant Test Raw Data

TRIMMED SPEARMAN-KARBER METHOD. VERSION 1.5

DATE: 1/26/98 TEST NUMBER: 1 DURATION: 96 h
TOXICANT : SDS
SPECIES: A. abdita

RAW DATA:

Concentration (mg/L)	Number Exposed	Mortalities
.00	10	0
.62	10	1
1.25	10	1
2.50	10	4
5.00	10	10
10.00	10	10

SPEARMAN-KARBER TRIM: 10.00%

SPEARMAN-KARBER ESTIMATES: LC50: 2.63
95% LOWER CONFIDENCE: 1.99
95% UPPER CONFIDENCE: 3.47

QST ENVIRONMENTAL INC.
TOXICOLOGY LABORATORY
GAINESVILLE, FLORIDA

PAGE:_____
QST QA FORM NO: 097A REFTOX
EFFECTIVE: AUGUST 1997

REFERENCE TOXICANT TEST DATA SHEET

Client: Misc	Project Number: Ref TOX
Test Material	**Test Conditions**
Amount of SDS : 0.1001 (g) Volume of Milli-Q Water: 100 (mL) Date Prepared: 1/06/98	[X] Definitive [X] Static [ ] Screening Duration: 96 Hours
Test Organism History	Dilution Water: Natural Filtered Seawater
Species: A. abdita Batch Number: 98-01 Age/Life Stage: Adult Date of Acclimation/Maintenance: 1/06/98 See Page 204 of Insect Holding Log Mortality 48 hours prior to test: 0 (%) Replicates/Concentration: 1 No. Of Organisms/Replicate: 10	Lighting: [X] Fluorescent [ ] Incandescent Photoperiod: 0 Hr Light 24 Hr Dark Test Vessel Dimensions: 100 (mm) L X — W 50 H Test Solution Height: 4 (cm) Test Vessel Volume: 0.34 (L) Test Solution Volume: 0.20 (L) Test Temperature: 20 ± 1 °C Test Salinity: 28 ± 2 ppt
Test Area Used: Waterbath 9	Test Vessel Composition: [X] Glass [ ] Plastic
Test Concentrations Based on: [X] Whole Material [ ] Active Ingredient	Test Protocol/Guideline Followed: SOP-A-004

Test Concentrations: (Units: mg/L)	Control	0.62	1.25	2.5	5	10	
Amount Dilution Water Added (mL)	200	199.875	199.75	199.5	199	198	
Amount of Reftox Stock Added (mL)	—	0.125	0.25	0.5	1	2	

Additional Observations:_____

Data By: MO Date: 1/06/98

QST ENVIRONMENTAL INC.
TOXICOLOGY LABORATORY
GAINESVILLE, FLORIDA

PAGE:_____
QST QA FORM NO: 097 REFTOX
EFFECTIVE: AUGUST 1997

REFERENCE TOXICANT TEST DATA: DAY 0 - 2

Client: MTBC	Project Number: Ref Tox	Species: A. abdita

DAY 0

Nominal Concentration (mg/L)	Date: 1/06/98		Time: 1430		Analyst: MO	
	# Alive	Observ.	Temp. (°C)	Sal (ppt)	DO (mg/L)	pH
Control	10	N	20.1	27	7.4	8.0
0.62	10	N	—	—	—	—
1.25	10	N	—	—	—	—
2.5	10	N	—	—	—	—
5	10	N	—	—	—	—
10	10	N	—	—	—	—

DAY 1

Nominal Concentration	Date: 1/07/98		Time: 1700		Analyst: MO	
	# Alive	Observ.	Temp. (°C)	Sal (ppt)	DO (mg/L)	pH
Control	10	N	20.9	27	7.3	8.0
0.62	10	N	—	—	—	—
1.25	10	N	—	—	—	—
2.5	10	N	—	—	—	—
5	6	4 Dead	—	—	—	—
10	0	10 Dead	—	—	7.0	8.0

DAY 2

Nominal Concentration	Date: 1/08/98		Time: 1100		Analyst: MO	
	# Alive	Observ.	Temp. (°C)	Sal (ppt)	DO (mg/L)	pH
Control	10	N	20.8	27	7.2	8.0
0.62	10	N	—	—	—	—
1.25	10	N	—	—	—	—
2.5	10	N	—	—	—	—
5	2	4 Dead	—	—	—	—
10	0	—	—	—	—	—

QST ENVIRONMENTAL INC.
TOXICOLOGY LABORATORY
GAINESVILLE, FLORIDA

PAGE:_____
QST QA FORM NO: 097 REFTOX
EFFECTIVE: AUGUST 1997

REFERENCE TOXICANT TEST DATA: DAY 3 AND 4

Client: MISC	Project Number:	Species: A. abdita

DAY 3

Nominal Concentration	Date: 1-9-98		Time: 0900		Analyst: MD	
	# Alive	Observ.	Temp. (°C)	Sal (ppt)	DO (mg/L)	pH
Control	10	N	21.8	27	7.2	8.6
0.62	10	N	—	—	—	—
1.25	10	N	—	—	—	—
2.5	8	2 DEAD	—	—	—	—
5	0	2 DEAD	21.7	27	7.1	7.9

DAY 4	Date: 1-10-98		Time: 1200		Analyst: MD	
Nominal Concentration	# Alive	Observ.	Temp. (°C)	Sal (ppt)	DO (mg/L)	pH
Control	10	N	20.9	26	7.1	7.9
0.62	9	1 Dead	—	—	—	—
1.25	9	1 Dead	—	—	—	—
2.5	6	2 Dead	—	—	—	—
5	—	—	—	—	—	—
—	—	—	—	—	—	—

SUMMARY

Nominal Concentration	Number Dead
Control	0
0.62	1
1.25	1
25	4
5	10
10	10

COMMENTS:

APPENDIX E

RESULTS OF SEDIMENT TOXICITY TESTING WITH *HYALELLA AZTECA*

EA Engineering, Science, and Technology

15 Loveton Circle
Sparks, MD 21152
Telephone: 410-771-4950
Fax: 410-771-4204

18 June 1998

Ms. Anita Pease
Harding Lawson Associates
2120 Washington Boulevard, Suite 300
Arlington, Virginia 22204

Dear Ms. Pease:

Enclosed please find one copy of EA Engineering, Science, and Technology's final report titled "Results of Toxicity Testing with *Hyalella azteca* on Sediment Samples from Harding Lawson Associates" (EA Report #2810). Should you have any questions or comments regarding this report, please do not hesitate to contact me at (410) 771-4950. On behalf of EA, I would like to thank you for the opportunity to perform this work for you.

Sincerely,

Lynda Hartzell

Lynda Hartzell
Associate Scientist
Environmental Toxicology

cc: Lissa Miller

F:\7000310\ABB\LETTERS\2810-FNL.WPD

RESULTS OF TOXICITY TESTING WITH *Hyalella azteca* ON SEDIMENT SAMPLES FROM HARDING LAWSON ASSOCIATES

Prepared for:

Harding Lawson Associates
1536 Kingsley Avenue, Suite 127
Orange Park, Florida 32073

Prepared by:

EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152

June 1998

EA Project 70003.10

Report Number 2810

RESULTS OF TOXICITY TESTING WITH *Hyalella azteca* ON SEDIMENT SAMPLES FROM HARDING LAWSON ASSOCIATES

Prepared for:

Harding Lawson Associates
1536 Kingsley Avenue, Suite 127
Orange Park, Florida 32073

Prepared by:

EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152

Wayne L. McCulloch — 17 June 1998
Project Manager — Date

Virginia A. Sohn — 16 June 1998
Scientist — Date

June 1998

Report Number 2810

1. INTRODUCTION

At the request of Harding Lawson Associates (formerly ABB Environmental Services, Inc.), EA Engineering, Science and Technology performed 10-day sediment toxicity tests using the freshwater amphipod *Hyalella azteca* as the test species. The tests were conducted on three site sediment samples, one of which was a reference location sediment, and a laboratory-prepared formulated sediment. The objective of the testing was to assess the toxicity of the sediment samples to the test organisms by determining the effects upon survival and growth of the organisms exposed to the two test sediments, as compared to the organisms exposed to the reference sediment and the formulated laboratory sediment. This testing was performed as part of a field investigation conducted by ABB Environmental Services to evaluate potential risks to benthic macroinvertebrates associated with contaminants in the PSC 44 drainage ditch sediment located at a screening site at Naval Air Station Jacksonville, Florida.

2. METHODS AND MATERIALS

2.1 SAMPLE DESCRIPTION

Sediment from an upgradient (reference) site and two sites in the PSC drainage ditch at Naval Air Station Jacksonville, Florida were collected on 17 April 1998 by ABB Environmental Services personnel. The sediments were collected in 1-gallon buckets and were shipped on wet ice via Federal Express courier to EA's Ecotoxicology Laboratory in Sparks, Maryland. An additional 40-oz of each sediment was collected in glass jars for cadmium analysis and was shipped with the 1-gallon buckets to EA. The sediment samples were identified as 44D00302 (reference site), 44D00202, and 44D00102. Upon receipt at EA, the sediments were logged in and assigned EA Ecotoxicology Laboratory accession numbers. Table 1 summarizes the sample collection and receipt data. The 40-oz jars of sediment were relinquished to EA's analytical chemistry laboratory for cadmium analysis. All samples were stored in the dark at 4°C when not is use. Prior to use in toxicity testing, each sediment sample was sieved to remove large particles and debris and was then homogenized.

An artificial laboratory sediment was prepared following the formulation by Suedel and Rodgers (1994) as presented in Table 2.

2.2 TEST ORGANISMS

Hyalella azteca (freshwater amphipods) were obtained from EA's Ecotoxicology culture facility in Sparks, Maryland. The amphipods were cultured at 20°C in 10-gallon glass aquaria with a substrate of hardwood leaves and overlying water of dechlorinated municipal tap water. Prior to introduction into the aquaria, the leaves were pre-soaked or boiled to remove tannins. The cultures were fed Tetramin-B flake food weekly in addition to the hardwood leaves. For use in testing, 7-14 day old organisms were collected from the cultures and gradually acclimated to the proper test temperature (23°C).

2.3 OVERLYING WATER

Dechlorinated municipal tap water was used as the overlying water for culturing and testing the *H. azteca*. The source of tap water was the City of Baltimore municipal water system. Upon entering the laboratory, the water was passed through a high-capacity, activated-carbon filtration system to remove any possible contaminants such as chlorine, detergents, and other possible trace organic contaminants. This water source has proven safe for aquatic organism toxicity testing at EA as evidenced by maintenance of multigeneration *Daphnia magna, D. pulex,* and fathead minnow cultures with no evident loss of fecundity.

2.4 TOXICITY TEST OPERATIONS AND PERFORMANCE

The sediment toxicity tests were conducted in accordance with US EPA guidance (US EPA 1994) and methodology followed EA's standard toxicity testing protocols (EA 1996) which are included as Attachment I of this report. The *H. azteca* sediment toxicity tests were initiated on 24 April 1998 and were completed on 4 May 1998. The tests were performed with eight replicates per sediment sample and formulated laboratory sediment. Each replicate consisted of 100 ml of sediment with 175 ml of overlying water in a lipless 300-ml glass beaker. The sediment and overlying water were placed into the beakers 24-hours prior to introduction of the test organisms. The beakers were left undisturbed overnight so as to allow any suspended sediment particles in the water column to settle.

Ten *H. azteca* (7-14 days old) were randomly introduced to each replicate test chamber. The introduction of the test organisms to the test chambers marked the initiation of the toxicity tests. The test chambers were placed in a water bath and maintained at 23 ± 1°C with a 16-hour light/8-hour dark photoperiod. The *H. azteca* were fed 1.5 ml/replicate of YCT (a suspension of yeast, ground cereal leaves, and trout chow) daily.

The overlying dechlorinated tap water in the exposure chambers was renewed twice daily (morning and late afternoon) using a water delivery system (Zumwalt et al. 1994). Fresh overlying water was slowly added to each replicate, allowing the water already in the beaker to flow out through a notch cut into the top of the beaker. The notch was sealed with fine mesh screen to prevent any organisms from being flushed out of the test chamber. Temperature and dissolved oxygen measurements were recorded daily on the overlying water in one replicate of each test sediment and formulated laboratory sediment. At test initiation and Day 9, conductivity and pH were measured in one replicate of each sediment, while alkalinity, hardness and ammonia were measured on composited aliquots taken from each of the replicates of each sediment. Water quality parameters were measured using methods described in US EPA (1979) and APHA et al. (1995). A summary of the water quality measurements recorded during testing is provided in Table 3.

At the end of the 10-day exposure period, the surviving organisms from each replicate were retrieved by screening through a 250 μm sieve. The number of surviving *H. azteca* from each replicate was recorded, and the organisms were placed in a dried, pre-weighed tin and placed in a drying oven at 100°C. After approximately 16 hours, the tins were removed from the oven, placed in a desiccator to cool, and each pan was weighed to the nearest 0.01 mg. The dry weight of the surviving organisms in each replicate was determined by subtracting the weight of the empty tin from the weight of the tin plus dried organisms. Copies of the original data sheets, which include all observations and water quality measurements, are provided in Attachment II. Table 4 contains the survival and dry weight results from the *H. azteca* toxicity testing.

2.5 DATA ANALYSIS

The survival and dry weight data were statistically analyzed to determine if either of the two test sediments were significantly (P=0.05) different from the reference sediment and formulated laboratory sediment. If the data from each individual comparison were normally

distributed, then an ANOVA followed by a t-Test were performed to detect statistically significant differences between one sediment and another at $\alpha=0.05$. If the data distribution from a comparison was non-normal, then a Steel's Many One Rank Test (for equal replicate numbers) or a Wilcoxon's Rank Sum Test with Bonferroni Adjustment (for unequal replicate numbers) was used to compare the group means. Attachment III contains copies of the statistical analyses.

2.6 REFERENCE TOXICANT TESTS

In conformance with EA's quality assurance/quality control program, reference toxicant tests were performed with the EA-cultured test species. The *H. azteca* were exposed to the reference toxicant copper sulfate ($CuSO_4$) in a graded concentration series to determine the 96-hour LC50 value. The results of the reference toxicant test were compared to control chart limits established by EA according to US EPA methodology (US EPA 1993). Reference toxicant test data is contained in Table 5.

2.7 ARCHIVES

Original data sheets, records, memoranda, notes, and computer printouts are archived at EA's Baltimore Office in Sparks, Maryland. These data will be retained for a period of 5 years unless a longer period of time is requested by Harding Lawson Associates.

3. RESULTS AND DISCUSSION

A summary of collection and receipt information for the field collected sediments is presented in Table 1, and the constituents of the formulated laboratory sediment are listed in Table 2.

Table 3 summarizes the water quality measurements recorded during the *H. azteca* toxicity tests. The temperatures of the overlying waters were within the proper testing range (23 ± 1°C) for the duration of the exposure period. In addition, alkalinity, hardness, pH, and conductivity values of the overlying waters did not differ by more than 50 percent during testing; however, there was an increase in ammonia levels of the overlying waters in all sediments except the reference sediment 44D00302 (AT8-302). On Day 1 of the exposure period (24 hours after introduction of the test organisms), the dissolved oxygen level in the 44D00202 test sediment (AT8-202) was at 34 percent saturation (3.4 mg/L) which was below the aeration trigger level of 40 percent saturation. The dissolved oxygen level in the other test sediments and formulated laboratory sediment ranged 4.4-4.6 mg/L (slightly above 40 percent saturation). In order to maintain dissolved oxygen levels above 40 percent saturation, all replicates of the three test sediments and the formulated laboratory sediment were placed under gently aeration for the remainder of the exposure period. Mean dissolved oxygen levels in the overlying waters ranged 7.2-7.6 mg/L during testing.

The results of the 10-day *H. azteca* sediment toxicity tests are summarized in Table 4. The *H. azteca* toxicity tests were initiated on 24 April within seven days of collection of the sediment samples. At the completion of the toxicity tests on 4 May, the reference sediment 44D00302 (AT8-203) had 96 percent survival with a mean dry weight of 0.112 mg/organism. Survival in the 44D00202 sediment (AT8-202) was 99 percent, while survival in the 44D00102 sediment (AT8-204) was 93 percent. Statistical analyses showed no significant ($P=0.05$) decrease in survival of the 44D00102 organisms when compared to the reference sediment 44D00302. Mean dry weights of the organisms exposed to the 44D00102 and 44D00202 sediments were higher than the reference sediment. The 44D00102 sediment had a mean dry weight of 0.124 mg/organism, while the 44D00202 sediment had a mean dry weight

of 0.120 mg/organism. No statistical comparisons were made to the formulated laboratory sediment, because all survival and growth values for the three field collected sediments were higher than the formulated laboratory sediment. The formulated laboratory sediment had an acceptable mean survival of 81 percent with a mean dry weight of 0.079 mg/organism. Replicate E of the laboratory sediment had 50 percent survival and was considered by EA's best professional judgement as an anomalous value when compared to the other seven replicates of the laboratory sediment; consequently, replicate E was excluded from the results.

The results of the reference toxicant testing conducted on the EA-cultured *H. azteca* are presented in Table 5. The 96-hour LC50 from the reference toxicant test using copper sulfate ($CuSO_4$) was 297 μg/L Cu which fell within the acceptable control chart limits of 214-317 μg/L Cu. These reference toxicant test results indicate that the *H. azteca* cultures were of acceptable quality.

The results of the cadmium analyses conducted on the three field collected sediments are summarized in Table 6. The complete data report for the cadmium analyses is presented in Attachment IV.

In summary, neither the 44D00102 nor the 44D00202 sediments were toxic to *H. azteca* with respect to survival or growth when compared to the reference sediment 44D00302. The Report Quality Assurance Record is presented in Attachment V.

4. REFERENCES

American Public Health Association (APHA), American Water Works Association, Water Environment Federation. 1995. Standard Methods for the Examination of Water and Wastewater. 19th edition. APHA, Washington, D.C.

EA. 1996. Quality Control and Standard Operating Procedures Manual for the EA Ecotoxicology Laboratory. Revision No.5. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

US EPA. 1979. Methods for Chemical Analysis of Water and Wastes. EPA/600/4-79/020. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

US EPA. 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fourth Edition. EPA/600/4-90/027F. U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio.

US EPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. EPA/600/R-94/024. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

Zumwalt, D.C., F.J. Dwyer, I.E. Greer, and C.G. Ingersoll. 1994. A water-renewal system that accurately delivers small volumes of water to exposure chamber. Environ. Toxicol. Chem. 13:1311-1314.

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT INFORMATION FOR SEDIMENT SAMPLES FROM HARDING LAWSON ASSOCIATES

Sample Identification	EA Accession Number	Sample Collection	Sample Receipt
44D00302 (reference)	AT8-203	1010, 17 APR 98	1102, 18 APR 98
44D00202	AT8-202	0910, 17 APR 98	1102, 18 APR 98
44D00102	AT8-204	1100, 17 APR 98	1102, 18 APR 98

TABLE 2 FORMULATED LABORATORY SEDIMENT CONSTITUENTS AND CORRESPONDING SOURCES[a]

Constituent	Source	Percent of Total Dry Weight
Ca-Montmorillonite ("Cheto" clay) #SAz-1	University of Missouri - Columbia, Source Clays Columbia, Missouri	1.0
ASP 400 (kaolinite clay)	Engelhard Corporation Edison, New Jersey	43.5
ASP 600 (clay)	Engelhard Corporation Edison, New Jersey	4.0
Mystic White #18, #45, and #90 (silica sands)	New England Silica, Inc. South Windsor, Connecticut	Coarse Sand: 9.7% Medium Sand: 19.5% Fine Sand: 19.5%
Peat Moss (organic matter)	Hoffman's Peat Moss	2.4
Dolomite (buffer) ("Dixie Brand Dolomite")	Southern Agri-Minerals Corporation Hartford, Alabama	0.4

(a) Suedel, B.C. and J.H. Rodgers, Jr. 1994. Development of formulated reference sediments for freshwater and estuarine sediment toxicity testing. Environ. Toxicol. Chem. 13:1165-1175.

TABLE 3 MEAN (±STANDARD DEVIATION) WATER QUALITY VALUES MEASURED DURING *Hyalella azteca* TOXICITY TESTING FOR HARDING LAWSON ASSOCIATES

Sample Identification	EA Accession Number	Temperature[a] (°C)	Dissolved Oxygen[a] (mg/L)	Conductivity[b] µS/cm	pH[b]	Alkalinity[c] (mg/L as $CaCO_3$)	Hardness[c] (mg/L as $CaCO_3$)	Ammonia[c] (mg/L N-NH_3)
44D00302	AT8-203	22.8 (±0.6)	7.2 (±0.9)	273 (±5)	7.7 (±0.1)	51 (±1)	88 (±6)	0.13 (±0.01)
44D00202	AT8-202	22.7 (±0.5)	7.4 (±1.3)	263 (±11)	7.7 (±0.1)	44 (±3)	86 (±8)	0.16 (±0.17)
44D00102	AT8-204	22.9 (±0.5)	7.3 (±1.0)	269 (±8)	7.7 (±0.1)	50 (±0)	86 (±3)	0.11 (±0.08)
Formulated Laboratory Sediment	--	22.6 (±0.4)	7.6 (±1.1)	299 (±33)	7.6 (±0.4)	49 (±1)	92 (±11)	0.50 (±0.57)

(a) Temperature and dissolved oxygen were measured in one replicate of each sediment once daily, between renewals of the overlying water.
(b) Conductivity and pH were measured in one replicate of each sediment at test initiation and Day 9.
(c) Alkalinity, hardness, and ammonia were measured at test initiation and Day 9 on each sediment by compositing an aliquot of the overlying water from each replicate of the sediment.

TABLE 4 SUMMARY OF RESULTS OF 10-DAY *Hyalella azteca* SEDIMENT TOXICITY TESTS FOR HARDING LAWSON ASSOCIATES

Test Organism: *Hyalella azteca*

QC Test Number: TN-98-130

Test Initiation: 24 April 1998

Test Termination: 4 May 1998

Sample Identification	EA Accession Number	10-Day Percent Survival	10-Day Mean Dry Weight[a] as mg/organism (±S.D.)
44D00302 (reference)	AT8-203	96	0.112 (±0.022)
44D00202	AT8-202	99	0.120 (±0.021)
44D00102	AT8-204	93	0.124 (±0.029)
Formulated Laboratory Sediment	--	81	0.079 (±0.014)

(a) Mean dry weight of organisms at test initiation was 0.023 mg/organism.

TABLE 5 REFERENCE TOXICANT TEST DATA FOR *Hyalella azteca*

QC Test Number	Reference Toxicant	96-Hour LC50	Acceptable Control Chart Limits
RT-98-081	Copper sulfate ($CuSO_4$)	297 μg/L Cu	214-317 μg/L Cu

TABLE 6 RESULTS OF CADMIUM ANALYSES ON SEDIMENT SAMPLES FROM HARDING LAWSON ASSOCIATES

Sample Identification	Cadmium (mg/kg)
44D00302	0.31
44D00202	1.60
44D00102	0.22

ATTACHMENT I

Protocols

SEDIMENT TOXICITY TEST (DAILY RENEWAL) WITH *Hyalella azteca*

1. TEST OBJECTIVE

To assess the toxicity of a whole sediment sample to *Hyalella azteca* and determine the effects on survival (growth optional) of the test organisms compared to controls.

2. TEST ARTICLE

2.1 Description/Identification

Unless otherwise specified, the test material is supplied by the client. Adequate chemical specifications with special reference to hazardous properties and storage conditions are also supplied by the client.

2.2 Methods of Synthesis

Test article is a whole sediment sample. Information on the methods of synthesis, stability, and composition or other characteristics which define the test article are on the file with the client.

2.3 Sample Preparation

Depending upon the project, the sediment may be screened through a suitably sized sieve to remove large particles and indigenous organisms, and homogenized before being placed in the test chambers. Sediment and overlying water should be added to test vessels 24 hours prior to introduction of test organisms in order to allow suspended sediments to settle.

3. EXPERIMENTAL DESIGN

3.1 Test Organisms

3.1.1 Species

The test species is the amphipod, *Hyalella azteca*.

3.1.2 Source

H. azteca used for toxicity tests are obtained from EA cultures or from a scientific organism vendor as specified in the report.

3.1.3 Culturing and Holding Conditions

Stocks obtained from a scientific vendor are transferred into recirculating holding tanks containing hardwood leaves which have been presoaked or boiled to remove tannins. The organisms are gradually acclimated to testing conditions and to the overlying water used in testing. During the holding period, the *H. azteca* are fed Tetramin-B flake food weekly in addition to the hardwood leaves. Dead organisms or these displaying abnormal behavior, discoloration, or pronounced lethargy are removed as observed, and recorded on appropriate log sheets as part of the quality control program. Certain regulatory or project specific objectives may require organism acclimation to the dilution water when it is different from the holding/culture water.

3.1.4 Age of Test Organisms at Test Initiation

Juvenile organisms, 7-14 days old at test initiaion, are used for the toxicity testing. Length or weight should be measured on a subset of at least 20 organisms from the population used to start the test.

3.2 Test Concentration Series

H. azteca are exposed in replicate chambers to whole sediment samples and to a laboratory or reference sediment control.

3.3 Overlying Water

The overlying water is typically dechlorinated tap water. The source of dechlorinated tap water is the City of Baltimore municipal water system. Upon entry to the laboratory, the water passes through a high-capacity, activated-carbon filtration system to remove chlorine and other possible organic contaminants. This water source has proven safe for aquatic organism toxicity testing at EA, as evidenced by maintenance of the multigeneration *Daphnia* and *Pimephales promelas* cultures, with no evident loss of fecundity. Reconstituted fresh water or other dilution water (e.g. site water) may be used depending on study requirements.

3.4 Test Vessels and Test Volume

Test vessels are typically 300-ml high-form lipless beakers, each containing 100 ml volume of sediment and 175 ml volume of overlying water. The size of the test vessels, and the volume of sediment and overlying water may be changed depending upon the study requirements.

3.5 Test Organism Number

The number of replicate chambers per treatment depends on the test objective. Eight replicates are recommended for routine testing. Each replicate test chamber has 10 organisms. To introduce the test organisms into the test chambers, ten *H. azteca* are randomly assigned to 30-ml portion cups. One cup of 10 organisms is then randomly added to each replicate. Prior to organism transfer, the volume of each transfer portion cup is reduced.

3.6 Test Environment

The test vessels are maintained in an environmentally controlled laboratory with a 16-hour light, 8-hour dark photoperiod. Temperature within the environmental room is monitored continuously using temperature recorders and is maintained at 23 ± 1°C (unless a different project-specific temperature is required). The instantaneous temperature must always be within ± 3°C of the desired temperature, and the daily mean temperature must be within ± 1°C of the desired temperature.

3.7 Test Observations

The overlying water is renewed daily, either continuously or intermittently, at a rate of at least 2 volume additions/day.

Test organisms are fed a suspension of yeast/cereal leaves/trout chow (YCT) during the exposure period. However, the amount of food added to the test chambers is kept to a minimum to avoid fungal or bacterial growth on the sediment surface. A typical feeding rate is 1.5 ml YCT daily per replicate. If the dissolved oxygen concentration drops below 40 percent of saturation in the overlying water of a replicate, then feeding should be suspended in all replicates until the dissolved oxygen concentration increases to ≥40 percent.

Samples of overlying water from the test sediment and control or reference sediment are analyzed for conductivity, alkalinity, hardness, pH, and ammonia at test initiation and termination. Water samples from the replicates of a treatment may be pooled for analysis. Measurements of water quality are taken daily thereafter for dissolved oxygen and temperature

from a minimum of one replicate of each sediment, reference, and control treatment. During testing, the alkalinity, hardness, conductivity, pH, and ammonia of the overlying water within a treatment should not vary by more than 50 percent. Aliquots of overlying water may be gently aerated, if necessary, to maintain dissolved oxygen levels at or above 40 percent of saturation. Analytical determinations are conducted according to APHA et al. (1995) and US EPA (1979).

The study terminates after 10 days of exposure to the sediment sample. At test termination, test organisms are observed to record the number of surviving *H. azteca* in each replicate. If growth is used as an endpoint, surviving *H. azteca* at the end of the test period may be placed into pre-weighed, oven-dried aluminum pans (one replicate per pan). Organisms are oven dried for a minimum of six hours at 100°C after which each pan is weighed. Mean dry weight of the *H. azteca* (weight of pan and organisms minus weight of pan/number of organisms) is calculated.

3.8 Data Analysis

Statistical analyses are performed on percent survival and mean dry weight data. Analysis of variance (ANOVA) and either Bonferroni's T-Test or Dunnett's Mean Comparison Test can be used to analyze significance of effects. Depending on the distributional characteristics of the data generated, it may be necessary to use Steel's Many-One Rank Test or the Wilcoxon Rank Sum Test instead (US EPA 1994). For single treatment comparisons, a t-Test can be performed. The statistical methods used are specified in the final report.

4. FINAL REPORT

The final report is prepared to contain, at a minimum, the following information:

- Objectives and procedures stated in the approved protocol, including any changes made to the original protocol
- Identity of the test article(s) by name or code number and their strength (i.e., quality/purity), and a description of any pretreatment
- Source of the overlying water, its chemical characteristics, and a description of any pretreatment
- Test concentration series used and duration of the assay

- Mean dry weights of test organisms with the respective standard deviations
- Water quality characteristics (pH, dissolved oxygen, temperature, etc.) of overlying water from reference, control, and test sediment treatments
- Any unforeseen circumstances that may have affected the quality or integrity of the study
- Signature of the project manager, senior technical reviewer, and quality control officer authorizing release of the report
- Location of all archived data and the original copy of the final report at EA

Items of data to be included in the report consist of experimental design and test performance, effects on general appearance of test organisms (if applicable), morbidity and mortality, presentation of water quality characteristics, and survival and weight data.

5. QUALITY ASSURANCE

5.1 Amendments to Protocol

Amendments to the authorized protocol established by EA or by the client are made only after proper authorization. Such authorization is achieved by completion of the Protocol Amendment Form by EA after consultation with the client.

5.2 Standard Operating Procedures

Unless otherwise specified, all procedures given in the protocol are subject to detailed Standard Operating Procedures (SOPs) which are contained in the SOP manuals of the participating departments. These SOPs and protocols generally follow the type of requirements in the U.S. EPA's Good Laboratory Practice Standards (GLPs) (US EPA 1989).

5.3 Reference Toxicant

A reference toxicant test, utilizing potassium chloride (KCl), copper sulfate, or another appropriate chemical, is used as an internal quality check of the sensitivity of the test organisms. Testing is conducted at least once monthly on organisms which are cultured in-house, and on each population of organisms purchased for testing from an outside source if reference toxicant data are not available from the supplier on the acquired lot. The results of

each test are compared with historical, species-specific toxicological information from reference toxicant tests performed at EA, to determine if the results are within acceptable limits. Limits are established using the control charts outlined in US EPA (1993).

5.4 Quality Assurance Evaluation

Studies conducted under this protocol may be subject to internal audit by EA's Quality Assurance Unit. A quality control officer is responsible for monitoring each study to assure the client that the facilities, equipment, personnel, methods, practices, records, and controls are in conformance with EA's QC program and, if applicable, EPA's GLPs.

5.5 Inspection by Regulatory Authorities

In the event of an inspection of EA by an outside authority during the course of the study, the client whose study is being inspected will be consulted before examiners are permitted access to any of the project records or the experimental areas.

5.6 Archives

Copies of project-specific records shall be transferred to the client promptly after the project is completed or as negotiated and budgeted. Original primary data are retained at EA for 5 years. Primary data include chain-of-custody records, laboratory data sheets, records, memoranda, notes, photographs, microfilm, and computer printouts that are a result of the original observations and activities of the study and which are necessary for the reconstruction and evaluation of the study report.

5.7 Location

Studies are conducted at the Ecotoxicology Laboratory of EA Engineering, Science, and Technology, Inc. at the Loveton Office in Sparks, Maryland.

6. SPECIFICATIONS OF THE *Hyalella azteca* SEDIMENT TOXICITY TEST

6.1 Basic References

American Public Health Association (APHA) American Water Works Association, Water Envrionment Federation. 1995. Standard Methods for Examination of Water and Wastewater, 19th or most recent version. APHA, Washington, D.C.

American Society for Testing and Materials (ASTM). 1991. Standard Practice for Conducting Acute Tests with Fishes, Macroinvertebrates, and Amphibians. ASTM Designation: E729-80, Philadelphia, Pennsylvania.

American Socity for Testing and Materials (ASTM). 1991. Standard Guide for Conducting Sediment Toxicity Tests with Freshwater Invertebrates. ASTM Designation: E1383-90, Philadelphia, Pennsylvania

American Society for Testing and Materials (ASTM). 1995. Standard Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates. ASTM Designation: E1706-95, Philadelphia, Pennsylvania.

EA. 1996. Quality Control and Standard Operating Procedures Manual for EA's Ecotoxicology Laboratory. Fifth Revision. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

US EPA. 1979. Methods for Chemical Analysis of Water and Wastes. EPA/600/4-79/020. U.S. Environmental Protection Agency, Washington, D.C.

US EPA. 1989. Toxic Substances Control Act (TSCA); Good Laboratory Practice Standards. Title 40 CFR Part 792. Fed. Regist. 54(158): 34034-34074.

US EPA. 1989. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Second Edition. EPA/600/4-89/001. U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio.

US EPA. 1991. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fourth Edition. EPA/600/4-90/027. U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio.

US EPA. 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fourth Edition. EPA/600/4-90/027F. U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio.

US EPA. 1994. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Third Edition. EPA/600/4-91/002. U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Cincinnati, Ohio.

US EPA. 1994. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates. EPA/600/R-94/024. U.S. Environmental Protection Agency, Office of Research and Development, Duluth, Minnesota.

6.2 Test Specifications

Test organism:	*Hyalella azteca*
Organism age:	Juvenile (7-14 days old at start of test)
Aeration:	None, unless dissolved oxygen falls below 40 % saturation; gentle aeration should be provided through a 1-ml glass pipet, placed no closer than 2 cm above the sediment surface.
Temperature:	23±1°C
Light quality:	Wide-spectrum fluorescent light
Light intensity:	50-100 f.c.
Photoperiod:	16-hour light, 8-hour dark
Overlying water:	Dechlorinated municipal tap water, reconstituted fresh water, or appropriate receiving water
Test container:	300-ml beaker
Test volume:	100 ml sediment with 175 ml overlying water
No. of replicates:	8
No. organisms per replicate:	10

Feeding regime:	1.5 ml YCT daily per replicate
Test duration:	10 days
Endpoints:	Survival (growth optional)
Test acceptability:	80 percent or greater survival in the control sediment

ATTACHMENT II

Data Sheets

Chain-of-Custody Record

EA Engineering, Science, and Technology

Ecotoxicology Laboratory
Loveton Circle
Sparks (Baltimore), Maryland 21152
Telephone: (410) 771-4950
Fax: (410) 771-4204

FOR OFFICE USE ONLY
Species to be tested:

____	D. magna	____	Menidia sp.
____	D. pulex	____	P. pugio
____	C. dubia	____	C. variegatus
____	P. promelas	____	M. bahia
X	Other H. azteca	____	Other

A = Acute C = Chronic B = Bioaccumulation

Client: ABB-ES Project No.: NAS Jacksonville PSC 44

NPDES Number: NA Client Purchase Order Number: SE849059G

State/City/County Collected: Jacksonville, FL

LAH 14-day 10

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection Start Date/Time	Collection End Date/Time	Sample Description (including Site, Station Number, and Outfall Number)	Number/Volume of Container
ATS-202		X	4-17-98/0840	- 0910	44D00202 - toxicity testing	1/1gallon plastic
		X	"	"	44D00202 - cadmium analysis	1/40oz glass
ATS-203		X	" /0930	- 1010	44D00302 - toxicity testing	1/1gallon plastic
		X	"	"	44D00302 - cadmium analysis	1/40 oz glass
ATS-204		X	" /1030	1100	44D00102 - toxicity testing	1/1gallon plastic
		X	"	"	44D00102 - cadmium analysis	1/40 oz glass

Sampled By:	Date/Time	Received By:	Date/Time
Anita Reese	4/17/98 1400		
Sampler's Printed Name:	Title:	Relinquished By:	Date/Time
Relinquished By:	Date/Time	Received By Laboratory:	Date/Time 4/18/98 1102

Was Sample Chilled During Collection? (Yes) No

Sample Shipped By: (circle)

(Fed. Ex.) Puro. UPS Airborne

Other: _____

Comments:

40 oz glass jars contain sediment to be tested for cadmium.

ON ice when recieved!

PO 4/18/98 1102

White—Report Production Yellow—Laboratory Pink—Client/Sampler

EA0534 F&B 8/6/96 TOXCOC.cdr

SEDIMENT TOXICITY TEST DATA SHEET

Project No.: 70023.10
Client: ABB
QC Test No.: TN98-130
Test Article: Sediments
Sample No.: ATS-202, 203, 204

Overlying Water: Dechlor.
Sample No.: N/A
Test Organism: H. azteca
Lot No.:

Beginning Date: 4/24/98 Time: 1407
Ending Date: 5/4/98 Time: 1500
Acclimation: N/A Age: 7-14 days
Source: EA

Treatment	Replicate No.	No. Organisms Alive										
		0 Date 4/24	1 Date 4/25	2 Date 4/26	3 Date 4/27	4 Date 4/28	5 Date 4/29	6 Date 4/30	7 Date 5/1	8 Date 5/2	9 Date 5/3	10 Date 5/4
Lab	A	10										8
Control	B	10										8
	C	10										7
	D	10										7
	E	10										5 (a)
	F	10										10
	G	10										9
	H	10										8
ATS-202	A	10										10
	B	10										10
	C	10										9
	D	10										10
	E	10										10
	F	10										10
	G	10										10
	H	10										10
Initials/Time		PO/1407										

(a) Rep E excluded from analysis as an outlier

ATS-SD1
3/10/93

SEDIMENT TOXICITY TEST DATA SHEET

Project No.: 7000310
Client: ABB
QC Test No.: TN98-130
Test Article: Sediments
Sample No.: ATS-202, 203, 204

Overlying Water: Dechlor
Sample No.: N/A

Test Organism: H. azteca
Lot No.:

Beginning Date: 4/24/98 Time: 1407
Ending Date: 5/4/98 Time: 1500

Acclimation: N/A Age: 7-14 days
Source: LA

Treatment	Replicate No.	No. Organisms Alive										
		0 Date 4/24	1 Date 4/25	2 Date 4/26	3 Date 4/27	4 Date 4/28	5 Date 4/29	6 Date 4/30	7 Date 5/1	8 Date 5/2	9 Date 5/3	10 Date 5/4
ATS-203	A	10										10
	B	10										10
	C	10										10
	D	10										10
	E	10										9
	F	10										9
	G	10										10
	H	10										9
ATS-204	A	10										9
	B	10									Lost Rep BSH	—
	C	10										9
	D	10										10
	E	10										10
	F	10										10
	G	10										7
	H	10										10
Initials/Time		KDT/KO										

ATS-SD1
3/10/93

EA

WEIGHT DATA (Test Species: H. azteca)

Project No.: 70003.10 Client: ABB QC Test Number: TN-98-130

Sample Number: N/A Balance Calibration: 0-50g Oven Temp. (°C): 100.4°C

Tin Lot Number: #6 Red Tins Placed in Oven (date/time/initials): 1512, 4/24/98, RO

Tins Removed from Oven (date/time/initials): 4/25/98, 1630, RO Tins Weighed (date/time/initials): RSH 5/5/98 0930

Test Concentration	Rep. No.	Pan No.	A Weight of Oven-Dried Pans (mg)	B Weight of Pan and Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Average Dry Organism Weight (mg)	Observations
Initial	A	4	29.58	29.79	0.21	10	0.021	
Weights	B	3	34.26	34.51	0.25	10	0.025	
							$\bar{x}$=0.023	

General Remarks: calculations checked 5/7/98 LAH.

ATS CH11

WEIGHT DATA (Test Species: H. azteca)

Project No.: 7000310 Client: ABB QC Test Number: TW-130

Sample Number: Lab Control Balance Calibration: 0/50 g Oven Temp. (°C): 100°C

Tin Lot Number: Green #10 Tins Placed in Oven (date/time/initials): 5/4/98 1700 MSH

Tins Removed from Oven (date/time/initials): 5/5/98 MSH 0900 Tins Weighed (date/time/initials): SSD 5/5/98 0930

Test Concentration	Rep. No.	Pan No.	A Weight of Oven-Dried Pans (mg)	B Weight of Pan and Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Average Dry Organism Weight (mg)	Observations
Lab Control	A	25	28.88	29.36	0.48	8	0.060	
	B	37	30.30	30.87	0.57	8	0.071	
	C	3	28.89	29.61	0.72	7	0.103	
	D	24	29.13	29.63	0.50	7	0.071	
	E	~~34~~ 15	28.46	SSD 28.~~88~~ 87	0.41	5 ~~9~~ 7 MSH	0.082	
	F	34	27.16	27.86	0.70	9	0.078	(1) lost all to alive
	G	21	29.46	30.26	0.80	9	0.089	
	H	3	29.39	30.03	0.64	8	0.080	

General Remarks: calculations checked 5/7/98 LAH.

ATS CH11

WEIGHT DATA (Test Species: H. azteca)

Project No.: 70003.10 Client: ABB QC Test Number: TN-130

Sample Number: ATS-202 Balance Calibration: 0/50 g Oven Temp. (°C): 100°C

Tin Lot Number: Green #10 Tins Placed in Oven (date/time/initials): 5/4/98 1700 RSH

Tins Removed from Oven (date/time/initials): 5/5/98 RSH 0100 Tins Weighed (date/time/initials): SSD 5/5/98 0930

Test Concentration	Rep. No.	Pan No.	A Weight of Oven-Dried Pans (mg)	B Weight of Pan and Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Average Dry Organism Weight (mg)	Observations
ATS-202	A	4	29.96	SSD ~~3~~ 31.50	1.54	10	0.154	
	B	36	28.93	29.81	0.88	10	0.088	
	C	TSH ~~17~~ 15	27.91	SSD 28.~~42~~ 91	1.00	TSD ~~10~~ 9	0.111	
	D	17	28.88	29.99	1.11	10	0.111	
	E	27	27.82	28.95	1.13	10	0.113	
	F	40	29.50	30.72	1.22	10	0.122	
	G	28	28.64	29.78	1.14	10	0.114	
	H	42	28.27	29.75	1.48	~~9~~ 10 JL	0.148	

General Remarks: calculations checked 5/7/98 LAH.

ATS CI111

WEIGHT DATA (Test Species: H. azteca)

Project No.: 70003.10 Client: ABB QC Test Number: TIN-130

Sample Number: ATS-203 Balance Calibration: 0/50g Oven Temp. (°C): 100°C

Tin Lot Number: Green #10 Tins Placed in Oven (date/time/initials): 5/4/98 1700 MSH

Tins Removed from Oven (date/time/initials): 5/5/98 MSH 0900 Tins Weighed (date/time/initials): SSD 5/5/98 0930

Test Concentration	Rep. No.	Pan No.	A Weight of Oven-Dried Pans (mg)	B Weight of Pan and Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Average Dry Organism Weight (mg)	Observations
ATS-203	A	18	TN + 29.65	SSD 30.~~77~~91	1.26	10	0.126	
	B	23	28.30	29.43	1.13	10	0.113	
	C	8	29.81	31.36	1.55	10	0.155	
	D	1	29.92	30.97	1.05	10	0.105	
	E	26	28.39	29.16	0.77	9	0.086	
	F	22	29.33	30.45	1.12	9	0.124	
	G	20	28.12	29.05	0.93	10	0.093	
	H	2	29.56	30.42	0.86	9	0.096	

General Remarks: calculations checked 5/7/98 LMT.

EAS

WEIGHT DATA (Test Species: H. azteca)

Project No.: 70003.10 Client: ABB QC Test Number: TIV-130

Sample Number: 1978-204 Balance Calibration: 0/50 g Oven Temp. (°C): 100°C

Tin Lot Number: Green #10 Tins Placed in Oven (date/time/initials): 5/4/98 1700 RSH

Tins Removed from Oven (date/time/initials): 5/5/98 RSH 0900 Tins Weighed (date/time/initials): SSD 5/5/98 0930

Test Concentration	Rep. No.	Pan No.	A Weight of Oven-Dried Pans (mg)	B Weight of Pan and Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Average Dry Organism Weight (mg)	Observations
A18 204	A	30	27.81	29.43	1.62	9	0.180	
	B	—				—		Rep lost at test termination RH
	C	9	27.99	28.95	0.96	9	0.107	
	D	14	28.40	29.76	1.36	10	0.136	
	E	7	28.26	29.24	LAH ~~1.28~~ 0.98	10	LAH ~~0.128~~	0.098
	F	6	30.57	31.57	1.00	10	0.100	
	G	41	28.58	29.52	0.94	7	0.134	
	H	32	29.06	30.17	1.11	10	0.111	

General Remarks: Calculations checked 5/7/98 LAH.

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: TN98-130

Date/Time | Activity | Investigator

Test Treatment: Lab Control

Water Quality Monitoring (1X/Day):

composite of all reps

Test Day	Replicate Sampled	Initials /TIME Meter #s	Temp (°C)	D.O. (mg/L)	pH	Cond (µS/cm)	Hardness (mg/L)	Alkalinity (mg/L)	Ammonia (mg/L)
0	A	73/100 74/917 56 RO 1122	22.8	7.2	7.3	322	100	48	0.09
1	B	99/100 56 RO 1410	23.3	4.5	—	—	—	—	—
2	C	74/18 56 1345 RSH	22.4	7.8	—	—	—	—	—
3	D	74/100 55 1730 RSH	22.0	7.9	—	—	—	—	—
4	E	99/100 55 1449 RO	22.1	8.0	—	—	—	—	—
5	F	92/100 56 1614 RO	22.2	7.9	—	—	—	—	—
6	G	99/100 56 1718 RSH	22.8	8.7	—	—	—	—	—
7	H	99/100 56 1530 RSH	23.1	7.6	—	—	—	—	—
8	A	74/100 56 1345 KAH	22.4	7.6	—	—	—	—	—
9	B	99/100 74/918 55 1600 TSH	22.5	8.2	7.8	276	84	50	0.90
10	C	90/100 55 1343 [illegible]	23.1	8.0	—	—	—	—	—

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: TN-98-130

Date/Time | Activity | Investigator

Test Treatment: AT8-202

Water Quality Monitoring (1X/Day):

COMPOSITE of all reps.

Test Day	Replicate Sampled	Initials /TIME Meter #s	Temp (°C)	D.O. (mg/L)	pH	Cond (µS/cm)	Hardness (mg/L)	Alkalinity (mg/L)	Ammonia (mg/L)
0	A	73/100 741917 56 RO 1125	22.9	7.6	7.6	270	92	46	0.04
1	B	99/100 56 1410 RO	23.4	3.4	—	—	—	—	—
2	C	74/18 56 1545 RSH	22.3	7.8	—	—	—	—	—
3	D	74/100 55 1730 RSH	22.1	8.0	—	—	—	—	—
4	E	99/100 55 1419 RO	22.0	8.1	—	—	—	—	—
5	F	92/100 56 1614 RO	22.5	7.8	—	—	—	—	—
6	G	99/100 56 1718 RSH	22.8	7.9	—	—	—	—	—
7	H	99/100 56 1530 KRSH	23.1	7.3	—	—	—	—	—
8	A	74/100 56 1345 KAH	22.4	8.0	—	—	—	—	—
9	B	99/100 741918 55 1607 SH	22.7	7.8	7.8	255	80	42	0.28
10	C	99/100 55 1343 RO	23.2	7.8	—	—	—	—	—

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: TN-98-130

Date/Time Activity Investigator

Test Treatment: AT8-203

Water Quality Monitoring (1X/Day):

COMPOSITE OF ALL REPS

Test Day	Replicate Sampled	Initials /TIME Meter #s	Temp (°C)	D.O. (mg/L)	pH	Cond (µS/cm)	Hardness (mg/L)	Alkalinity (mg/L)	Ammonia (mg/L)
0	A	TB/100 741917 56 1129 RO	22.7	7.1	7.6	276	92	50	0.13
1	B	99/100 56 1410 RO	23.8	4.6	—	—	—	—	—
2	C	74118 56 1545 RSH	22.2	7.5	—	—	—	—	—
3	D	74/100 55 1730 RSH	22.3	7.9	—	—	—	—	—
4	E	99/100 55 1419 RO	22.3	7.5	—	—	—	—	—
5	F	92/100 56 1614 RO	22.2	7.6	—	—	—	—	—
6	G	99/100 56 1718 RSH	22.8	7.3	—	—	—	—	—
7	H	99/100 56 1530 RSH	23.3	7.2	—	—	—	—	—
8	A	74/100 56 1345 WAH	22.7	7.7	—	—	—	—	—
9	B	99/100 741915 55 1600 TBH	23.3	7.2	7.7	269	84	52	0.12
10	C	99/100 55 1343 GL	23.4	7.6	—	—	—	—	—

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: TN48-B0

Date/Time | Activity | Investigator

Test Treatment: AT8-204

COMPOSITE OF ALL REPS.

Water Quality Monitoring (1X/Day):

Test Day	Replicate Sampled	Initials / Meter #s	Time	Temp (°C)	D.O. (mg/L)	pH	Cond (µS/cm)	Hardness (mg/L)	Alkalinity (mg/L)	Ammonia (mg/L)
0	A	73/100 74/917 56	1131 RO	22.7	7.2	7.6	274	88	50	0.05
1	B	99/100 56	1410 RO	23.7	4.4	—	—	—	—	—
2	C	74/18 56	1545 RSH	22.4	7.8	—	—	—	—	—
3	D	74/100 55	1730 RSH	22.3	7.8	—	—	—	—	—
4	E	99/100 55	1419 RO	22.3	7.7	—	—	—	—	—
5	F	92/100 56	1614 RO	22.5	7.6	—	—	—	—	—
6	G	99/100 56	1718 RSH	22.9	7.8	—	—	—	—	—
7	H	99/100 56	1530 RSH	23.3	7.1	—	—	—	—	—
8	A	74/100 56	1345 KAH	22.7	7.3	—	—	—	—	—
9	B	99/100 74/918 55	1605 TSH	23.4	7.8	7.7	263	84	50	0.16
10	C	99/100 55	1343 GL	23.4	7.9	—	—	—	—	—

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: IN-98-130

Date/Time	Activity	Investigator

Renewal Record (2X/Day):

Day 0 4/24/98 AM - 1100 Initials - RO
PM - 1640 Initials - RO

Day	Date	Time		Initials
1	4/25/98	AM	0910	RO
		PM	1615	RO
2	4/26/98	AM	0930	RSH
		PM	1600	RSH
3	4/27/98	AM	0945	RSH
		PM	1740	RSH
4	4/28/98	AM	0906	RO
		PM	1630	RSH
5	4/29/98	AM	0910	RO
		PM	1629	RO
6	4/30/98	AM	0907	RO
		PM	1725	RSH
7	5/1/98	AM	0945	RO
		PM	1545	KAH
8	5/2/98	AM	1030	RO/KAH
		PM	1555	KAH
9	5/3/98	AM	1000	[illegible]
		PM	1630	[illegible]
10	N/A	AM	—	—
		PM	—	—

24 Chambers 175 mls/each 4.2 L/Renewal

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: TN-98-130

Date/Time Activity Investigator

Feeding Record (1X/Day, between renewals): 1½ mls YCT / FED.

INITIAL FEED. Day 0 4/24/98 1445 RO

Day	Date	Time	Initials
1	4/25/98	0925	RO
2	4/26/98	1000	RSH
3	4/27/98	1005	RSH
4	4/28/98	0919	RO
5	4/29/98	0917	RO
6	4/30/98	0912	RO
7	5/1/98	0945	RO
8	5/2/98	1042	RO
9	5/3/98	1020	RO
10	N/A	—	—

Comments:

AQUATIC TOXICOLOGY BENCH SHEET

Project No.: 70003310
Client: ABB
QC Test No.: TN-98-130

Date/Time		Activity	Investigator
4/23/98	1500	Sediment Added to Chambers	RSH
↓	1600	Overlying Water Added to Chambers	RSH
4/24/98	1407	Organisms Transferred	RO

Sample Nos.: AT8-202, 203, 204
Overlying Water: DECHLOR

Test Concentration	Volume Test Sediment (ml)	Volume Overlying Water (ml)
Control (formulated sediment)	100 ml	175 ml
AT8-202	100 ml	175 ml
AT8-203	100 ml	175 ml
AT8-204	100 ml	175 ml

EA

AQUATIC TOXICOLOGY BENCH SHEET

Project No: 70003.10
Client: ABB
QC Test No.: JN-98-130

Date/Time	Activity	Investigator
4/25/98 1615	Entire test aerated due to low D.O. levels. (D.O. ATS-202 Rep B = 34%.)	RO
4/25/98 - ~~4/26/98~~ 5/3/98	Zumwalt diluter used for renewals 4.2 L dechlor dumped in to diluter for each renewal (175 mls of dechlor water to be replaced. 24 seringes on Zumwalt diluter) $\boxed{175 \times 24 = 4200 \text{ mls}}$	RSN

ATS-MS2
3/10/93

ATTACHMENT III

Statistical Analyses

TITLE: TN-98-130 ABB H.AZTECA SURVIVAL
FILE: f:\ls\130hasur.abb
TRANSFORM: NO TRANSFORM NUMBER OF GROUPS: 4

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	AT8-203 (REF)	1	1.0000	1.0000
1	AT8-203 (REF)	2	1.0000	1.0000
1	AT8-203 (REF)	3	1.0000	1.0000
1	AT8-203 (REF)	4	1.0000	1.0000
1	AT8-203 (REF)	5	0.9000	0.9000
1	AT8-203 (REF)	6	0.9000	0.9000
1	AT8-203 (REF)	7	1.0000	1.0000
1	AT8-203 (REF)	8	0.9000	0.9000
2	AT8-202	1	1.0000	1.0000
2	AT8-202	2	1.0000	1.0000
2	AT8-202	3	0.9000	0.9000
2	AT8-202	4	1.0000	1.0000
2	AT8-202	5	1.0000	1.0000
2	AT8-202	6	1.0000	1.0000
2	AT8-202	7	1.0000	1.0000
2	AT8-202	8	1.0000	1.0000
3	AT8-204	1	0.9000	0.9000
3	AT8-204	2	0.9000	0.9000
3	AT8-204	3	1.0000	1.0000
3	AT8-204	4	1.0000	1.0000
3	AT8-204	5	1.0000	1.0000
3	AT8-204	6	0.7000	0.7000
3	AT8-204	7	1.0000	1.0000
4	LAB CONTROL	1	0.8000	0.8000
4	LAB CONTROL	2	0.8000	0.8000
4	LAB CONTROL	3	0.7000	0.7000
4	LAB CONTROL	4	0.7000	0.7000
4	LAB CONTROL	5	1.0000	1.0000
4	LAB CONTROL	6	0.9000	0.9000
4	LAB CONTROL	7	0.8000	0.8000

TN-98-130 ABB H.AZTECA SURVIVAL
File: f:\ls\130hasur.abb Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	AT8-203 (REF)	8	0.900	1.000	0.963
2	AT8-202	8	0.900	1.000	0.988
3	AT8-204	7	0.700	1.000	0.929
4	LAB CONTROL	7	0.700	1.000	0.814

TN-98-130 ABB H.AZTECA SURVIVAL
File: f:\ls\130hasur.abb Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	AT8-203 (REF)	0.003	0.052	0.018	5.38
2	AT8-202	0.001	0.035	0.013	3.58
3	AT8-204	0.012	0.111	0.042	11.98
4	LAB CONTROL	0.011	0.107	0.040	13.13

TITLE: TN-98-130 ABB H.AZTECA SURVIVAL
FILE: F:\LS\130HASUA.ABB
TRANSFORM: NO TRANSFORM NUMBER OF GROUPS: 2

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	AT8-203 (REF)	1	1.0000	1.0000
1	AT8-203 (REF)	2	1.0000	1.0000
1	AT8-203 (REF)	3	1.0000	1.0000
1	AT8-203 (REF)	4	1.0000	1.0000
1	AT8-203 (REF)	5	0.9000	0.9000
1	AT8-203 (REF)	6	0.9000	0.9000
1	AT8-203 (REF)	7	1.0000	1.0000
1	AT8-203 (REF)	8	0.9000	0.9000
2	AT8-204	1	0.9000	0.9000
2	AT8-204	2	0.9000	0.9000
2	AT8-204	3	1.0000	1.0000
2	AT8-204	4	1.0000	1.0000
2	AT8-204	5	1.0000	1.0000
2	AT8-204	6	0.7000	0.7000
2	AT8-204	7	1.0000	1.0000

TN-98-130 ABB H.AZTECA SURVIVAL
File: F:\LS\130HASUA.ABB Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	AT8-203 (REF)	8	0.900	1.000	0.963
2	AT8-204	7	0.700	1.000	0.929

TN-98-130 ABB H.AZTECA SURVIVAL
File: F:\LS\130HASUA.ABB Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	AT8-203 (REF)	0.003	0.052	0.018	5.38
2	AT8-204	0.012	0.111	0.042	11.98

TN-98-130 ABB H.AZTECA SURVIVAL
File: F:\LS\130HASUA.ABB Transform: ARC SINE(SQUARE ROOT(Y))

Shapiro - Wilk's test for normality

D = 0.200

W = 0.811

Critical W (P = 0.05) (n = 15) = 0.881
Critical W (P = 0.01) (n = 15) = 0.835

Data FAIL normality test. Try another transformation.

Warning - The F-test of homogeneity is sensitive to non-normal data and should not be performed.

TN-98-130 ABB H.AZTECA SURVIVAL
File: F:\LS\130HASUA.ABB Transform: ARC SINE(SQUARE ROOT(Y))

F-Test for equality of two variances

GROUP	IDENTIFICATION	VARIANCE	F
1	AT8-203 (REF)	0.007	
2	AT8-204	0.025	3.527

Critical F = 9.16 (P=0.01, 6, 7)

Since F <= Critical F, FAIL TO REJECT Ho: Equal Variances.

TN-98-130 ABB H.AZTECA SURVIVAL
File: F:\LS\130HASUA.ABB Transform: ARC SINE(SQUARE ROOT(Y))

WILCOXON'S RANK SUM TEST W/ BONFERRONI ADJUSTMENT - Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	RANK SUM	CRIT. VALUE	REPS	SIG
1	AT8-203 (REF)	1.351				
2	AT8-204	1.305	53.00	41.00	7	

Critical values use k = 1, are 1 tailed, and alpha = 0.05

TITLE: TN-98-130 ABB H.AZTECA GROWTH
FILE: F:\LS\130HAGRO.ABB
TRANSFORM: NO TRANSFORM NUMBER OF GROUPS: 4

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	AT8-203 (REF)	1	0.1260	0.1260
1	AT8-203 (REF)	2	0.1130	0.1130
1	AT8-203 (REF)	3	0.1550	0.1550
1	AT8-203 (REF)	4	0.1050	0.1050
1	AT8-203 (REF)	5	0.0860	0.0860
1	AT8-203 (REF)	6	0.1240	0.1240
1	AT8-203 (REF)	7	0.0930	0.0930
1	AT8-203 (REF)	8	0.0960	0.0960
2	AT8-202	1	0.1540	0.1540
2	AT8-202	2	0.0880	0.0880
2	AT8-202	3	0.1110	0.1110
2	AT8-202	4	0.1110	0.1110
2	AT8-202	5	0.1130	0.1130
2	AT8-202	6	0.1220	0.1220
2	AT8-202	7	0.1140	0.1140
2	AT8-202	8	0.1480	0.1480
3	AT8-204	1	0.1800	0.1800
3	AT8-204	2	0.1070	0.1070
3	AT8-204	3	0.1360	0.1360
3	AT8-204	4	0.0980	0.0980
3	AT8-204	5	0.1000	0.1000
3	AT8-204	6	0.1340	0.1340
3	AT8-204	7	0.1110	0.1110
4	LAB CONTROL	1	0.0600	0.0600
4	LAB CONTROL	2	0.0710	0.0710
4	LAB CONTROL	3	0.1030	0.1030
4	LAB CONTROL	4	0.0710	0.0710
4	LAB CONTROL	5	0.0780	0.0780
4	LAB CONTROL	6	0.0890	0.0890
4	LAB CONTROL	7	0.0800	0.0800

TN-98-130 ABB H.AZTECA GROWTH
File: F:\LS\130HAGRO.ABB Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	AT8-203 (REF)	8	0.086	0.155	0.112
2	AT8-202	8	0.088	0.154	0.120
3	AT8-204	7	0.098	0.180	0.124
4	LAB CONTROL	7	0.060	0.103	0.079

TN-98-130 ABB H.AZTECA GROWTH
File: F:\LS\130HAGRO.ABB Transform: NO TRANSFORM

SUMMARY STATISTICS ON TRANSFORMED DATA TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	AT8-203 (REF)	0.001	0.022	0.008	20.01
2	AT8-202	0.000	0.021	0.008	17.84
3	AT8-204	0.001	0.029	0.011	23.54
4	LAB CONTROL	0.000	0.014	0.005	17.68

ATTACHMENT IV

Chemical Analyses

LABORATORY DATA REPORT

Prepared for:

NAS Jacksonville

Prepared by:

EA Laboratories
19 Loveton Circle
Sparks, MD 21152

Report 980617

May 1998

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Jacksonville
EA Laboratories Report 980617

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1. NARRATIVE

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech. Inc.**
Site: **NAS Jacksonville**
Project number: **70003.10**

EA Laboratories Report: **980617**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **8 May 1998**

This report contains the results of the analysis of three soil samples collected on 17 April 1998 in support of the referenced project.

SAMPLE RECEIPT

The samples arrived intact by hand at EA Laboratories on 15 April 1998. Upon receipt, the samples were inspected and compared with the chain-of-custody record. The samples were then logged into the laboratory computer system with assigned laboratory accession numbers and released for analysis.

Client Sample Designation	EA Lab Number
44D00202	9804680
44D00302	9804681
44D00102	9804682

Following this narrative section are a glossary of data qualifiers (Table 1) and the original chain-of-custody record. Analytical results and quality control information are summarized in the appended data package which has been formatted to be consistent with the deliverable requirements of this project.

QUALITY CONTROL

The following sections are ordered as the data appears in this report. They contain observations made during sample analysis, summarize the results of quality control measurements, and address the impact on data usability based upon project Data Quality Objectives. For each fractional analysis the narrative includes:

- Sample chronology: This section summarizes the sample history by fraction including the sample preparation method and date, analytical method, and analysis date. Anything unusual about the samples, digestates, or extracts is identified. Holding time compliance is evaluated in this section.

- Laboratory method performance: All quality control criteria for method performance must be met for all target analytes for data to be reported. These criteria generally apply to instrument tune, calibration, method blanks, and Laboratory Control Samples (LCS). In some instances where method criteria fail, useable data can be obtained and are reported with client approval. The narrative will then include a thorough discussion of the impact on data quality.

EA Laboratories
ANALYTICAL NARRATIVE

Client: **EA Eng., Sci., and Tech. Inc.**
Site: **NAS Jacksonville**
Project number: **70003.10**

EA Laboratories Report: **980617**
Laboratory Project Manager: **Mary E. Asper**
Report Date: **8 May 1998**

- Sample performance: Quality control field samples are analyzed to determine any measurement bias due to the sample matrix based on evaluation of matrix spikes (MS), matrix spike duplicates (MSD), and laboratory duplicates (D). If acceptance criteria are not met, matrix interferences are confirmed either by reanalysis or by inspection of the LCS results to verify that laboratory method performance is in control. Data are reported with appropriate qualifiers or discussion.

METALS - WATER (EA9804680-EA9804682)

Sample Chronology: Three samples were prepared on 1 May 1998 (SW846 3050) and analyzed for total cadmium according to SW846 methods 6010 on 5 May 1998.

Laboratory Method Performance: All laboratory method performance criteria were met for the reported samples.

Sample Performance: All quality control criteria were met for the reported samples with the following exceptions:

The RPD of the cadmium (34.4%) duplicates is above the upper control limit (20%).

CERTIFICATION OF RESULTS

The Laboratory certifies that this report meets the project requirements for analytical data as stated in the Analytical Task Order (ATO) and the chain-of-custody. In addition, the Laboratory certifies that the data as reported meet the Data Quality Objectives for precision, accuracy, and completeness specified for this project or as stated in EA Laboratories Quality Assurance program for other than the conditions detailed above. It is recommended by the Laboratory that this analytical report should only be reproduced in its entirety. EA Laboratories is not responsible for any assumptions of data quality if partial packages are used to interpret data. Release of the data contained in this report has been authorized by the appropriate Laboratory Manager as verified by the following signature.

Mary E. Asper, Laboratory Project Manager — May 8, 1998

TABLE 1. LABORATORY ORGANIC ANALYSIS DATA QUALIFIERS [1]

Qualifiers other than those listed below may be required to properly define the results. If used, they are given an alphabetic designation not already specified in this table or in a project/program document. such as a Quality Assurance Project Plan or a contract Statement of Work. Each additional qualifier is fully described in the Analytical Narrative section of the laboratory report.

U Indicates a target compound was analyzed for but not detected. The sample Reporting Limit (RL) is corrected for dilution and, if a soil sample, for percent moisture, if reported on a dry weight basis.

J Indicates an estimated value. This qualifier is used under the following circumstances:

1) when estimating a concentration for tentatively identified compounds (TICs) in GC/MS analyses, where a 1:1 response is assumed,
2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the RL but greater than the method detection limit (MDL).

B This qualifier is used when the analyte is found in the associated method blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action. For GC/MS analyses, this qualifier is used for a TIC, as well as, for a positively identified target compound.

E This qualifier identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.

D When applied, this qualifier identifies all compound concentrations reported from a secondary dilution analysis.

A This qualifier indicates that a TIC is a suspected aldol-condensation product.

N Indicates presumptive evidence of a compound. This qualifier is only used for GC/MS TICs, where the identification is based on a mass spectral library search. For generic characterization of a TIC, such as chlorinated hydrocarbon, the N qualifier is not used.

P When applied, this qualifier indicates a reported value from a GC analysis when there is greater than 25% difference for det cted concentrations between the two GC columns.

---

(1) These Data Qualifiers are added by the laboratory to provide additional information for the reported results. ***They should not be confused with the qualifiers applied to the reported data as a result of a data validation process performed independently of the laboratory reporting procedure.***

2. CHAIN-OF-CUSTODY

Chain of Custody Record

EA Laboratories
19 Loveton Circle
Sparks, MD 21152
Telephone: (410) 771-4920
Fax: (410) 771-4407

Company Name: ABB - ES
Project Manager or Contact: Linda Hartzell
Phone:
Project No. 700310.
Project Name: NAS Jacksonville
Dept.: Task:
Sample Storage Location: B9
ATO Number: 4
Page of
Report #. 980617

Report Deliverables: 1 2 3 (4) (D) E
EDD: Yes/(No) STD Rep Limits
DUE TO CLIENT: 5-11-98

Parameters/Method Numbers for Analysis

Date	Time	Water	Soil	Sample Identification 19 Characters	No. of Containers	CADMIUM by 6010	EA Labs Accession Number	Remarks
4/17/98	0840-0910		X	44D00202	1	X	9804680	LPM: MARY ASPER
								Project Summary No.:
								EAL-PS-090
4/17/98	0930-1010		X	44D00302	1	X	9804681	
4/17/98	1030-1100		X	44D00102	1	X	9804682	
								SEND Report Next Door.
								L13702
								COC0002811

Sampled by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
A. Reese	4/17/98 1400			R. Olzewski - Tox Lab	4/17/98 1102
Relinquished by: (Signature)	**Date/Time**	**Received by Laboratory: (Signature)**	**Date/Time**	**Airbill Number:**	
L. Hartzell - Tox Lab	4/20/98 1121	[signature]	4/21/98 09:30		

Cooler Temp. N/AC pH: ☐ Yes ☑ No Comments: Custody Seals Intact ☑ Yes ☐ No

Sample Shipped by: (Circle) (Fed Ex.) Puro. UPS Hand Carried Other:

NOTE: Please indicate method number for analyses requested. This will help clarify any questions with laboratory techniques.

WHITE—EA Laboratories YELLOW—EA Laboratories PINK—Project Manager Shaded Areas for Lab Use Only

C20001

3. METALS DATA

A. Sample Data

EPA SW846

COVER PAGE - METALS ANALYSES DATA PACKAGE

Laboratory EA LABORATORIES

Client: ABB-ES
Project: NAS JACKSONVILLE

Lab Sample No.	Client ID.
T04680	44D00202
T04680D	44D00202D
T04680S	44D00202S
T04681	44D00302
T04682	44D00102

Comments:

NAS JACKSONVILLE

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Phyllis Christopher

Date: 5/8/98 Title: QC Chemist

EPA SW846

FORM 1
METALS ANALYSIS DATA SHEET

LAB SAMPLE NUMBER

T04680

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix: SOIL Client ID: 44D00202

Percent Solids: 75.7 Date Received: 04/20/98

Results for: TOTAL CADMIUM metals

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	1.6		*	P

M = "P" ICP SW6010
M = "F" Graphite Furnace AA As by SW7060, Pb by SW7421, Se by SW7740, Tl by SW7841, Sb by 7041
M = "CV" Cold Vapor AA - waters by SW7470, soils by SW7471

EPA SW846

FORM 1
METALS ANALYSIS DATA SHEET

LAB SAMPLE NUMBER

T04681

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix: SOIL Client ID: 44D00302

Percent Solids: 76.9 Date Received: 04/20/98

Results for: TOTAL CADMIUM metals

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.31	B	*	P

M = "P" ICP SW6010
M = "F" Graphite Furnace AA As by SW7060, Pb by SW7421, Se by SW7740, Tl by SW7841, Sb by 7041
= "CV" Cold Vapor AA - waters by SW7470, soils by SW7471

EPA SW846

FORM 1
METALS ANALYSIS DATA SHEET

LAB SAMPLE NUMBER

T04682

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix: SOIL Client ID: 44D00102

Percent Solids: 76.2 Date Received: 04/20/98

Results for: TOTAL CADMIUM metals

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.22	B	*	P

M = "P" ICP SW6010
M = "F" Graphite Furnace AA As by SW7060, Pb by SW7421, Se by SW7740, Tl by SW7841, Sb by 7041
M = "CV" Cold Vapor AA - waters by SW7470, soils by SW7471

B. QC Summary

EPA SW846

FORM 2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Laboratory: EA LABORATORIES

SDG No.:T04680

Initial Calibration Source: IV RICCA

Continuing Calibration Source: IV RICCA

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Cadmium	250.0	249.41	99.8	250.0	248.53	99.4	250.25	100.1	P

EPA SW846

FORM 2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Laboratory: EA LABORATORIES

SDG No.:T04680

Initial Calibration Source: IV RICCA

Continuing Calibration Source: IV RICCA

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Cadmium				250.0	252.92	101.2	254.30	101.7	P

EPA SW846

FORM 2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Laboratory: EA LABORATORIES

SDG No.:T04680

Initial Calibration Source: IV RICCA

Continuing Calibration Source: IV RICCA

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Cadmium				250.0	252.05	100.8			P

EPA SW846

FORM 3
BLANKS

Laboratory: EA LABORATORIES

SDG No.: T04680

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.060	U	P

EPA SW846

FORM 3
BLANKS

Laboratory: EA LABORATORIES

SDG No.: T04680

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Cadmium			0.6	U	0.6	U					P

EPA SW846

FORM 4
ICP INTERFERENCE CHECK SAMPLE

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7P

ICS Source: IV

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Cadmium	0	500	-2	421.7	84.3	-1	436.0	87.2

EPA SW846

FORM 5
SPIKE SAMPLE RECOVERY

LAB SAMPLE NUMBER

T04680S

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix (soil/water): SOIL
% Solids for Sample: 75.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Cadmium	75-125	7.2460		1.5742		6.26	90.6		P

Comments:

EPA SW846

FORM 6
DUPLICATES

LAB SAMPLE NUMBER

T04680D

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix (soil/water): SOIL

% Solids for Sample: 75.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Cadmium	0.6	1.5742		2.2284		34.4	*	P

EPA SW846

FORM 7
LABORATORY CONTROL SAMPLE

Laboratory: EA LABORATORIES

SDG No.: T04680

Solid LCS Source: ERA Lot 233

Aqueous LCS Source: IV

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Cadmium				114.0	91.4		68.6	159.0	80.2

EPA SW846

FORM 9
ICP SERIAL DILUTIONS

LAB SAMPLE NUMBER

T04682L

Laboratory: EA LABORATORIES

SDG No.: T04680

Matrix (soil/water): SOIL

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Cadmium	1.79	B	3.00	U	100.0		P

EPA SW846

FORM 10
METHOD DETECTION LIMITS

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7P Date: 07/11/97

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	Reporting Limit (ug/L)	MDL (ug/L)	M
Cadmium	226.50		5.0	0.6	P

Comments:

EPA SW846

FROM 11A
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 4P Date: 07/22/96

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	
Aluminum	308.22	1.0000000	0.0000000	-0.0040644	0.0001044	
Antimony	206.83	0.0000000	0.0000000	0.0000264	0.0000000	
Arsenic	189.98	0.0000000	0.0000000	0.0000000	0.0000000	
Barium	455.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	214.44	-0.0000039	10.0000000	0.0000847	0.0000000	
Calcium	317.93	-0.0000643	1.0000000	-0.0003590	-0.0000590	
Chromium	267.72	0.0000000	0.0000000	0.0000145	0.0000000	
Cobalt	228.62	0.0000000	0.0000000	0.0000741	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000172	0.0000000	
Iron	259.94	0.0000000	0.0000299	1.0000000	0.0000122	
Lead	220.35	-0.0001766	-0.0000102	0.0001413	0.0000000	
Magnesium	279.55	0.0000000	0.0000000	0.0000297	1.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0000031	0.0000114	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000023	0.0000000	
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0002721	
Selenium	196.03	-0.0000739	-0.0000630	0.0000000	0.0000000	
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	589.00	0.0000000	-0.0002161	-0.0002148	-0.0001237	
Thallium	190.80	0.0000000	0.0000000	0.0005080	0.0000000	
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	
Zinc	213.86	0.0000000	0.0000000	0.0000766	0.0000940	

Comments:

EPA SW846

FROM 11A
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 5P Date: 07/22/96

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	
Aluminum	396.15	1.0000000	0.0007339	0.0000000	0.0000000	
Antimony	206.83	0.0002009	0.0000000	0.0004064	0.0000000	
Arsenic	193.70	0.1728820	0.0000985	0.0017849	0.0002449	
Barium	233.53	0.0000000	0.0000000	0.0001768	0.0000000	
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	
Cadmium	226.50	0.0000085	0.0000000	0.0002273	0.0000000	
Calcium	317.93	0.0000000	1.0000000	0.0001666	0.0000000	
Chromium	267.72	0.0000000	0.0000000	0.0000175	0.0000071	
Cobalt	228.62	0.0000000	0.0000000	0.0000832	0.0000000	
Copper	324.75	0.0000000	0.0000000	0.0000508	0.0000000	
Iron	259.94	0.0000000	0.0000000	0.9751200	0.0000000	
Lead	220.35	0.0003837	0.0000000	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0023530	1.0000000	
Manganese	257.61	0.0000000	0.0000000	0.0001029	0.0000131	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000533	0.0000000	
Potassium						
Selenium	196.03	0.0039390	0.0001205	0.0072656	0.0003362	
Silver	328.07	0.0000000	0.0000226	-0.0000229	0.0000000	
Sodium	589.59	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium	190.80	0.0022766	0.0001289	0.0018188	0.0001762	
Vanadium	292.40	0.0000000	0.0000000	-0.0000297	0.0000000	
Zinc	213.86	0.0000000	0.0000000	0.0001086	0.0000507	

Comments:

EPA SW846

FROM 11A
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7PA Date: 03/13/97

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	MN
Aluminum						
Antimony	206.83	-0.0000100	-0.0000065	-0.0000100	0.0000000	
Arsenic	189.04	0.0000030	0.0000000	-0.0000400	0.0000000	
Barium						
Beryllium						
Cadmium	226.50	0.0000000	0.0000000	0.0000800		0.0004700
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead	220.35	0.0004500	-0.0000027	0.0000600	0.0000000	
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium	196.02	0.0000700	0.0000000	-0.0000020	0.0000000	0.0005000
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

EPA SW846

FROM 11A
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7PB Date: 03/13/97

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	MN
Aluminum						
Antimony	206.80	0.0000150	0.0000000	0.0000258	-0.0000077	
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead	220.35	-0.0003000	0.0000600	0.0000300	0.0000000	-0.0000300
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium	196.02	0.0000025	0.0000000	-0.0002550	0.0000000	0.0002391
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

EPA SW846

FORM 11B
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7PA Date: 03/13/97

Analyte	Wave-length (nm)	Interelement Correction Factors for: V				
Aluminum						
Antimony	206.83	-0.0110000				
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium	196.02	0.0001985				
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

EPA SW846

FORM 11B
ICP INTERELEMENT CORRECTION FACTORS (Annually)

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7PB Date: 03/13/97

Analyte	Wave-length (nm)	Interelement Correction Factors for: V				
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead	220.35	-0.0003248				
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						

Comments:

EPA SW846

FORM 12
ICP LINEAR RANGES

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 4P Date: 02/25/97

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	0.50	100000.0	P
Antimony	0.50	50000.0	P
Arsenic	0.50	20000.0	P
Barium	0.50	60000.0	P
Beryllium	0.50	2500.0	P
Cadmium	0.50	15000.0	P
Calcium	0.50	250000.0	P
Chromium	0.50	6000.0	P
Cobalt	0.50	15000.0	P
Copper	0.50	12500.0	P
Iron	0.50	30000.0	P
Lead	0.50	30000.0	P
Magnesium	0.50	50000.0	P
Manganese	0.50	25000.0	P
Mercury			
Nickel	0.50	15000.0	P
Potassium	0.50	250000.0	P
Selenium	0.50	10000.0	P
Silver	0.50	2500.0	P
Sodium	0.50	250000.0	P
Thallium	0.50	30000.0	P
Vanadium	0.50	15000.0	P
Zinc	0.50	25000.0	P

Comments:

EPA SW846

FORM 12
ICP LINEAR RANGES

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 5P Date: 02/18/97

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	100000.0	P
Antimony	10.00	10000.0	P
Arsenic	10.00	10000.0	P
Barium	10.00	20000.0	P
Beryllium	10.00	500.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	125000.0	P
Chromium	10.00	2000.0	P
Cobalt	10.00	12500.0	P
Copper	10.00	2500.0	P
Iron	10.00	10000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	250000.0	P
Manganese	10.00	5000.0	P
Mercury			
Nickel	10.00	5000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	30000.0	P
Silver	10.00	2500.0	P
Sodium	10.00		P
Thallium	10.00	10000.0	P
Vanadium	10.00	5000.0	P
Zinc	10.00	12500.0	P

Comments:

EPA SW846

FORM 12
ICP LINEAR RANGES

Laboratory: EA LABORATORIES

SDG No.: T04680

ICP ID Number: 7P

Date: 05/01/97

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum			
Antimony	10.00	20000.0	P
Arsenic	10.00	20000.0	P
Barium	10.00	2000.0	P
Beryllium			
Cadmium	10.00	1000.0	P
Calcium			
Chromium	10.00	4000.0	P
Cobalt			
Copper	10.00	5000.0	P
Iron			
Lead	10.00	8000.0	P
Magnesium			
Manganese			
Mercury			
Nickel	10.00	1000.0	P
Potassium	10.00	50000.0	P
Selenium	10.00	20000.0	P
Silver	10.00	1000.0	P
Sodium	10.00	50000.0	P
Thallium	10.00	10000.0	P
Vanadium			
Zinc			

Comments:

EPA SW846

FORM 13
Preparation Log

Laboratory: EA LABORATORIES

SDG No.: T04680

Method: P

LAB Sample No.	Preparation Date	Weight (gram)	Volume (ml)
LCSS	05/01/98	1.05	100
PBS	05/01/98	1.00	100
T04680	05/01/98	1.03	100
T04680D	05/01/98	1.01	100
T04680S	05/01/98	1.06	100
T04680SD	05/01/98	1.03	100
T04681	05/01/98	1.09	100
T04682	05/01/98	1.04	100

EPA SW846

FORM 14
Analysis Run Log

Lab Name: EA LABORATORIES
SDG No.: T04680
Instrument ID Number: 7P
Start Date: 05/05/98

Method: P
End Date: 05/05/98

Sample No.	D/F	Time	%R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1211		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S20	1.00	1214		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S100	1.00	1216		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
S1000	1.00	1219		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CKS	1.00	1225		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ICV	1.00	1228		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ICB	1.00	1230		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC1	1.00	1233		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
IEC2	1.00	1236		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ICSAI	1.00	1239		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ICSABI	1.00	1241		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CCV1	1.00	1244		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CCB1	1.00	1246		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1249		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1252		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1254		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1257		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1300		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1302		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1305		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1308		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1310		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CCV2	1.00	1313		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
CCB2	1.00	1316		—	—	—	—	—	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1318		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1321		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1324		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1326		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1329		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1332		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1334		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ZZZZZZ	1.00	1337		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

EPA SW846

FORM 14
Analysis Run Log

Lab Name: EA LABORATORIES
SDG No.: T04680
Instrument ID Number: 7P
Start Date: 05/05/98

Method: P
End Date: 05/05/98

Sample No.	D/F	Time	%R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
PBS	1.00	1340							X																		
ZZZZZZ	1.00	1343																									
CCV3	1.00	1345							X																		
CCB3	1.00	1348							X																		
LCSS	1.00	1350							X																		
T04680	1.00	1353							X																		
T04680D	1.00	1356							X																		
T04680S	1.00	1359							X																		
T04680SD	1.00	1401							X																		
T04680A	1.00	1404							X																		
T04681	1.00	1407							X																		
T04682	1.00	1409							X																		
T04682L	5.00	1412							X																		
CCV4	1.00	1415							X																		
CCB4	1.00	1417							X																		
IEC1	1.00	1420							X																		
IEC2	1.00	1423							X																		
ICSAF	1.00	1426							X																		
ICSABF	1.00	1428							X																		
CCV5	1.00	1431							X																		
CCB5	1.00	1443							X																		

C. QC Raw Data

Standardization Rpt. Tue 05-05-98 12:14:08 PM page 1

Method: 3PBCD Standard: STD1-BLANK
Run Time: 05/05/98 12:11:24

Elem	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576	V_2924
Avge	2.5079	-.13399	5.554	6.727	4.252	1.061	.9430
SDev	.2178	.14707	.001	.008	.015	.001	.0000
%RSD	8.6838	109.76	.0255	.1261	.3492	.0666	.0000
#1	2.6619	-.23799	5.555	6.721	4.263	1.062	.9430
#2	2.3539	-.03000	5.553	6.733	4.242	1.061	.9430

Elem	Ca3179	Cd2265
Avge	.3965	.03150
SDev	.0021	.00778
%RSD	.5350	24.693
#1	.3950	.02600
#2	.3980	.03700

7P2875 T04099
SAW T05113
TRACE ICP-7P T04680

(CKS) STD HIGH: M04433
STD 1: M04434
STD 2: M04435
(ICV\CCV) MQC: M04438

Method: 3PBCD Standard: 20PPB
Run Time: 05/05/98 12:14:13

Elem	220371	Cd2265
Avge	12115	4.2113
SDev	.225	.0233
%RSD	2.0053	.55406
#1	12332	4.1948
#2	11973	4.2278

Method: 3PBCD Standard: 100PPB
Run Time: 05/05/98 12:16:51

Elem	2203/1	Cd2265
Avge	52.782	21.213
SDev	.893	.046
%RSD	1.6919	.21665
#1	53.413	21.181
#2	52.150	21.246

Standardization Rpt. Tue 05-05-98 12:22:12 PM

Method: 3PBCD Standard: 1000PPB
Run Time: 05/05/98 12:19:38

Elem	2203/1	2203/2	Cd2265
Avge	515.52	316.32	215.33
SDev	.30	.88	.66
%RSD	.05788	.27919	.30703
#1	515.73	315.70	214.86
#2	515.31	316.95	215.79

Method: 3PBCD Standard: STDICSA
Run Time: 05/05/98 12:22:15

Elem	Mg2790	Al3082	Fe2714	Ca3179
Avge	3535.	2916.	442.6	778.2
SDev	9.	1.	.6	.2
%RSD	.2440	.0358	.1291	.0260
#1	3529.	2916.	442.2	778.0
#2	3541.	2917.	443.0	778.3

Method: 3PBCD Standard: STDMNV
Run Time: 05/05/98 12:23:53

Elem	Mn2576	V_2924
Avge	797.8	112.0
SDev	1.0	.1
%RSD	.1294	.1332
#1	797.0	111.9
#2	798.5	112.1

Method: 3PBCD Slope = Conc(SIR)/IR

Element	Wavel	High std	Low std	Slope	Y-intercept	Date Standardized
Pb2203	220.3	NONE	NONE	.000000	.000000	*NOT STANDARDIZED
2203/1	220.3	Multiple	Standards	2.00221	-5.01491	05/05/98 12:19:38
2203/2	220.3	1000PPB	STD1-BLANK	3.16001	.423420	05/05/98 12:23:53
Mg2790	279.0	STDICSA	STD1-BLANK	.141662	-.786750	05/05/98 12:23:53
Al3082	308.2	STDICSA	STD1-BLANK	.171840	-1.15591	05/05/98 12:23:53
Fe2714	271.4	STDICSA	STD1-BLANK	.456278	-1.94022	05/05/98 12:23:53
Mn2576	257.6	STDMNV	STD1-BLANK	.012552	-.013323	05/05/98 12:23:53
V_2924	292.4	STDMNV	STD1-BLANK	.090031	-.084895	05/05/98 12:23:53
Ca3179	317.9	STDICSA	STD1-BLANK	.642854	-.254879	05/05/98 12:23:53
Cd2265	226.5	Multiple	Standards	4.71594	-.145709	05/05/98 12:19:38

Analysis Report QC Standard Tue 05-05-98 12:28:15 PM page 1

Method: 3PBCD Sample Name: CKS Operator:
Run Time: 05/05/98 12:25:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	994.73	1029.8	977.23	.0159	.0228	.0110	.0027
SDev	20.43	1.8	31.53	.0192	.0244	.0113	.0015
%RSD	2.0534	.17736	3.2270	121.2	107.3	103.1	54.57
#1	980.21	1031.1	954.93	.0295	.0400	.0189	.0037
#2	1009.2	1028.5	999.53	.0023	.0055	.0030	.0016

Elem	V2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0054	-.0016	1012.7
SDev	.0024	.0209	1.2
%RSD	43.24	1301.	.11668
#1	.0071	.0132	1011.9
#2	.0038	-.0164	1013.6

Analysis Report QC Standard Tue 05-05-98 12:30:52 PM page 1

Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 12:28:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	495.82	505.48	491.00	2.624	1.055	.6260	.2432
SDev	.68	.03	1.00	.007	.005	.0074	.0004
%RSD	.13614	.00636	.20285	.2787	.4377	1.185	.1679
#1	495.34	505.46	490.29	2.619	1.052	.6207	.2429
#2	496.30	505.51	491.70	2.629	1.058	.6312	.2435

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2482	2.780	249.41
SDev	.0007	.004	.51
%RSD	.2822	.1472	.20433
#1	.2477	2.777	249.05
#2	.2487	2.782	249.77

Analysis Report Blank Sample Tue 05-05-98 12:33:29 PM page 1

Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 12:30:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.48713	-2.9281	.73153	-.0302	-.0313	-.0244	-.0006
SDev	.33057	.0952	.54313	.0006	.0005	.0006	.0000
%RSD	67.861	3.2510	74.246	1.992	1.554	2.643	.0000
#1	-.25338	-2.9954	1.1156	-.0306	-.0309	-.0240	-.0006
#2	-.72088	-2.8608	.34748	-.0297	-.0316	-.0249	-.0006

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0016	-.0521	.04912
SDev	.0000	.0005	.05999
%RSD	.0000	.8730	122.12
#1	.0016	-.0517	.09154
#2	.0016	-.0524	.00671

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Method: 3PBCD Sample Name: IEC1 Operator:
Run Time: 05/05/98 12:33:32
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.78241	-18.975	8.3003	245.3	247.2	100.4	.0086
SDev	.30685	.968	.0234	.2	.2	.1	.0000
%RSD	39.218	5.1033	.28208	.0857	.0624	.0646	.0000
#1	-.99939	-19.660	8.3168	245.2	247.1	100.4	.0086
#2	-.56544	-18.290	8.2837	245.5	247.3	100.5	.0086

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0068	251.2	-1.1888
SDev	.0001	.0	.0601
%RSD	.9365	.0072	5.0565
#1	.0068	251.2	-1.2313
#2	.0068	251.2	-1.1463

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Method: 3PBCD Sample Name: IEC2 Operator:
Run Time: 05/05/98 12:36:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.93219	-3.6958	.44753	.0203	.1549	.1013	4.821
SDev	.64663	2.0007	1.9683	.0092	.0118	.0106	.018
%RSD	69.366	54.135	439.82	45.49	7.608	10.51	.3746
#1	-1.3894	-2.2811	-.94427	.0268	.1632	.1088	4.834
#2	-.47496	-5.1105	1.8393	.0137	.1466	.0938	4.808

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	4.750	-.0029	-2.4095
SDev	.019	.0118	.0257
%RSD	.3940	408.6	1.0663
#1	4.764	.0055	-2.4277
#2	4.737	-.0112	-2.3913

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Method: 3PBCD Sample Name: ICSA Operator:
Run Time: 05/05/98 12:39:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.91560	-34.953	16.077	473.9	476.8	189.4	.0185
SDev	.39115	1.225	.025	.8	.2	.2	.0002
%RSD	42.721	3.5034	.15489	.1644	.0428	.0806	.8614
#1	-.63902	-34.087	16.060	473.4	476.7	189.3	.0187
#2	-1.1922	-35.818	16.095	474.5	477.0	189.5	.0184

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0140	468.5	-1.5755
SDev	.0000	.2	.0958
%RSD	.0000	.0337	6.0815
#1	.0140	468.4	-1.6433
#2	.0140	468.6	-1.5078

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Method: 3PBCD Sample Name: ICSAB Operator:
Run Time: 05/05/98 12:41:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	427.67	402.43	440.27	481.0	482.3	190.7	.0177
SDev	2.23	.55	3.07	1.1	.7	.4	.0001
%RSD	.52132	.13709	.69666	.2242	.1475	.1871	.5027
#1	426.09	402.04	438.10	480.2	481.8	190.5	.0176
#2	429.24	402.82	442.44	481.8	482.8	191.0	.0177

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0130	470.2	421.70
SDev	.0001	.7	1.20
%RSD	.4893	.1441	.28359
#1	.0130	469.7	420.85
#2	.0131	470.6	422.54

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Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 12:44:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	494.97	503.92	490.51	2.667	1.090	.6506	.2421
SDev	.59	1.02	.37	.030	.027	.0145	.0003
%RSD	.11842	.20200	.07555	1.130	2.451	2.231	.1393
#1	495.39	504.64	490.77	2.688	1.109	.6609	.2423
#2	494.56	503.20	490.24	2.646	1.072	.6404	.2418

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2474	2.772	248.53
SDev	.0006	.030	.33
%RSD	.2315	1.098	.13113
#1	.2478	2.794	248.76
#2	.2470	2.751	248.30

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Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 12:46:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.60896	-.38325	-.72165	-.0203	-.0259	-.0137	-.0004
SDev	.37419	.99728	.06311	.0002	.0012	.0016	.0000
%RSD	61.447	260.22	8.7456	.9889	4.683	11.78	.0000
#1	-.34437	.32193	-.67702	-.0201	-.0251	-.0148	-.0004
#2	-.87356	-1.0884	-.76628	-.0204	-.0268	-.0125	-.0004

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0023	-.0456	.02491
SDev	.0001	.0005	.05343
%RSD	2.773	.9959	214.46
#1	.0023	-.0453	.06270
#2	.0023	-.0460	-.01287

Method: 3PBCD Sample Name: T04099 2X Operator:
Run Time: 05/05/98 12:49:37
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	2873.9	2954.2	2833.7	22.27	26.56	1008.	14.09
SDev	10.0	5.1	17.6	.02	.02	.	.01
%RSD	.34908	.17432	.62149	.1075	.0823	.0101	.0975
#1	2866.8	2957.9	2821.3	22.26	26.55	1008.	14.08
#2	2881.0	2950.6	2846.2	22.29	26.58	1008.	14.09

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2966	70.58	-14.152
SDev	.0006	.10	.078
%RSD	.1932	.1423	.55299
#1	.2962	70.51	-14.097
#2	.2970	70.65	-14.207

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Method: 3PBCD Sample Name: T04099D 2X Operator:
Run Time: 05/05/98 12:52:15
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	2272.0	2339.2	2238.4	24.70	22.83	912.8	17.27
SDev	11.9	9.6	13.0	.11	.10	3.2	.06
%RSD	.52219	.41154	.57992	.4282	.4220	.3538	.3758
#1	2263.6	2332.4	2229.3	24.63	22.77	910.5	17.22
#2	2280.4	2346.0	2247.6	24.78	22.90	915.1	17.31

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.3488	89.16	-14.743
SDev	.0016	.36	.061
%RSD	.4563	.4089	.41672
#1	.3477	88.90	-14.786
#2	.3499	89.41	-14.699

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Method: 3PBCD Sample Name: T04099S 2X Operator:
Run Time: 05/05/98 12:54:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	3092.0	3183.3	3046.3	41.40	28.94	960.4	24.34
SDev	11.8	4.8	15.4	.15	.11	3.0	.08
%RSD	.38321	.15105	.50433	.3549	.3770	.3170	.3161
#1	3083.6	3179.9	3035.5	41.30	28.87	958.2	24.28
#2	3100.3	3186.7	3057.2	41.50	29.02	962.5	24.39

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.7392	123.4	3.7181
SDev	.0025	.4	.2751
%RSD	.3359	.3624	7.3997
#1	.7374	123.1	3.5235
#2	.7409	123.7	3.9126

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Method: 3PBCD Sample Name: T04099SD 2X Operator:
Run Time: 05/05/98 12:57:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	2541.5	2616.3	2504.2	51.33	31.94	971.8	18.51
SDev	10.8	6.4	12.9	.18	.15	2.7	.05
%RSD	.42350	.24496	.51662	.3536	.4717	.2730	.2525
#1	2533.9	2611.7	2495.0	51.20	31.83	969.9	18.47
#2	2549.1	2620.8	2513.3	51.46	32.04	973.7	18.54

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.6148	140.1	5.7120
SDev	.0020	.4	.0955
%RSD	.3210	.3210	1.6716
#1	.6134	139.7	5.6445
#2	.6162	140.4	5.7795

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Method: 3PBCD Sample Name: T04104 2X Operator:
Run Time: 05/05/98 13:00:12
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	109.28	114.40	106.72	15.44	45.76	245.9	4.692
SDev	.26	.45	.62	.07	.31	.9	.017
%RSD	.24175	.39239	.58111	.4651	.6744	.3724	.3647
#1	109.09	114.71	106.29	15.39	45.54	245.3	4.680
#2	109.47	114.08	107.16	15.49	45.98	246.6	4.704

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.1255	13.53	-4.9413
SDev	.0007	.05	.0895
%RSD	.5582	.3930	1.8122
#1	.1250	13.49	-5.0046
#2	.1259	13.57	-4.8780

Method: 3PBCD Sample Name: T04108 5X Operator:
Run Time: 05/05/98 13:02:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	159.45	167.10	155.63	43.86	21.52	243.7	22.25
SDev	.17	.21	.15	.00	.01	.1	.01
%RSD	.10700	.12635	.09663	.0025	.0559	.0339	.0271
#1	159.57	167.25	155.73	43.86	21.51	243.6	22.25
#2	159.33	166.95	155.52	43.86	21.53	243.8	22.26

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.6103	227.2	-13.360
SDev	.0002	.1	.017
%RSD	.0313	.0396	.12702
#1	.6105	227.2	-13.348
#2	.6102	227.1	-13.372

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Method: 3PBCD Sample Name: PB0682 Operator:
Run Time: 05/05/98 13:05:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	.73518	-.70121	1.4523	-.0666	-.0657	-.0331	.0016
SDev	.82813	.78824	1.6351	.0031	.0021	.0181	.0015
%RSD	112.64	112.41	112.59	4.659	3.143	54.62	91.15
#1	.14960	-.14384	.29610	-.0645	-.0643	-.0203	.0026
#2	1.3208	-1.2586	2.6085	-.0688	-.0672	-.0459	.0006

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0010	-.0566	-.03871
SDev	.0001	.0141	.07162
%RSD	12.86	24.91	185.02
#1	.0011	-.0466	-.08935
#2	.0009	-.0665	.01193

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Method: 3PBCD Sample Name: LCSW0682 Operator:
Run Time: 05/05/98 13:08:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	479.55	490.01	474.34	10.14	1.991	1.211	.4713
SDev	2.47	1.25	3.08	.05	.018	.006	.0021
%RSD	.51551	.25603	.64933	.4533	.9215	.5060	.4519
#1	477.81	489.12	472.16	10.11	1.978	1.207	.4698
#2	481.30	490.90	476.51	10.17	2.004	1.216	.4728

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4840	10.46	47.863
SDev	.0019	.04	.275
%RSD	.3814	.4083	.57550
#1	.4827	10.43	47.669
#2	.4853	10.49	48.058

Method: 3PBCD Sample Name: T05113 Operator:
Run Time: 05/05/98 13:10:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	16.118	16.621	15.866	13.14	10.00	20.19	.3982
SDev	.282	1.693	1.269	.02	.01	.01	.0002
%RSD	1.7512	10.187	7.9951	.1212	.0838	.0511	.0490
#1	15.918	17.819	14.969	13.13	9.995	20.19	.3981
#2	16.317	15.424	16.763	13.15	10.01	20.20	.3984

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0173	72.45	-.39948
SDev	.0001	.07	.00606
%RSD	.3673	.1023	1.5172
#1	.0173	72.40	-.40377
#2	.0174	72.50	-.39520

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Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 13:13:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	498.98	506.97	494.99	2.763	1.164	.7063	.2440
SDev	.22	.62	.01	.003	.000	.0048	.0001
%RSD	.04323	.12262	.00264	.0979	.0313	.6852	.0327
#1	499.13	507.41	495.00	2.761	1.164	.7097	.2441
#2	498.82	506.53	494.98	2.765	1.164	.7029	.2440

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2504	2.868	250.25
SDev	.0001	.005	.32
%RSD	.0254	.1902	.12780
#1	.2505	2.864	250.48
#2	.2504	2.872	250.03

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Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 13:16:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.33353	-1.6555	.32646	.0053	-.0002	.0087	-.0002
SDev	.15783	1.2946	.88296	.0011	.0010	.0003	.0001
%RSD	47.321	78.202	270.46	20.74	565.7	3.723	45.46
#1	-.44513	-.74005	-.29789	.0061	-.0009	.0084	-.0001
#2	-.22193	-2.5709	.95081	.0045	.0005	.0089	-.0002

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0032	-.0251	.07086
SDev	.0001	.0005	.03999
%RSD	4.041	1.813	56.437
#1	.0032	-.0254	.09914
#2	.0031	-.0247	.04258

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Method: 3PBCD Sample Name: T05113D Operator:
Run Time: 05/05/98 13:18:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	14.938	17.534	13.642	12.88	7.947	19.20	.3936
SDev	.447	1.010	1.174	.02	.002	.04	.0004
%RSD	2.9898	5.7588	8.6039	.1851	.0229	.2319	.0947
#1	14.622	18.248	12.812	12.86	7.945	19.17	.3933
#2	15.254	16.820	14.472	12.89	7.948	19.23	.3939

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0147	71.99	-.39460
SDev	.0004	.13	.06429
%RSD	2.603	.1749	16.292
#1	.0144	71.91	-.44005
#2	.0149	72.08	-.34914

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Method: 3PBCD Sample Name: T05113S Operator:
Run Time: 05/05/98 13:21:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	456.14	467.78	450.34	22.61	11.35	21.38	.8367
SDev	2.36	1.36	2.85	.09	.07	.08	.0035
%RSD	.51673	.29130	.63364	.3917	.6062	.3743	.4190
#1	454.48	466.81	448.32	22.54	11.30	21.32	.8343
#2	457.81	468.74	452.35	22.67	11.39	21.44	.8392

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4638	82.68	43.597
SDev	.0019	.35	.048
%RSD	.3981	.4195	.10943
#1	.4625	82.43	43.563
#2	.4651	82.92	43.631

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Method: 3PBCD Sample Name: T05113SD Operator:
Run Time: 05/05/98 13:24:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	438.38	448.84	433.16	21.62	9.354	20.12	.8037
SDev	1.20	.75	1.42	.06	.016	.06	.0022
%RSD	.27289	.16804	.32713	.2728	.1740	.3030	.2772
#1	437.54	448.31	432.16	21.58	9.343	20.08	.8021
#2	439.23	449.37	434.16	21.67	9.366	20.17	.8053

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4414	79.78	41.791
SDev	.0017	.23	.013
%RSD	.3894	.2843	.03009
#1	.4402	79.62	41.782
#2	.4427	79.94	41.800

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Method: 3PBCD Sample Name: T05113P Operator:
Run Time: 05/05/98 13:26:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	480.88	492.77	474.94	12.99	11.87	21.07	.8540
SDev	.85	2.02	.26	.00	.00	.01	.0001
%RSD	.17574	.41004	.05438	.0255	.0297	.0475	.0062
#1	480.28	491.34	474.76	12.98	11.87	21.06	.8539
#2	481.48	494.20	475.13	12.99	11.87	21.08	.8540

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4879	71.46	45.917
SDev	.0005	.02	.003
%RSD	.1044	.0274	.00612
#1	.4876	71.45	45.915
#2	.4883	71.48	45.919

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Method: 3PBCD Sample Name: T05119 Operator:
Run Time: 05/05/98 13:29:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	23.119	22.826	23.265	5.549	-.0304	.1380	.0130
SDev	.255	.068	.416	.027	.0002	.0013	.0000
%RSD	1.1023	.29895	1.7887	.4874	.7990	.9350	.2739
#1	23.299	22.778	23.559	5.530	-.0306	.1389	.0129
#2	22.939	22.875	22.970	5.568	-.0302	.1371	.0130

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0014	38.03	.45670
SDev	.0000	.15	.03673
%RSD	.0000	.4064	8.0419
#1	.0014	37.92	.43073
#2	.0014	38.14	.48267

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Method: 3PBCD Sample Name: T05120 Operator:
Run Time: 05/05/98 13:32:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	33.404	33.784	33.215	5.736	-.0564	.2318	.0276
SDev	.453	1.457	.048	.021	.0017	.0023	.0001
%RSD	1.3564	4.3113	.14416	.3650	3.018	.9744	.4176
#1	33.725	34.814	33.181	5.721	-.0552	.2334	.0275
#2	33.084	32.754	33.249	5.751	-.0576	.2302	.0277

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0016	39.67	.48284
SDev	.0002	.16	.04329
%RSD	12.12	.4011	8.9656
#1	.0017	39.55	.51345
#2	.0014	39.78	.45223

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Method: 3PBCD Sample Name: T05121 Operator:
Run Time: 05/05/98 13:34:53
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	36.697	36.948	36.571	3.509	-.0402	.6757	.1008
SDev	.697	1.065	1.576	.010	.0007	.0036	.0003
%RSD	1.8990	2.8821	4.3106	.2826	1.813	.5252	.2730
#1	36.204	37.701	35.456	3.502	-.0407	.6732	.1006
#2	37.190	36.195	37.686	3.516	-.0397	.6782	.1010

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0024	34.07	.36732
SDev	.0000	.10	.12640
%RSD	.0000	.2962	34.413
#1	.0024	34.00	.27794
#2	.0024	34.14	.45670

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Method: 3PBCD Sample Name: T05121L Operator:
Run Time: 05/05/98 13:37:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	7.3449	6.0968	7.9680	.6501	-.0660	.1074	.0196
SDev	.2938	.9817	.0497	.0008	.0010	.0013	.0000
%RSD	3.9997	16.102	.62337	.1233	1.473	1.201	.0452
#1	7.1372	5.4027	8.0031	.6506	-.0653	.1065	.0196
#2	7.5527	6.7910	7.9329	.6495	-.0667	.1084	.0196

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0023	6.707	.06133
SDev	.0001	.008	.05341
%RSD	2.773	.1152	87.089
#1	.0023	6.713	.09910
#2	.0023	6.702	.02356

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Method: 3PBCD Sample Name: PB0677 Operator:
Run Time: 05/05/98 13:40:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	1.6076	3.6068	.60946	-.0739	-.0891	-.0632	-.0006
SDev	.3253	1.9957	1.4840	.0008	.0013	.0045	.0001
%RSD	20.233	55.332	243.50	1.084	1.500	7.147	10.53
#1	1.3776	5.0180	-.43991	-.0745	-.0900	-.0664	-.0006
#2	1.8376	2.1956	1.6588	-.0734	-.0881	-.0600	-.0005

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	-.0008	-.0521	-.12812
SDev	.0010	.0005	.00692
%RSD	124.8	.8730	5.4041
#1	-.0014	-.0524	-.12323
#2	-.0001	-.0517	-.13302

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Method: 3PBCD Sample Name: LCSW0677 Operator:
Run Time: 05/05/98 13:43:00
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	457.12	482.87	444.26	9.606	1.831	1.137	.4508
SDev	4.52	22.05	4.24	.041	.011	.007	.0016
%RSD	.98820	4.5674	.95404	.4317	.5905	.5961	.3465
#1	453.93	467.28	447.26	9.577	1.824	1.132	.4497
#2	460.32	498.47	441.27	9.635	1.839	1.141	.4519

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4625	10.11	44.901
SDev	.0010	.04	.365
%RSD	.2202	.3868	.81186
#1	.4617	10.08	45.159
#2	.4632	10.13	44.643

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Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 13:45:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	503.72	506.53	502.32	2.811	1.183	.7503	.2468
SDev	4.86	3.23	5.68	.039	.014	.0290	.0022
%RSD	.96555	.63804	1.1304	1.390	1.202	3.870	.8701
#1	507.16	508.81	506.33	2.838	1.193	.7708	.2484
#2	500.28	504.24	498.30	2.783	1.173	.7298	.2453

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2532	2.926	252.92
SDev	.0036	.036	2.15
%RSD	1.408	1.243	.85070
#1	.2557	2.952	254.45
#2	.2506	2.901	251.40

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Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 13:48:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	.20923	-3.7628	2.1922	.0096	-.0034	.0230	.0001
SDev	1.1354	2.4575	.4754	.0008	.0017	.0052	.0000
%RSD	542.68	65.311	21.684	8.319	49.50	22.40	35.36
#1	-.59364	-5.5005	1.8561	.0102	-.0022	.0267	.0001
#2	1.0121	-2.0250	2.5284	.0091	-.0046	.0194	.0001

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0038	-.0177	.11718
SDev	.0001	.0000	.01358
%RSD	1.664	.0000	11.592
#1	.0038	-.0177	.10758
#2	.0039	-.0177	.12679

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Method: 3PBCD Sample Name: LCSS0677 Operator:
Run Time: 05/05/98 13:50:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	387.73	394.63	384.29	15.87	30.08	79.17	1.117
SDev	.33	4.44	1.72	.01	.03	.02	.000
%RSD	.08436	1.1239	.44859	.0858	.1030	.0265	.0405
#1	387.50	391.50	385.50	15.86	30.05	79.16	1.117
#2	387.96	397.77	383.07	15.88	30.10	79.19	1.118

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.5486	15.74	959.51
SDev	.0001	.02	.67
%RSD	.0116	.1040	.06963
#1	.5485	15.73	959.98
#2	.5486	15.75	959.04

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Method: 3PBCD Sample Name: T04680 Operator:
Run Time: 05/05/98 13:53:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	339.73	350.91	334.15	.6521	3.171	6.983	.0294
SDev	1.04	1.45	2.28	.0039	.014	.029	.0001
%RSD	.30589	.41308	.68285	.5991	.4292	.4205	.4826
#1	339.00	351.94	332.54	.6493	3.161	6.962	.0293
#2	340.47	349.89	335.76	.6549	3.180	7.003	.0295

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0158	4.706	12.294
SDev	.0000	.025	.025
%RSD	.0000	.5216	.20450
#1	.0158	4.688	12.277
#2	.0158	4.723	12.312

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Method: 3PBCD Sample Name: T04680D Operator:
Run Time: 05/05/98 13:56:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	187.50	192.75	184.88	1.019	3.777	7.611	.0315
SDev	.38	1.12	1.13	.007	.018	.028	.0001
%RSD	.20175	.58300	.61021	.6780	.4632	.3645	.3948
#1	187.23	193.54	184.08	1.015	3.765	7.592	.0314
#2	187.77	191.96	185.68	1.024	3.790	7.631	.0316

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0165	5.613	17.117
SDev	.0009	.017	.115
%RSD	5.780	.3077	.67339
#1	.0158	5.601	17.035
#2	.0172	5.625	17.198

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Method: 3PBCD Sample Name: T04680S Operator:
Run Time: 05/05/98 13:59:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	665.32	683.80	656.09	10.65	6.304	9.323	.4892
SDev	3.79	1.54	4.92	.03	.021	.033	.0014
%RSD	.56993	.22496	.74944	.2783	.3315	.3530	.2921
#1	662.63	682.71	652.61	10.63	6.289	9.300	.4882
#2	668.00	684.89	659.56	10.68	6.319	9.346	.4902

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4793	16.10	57.869
SDev	.0012	.05	.198
%RSD	.2524	.3162	.34172
#1	.4784	16.06	57.729
#2	.4801	16.13	58.009

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Method: 3PBCD Sample Name: T04680SD Operator:
Run Time: 05/05/98 14:01:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	646.55	663.87	637.90	10.36	6.064	9.029	.4724
SDev	1.96	1.60	3.74	.03	.025	.024	.0011
%RSD	.30347	.24127	.58651	.2631	.4168	.2644	.2349
#1	645.16	665.00	635.25	10.34	6.046	9.012	.4716
#2	647.93	662.74	640.54	10.38	6.082	9.045	.4731

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4676	15.39	55.880
SDev	.0009	.03	.068
%RSD	.1906	.2038	.12225
#1	.4670	15.37	55.832
#2	.4682	15.41	55.928

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Method: 3PBCD Sample Name: T04680P Operator:
Run Time: 05/05/98 14:04:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	807.49	830.11	796.19	.6505	5.139	8.091	.4973
SDev	2.82	.05	4.25	.0041	.020	.035	.0018
%RSD	.34874	.00584	.53331	.6313	.3972	.4266	.3605
#1	805.50	830.15	793.19	.6476	5.124	8.067	.4960
#2	809.48	830.08	799.19	.6535	5.153	8.116	.4986

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.4920	4.695	59.143
SDev	.0019	.021	.097
%RSD	.3752	.4454	.16480
#1	.4907	4.680	59.074
#2	.4933	4.710	59.212

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Method: 3PBCD Sample Name: T04681 Operator:
Run Time: 05/05/98 14:07:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	80.257	85.099	77.839	2.301	3.432	10.79	.0401
SDev	.123	.841	.235	.008	.004	.02	.0000
%RSD	.15368	.98816	.30179	.3657	.1204	.1854	.0663
#1	80.344	85.694	77.673	2.295	3.429	10.77	.0402
#2	80.169	84.504	78.005	2.307	3.435	10.80	.0401

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0149	61.91	2.5970
SDev	.0004	.14	.0324
%RSD	2.556	.2335	1.2459
#1	.0147	61.81	2.5742
#2	.0152	62.01	2.6199

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Method: 3PBCD Sample Name: T04682 Operator:
Run Time: 05/05/98 14:09:57
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	48.882	52.014	47.318	2.278	4.639	10.86	.0957
SDev	.277	1.337	1.083	.014	.033	.07	.0005
%RSD	.56647	2.5708	2.2882	.6332	.7071	.6356	.5473
#1	48.686	52.960	46.552	2.268	4.616	10.81	.0953
#2	49.077	51.069	48.083	2.288	4.662	10.91	.0960

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0123	18.74	1.7868
SDev	.0003	.11	.0463
%RSD	2.065	.5798	2.5924
#1	.0122	18.66	1.7540
#2	.0125	18.81	1.8195

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Method: 3PBCD Sample Name: T04682L Operator:
Run Time: 05/05/98 14:12:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	9.9358	6.8622	11.470	.4239	.9019	2.207	.0190
SDev	.1341	2.2986	1.349	.0021	.0027	.005	.0000
%RSD	1.3496	33.497	11.757	.4962	.2964	.2485	.1873
#1	10.031	5.2368	12.424	.4254	.9001	2.203	.0190
#2	9.8410	8.4875	10.517	.4224	.9038	2.211	.0189

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0043	3.772	.40231
SDev	.0000	.000	.16365
%RSD	.0000	.0121	40.677
#1	.0043	3.772	.51802
#2	.0043	3.772	.28659

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Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 14:15:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	505.10	515.57	499.87	2.799	1.196	.6983	.2487
SDev	.05	.54	.20	.007	.002	.0039	.0004
%RSD	.00948	.10543	.03993	.2613	.1625	.5544	.1713
#1	505.14	515.96	499.73	2.794	1.195	.6956	.2484
#2	505.07	515.19	500.02	2.804	1.197	.7010	.2490

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2542	2.932	254.30
SDev	.0006	.003	.61
%RSD	.2504	.0930	.24111
#1	.2538	2.930	253.86
#2	.2547	2.934	254.73

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Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 14:17:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.79259	-1.0524	-.66289	.0098	.0076	.0230	.0001
SDev	.32912	1.7895	.39995	.0021	.0000	.0000	.0000
%RSD	41.524	170.04	60.334	21.37	.0000	.0000	23.57
#1	-.55987	.21297	-.94570	.0084	.0076	.0230	.0001
#2	-1.0253	-2.3177	-.38008	.0113	.0076	.0230	.0001

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0035	-.0154	.14310
SDev	.0003	.0005	.01666
%RSD	7.252	2.946	11.642
#1	.0033	-.0157	.15488
#2	.0037	-.0151	.13132

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Method: 3PBCD Sample Name: IEC1 Operator:
Run Time: 05/05/98 14:20:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	.08626	-21.173	10.700	250.8	255.1	101.8	.0088
SDev	.06851	1.010	.402	.2	.4	.1	.0000
%RSD	79.426	4.7705	3.7529	.0933	.1576	.1420	.1013
#1	.13470	-20.459	10.416	251.0	255.4	101.9	.0088
#2	.03781	-21.887	10.984	250.6	254.8	101.7	.0088

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0070	253.3	-.88141
SDev	.0002	.3	.20063
%RSD	2.737	.1276	22.762
#1	.0068	253.5	-1.0233
#2	.0071	253.1	-.73955

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Method: 3PBCD Sample Name: IEC2 Operator:
Run Time: 05/05/98 14:23:20
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.98231	-2.2539	-.34746	.0541	.1937	.1230	4.965
SDev	.68887	1.7996	1.93122	.0004	.0022	.0065	.023
%RSD	70.127	79.841	555.81	.7404	1.129	5.248	.4626
#1	-.49521	-3.5264	1.0181	.0544	.1952	.1275	4.949
#2	-1.4694	-.98145	-1.7130	.0538	.1921	.1184	4.982

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	4.891	.0251	-2.4408
SDev	.022	.0032	.0872
%RSD	.4568	12.69	3.5711
#1	4.875	.0273	-2.3792
#2	4.907	.0228	-2.5025

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Method: 3PBCD Sample Name: ICSA Operator:
Run Time: 05/05/98 14:26:07
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	.45158	-35.781	18.541	493.2	495.0	195.1	.0201
SDev	1.1758	.890	2.207	1.1	.6	.3	.0001
%RSD	260.38	2.4870	11.904	.2264	.1219	.1741	.5288
#1	-.37985	-35.152	16.980	492.4	494.6	194.8	.0202
#2	1.2830	-36.410	20.101	494.0	495.4	195.3	.0201

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0158	480.5	-1.2579
SDev	.0000	.6	.0731
%RSD	.0000	.1219	5.8108
#1	.0158	480.1	-1.3096
#2	.0158	480.9	-1.2062

Analysis Report QC Standard Tue 05-05-98 02:31:26 PM page 1

Method: 3PBCD Sample Name: ICSAB Operator:
Run Time: 05/05/98 14:28:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	440.13	413.85	453.25	499.4	500.1	196.2	.0186
SDev	2.21	2.80	4.71	.9	.5	.2	.0000
%RSD	.50163	.67751	1.0392	.1711	.1097	.1029	.0955
#1	438.57	415.83	449.92	498.8	499.7	196.0	.0186
#2	441.69	411.87	456.58	500.0	500.5	196.3	.0186

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0146	482.4	436.01
SDev	.0001	.4	.50
%RSD	.4351	.0915	.11469
#1	.0146	482.1	435.66
#2	.0147	482.7	436.37

Analysis Report QC Standard Tue 05-05-98 02:34:03 PM page 1

Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 14:31:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	499.43	509.58	494.36	2.698	1.103	.6575	.2430
SDev	.82	1.97	.25	.023	.024	.0203	.0003
%RSD	.16413	.38623	.04984	.8575	2.181	3.091	.1023
#1	500.01	510.97	494.54	2.715	1.120	.6718	.2432
#2	498.85	508.19	494.19	2.682	1.086	.6431	.2428

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.2470	2.768	252.05
SDev	.0005	.023	.36
%RSD	.2062	.8212	.14243
#1	.2474	2.784	252.30
#2	.2467	2.752	251.80

Analysis Report Blank Sample Tue 05-05-98 02:45:36 PM page 1

Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 14:43:02
Comment:
Mode: CONC Corr. Factor: 1

Elem	Pb2203	2203/1	2203/2	Mg2790	Al3082	Fe2714	Mn2576
Units	ppb	ppb	ppb	ppm	ppm	ppm	ppm
Avge	-.47198	-3.0956	.83786	-.0351	-.0327	-.0110	-.0005
SDev	.72448	1.7415	.21675	.0000	.0013	.0177	.0000
%RSD	153.50	56.256	25.869	.0000	4.083	162.0	1.861
#1	.04030	-1.8642	.99113	-.0351	-.0318	.0016	-.0005
#2	-.98427	-4.3270	.68460	-.0351	-.0337	-.0235	-.0005

Elem	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppb
Avge	.0023	-.0627	.07199
SDev	.0000	.0000	.10760
%RSD	.0000	.0000	149.47
#1	.0023	-.0627	-.00410
#2	.0023	-.0627	.14807

Analysis Report Tue 05-05-98 02:49:43 PM page 1

Method: 3PBCD Sample Name: T04099 10X Operator:
Run Time: 05/05/98 14:47:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	4.830	5.526	217.8	3.120	.0645	15.10	-3.3992
SDev	.011	.009	.7	.010	.0002	.04	.2074
%RSD	.2178	.1627	.3295	.3291	.2961	.2949	6.1023
#1	4.822	5.520	217.3	3.112	.0644	15.07	-3.2525
#2	4.837	5.533	218.3	3.127	.0646	15.13	-3.5459

Analysis Report Tue 05-05-98 02:51:56 PM page 1

Method: 3PBCD Sample Name: T04099D 10X Operator:
Run Time: 05/05/98 14:49:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	5.299	4.696	196.2	3.819	.0735	18.91	-3.3876
SDev	.008	.008	.3	.007	.0011	.02	.0514
%RSD	.1550	.1630	.1572	.1771	1.472	.1153	1.5181
#1	5.294	4.701	196.0	3.814	.0727	18.90	-3.4239
#2	5.305	4.690	196.4	3.823	.0743	18.93	-3.3512

Analysis Report Tue 05-05-98 02:54:10 PM page 1

Method: 3PBCD Sample Name: T04099S 10X Operator:
Run Time: 05/05/98 14:52:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	9.046	6.028	210.4	5.588	.1587	26.72	.47379
SDev	.002	.007	.3	.009	.0001	.03	.04166
%RSD	.0244	.1109	.1337	.1636	.0802	.0953	8.7926
#1	9.045	6.023	210.2	5.581	.1586	26.70	.44433
#2	9.048	6.033	210.6	5.594	.1588	26.74	.50324

Analysis Report Tue 05-05-98 02:56:24 PM page 1

Method: 3PBCD Sample Name: T04099SD 10X Operator:
Run Time: 05/05/98 14:54:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	11.22	6.628	213.3	4.190	.1331	30.38	.72020
SDev	.02	.015	.3	.005	.0005	.05	.00490
%RSD	.1562	.2310	.1493	.1176	.3827	.1571	.68025
#1	11.21	6.617	213.1	4.186	.1327	30.35	.72367
#2	11.24	6.639	213.5	4.193	.1334	30.42	.71674

Analysis Report Tue 05-05-98 02:58:37 PM page 1

Method: 3PBCD Sample Name: T04108 20X Operator:
Run Time: 05/05/98 14:56:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	11.37	5.403	64.10	6.110	.1577	59.19	-3.7939
SDev	.01	.013	.06	.007	.0000	.04	.0274
%RSD	.1269	.2406	.0901	.1068	.0000	.0684	.72200
#1	11.36	5.394	64.06	6.105	.1577	59.16	-3.8132
#2	11.38	5.413	64.14	6.115	.1577	59.22	-3.7745

Analysis Report QC Standard Tue 05-05-98 03:00:54 PM page 1

Method: 3PBCD Sample Name: IEC1 Operator:
Run Time: 05/05/98 14:58:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	253.0	255.6	102.2	.0096	.0076	253.6	-.96148
SDev	.3	.0	.1	.0004	.0002	.2	.18900
%RSD	.1167	.0139	.0902	4.601	2.510	.0622	19.657
#1	252.8	255.6	102.2	.0100	.0075	253.5	-1.0951
#2	253.2	255.6	102.3	.0093	.0077	253.7	-.82784

Analysis Report QC Standard Tue 05-05-98 03:03:03 PM page 1

Method: 3PBCD Sample Name: IEC2 Operator:
Run Time: 05/05/98 15:00:58
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	.1278	.2741	.1743	4.977	4.895	.0993	-2.4864
SDev	.0188	.0204	.0307	.004	.005	.0182	.0429
%RSD	14.74	7.448	17.59	.0851	.1027	18.31	1.7250
#1	.1411	.2885	.1960	4.974	4.892	.1122	-2.5167
#2	.1145	.2596	.1526	4.980	4.899	.0865	-2.4560

Analysis Report QC Standard Tue 05-05-98 03:05:24 PM page 1

Method: 3PBCD Sample Name: ICSA Operator:
Run Time: 05/05/98 15:03:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	492.4	493.1	194.3	.0216	.0180	477.3	-1.4195
SDev	1.0	.2	.1	.0003	.0002	.7	.0372
%RSD	.1940	.0494	.0759	1.521	1.063	.1380	2.6227
#1	491.8	493.3	194.2	.0218	.0181	476.9	-1.3932
#2	493.1	492.9	194.4	.0214	.0178	477.8	-1.4458

Analysis Report QC Standard Tue 05-05-98 03:07:37 PM page 1

Method: 3PBCD Sample Name: ICSAB Operator:
Run Time: 05/05/98 15:05:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	500.8	498.9	196.4	.0192	.0153	481.7	436.71
SDev	1.8	.9	.6	.0000	.0003	1.4	1.33
%RSD	.3550	.1865	.3046	.1387	2.086	.2969	.30545
#1	499.6	498.2	195.9	.0192	.0150	480.7	435.76
#2	502.1	499.5	196.8	.0192	.0155	482.7	437.65

Analysis Report QC Standard Tue 05-05-98 03:09:46 PM page 1

Method: 3PBCD Sample Name: CCV Operator:
Run Time: 05/05/98 15:07:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	2.820	1.238	.7311	.2423	.2448	2.887	251.16
SDev	.031	.036	.0342	.0000	.0001	.032	.21
%RSD	1.087	2.895	4.677	.0146	.0260	1.118	.08299
#1	2.842	1.263	.7553	.2423	.2448	2.910	251.02
#2	2.799	1.213	.7070	.2423	.2449	2.864	251.31

Analysis Report Blank Sample Tue 05-05-98 03:11:54 PM page 1

Method: 3PBCD Sample Name: Blank Operator:
Run Time: 05/05/98 15:09:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Mg2790	Al3082	Fe2714	Mn2576	V_2924	Ca3179	Cd2265
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Avge	.0052	.0089	.0050	-.0003	.0028	-.0254	.09939
SDev	.0006	.0005	.0023	.0000	.0001	.0009	.00010
%RSD	11.47	5.439	45.00	9.223	2.245	3.580	.10102
#1	.0057	.0093	.0066	-.0003	.0028	-.0247	.09932
#2	.0048	.0086	.0034	-.0003	.0029	-.0260	.09946

D. Laboratory Logs

EA LABORATORIES
METALS DIGESTION LOG-SOIL(Solid)

805014

Analyst: JAM Date: 5·0198

Method No: (EAL-M-) 3050ICP Final Volume: 100ml

Reagents Added: 10ml 1:1 HNO_3, 10ml CON HNO_3, 10ml 30% H_2O_2, 5ml CON HCl

Reagent Lot Numbers: F28542 M07545 KVNA M04543

Matrix spike:
Standard Stock Id: M04387
Volume of stock added: 10ml

LCS:
Stock Source: M04387 ICP Solid Lot
Volume of stock: 10ml ERA Lot #233

Sample No. TB805014	Weight G	Color Before	Color After	Texture	Artifacts	Hotplate ID	Hotplate Setting	Comments
PB	10ml	Colorless	Colorless	—	none	#1(4A)	2	
IL805014 LCSW	10ml	↓	↓	—	↓	↓	↓	
IL805014 LCSS	1.0503	brown	light yellow	fine, soft				
T04680	1.0317	↓	Colorless	↓				
T04680 DUP	1.0147		↓					
T04680 SPK	1.0550							
T04680 SPK DUP	1.0307				↓			
T04681	1.0992	↓			twigs			
T04687	1.0423	brown	↓	↓	none	↓	↓	

RECEIVED
MAY 04 1998
By

Samples measured by: LAM
Samples prepared by: LAM
Samples filtered and batched by: CD

#677

000048

030099

EA LABORATORIES PRE-DIGESTION SPIKE LOG

FURNACE/ICP

DATE 5/1/98 ANALYST LAM FINAL VOLUME: ICP 50/100 mL
FN 50/100 mL

CLIENT Abb Nas

SAMPLE RANGE T0460 80-88

ICP SPIKE STOCK USED M04387 VOLUME OF STOCK USED (ICP) 10 mL

FURNACE STOCK USED _____ VOLUME OF STOCK USED (FN) _____

METHOD SW846

ELEMENT	SUBSTOCK A CONC. (PPM)	FINAL CONC. (PPB)
Ag SW846 Ag CLP/200	50 5.0	500 50.0
Al, As, Ba, Se	200	2000
Ca, K, Mg, Na	1000	10000
Cd, Be	5.0	50.0
Co, Mn, Ni, Pb, Sb, V, Zn	50.0	500
Cr	20.0	200
Cu	25.0	250
Fe	100	1000
B, Si, Ti, Sn	100	1000
Mo, Sr	50.0	500

TRACE ICP / FURNACE LEVELS			
As	SW846	2.5	25.0
As	CLP/ 200	4.0	40.0
Se	SW846	5.0	50.0
Se	CLP/200	1.0	10.0
Pb	SW846	2.5	25.0
Pb	CLP/200	2.0	20.0
Tl	SW846	2.5	25.0
Tl	CLP/200	5.0	50.0
Ag	SW846	5.0	50.0
Ag	CLP/ 200	2.5	25.0
Cd	SW846	0.5	5.0
Cd	CLP/ 200	0.5	5.0
Ni	SW846	2.5	25.0
Ni	CLP/ 200	5.0	50.0
Cr	SW846	2.5	25.0
Cr	CLP/ 200	2.5	25.0
Cu	SW846	2.5	25.0
Cu	CLP/200	2.5	25.0
Be	SW846	0.5	5.0

METAL'S STANDARD PREP LOGBOOK #3

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M03269	5/9/97	BLS	TRACE STD High	Ni	RICCA	D171	1000ppm	1 mL	1000mL	1ppm	V077-KRVP V079-KTKBP	8/9/97
(cont.)				Sb		F061						
				Se		A101						
				Tl		C101						
				Na		J172		5mL		5ppm		
				K		E231						
M03270	5/9/97	BLS	TRACE STD 1	TRACE STD High	M03269	Prep DATE: 5/9/97	See Sheets	4mL	200mL	See sheets	V077-KRVP V079-KTKBP	8/9/97
M03271			TRACE STD 2					20mL				
M03272	5-12-97	MAM	Std	Hg	Mall	Prep 5-8-97	10 ppm	1.0 ml	100 ml	100 ppb	V077 KTKBP	5-12-97
M03273			MAC		Ricca							
M03274	5/12/97	JH	STOCK STD High	See Sheets	H.P	712712	See Sheets	250ml	NA	NA	NA	6/98
M03275												
M03276												
M03277												
M03278												
M03279												
M03280												
M03281												
M03282												
M03283												
M03284												

030102

METAL'S STANDARD PREP LOGBOOK #3

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M03387	6/5/97	SAW	Mg STOCK	Mg	RICCA	D171	1000PPM	100ML	—	—	—	6/98
M03388	↓	↓	Fe STOCK	Fe	RICCA	B052	↓	↓	—	—	—	10/98
M03389	↓	↓	Mn STOCK	Mn	RICCA	A282	↓	↓	—	—	—	10/98
M03390	↓	↓	B STOCK	B	RICCA	F072	↓	↓	—	—	—	7/98
M03391	6/5/97	SAW	STD HIGH	MIX1	HP	M03276	SEE SHEETS	100.0ML	1000ML	SEE SHEETS	V077KPRV-P V078KTKB-P	9/5/97
↓	↓	↓	↓	MIX1*	HP	M02937	↓	50.0ML	↓	↓	↓	↓
M03392	6/5/97	SAW	Co STOCK	Co	RICCA	D251	1000PPM	100ML	—	—	—	6/98
M03393	↓	↓	Cd STOCK	Cd	RICCA	B142	↓	↓	↓	↓	↓	11/98
M03394	↓	↓	Ag STOCK	Ag	RICCA	M242	↓	↓	↓	↓	↓	9/98
M03395	↓	↓	Sb STOCK	Sb	RICCA	A082	↓	↓	↓	↓	↓	9/98
M03396	↓	↓	V STOCK	V	RICCA	B132	↓	↓	↓	↓	↓	10/98
M03397	↓	↓	Se STOCK	Se	RICCA	A212	↓	500ML	↓	↓	↓	10/98
M03398	↓	↓	Pb STOCK	Pb	RICCA	B212	↓	↓	↓	↓	↓	11/98
M03399	↓	↓	As STOCK	As	RICCA	B162	↓	↓	↓	↓	↓	11/98
M03400	↓	↓	Cu STOCK	Cu	MALL	KTNJ-P	↓	100ML	↓	↓	↓	8/98
M03401	↓	↓	Ni STOCK	Ni	MALL	KTNA-P	↓	↓	↓	↓	↓	8/98
M03402	↓	↓	Ba STOCK	Ba	MALL	KTTA-P	↓	↓	↓	↓	↓	10/98
M03403	↓	↓	Cr STOCK	Cr	MALL	KVCJ-P	↓	↓	↓	↓	↓	2/99
M03404	↓	↓	B STOCK	B	MALL	KTCM-P	↓	↓	↓	↓	↓	2/98
M03405	↓	↓	K STOCK	K	MALL	KVEG-P	↓	↓	↓	↓	↓	3/99
M03406	6/6/97	K3H	FN Std	Cd	Mall	M03244 2/98	1000ppm	50ml	50ml	1ppm	KTKBP	6/13/97
M03407	↓	↓	FNMQC	↓	Ricca	M02778 4/98	↓	↓	↓	↓	↓	↓

030103

000109

METAL'S STANDARD PREP LOGBOOK #3

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M03418	6-9-97	V.Rm	Int. Std	Hg	Mall	exp 12-97 H548-KPVS-P	1000ppm	1 ml	100ml	10ppm	KTKB-P	7-9-97
M03419	↓	↓	↓	↓	Ricca	F201 exp 8-97	↓	↓	↓	↓	↓	↓
M03420	6-9-97	MRm	Std	Hg	Mall	M03418 exp 7-9-97	10ppm	1.0ml	100ml	100ppb	KTKB-P	6-9-97
M03421	↓	↓	MQC	↓	Ricca	M03419 exp 7-9-97	↓	↓	↓	↓	↓	↓
M03422	6/9/97	JH	Ricca	Pb	—	B307	1000ppm	473ml	—	—	—	6/9/98
M03423				V	Ricca	B132		118ml	—	—	—	↓
M03424			CCPP-ICS-B	see sheets	I.V.	LMEB58023	see sheets	100ml	—	—	—	6/1/98
M03425			CCPP ICSA	see sheets	I.V.	M-MEB58043	↓	500ml	—	—	—	↓
M03426			Mn	—	Ricca	A2P2	1000ppm	118ml	—	—	—	6/9/98
M03427	6/9/97	SAW	TRACE MQC	As	Mall	M02084	1000PPM	500uL	1L	500PPb	V077 KPRV-P V078 KTKB-P	9/9/97
↓	↓	↓	↓	Pb	↓	M03215	↓	↓	↓	↓	↓	↓
				Sb		M02788						
				Cd		M03244						
				Se	JTBAKER	M02808						
M03428	6-10-97	MRm	Std	Hg	Mall	M03418	10ppm	1.0ml	100ml	100ppb	KTKB-P	6-10-97
M03429	6-10-97	↓	MQC	↓	Ricca	M03419	↓	↓	↓	↓	↓	↓
M03430	6/11/97	SAW	Ca, Mg CRI 30PPb	Ca	Inorg Vent	M03381	25 PPM	120uL	100mL	30PPb	V077 KPRV-P V078 KTKB-P	6/18/97
↓	↓	↓	↓	Mg	↓	↓	↓	↓	↓	↓	↓	↓
M03431	6-11-97	MRm	Std	Hg	Mall	M03418	10ppm	1ml	100ml	100ppb	KTKB-P	6-11-97
M03432	↓	↓	MQC	↓	Ricca	M03419	↓	↓	↓	↓	↓	↓

KJH 6/12/97

030104

000111

METAL'S STANDARD PREP LOGBOOK #3

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M03738	9/23/97	SAW	MIX 2A	SOLN A	HP	724713	SEE SHEETS	250 mL	—	—	—	10/98
M03739	9/23/97	SAW	MIX 2A	SOLN A	HP	724713	SEE SHEETS	250 mL	—	—	—	10/98
M03740	9/23/97	SAW	MIX 3	SEE SHEETS	HP	724805	SEE SHEETS	250 mL	—	—	—	10/98
M03741	9/23/97	SAW	MIX 3	SEE SHEETS	HP	724805	SEE SHEETS	250 mL	—	—	—	10/98
M03742	9/23/97	SAW	MIX 4	SOLN A	HP	725811	SEE SHEETS	500 mL	—	—	—	10/98
M03743	9/23/97	SAW	MIX 4	SOLN B	HP	725811	SEE SHEETS	500 mL	—	—	—	10/98
M03744	9/23/97	SAW	ICSAB	CLAP ICSA	INORG VENT	M03595	SEE SHEETS	200 mL	2000 mL ~~200 mL~~	SEE SHEETS	V077 KTKB-P V078 KVCN	12/23/97
↓	↓	↓	↓	CLAP ICSB	INORG VENT	M03365	SEE SHEETS	20 mL	↓	↓	↓	↓
M03745	9/23/97	SAW	STD 1	MIX 2A	HP	M03738	SEE SHEETS	1.0 mL	1000 mL	SEE SHEETS	V077 KTKB-P V078 KVCN	12/23/97
↓	↓	↓	↓	MIX 2A*	HP	M03737	SEE SHEETS	1.0 mL	↓	↓	↓	↓
M03746	9/23/97	SAW	STD 2	MIX 3	HP	M03740	SEE SHEETS	10.0 mL	1000 mL	SEE SHEETS	V077 KTKB-P V078 KVCN	12/23/97
↓	↓	↓	↓	MIX 1A*	HP	M03284	SEE SHEETS	5.0 mL	↓	↓	↓	↓
M03747	9/23/97	SAW	TRACE STD HIGH	MIX 4	HP	M03742	SEE SHEETS	10.0 mL	1000 mL	SEE SHEETS	V077 KTKB-P V078 KVCN	12/23/97
↓	↓	↓	↓	MIX 4*	HP	M03743	SEE SHEETS	10.0 mL	↓	↓	↓	↓
M03748	9/23/97	SAW	TRACE STD 1 - 20 ppb	M03747 PREP'D	HP	M03747	SEE SHEETS	2.0 mL	100 mL	SEE SHEETS	V077 KTKB-P V078 KVCN	10/23/97
M03749	9/23/97	SAW	TRACE STD 2 - 100 ppb	PREP'D 9/23/97	HP	M03747	SEE SHEETS	10.0 mL	100 mL	SEE SHEETS	V077 KTKB-P V078 KVCN	10/23/97
M03750	9/23/97	AFS	Std	Hg	M03689	Prep 9/9/97	10 ppm	500 uL	50 mL	100 ppb	V077 KTKB-P	9/24/97
M03751	↓	↓	MQC	↓	M03690	↓	↓	↓	↓	↓	↓	↓

Qc'd [illegible] 10/17/97

000145

030105

METAL'S STANDARD PREP LOGBOOK #3

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M04185	2/20/98	JH	FN STD	Cu	H.P.	M03770	10,000ppm	10ml	100ml	1000ppb	KVP L39539	2/27/98
				Cd	↓	M03779	↓	↓	↓	↓	↓	↓
				Ag	↓	M03761	↓	↓	↓	↓	↓	↓
M04186	2/20/98	JH	Excel Sub	Ni	Ricca	M02883	1000ppm	800ml	100ml	8000ppb	KVP L39539	5/20/98
				Zn	Mall	M04012	↓	400ml	↓	4000ppb	↓	↓
M04187	2/20/98	JH	Excel	Be	Prep'd 1/20/98	M04072	800ppb	2ml	200ml	8.0ppb		4/20/98
				Mo	↓	↓	1000ppb	↓	↓	10ppb	↓	↓
				Ni	Prep'd 2/20/98	M04186	8000ppb	↓	↓	80ppb	↓	↓
				Zn	↓	↓	4000ppb	↓	↓	40ppb	↓	↓
M04188	2/20/98	JH	QCP CICV-2	Stock Solution	I.V.	L-MEB58032	—	100ml	—	—	—	3/99
M04189			QCP CICV-3			M-MEB58063	—	↓	—	—	—	↓
M04190			QCP CICV-3			M-MEB58063	—	↓	—	—	—	↓
M04191			QCP CICV-2			L-MEB58032	—	↓	—	—	—	↓
M04192			QCP CICV-1			N-MEB58076	—	↓	—	—	—	↓
M04193			CLPP Cal-3			M-MEB58073	—	↓	—	—	—	↓
M04194			CLPP Cal-2			M-SB02047	—	↓	—	—	—	↓
M04195			CLPP ICS-A			N-MEB58074	—	600ml	—	—	—	↓
M04196			CLPP ICS-A			N-MEB58074	—	↓	—	—	—	↓
M04197			CLPP Cal-1			N-MEB58075	—	100ml	—	—	—	3/99
M04198			QCP CICV-1			N-MEB58076	—	↓	—	—	—	↓

030106

METAL'S STANDARD PREP LOGBOOK #4

Std. number	Date	Analyst	Std Name	Metal	Stock Source	Lot Number	Conc.	Vol. of Stock	Final Vol.	Final Conc.	Acid Lot #	Exp. Date
M04431	5/2/98	JHV	STD1	Mix 2A	~~MB~~ H.P	M03738	see Sheets	1ml	1000ml	see Sheets	L28542 L37550	8/2/98
↓			~~Std~~ ↓	Mix 2A #	↓	M03737	↓	↓	↓	↓	↓	↓
~~M04432~~			~~STD2~~	~~Mix1~~	↓	~~M04136~~	↓	~~5.0ml~~	JHV 8/2/98	↓	↓	↓
↓	see below		↓	Mix 3	↓	~~M03740~~	↓	10ml	↓	↓	↓	↓
M04433	5/2/98	JHV	TRACE STD High	Mix4A	H.P	M03742	↓	10ml	1000ml	↓	↓	8/2/98
				Mix4B	↓	M03743	↓	↓	↓	↓	↓	↓
M04434	5/2/98	JHV	Trace STD1	PNP'D	H.P	M04433	↓	4ml	200ml	20ppb	↓	7/2/98
M04435	5/2/98	JHV	Trace STD2	5/2/98	↓	↓	↓	20ml	↓	100ppb	↓	↓
M04436	5/2/98	JHV	STD2	Mix 1	H.P	M03276	see Sheets	5.0ml	1000ml	see Sheets	↓	8/2/98
				Mix 3	↓	M03740	↓	10ml	↓	↓	↓	↓
M04437	5/4/98	JHV	IEC2	Mn	Recca	M03389	1000ppm	5ml	1000ml	5ppm	L28542 L37550	8/4/98
				V	↓	M03423	↓	↓	↓	↓	↓	↓
M04438	5/4/98	JHV	TRACE Q4	QCP CICV1	IV JHV 8/4/98	M04198 ~~M04498~~	see Sheets	2.0ml	2000ml	see Sheets	↓	↓
				QCP CICV2	↓	M04191	↓	↓	↓	↓	↓	↓
				QCP CICV3	↓	M04189	↓	↓	↓	↓	↓	↓
M04439	5/4/98	APS	FN Std	Ag	Hall	M03619	1000ppm	50ml	50ml	1ppm	L28542	5/11/98
↓	↓	↓	↓	As	↓	M02084	↓	50ml	↓	↓	↓	↓
↓	↓	↓	↓	Cd	↓	M03825	↓	50ml	↓	↓	↓	↓
↓	↓	↓	↓	Cr	↓	M02781	↓	50ml	↓	↓	↓	↓
↓	↓	↓	↓	Cu	↓	M03815	↓	50ml	↓	↓	↓	↓
↓	↓	↓	↓	Pb	↓	M04314	↓	50ml	↓	↓	↓	↓

030107

ENVIRONMENTAL RESOURCE ASSOCIATES
ARVADA, COLORADO 1-800-372-0122

Certification

PriorityPollutnT™/CLP Inorganic Soils — Quality Control Standards

Catalog № PPS-46 Lot № 233

Parameter	Certified Value	Performance Acceptance Limits™
TRACE METALS PriorityPollutnT™ (Catalog No 540)	**mg/Kg**	**mg/Kg**
aluminum	3980	2100 - 5860
antimony	54.3	5.10 - 103
arsenic	108	80.1 - 136
barium	59.7	45.2 - 74.2
beryllium	47.6	33.7 - 61.4
boron	75.4	53.4 - 97.3
cadmium	114	68.6 - 159
calcium	1770	1290 - 2250
chromium	42.2	32.4 - 52.1
cobalt	123	97.5 - 148
copper	68.9	56.4 - 81.3
iron	7300	2920 - 11700
lead	44.3	33.7 - 54.9
magnesium	1880	1360 - 2400
manganese	128	93.7 - 162
mercury	1.71	1.16 - 2.26
molybdenum	61.1	44.1 - 78.1
nickel	71.8	55.7 - 88.0
potassium	2400	1830 - 2970
selenium	70.6	44.6 - 96.6
silver	59.7	30.6 - 88.8
sodium	280	168 - 391
strontium	122	88.4 - 155
thallium	77.8	44.5 - 111
tin	79.0	59.2 - 98.9
titanium	196	89.8 - 301
vanadium	64.3	43.9 - 84.7
zinc	85.6	66.2 - 105
CYANIDE PriorityPollutnT™ (Catalog No 541)	**mg/Kg**	**mg/Kg**
total cyanide	51.1	27.0 - 75.2

The ***Trace Metals Certified Values*** are equal to the mean recoveries for each parameter as determined in an interlaboratory round robin study. The standard was digested using various EPA methods such as Method 3050, 3051, etc. and the digest analyzed by ICP and atomic absorption spectroscopy.

The ***Cyanide Certified Value*** is equal to the mean recovery as determined in an interlaboratory round robin study. The standard was distilled and analyzed following the procedure outlined in Method 9010, SW-846.

The ***Performance Acceptance Limits (PALs™)*** are listed as guidelines for acceptable analytical results given the limitations of the USEPA methodologies commonly used to determine these parameters and closely approximate the 95% confidence interval. The PALs™ are based on data generated by your peer laboratories in ERA's InterLaB™ programs. If your result falls outside of the PALs™, ERA recommends that you investigate potential sources of error in your preparation and/or analytical procedures. For further technical assistance, call ERA at 1-800-372-0122.

For users of internal standards, ERA has determined that scandium is present in this soil at 2.2 mg/Kg and that yttrium is present at 17 mg/Kg.

PriorityPollutnT™/CLP Inorganic Soils Lot No. 233

% Solid/Moisture Report
Samples: 9804680 through 9804682
Blanks Included? N Other QC Included? N

Sample#	% Solid	% Moisture	Date of Analysis	Analyst
9804680	75.68	24.32	04-MAY-98	KLL
9804681	76.87	23.13	04-MAY-98	KLL
9804682	76.20	23.80	04-MAY-98	KLL

E. Technical Review Checklist and Other Analysis Documentation

9804680 - 4682
3 Soils

EA LABORATORIES
QUALITY ASSURANCE SUMMARY
FOR SW-846 ANALYSES

Project: TOX Lab ABB Jacksonville **Analysis:** Metals **Analyst(s):** SAW

EA Laboratories Report No. 980617 **Method:** U.S. EPA SW846

Reviewed by: [illegible] **Date:** 5/8/98 **Data Generator:** ULF

1. Samples were analyzed within six months of sample collection. Mercury was analyzed within 28 days.
✓ Yes _____ No _____ NCR#

2. ICP Initial Calibration: A calibration blank and at least three standards were analyzed daily, and the initial calibration verification standard recovery was within 90-110%. The check standard recovery was within ±5%.
✓ Yes _____ No

3. AA Calibration: A calibration blank and at least three standards were used to establish the curve, and the initial calibration verification standard recovery was within 90-110%.
NA Yes _____ No

4. Continuing Calibration Verification (CCV): A CCV standard prepared from a source other than that of the initial calibration was used, and the result was 90-110% of the true value for both ICP and GFAA (80-120% for Mercury). The CCV was run at a frequency of 10% or every two hours and at the end of the run.
✓ Yes _____ No

5. A preparation blank was analyzed with each batch and all analytes are less than three times the MDL or below the reporting limit for the project.
_____ Yes _____ No _____ NCR#

6. Matrix spikes, matrix spike duplicates and matrix duplicates were analyzed for each batch. Accuracy and precision criteria were met for all analytes. If no specify analyte and recovery or RPD.
_____ Yes _____ No

Analyte	MS recovery	MSD recovery	Dup RPD
Cd			34.4

EA LABORATORIES
QUALITY ASSURANCE SUMMARY
FOR SW-846 ANALYSES

Project: TDX LAB ABB

Analysis: Metals

EA Laboratories Report No. 98061

Method: U.S. EPA SW846

Reviewed by: QL

Date: 5/8/98

7. LCS criteria were met for all analytes.
✓ Yes _____ No _____ NCR#

Preparation Date: 5/1/98

Analysis Date: 5/5/98

Comments:

ATTACHMENT V

Report Quality Assurance Record

REPORT QUALITY ASSURANCE RECORD

Client: Harding Lawson Associates
Project Number: 70003.1C
Author: L. Hartzell

EA Report No.: 2810
Type Analysis: 10-day sediment test
Test Organisms: Hyalella azteca

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.	Lynda A. Hartzell	5/13/98
2. Samples prepared and processed according to study plan requirements.	Lynda A. Hartzell	5/13/98
3. Data collected using calibrated equipment.	Lynda A. Hartzell	5/13/98
4. Calculations checked:		
- Hand calculations checked	Richard A. Connelly	5/13/98
- Documented and verified statistical procedure used.	Lynda A. Hartzell	5/13/98
5. Data input/statistical analyses complete and correct.	Richard A. Connelly	5/13/98
6. Reported results and facts checked against original sources.	Richard A. Connelly	5/13/98
7. Data presented in figures and tables correct and in agreement with text.	Richard A. Connelly	5/13/98
8. Results reviewed for compliance with study plan requirements.	Wayne McCullock	5/18/98

	AUTHOR	DATE
9. Commentary reviewed and resolved.	Lynda A. Hartzell	6/17/98

10. All study plan and quality assurance/control requirements have been met and the report is approved:

Wayne McCullock	5/18/98
PROJECT MANAGER	DATE
Richard A. Connelly	5/13/98
QUALITY CONTROL OFFICER	DATE
Virginia A. Sohn	6/16/98
SENIOR TECHNICAL REVIEWER	DATE

APPENDIX F

BACKGROUND SCREENING CONCENTRATIONS FOR OPERABLE UNIT 3 REMEDIAL INVESTIGATION

Table F-1
Background Screening Concentrations for Operable Unit 3 Remedial Investigation

Sampling Event Report
Potential Source of Contamination 44
Naval Air Station
Jacksonville, Florida

Parameter	St. Johns' Sediment (mg/kg)
Aluminum	1,239.5
Antimony	ND
Arsenic	ND
Barium	4.8
Beryllium	ND
Cadmium	ND
Calcium	1,914
Chromium	4.65
Cobalt	0.6
Cooper	1.8
Iron	1,644
Lead	6.7
Magnesium	353.8
Manganese	19.95
Mercury	ND
Nickel	ND
Potassium	122.8
Selenium	1.48
Silver	ND
Sodium	ND
Thallium	ND
Vanadium	3.65
Zinc	ND

Analytical data for the specific metal in the sampled media are all below the reporting limits.

Notes: mg/kg = milligrams per kilogram.
ND = not detected.

APPENDIX G

CALCULATIONS OF RISK FROM CONTAMINATED SEDIMENT FOR POSSIBLE FUTURE RESIDENTS

TABLE G-1

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
NAVAL AIR STATION JACKSONVILLE
PSC 44

08-Dec-98

Aug 1996

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	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	USEPA, 1992b
SURFACE AREA EXPOSED	SA	2,500	cm²	USEPA, 1992a (below knees)
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992a
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	50	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	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, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memorandum; February 10, 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)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$\text{INTAKE-DERMAL} = \frac{(DA_{event} \times EF \times ED \times SA)}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE G-1

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
ADULT RESIDENT
NAVAL AIR STATION JACKSONVILLE
PSC 44

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
benzo(a)anthracene	o	10000	ug/kg	0.0E+00	7.3	0.0E+00	0.01	1.7E-07	8	1.3E-06	1.3E-06
benzo(a)pyrene	o	8500	ug/kg	0.0E+00	7.3	0.0E+00	0.01	1.4E-07	8	1.1E-06	1.1E-06
benzo(b)fluoranthene	o	14000	ug/kg	0.0E+00	7.3	0.0E+00	0.01	2.3E-07	8	1.9E-06	1.9E-06
indeno(1,2,3-cd)pyrene	o	2800	ug/kg	0.0E+00	7.3	0.0E+00	0.01	4.7E-08	8	3.8E-07	3.8E-07
arsenic	I	1.7	mg/kg	0.0E+00	1.5	0.0E+00	0.001	2.9E-09	1.5	4.3E-09	4.3E-09
SUMMARY CANCER RISK						0E+00				5E-06	5E-06

[1] Relative potency factors have been applied to the CSFs for carcinogenic PAHs. Relative potency factors are derived in "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons," USEPA, 1993.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from oral CSFs.
NE = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT 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
benzo(a)anthracene	o	10000	ug/kg	0.0E+00	ND		0.01	4.9E-07	ND		
benzo(a)pyrene	o	8500	ug/kg	0.0E+00	ND		0.01	4.2E-07	ND		
benzo(b)fluoranthene	o	14000	ug/kg	0.0E+00	ND		0.01	6.8E-07	ND		
indeno(1,2,3-cd)pyrene	o	2800	ug/kg	0.0E+00	ND		0.01	1.4E-07	ND		
arsenic	I	1.7	mg/kg	0.0E+00	0.0003	0.0E+00	0.001	8.3E-09	0.00029	2.9E-05	2.9E-05
SUMMARY HAZARD INDEX						0E+00				3E-05	3E-05

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from oral RfDs.
ND = no data available.

TABLE G-2

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
NAVAL AIR STATION JACKSONVILLE
PSC 44

08-Dec-98

Aug 1996

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SEDIMENT	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	20	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	USEPA, 1992b
AGE-WEIGHTED SURFACE AREA	$SA_{soil/adj}$	300	cm²	[1] (below knees)
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992a
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	100	days/year [2]	Assumption
EXPOSURE DURATION	ED	2	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1995

[1] In estimating the dermally absorbed dose for children age 4 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.
[2] 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, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1992b. USEPA Region IV Guidance Memorandum; February 10, 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)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

INTAKE-DERMAL = (DAevent x EF/ AT x 365 days/year) x SAsoil/adj

Where:

$SA_{soil/adj}$ = SUM(SAi x EDi/BWi)
DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED.

TABLE G-2

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SEDIMENT
CHILD RESIDENT
NAVAL AIR STATION JACKSONVILLE
PSC 44

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SEDIMENT CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1,3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
benzo(a)anthracene	o	10000	ug/kg	0.0E+00	7.3	0.0E+00	0.01	1.2E-07	8	9.4E-07	9.4E-07
benzo(a)pyrene	o	8500	ug/kg	0.0E+00	7.3	0.0E+00	0.01	1.0E-07	8	8.0E-07	8.0E-07
benzo(b)fluoranthene	o	14000	ug/kg	0.0E+00	7.3	0.0E+00	0.01	1.6E-07	8	1.3E-06	1.3E-06
indeno(1,2,3-cd)pyrene	o	2800	ug/kg	0.0E+00	7.3	0.0E+00	0.01	3.3E-08	8	2.6E-07	2.6E-07
arsenic	I	1.7	mg/kg	0.0E+00	1.5	0.0E+00	0.001	2.0E-09	1.5	3.0E-09	3.0E-09
SUMMARY CANCER RISK						0E+00				3E-06	3E-06

[1] Relative potency factors were applied to the CSFs for carcinogenic PAHs. Relative potency factors are derived in "Provisional Guidance for Quantitative Risk Assessment for Polycyclic Aromatic Hydrocarbons," USEPA, 1993.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[3] Calculated from oral CSFs.
NE = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC	SEDIMENT 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
benzo(a)anthracene	o	10000	ug/kg	0.0E+00	ND		0.01	4.1E-06	ND		
benzo(a)pyrene	o	8500	ug/kg	0.0E+00	ND		0.01	3.5E-06	ND		
benzo(b)fluoranthene	o	14000	ug/kg	0.0E+00	ND		0.01	5.8E-06	ND		
indeno(1,2,3-cd)pyrene	o	2800	ug/kg	0.0E+00	ND		0.01	1.2E-06	ND		
arsenic	I	1.7	mg/kg	0.0E+00	0.0003	0.0E+00	0.001	7.0E-08	0.00029	2.4E-04	2.4E-04
SUMMARY HAZARD INDEX						0E+00				2E-04	2E-04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from oral RfDs.
ND = no data available.

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 47
PESTICIDE SHOP, BUILDING 536

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Unit Identification Code: N00207

Contract No.: N62467-89-D-0317/040

Prepared by:

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Prepared for:

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

Dana Gaskins, Code 1857, Engineer-in-Charge

February 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-0317/040 are complete and accurate and comply with all requirements of this contract.

DATE: February 8, 1999

NAME AND TITLE OF CERTIFYING OFFICIAL: Phylissa Miller
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Phylissa Miller
Project Technical Lead

(DFAR 252.227-7036)

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SAS.02.99

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Naval Air Station Jacksonville
Jacksonville, Florida

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Pesticide Shop, Building 536
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Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
BHC	1,2,3,4,5,6-hexachlorocyclohexane
Compuchem	Compuchem Environmental Corporation
DVECC	Disease Vector Ecology and Control Center
EDS	Environmental Data Services
FDEP	Florida Department of Environmental Protection
FRE	focused risk evaluation
GGC	groundwater guidance concentration
HLA	Harding Lawson Associates
IRA	interim remedial action
MCL	maximum contaminant level
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPP	2-(2-methyl-4-chlorophenoxy)propionic acid
mg/kg	milligrams per kilogram
μg/kg	micrograms per kilogram
μg/ℓ	micrograms per liter
NAS	Naval Air Station
NFESC	Naval Facilities Engineering Service Center
NTU	nephelometric turbidity unit
PARCC	precision, accuracy, representativeness, completeness, and comparability
PSC	potential source of contamination
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RI/FS	remedial investigation and feasibility study
RRDS	Remedial Response Decision System
SDG	sample delivery group
SSW	site screening workplan
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Harding Lawson Associates (HLA) (formerly ABB Environmental Services [ABB-ES]), under contract to the Department of Navy (Contract No. N62467-89-D-0317, Task Order No. 040) is submitting this Sampling Event Report for Potential Source of Contamination (PSC) 47, Pesticide Shop, Building 536 at Naval Air Station (NAS) Jacksonville, Jacksonville, Florida. PSC 47 is located in the central part of the station, south of Birmingham Avenue and west of Child Street (Figures 1-1 and 1-2). The PSC includes a long narrow building (Building 536), with approximately six working bays, and the pavement surrounding the building. A mowed grassy area surrounds the pavement and is surrounded by a 6-foot-high fence. The entire PSC occupies 1½ acres. The gate is locked after business hours and when the area is unattended. A drainage ditch that lies between the eastern boundary of the Pesticide Shop fence and Child Street runs south toward recreational baseball fields. PSC 47 appears to be flat, but surface water runoff most likely flows east toward the drainage ditch.

This Sampling Event Report summarizes the methods and the results of the field investigation and presents the field and analytical data.

1.1 PURPOSE AND SCOPE. The purpose of the sampling event at PSC 47 was to gather sufficient information to support the next phase of the Remedial Response Decision System (RRDS) process (ABB-ES, 1995). The scope of the sampling event for PSC 47, detailed in the Site Screening Workplan (SSW) (ABB-ES, 1997), included the following:

- Collection of up to 50 surface soil samples. At approximately 25 locations, soil samples were to be collected from 0 to 1 and 1 to 2 feet below land surface.

- Collection of up to two surface water and two sediment samples from the drainage ditch located east of the site between the perimeter fence and Child Street.

- Collection of one sludge sample from each of two soakage pits.

- Installation of two "micro" monitoring wells to collect groundwater samples. The two wells were to be installed, based on the U.S. Geological Survey basewide groundwater flow model, downgradient of the most active portions of the site.

- Laboratory analysis of the soil, sludge, groundwater, surface water, and sediment samples for the U.S. Environmental Protection Agency (USEPA) target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), herbicides, and target analyte list (TAL) inorganics.

Fieldwork for this sampling event was conducted between April 9, 1997, and August 13, 1997.

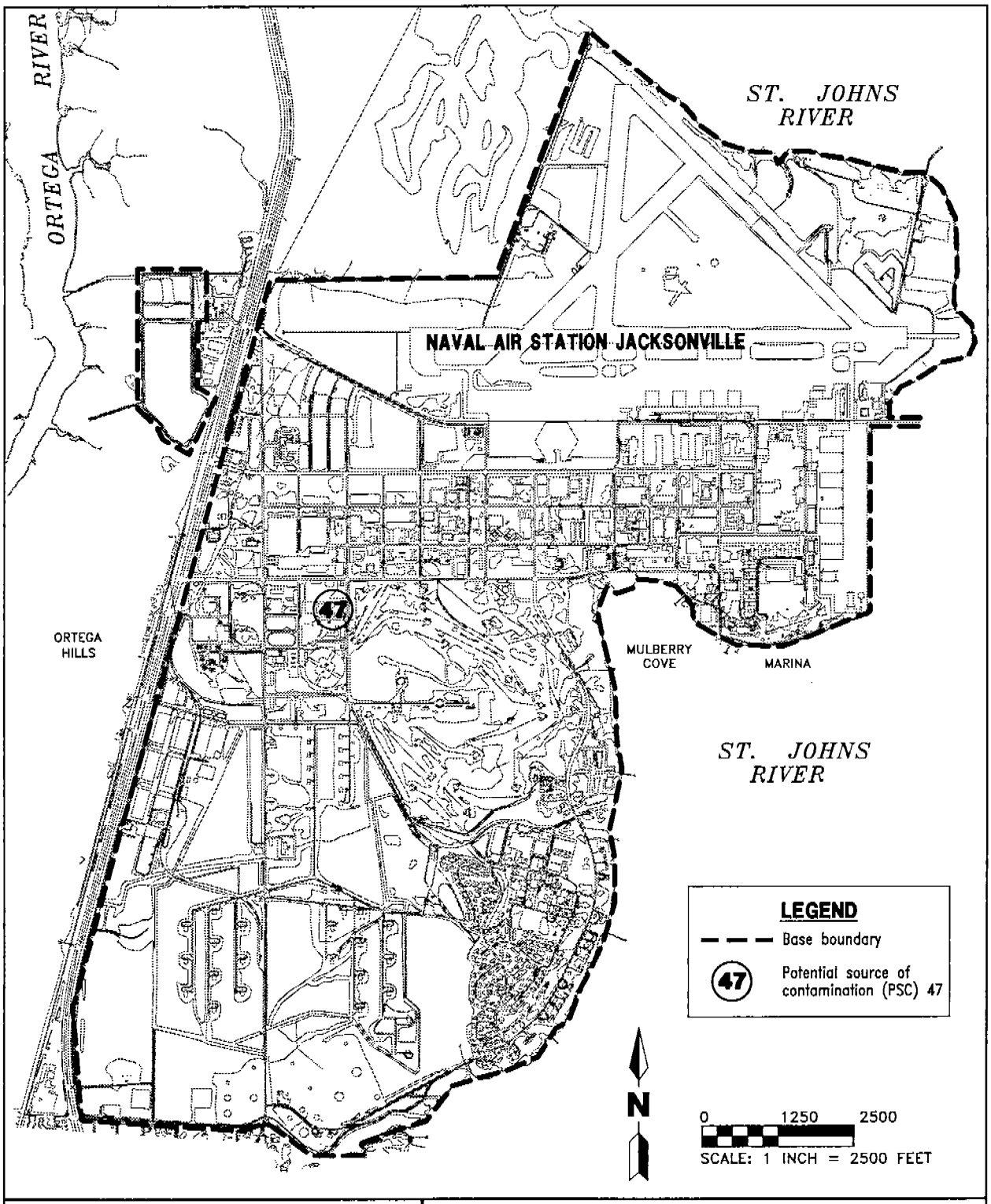

FIGURE 1-1
LOCATION OF PSC 47 AT
NAVAL AIR STATION JACKSONVILLE

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SAMPLING EVENT REPORT
PSC 47

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

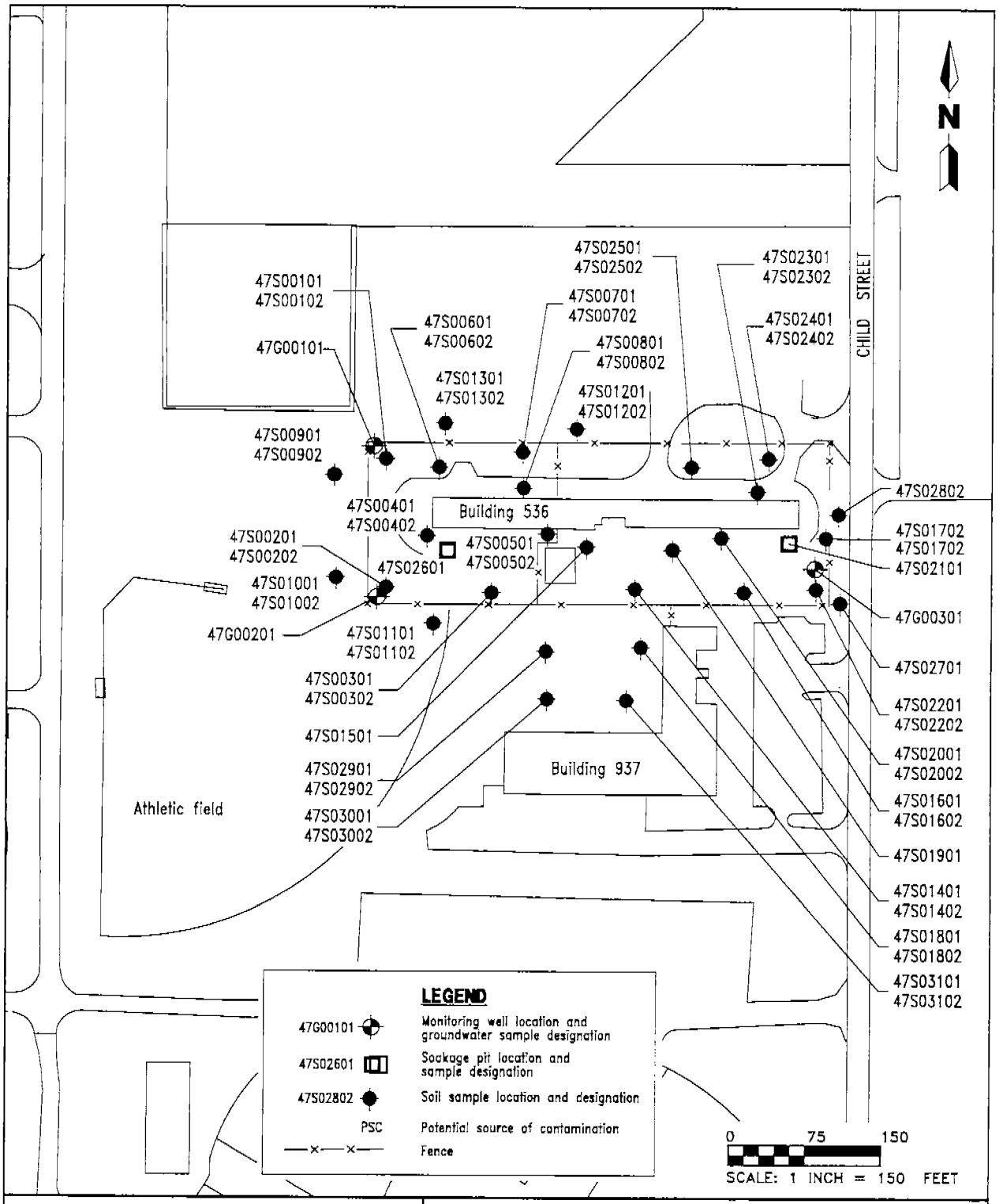

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 47, PESTICIDE SHOP, BUILDING 536

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SAMPLING EVENT REPORT
PSC 47

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

1.2 SITE DESCRIPTION. The Pesticide Shop was identified as a PSC and added to NAS Jacksonville's Hazardous and Solid Waste Amendment permit in 1993 because past practices included disposal of pesticides into the soil at the PSC (Gartland, 1993).

The Pesticide Shop has occupied its current site since the middle to late 1960s. The site was previously used as an engine test cell facility, and engines were tested within the bays of Building 536. During the 1960s and 1970s, the Disease Vector Ecology and Control Center (DVECC) also used the grounds of the Pesticide Shop as a training site. DVECC is located next to the Pesticide Shop in Building 937. Test slabs of concrete, cinder block, and brick were constructed in the southeast corner of the property as mock building structures, and chlordane was applied to and around the slabs during DVECC training exercises for termite control. Past activities at PSC 47 also included storage of pesticides and herbicides, as well as calibration and testing of pesticide application equipment (Spencer, 1993). Although most equipment was tested in the bays, some testing reportedly took place along the south side of Building 536. Prior to paving bay areas, it is possible that pesticides and herbicides were spilled on the ground.

In April 1989, representatives from DVECC and the Naval Hospital met to discuss the historical inability of the insectary in Building 937 to support mosquito growth. Meeting participants expressed concern about the possibility of significant ground contamination in the immediate area due to the long history of pesticide application training on the grounds of Building 937 and the adjacent Building 536 site (Germann, 1989).

In 1991, approximately 30 rusted 55-gallon drums were removed from the southwest corner of PSC 47. According to waste handlers at NAS Jacksonville, the drums were empty at the time of removal, but had once contained malathion and other pesticides. The lids were off, and some drums had holes. Vegetation grew around the drums prior to removal. The drums were crushed and sent to the U.S. Naval Station Mayport incinerator. No samples were collected in or near the drums during or following the removal (Smith, 1994). An employee at the Pesticide Shop recalled that chlordane was spilled in the northwest corner of the property, but could specify neither the date nor size of the spill (Spencer, 1994).

2.0 SAMPLING APPROACH AND FIELD CHANGES

The work described herein was performed, in general, as presented in Subsection 4.14 of the SSW (ABB-ES, 1997). Exceptions to the proposed methods are described in this section.

The SSW called for collection of 50 soil samples from 25 locations, two sludge samples, two sediment samples, two surface water samples, and two groundwater samples. For this sampling event, 56 surface soil samples were collected from 31 locations, no sediment or surface water samples were collected, and three groundwater samples were collected. Detailed explanations of the changes are provided below.

Two additional soil samples were collected from the area south of the fenced area surrounding Building 536, behind (i.e., northwest of) Building 937 (Figure 1-2). The soil-like sludge material collected from the soakage pits were also identified as soil samples (47S02101 and 47S02601). Because no surface water was encountered in the drainage swale between the Pesticide Shop property and Child Street, the two sediment samples proposed for this location were collected and identified as soil samples (47S02701 and 47S02801). A total of 56 soil samples were collected from PSC 47.

Based on the presence of the dry drainage ditch, which is as much as three feet below the surrounding land surface and is near the southeast corner of the Pesticide Shop boundary, a third "micro" monitoring well was installed in this area. A total of three groundwater samples were collected from PSC 47.

The soil and groundwater samples collected for laboratory analysis were sent by overnight carrier to the subcontract laboratory, Compuchem Environmental Corporation (Compuchem), Cary, North Carolina. Samples were analyzed for TCL VOCs, SVOCs, pesticides/PCBs, herbicides, and TAL inorganic compounds. Not all samples, however, were analyzed for each parameter. A sample tracking log that includes sample and sample delivery group (SDG) identifiers, relevant dates, sample depths, and parameters analyzed is included in Appendix A.

Following laboratory analysis of the soil and groundwater samples, all data were validated in accordance with the Naval Facilities Engineering Service Center (NFESC) Level D protocol. A summary of the validated analytical results is included in Appendix B. A summary of detections in the soil and groundwater analytical results is presented in Appendix C.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field samples and associated quality assurance and quality control (QA/QC) samples were collected and analyzed according to USEPA Contract Laboratory Program and NFESC requirements by an NFESC certified laboratory, CompuChem Laboratories, Cary, North Carolina. The analytical data packages, submitted by SDGs, were independently validated by a subcontract data validation company, Environmental Data Services (EDS), Concord, New Hampshire, in accordance with validation requirements contained in NFESC document, *Navy Installation Restoration Laboratory Quality Assurance Guide*, dated February 1996 (NFESC, 1996). Other documents utilized in the data validation and review include the USEPA's *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, dated February 1994 (USEPA, 1994a) and the USEPA's *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, dated February 1994 (USEPA, 1994b).

A detailed QA/QC evaluation can be found in the EDS report (EDS, 1997), which summarizes the results of the data quality assessment according to the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters for the entire site screening activity. The EDS report was issued as Appendix B of the SSW. The generated analytical data were found to be acceptable according to the PARCC criteria, with less than 5 percent of the data requiring qualification (primarily estimated "J" qualifier).

4.0 ANALYTICAL RESULTS

4.1 ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES. Appendix C contains a summary of the parameters detected in surface soil samples collected at PSC 47. The complete validated analytical data are included in Appendix B.

4.1.1 Volatile Organic Compounds Twenty-nine of the 56 surface soil samples were analyzed for VOCs. Ten VOCs were detected in the 29 surface soil samples. Two of the compounds, acetone and methylene chloride, are considered artifacts of laboratory or decontamination procedures. The remaining eight VOCs were detected in only 4 of the 29 samples. All were detected at low levels.

4.1.2 Semivolatile Organic Compounds Forty-seven of the surface soil samples were analyzed for SVOCs. Thirty SVOCs were detected in the 47 surface soil samples analyzed. Two parameters were detected at moderately high levels. Benzo(a)pyrene was detected in five samples at up to 290 micrograms per kilogram (μg/kg), and n-nitroso-di-n-propylamine was detected only in the duplicate of sample 47S02502 at 40 μg/kg. (Because of the method of averaging a non-detected sample with a detected duplicate, the concentration for sample 47S02502 is reported as 107.5 μg/kg.)

4.1.3 Pesticides and Polychlorinated Biphenyls All 56 surface soil samples were analyzed for pesticides and PCBs. Twenty pesticides and PCBs were detected, and 13 of the 20 pesticides/PCBs were detected at significant levels. The most significant levels of the pesticides were aldrin (4,500 μg/kg), α-chlordane (280,000 μg/kg), 1,2,3,4,5,6-hexachlorocyclohexane, α-isomer (commonly referred to as α-BHC) (61,000 μg/kg), β-BHC (23,600 μg/kg), γ-chlordane (310,000 μg/kg), 4,4'-dichlorodiphenyldichloroethane (3,100,000 μg/kg), 4,4'-dichlorodiphenyl-dichloroethene (410,000 μg/kg), 4,4'-dichlorodiphenyltrichloroethane (12,000,000 μg/kg), dieldrin (77,000 μg/kg), heptachlor (12,000 μg/kg), and heptachlor epoxide (4,200 μg/kg) (see Appendix C).

4.1.4 Herbicides Ten herbicides were detected in the 54 soil samples analyzed for that parameter. Dinoseb, 2-methyl-4-chlorophenoxyacetic acid (MCPA), and 2-(2-methyl-4-chlorophenoxy)propionic acid (MCPP) exceeded levels that could be explained simply by the use of herbicides for weed control. MCPA was detected in 36 of 54 samples, ranging from 50 to 4,600,000 μg/kg. The detections of MCPP, found in 32 of 54 samples, ranged from 46 to 320,000 μg/kg. Seven of the highest detections were located south of the Pesticide Shop perimeter fence behind Building 937. The highest concentration of MCPA was from the soil/sediment material (47S02101) collected in the eastern soakage pit (Figure 1-2).

4.1.5 Inorganic Parameters Twenty-two inorganic parameters were identified in 56 surface soil samples. Arsenic and lead were detected at maximum concentration levels of 1,570 milligrams per kilogram (mg/kg) and 2,820 mg/kg, respectively. The highest lead concentration was detected in sample 47S02601, from the western soakage pit, whereas the highest arsenic concentration was detected in sample 47S02101, from the eastern soakage pit.

4.2 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES. The complete validated analytical data are included in Appendix B. Appendix C presents a summary of the parameters detected in three groundwater samples collected at PSC 47. It should

be noted that while turbidity readings at MW001 stabilized below 5 nephelometric turbidity units (NTUs) very rapidly, prolonged low-flow purging (i.e., 2.5 to 3.0 hours) at MW002 and MW003 were unable to lower the turbidity readings below 31 and 15 NTUs, respectively.

4.2.1 Volatile Organic Compounds VOCs were detected in only one of the three groundwater samples (47G00301) at PSC 47. Of the eight VOCs detected only benzene at 2 micrograms per liter ($\mu g/\ell$) and trichloroethene at 5 $\mu g/\ell$ exceeded their Florida groundwater guidance concentrations (GGCs) of 1 $\mu g/\ell$ and 3 $\mu g/\ell$, respectively.

4.2.2 Semivolatile Organic Compounds Five SVOCs were detected in one sample (47G00301). Of the five SVOCs only 2,4,5-trichlorophenol at 8 $\mu g/\ell$ and naphthalene at 7 $\mu g/\ell$ exceeded their Florida GGCs of 4 $\mu g/\ell$ and 6.8 $\mu g/\ell$, respectively.

4.2.3 Pesticides and Polychlorinated Biphenyls Of the 20 compounds detected in the groundwater at PSC 47, 15 were detected above their respective Florida GGCs; 3 of the 15 were detected in MW001, 13 of the 15 were detected in MW002, and 6 of the 15 were detected in MW003. It is probable that some of the detected pesticide concentration levels in MW002 and MW003 are due to the elevated turbidity and do not represent solubilized compounds.

4.2.4 Herbicides Of the nine herbicides detected in the groundwater from the three wells, only MCPA, detected in sample 47G00301 at 2,000 $\mu g/\ell$, was above the Florida GGC of 1,000 $\mu g/\ell$.

4.2.5 Inorganic Parameters Twenty-one inorganic parameters were detected in the three groundwater samples analyzed. Only one sample (47G00201) contained substances at levels above the primary drinking water standards. Antimony, detected at 6.3 $\mu g/\ell$, and arsenic, at 332 $\mu g/\ell$, exceeded both the Florida GGC and Federal maximum contaminant level (MCL) primary standards of 6 $\mu g/\ell$ for antimony and 50 $\mu g/\ell$ for arsenic. Aluminum (a maximum detected concentration of 1,260 $\mu g/\ell$), iron (18,700 $\mu g/\ell$) and manganese (194 $\mu g/\ell$) were detected at concentrations exceeding both their Florida GGC and Federal MCL secondary standards of 200 $\mu g/\ell$ for aluminum, 300 $\mu g/\ell$ for iron, and 50 $\mu g/\ell$ for manganese. Exceedances of secondary standards were observed in the three groundwater samples analyzed and may be related to the suspended solids naturally present in groundwater samples.

5.0 RISK EVALUATION

The purpose of performing focused risk evaluations (FREs) as part of the site screening evaluation is to assist in determining whether or not the existing risk at a PSC (1) supports a no further action decision, (2) indicates the need for an interim remedial action (IRA), or (3) requires additional investigation to make a decision. The documentation of the decision for PSC 47 may be found in the RRDS document for PSC 47 (ABB-ES, 1995).

It was not necessary to conduct an FRE to support a decision to perform an IRA on the surface soil at PSC 47 and to recommend that a remedial investigation and feasibility study (RI/FS) be conducted upon completion of the IRA. As the following table shows, several of the pesticides and herbicides were detected at levels that were orders of magnitude greater than USEPA Region III Risk-Based Concentrations (USEPA, 1997) and Florida Department of Environmental Protection (FDEP) Soil Cleanup Goals (FDEP, 1995). Detection of contaminants at these levels required interim action. After the IRA, an RI/FS should be conducted to further characterize any residual contamination. The following table was compiled to demonstrate the need for an IRA and does not suggest that there are no other contaminants present at PSC 47 at levels that may present a risk to human health or the environment.

Chemical	Maximum Detected Concentration	Region III Industrial RBC	FDEP Industrial SCG
Pesticides and Herbicides (μg/kg)			
4,4'-DDD	3,100,000	24,000	17,000
4,4'-DDE	410,000	17,000	11,000
4,4'-DDT	12,000,000	17,000	12,000
Aldrin	4,500	340	200
Dieldrin	77,000	360	300
Heptachlor	12,000	1,300	500
Heptachlor epoxide	4,200	630	300
α-BHC	61,000	910	600
α-Chlordane	280,000	16,000	3,000
β-BHC	23,600	3,200	2,300
γ-Chlordane	310,000	16,000	3,000
MCPA	4,600,000	1,000,000	800,000

Notes: RBC = risk-based concentration.
SCG = soil cleanup goal.
μg/kg = micrograms per kilogram.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
BHC = benzene hexachloride.
MCPA = 2-methyl-4-chlorophenoxyacetic acid.

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APPENDIX A

OFF-SITE SAMPLE TRACKING LOG

PSC 47
OFFSITE SAMPLE TRACKING LOG
SITE SCREENING, NAS JACKSONVILLE

ABB SDG	SAMPLE ID	COMMENT	SAMP DATE	UDEPTH (ft bls)	LDEPTH (ft bls)	MATRIX	TAL_MET	TCL VOC	TCL SVOC	TCL PESTPCB	HERB 8150	DRFL	TAT	DSTV	DRFV	E-DATA
00007	47G00101		4/22/97	2.4	11.4	groundwater	X	X	X	X	X	6/2/97	31	6/20/97	7/18/97	
00010	47G00201		5/7/97	1	10	groundwater	X	X	X	X	X	6/9/97	33	6/20/97	7/22/97	
0018W	47G00301		8/13/97	1	10	groundwater	X	X	X	X	X	10/1/97	43	10/1/97	10/17/97	
00002	47S00101		4/9/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00102		4/9/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00201		4/10/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	**47S00201D**	47S09001	4/10/97	0	1	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00202		4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	**47S00202D**	47S09002	4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00301		4/10/97	0	1	soil	X			X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00302		4/10/97	1	2	soil	X			X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00401		4/10/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00402		4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00501		4/10/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00502		4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00601		4/10/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00602		4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00701		4/10/97	0	1	soil	X			X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00702		4/10/97	1	2	soil	X			X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00801		4/10/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00802		4/10/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00901		4/11/97	0	1	soil	X		X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00902		4/11/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00902MS		4/11/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00002	47S00902MSD		4/11/97	1	2	soil	X	X	X	X	X	5/19/97	38	6/20/97	7/7/97	
00003	47S01001		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01002		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01101		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01102		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01201		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01202		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01301		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01302		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01401		4/11/97	0	1	soil	X			X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01402		4/11/97	1	2	soil	X			X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01501		4/11/97	0	1	soil	X			X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01601		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01602		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01701		4/11/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01702		4/11/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00003	47S01801		4/14/97	0	1	soil	X		X	X	X	5/22/97	37	6/20/97	7/8/97	

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00003	47S01802		4/14/97	1	2	soil	X	X	X	X	X	5/22/97	37	6/20/97	7/8/97	
00005	47S01901		4/17/97	0	1	soil	X		X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02001		4/17/97	0	1	soil	X		X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02002		4/17/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02101		4/17/97	0	1	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02201		4/17/97	0	1	soil	X		X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02202		4/17/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02301		4/17/97	0	1	soil	X		X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02302		4/17/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02401		4/18/97	0	1	soil	X			X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02402		4/18/97	1	2	soil	X			X	X	5/27/97	39	6/20/97	8/14/97	
00006	47S02501		4/18/97	0	1	soil	X		X	X	X	5/23/97	35	6/20/97	8/14/97	
00006	47S02501D		4/18/97	0	1	soil	X		X	X	X	5/23/97	35	6/20/97	8/14/97	
00006	47S02501MS		4/18/97	0	1	soil	X		X	X	X	5/23/97	35	6/20/97	8/14/97	
00006	47S02501MSD		4/18/97	0	1	soil	X		X	X	X	5/23/97	35	6/20/97	8/14/97	
00005	47S02502		4/18/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02502D		4/18/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02502MS		4/18/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00005	47S02502MSD		4/18/97	1	2	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
0005W	47S025TB		4/18/97	1	2	soil		X				5/27/97	39	6/20/97	7/10/97	
00005	47S02601		4/18/97	0	1	soil	X	X	X	X	X	5/27/97	39	6/20/97	8/14/97	
00009	47S02701	drainage ditch	5/8/97	0	1	soil	X	X	X	X		6/12/97	30	6/20/97	7/21/97	
00009	47S02801	drainage ditch	5/8/97	0	1	soil	X	X	X	X		6/12/97	30	6/20/97	7/21/97	
00015	47S02901		7/2/97	0	1	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S02901D		7/2/97	0	1	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S02902		7/2/97	0	2	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S03001		7/2/97	0	1	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S03002		7/2/97	1	2	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S03101		7/2/97	0	1	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	
00015	47S03102		7/2/97	1	2	soil	X	X	X	X	X	8/1/97	30	8/1/97	8/8/97	

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OFFSITE SAMPLE TRACKING LOG
SITE SCREENING, NAS JACKSONVILLE

NOTES:

ABB SDG	ABB-ES Sample Delivery Group (ABB-ES defined group of 20 samples or less collected not more than 14 days of each other.
SAMPLE ID	Sample Identifier (Note: If an erroneous identifier was used in the chain-of-custody, that identifier is indicated in the COMMENTS column.
COMMENTS	General comments (see previous note on sample identifiers). Letter code indicates the source analytical database file .
UDEPTH, LDEPTH	Depths, upper (UDEPTH) and lower (LDEPTH)
MATRIX	Media Sampled
SAMP DATE	Date of Sample Collection
TAL_MET	Target Analyte List Metals
VOC	Target Compound List Volatile Organics
SVOC	Target Compound List Semivolatile Organics
PESTPCB	Target Compound List Pesticides and Polychlorinated Biphenyls
HERB	Herbicides
DRFL	Date Package Received from Laboratory
TAT	Turnaround Time (days)
DSTV	Date Package Sent to Validators
DRFV	Date Package Received from Validators
E-DATA	Electronic data deliverable (Type)
■	Diskette

APPENDIX B

VALIDATED ANALYTICAL RESULTS

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00101		47S00102		47S00201		47S00201D		47S00202		47S00202D		47S00301		47S00302		47S00401	
Sampling Date	4/9/97		4/9/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,1,2,2-Tetrachloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,1,2-Trichloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,1-Dichloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,1-Dichloroethene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,2-Dichloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,2-Dichloroethene (total)	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
1,2-Dichloropropane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
2-Butanone	NA		11	UR	NA		12	U	11	U	12	U	NA		NA		NA	
2-Hexanone	NA		11	UR	NA		12	U	11	U	12	U	NA		NA		NA	
4-Methyl-2-pentanone	NA		11	UR	NA		12	U	11	U	12	U	NA		NA		NA	
Acetone	NA		26	J	NA		30	J	28	J	34	J	NA		NA		NA	
Benzene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Bromodichloromethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Bromoform	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Bromomethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Carbon disulfide	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Carbon tetrachloride	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Chlorobenzene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Chloroethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Chloroform	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Chloromethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
cis-1,3-Dichloropropene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Dibromochloromethane	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Ethylbenzene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Methylene chloride	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Styrene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Tetrachloroethene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Toluene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
trans-1,3-Dichloropropene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Trichloroethene	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Vinyl chloride	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Xylene (total)	NA		11	U	NA		12	U	11	U	12	U	NA		NA		NA	
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
1,2-Dichlorobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00101		47S00102		47S00201		47S00201D		47S00202		47S00202D		47S00301		47S00302		47S00401	
Sampling Date	4/9/97		4/9/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
1,3-Dichlorobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
1,4-Dichlorobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,2'-oxybis(1-Chloropropane)	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,4,5-Trichlorophenol	880	U	900	UJ	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
2,4,6-Trichlorophenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,4-Dichlorophenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,4-Dimethylphenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,4-Dinitrophenol	880	U	900	UJ	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
2,4-Dinitrotoluene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2,6-Dinitrotoluene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2-Chloronaphthalene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2-Chlorophenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2-Methylnaphthalene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2-Methylphenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
2-Nitroaniline	880	U	900	UR	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
2-Nitrophenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
3,3'-Dichlorobenzidine	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
3-Nitroaniline	880	U	900	UR	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
4,6-Dinitro-2-methylphenol	880	U	900	UJ	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
4-Bromophenyl-phenylether	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
4-Chloro-3-methylphenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
4-Chloroaniline	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
4-Chlorophenyl-phenylether	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
4-Methylphenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
4-Nitroaniline	880	U	900	UR	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
4-Nitrophenol	880	UJ	900	UJ	4300	UJ	5000	UJ	4600	UJ	5100	UJ	NA		NA		900	UJ
Acenaphthene	350	UJ	360	UR	1700	UJ	2000	UJ	1800	UJ	2000	UJ	NA		NA		360	UJ
Acenaphthylene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Anthracene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Benzo(a)anthracene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		58	J
Benzo(a)pyrene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		61	J
Benzo(b)fluoranthene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		110	J
Benzo(g,h,i)perylene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		44	J
Benzo(k)fluoranthene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		130	J
bis(2-Chloroethoxy)methane	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
bis(2-Chloroethyl)ether	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
bis(2-Ethylhexyl)phthalate	350	U	40	J	1700	U	2000	U	1800	U	2000	U	NA		NA		54	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00101		47S00102		47S00201		47S00201D		47S00202		47S00202D		47S00301		47S00302		47S00401	
Sampling Date	4/9/97		4/9/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Butylbenzylphthalate	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Carbazole	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Chrysene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		66	J
Di-n-butylphthalate	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Di-n-octylphthalate	350	U	38	J	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Dibenz(a,h)anthracene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Dibenzofuran	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Diethylphthalate	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Dimethylphthalate	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Fluoranthene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		48	J
Fluorene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Hexachlorobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Hexachlorobutadiene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Hexachlorocyclopentadiene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Hexachloroethane	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Indeno(1,2,3-cd)pyrene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		39	J
Isophorone	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
N-Nitroso-di-n-propylamine	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
N-Nitrosodiphenylamine (1)	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Naphthalene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Nitrobenzene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Pentachlorophenol	880	U	900	UJ	4300	U	5000	U	4600	U	5100	U	NA		NA		900	U
Phenanthrene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Phenol	350	U	360	UJ	1700	U	2000	U	1800	U	2000	U	NA		NA		360	U
Pyrene	350	U	360	UR	1700	U	2000	U	1800	U	2000	U	NA		NA		32	J
Pesticides/PCB, ug/kg																		
4,4'-DDD	44000		52	J	940000		130000	J	94000		190000	J	480	J	55		990	J
4,4'-DDE	8600	J	150		69000	J	48000		12000	J	26000	J	4200		160		550	
4,4'-DDT	640000		4500		5500000		5600000		3600000		2800000		10000		610		850	J
Aldrin	9000	U	37	U	88000	U	21000	U	9400	U	21000	U	360	U	8.9	U	1.4	J
alpha-BHC	9000	U	37	U	88000	U	21000	U	9400	U	21000	U	360	U	8.9	U	18	U
alpha-Chlordane	2100	J	37	U	44000	J	34000	J	8400	J	18000	J	2900		180		73	
Aroclor-1016	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U
Aroclor-1221	360000	U	1400	U	3500000	U	820000	U	370000	U	820000	U	14000	U	350	U	720	U
Aroclor-1232	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U
Aroclor-1242	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U
Aroclor-1248	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00101		47S00102		47S00201		47S00201D		47S00202		47S00202D		47S00301		47S00302		47S00401	
Sampling Date	4/9/97		4/9/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Aroclor-1254	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U
Aroclor-1260	170000	U	720	U	1700000	U	400000	U	180000	U	400000	U	7000	U	170	U	360	U
beta-BHC	9000	U	37	U	88000	U	3200	J	9400	U	21000	U	270	J	4	J	18	U
delta-BHC	9000	U	37	U	88000	U	21000	U	460	J	21000	U	33	J	8.9	U	18	U
Dieldrin	17000	U	6.5	J	170000	U	40000	U	18000	U	40000	U	700	U	17	U	110	
Endosulfan I	9000	U	37	U	88000	U	21000	U	9400	U	21000	U	360	U	8.9	U	18	U
Endosulfan II	17000	U	72	U	170000	U	40000	U	18000	U	40000	U	700	U	17	U	36	U
Endosulfan sulfate	17000	U	72	U	170000	U	40000	U	18000	U	40000	U	700	U	17	U	36	U
Endrin	1100	J	72	U	26000	J	40000	U	1500	J	3200	J	42	J	17	U	36	U
Endrin aldehyde	17000	U	72	U	170000	U	40000	U	18000	U	40000	U	22	J	17	U	36	U
Endrin ketone	17000	U	72	U	170000	U	40000	U	18000	U	40000	U	700	U	2	J	36	U
gamma-BHC (Lindane)	9000	U	37	U	88000	U	21000	U	9400	U	21000	U	10	J	8.9	U	18	U
gamma-Chlordane	3800	J	5.1	J	77000	J	37000	J	9200	J	19000	J	3000		180		82	
Heptachlor	9000	U	37	U	7500	J	5600	J	2200	J	4900	J	540		15		0.47	J
Heptachlor epoxide	9000	U	37	U	88000	U	21000	U	9400	U	21000	U	360	U	8.9	U	18	U
Methoxychlor	90000	U	370	U	880000	U	210000	U	94000	U	210000	U	3600	U	89	U	180	U
Toxaphene	900000	U	3700	U	8800000	U	2100000	U	940000	U	2100000	U	36000	U	890	U	1800	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	10	J	0.38	J	16	J	5.3	J	6.1	J	73	U	1.8	J	1.4	J	1.3	J
2,4,5-T	0.69	J	0.83	J	66	J	65	J	4.9	J	16	J	18	J	2.6	J	8.9	J
2,4-D	3.1	J	16	UJ	280	J	260	J	120	J	180	U	0.72	U	19	J	180	J
2,4-DB	33	J	50	J	15000	J	6100	J	380	J	4100	J	89	J	35	J	13	J
Dalapon	17	J	9	J	140	J	230	J	19	J	29	J	5.3	J	5.4	J	14	J
Dicamba	7.3	J	2.6	J	8.6	J	7.5	J	12		53	J	17	J	0.63	J	5.9	J
Dichloroprop	34	J	26	UJ	390	J	180	J	18	J	290	U	7.6	J	4	J	84	J
Dinoseb	8.6	J	5.4	J	1200	J	170	J	110	J	16	J	30	J	12	J	24	J
MCPA	7200	J	46	J	62000	J	2200	J	21000	J	120000	J	1300	U	620	U	380	J
MCPP	950	U	8500	J	580	J	530	J	910	J	2200	U	1900	U	940	U	4600	J
Inorganics, mg/kg																		
Aluminum	1280	J	1790	J	168	J	193	J	553	J	705	J	637	J	79.5	U	567	J
Antimony	1.1	UJ	1.1	UJ	0.6	J	1.6	U	1.2	UJ	1.4	UJ	1.4	U	0.78	U	1.1	UJ
Arsenic	0.74	J	1.3	U	1.2	J	0.73	J	1.3	J	1.7	J	3		1.2	U	3.5	
Barium	7	J	4.4	J	5.5	J	6.2	J	4.2	J	4.8	J	31.9	J	8.2	J	5.2	J
Beryllium	0.09	U	0.09	U	0.08	U	0.12	U	0.09	U	0.12	U	0.06	U	0.08	U	0.05	U
Cadmium	0.15	J	0.2	U	2.8		3.3		0.36	J	0.47	J	1.2		0.17	U	0.23	J
Calcium	546	J	311	J	1000	J	1420		421	J	462	J	78400		2290		235000	
Chromium	3.5		2	J	3.3		4.8		1.8	J	2	J	16.3		1.7	J	6.1	

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00101		47S00102		47S00201		47S00201D		47S00202		47S00202D		47S00301		47S00302		47S00401	
Sampling Date	4/9/97		4/9/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Cobalt	0.4	U	0.44	U	0.4	U	0.28	J	0.44	U	0.54	U	0.57	J	0.4	U	0.37	J
Copper	5.1	J	1.8	J	8		6.4		1.5	J	2.7	J	22.9		2.1	J	2.2	J
Iron	1030		479		2420		4520		281		1110		1900		186		287	
Lead	27.7		3.7		51.4		60.6		6.4		8.6		132		6.8		3.6	
Magnesium	74.1	J	45.8	J	46.5	J	55.6	J	19.5	U	20.9	J	545	J	32.7	J	1390	
Manganese	8.6	J	7.8	J	19.1	J	26.4	J	7.8	J	7.7	J	24.9	J	11.3	J	26	J
Mercury	0.05	U	0.05	U	0.05	U	0.07	U	0.07	U	0.07	U	0.05	U	0.05	U	0.05	U
Nickel	0.94	J	1.4	J	1.8	J	2.3	J	0.82	J	1.5	J	4.8	J	0.61	J	0.98	J
Potassium	67.6	U	37.2	U	52.3	U	51.6	U	32.9	U	39.5	U	80.5	U	45.6	U	94.1	J
Selenium	1.9	U	2	U	1.8	U	2.7	U	2.1	U	2.4	U	2	U	1.9	U	2	U
Silver	0.32	U	0.33	U	0.31	U	0.42	U	0.33	U	0.41	U	1.2	J	0.32	U	0.32	U
Sodium	274	U	234	U	257	U	300	U	279	U	279	U	295	U	279	U	277	U
Thallium	2.5	U	2.6	U	2.3	U	3.2	U	2.6	U	3.2	U	2.6	U	2.5	U	2.6	U
Vanadium	3.6		2	J	1.1	J	1	J	1	J	0.99	J	4.4	J	1	J	4.8	J
Zinc	19.3	J	4	J	43.9	J	46.3	J	6.6	J	7.6	J	78	J	4.6	J	4	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00402		47S00501		47S00502		47S00601		47S00602		47S00701		47S00702		47S00801		47S00802	
Sampling Date	4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,1,2,2-Tetrachloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,1,2-Trichloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,1-Dichloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,1-Dichloroethene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,2-Dichloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,2-Dichloroethene (total)	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
1,2-Dichloropropane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
2-Butanone	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
2-Hexanone	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
4-Methyl-2-pentanone	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Acetone	28	J	NA		18	J	NA		28	J	NA		NA		NA		26	J
Benzene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Bromodichloromethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Bromoform	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Bromomethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Carbon disulfide	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Carbon tetrachloride	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Chlorobenzene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Chloroethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Chloroform	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Chloromethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
cis-1,3-Dichloropropene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Dibromochloromethane	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Ethylbenzene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Methylene chloride	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Styrene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Tetrachloroethene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Toluene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
trans-1,3-Dichloropropene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Trichloroethene	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Vinyl chloride	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Xylene (total)	11	U	NA		11	U	NA		11	U	NA		NA		NA		11	U
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
1,2-Dichlorobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00402		47S00501		47S00502		47S00601		47S00602		47S00701		47S00702		47S00801		47S00802	
Sampling Date	4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
1,3-Dichlorobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
1,4-Dichlorobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,2'-oxybis(1-Chloropropane)	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,4,5-Trichlorophenol	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
2,4,6-Trichlorophenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,4-Dichlorophenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,4-Dimethylphenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,4-Dinitrophenol	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
2,4-Dinitrotoluene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2,6-Dinitrotoluene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2-Chloronaphthalene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2-Chlorophenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2-Methylnaphthalene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2-Methylphenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
2-Nitroaniline	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
2-Nitrophenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
3,3'-Dichlorobenzidine	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
3-Nitroaniline	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
4,6-Dinitro-2-methylphenol	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
4-Bromophenyl-phenylether	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
4-Chloro-3-methylphenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
4-Chloroaniline	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
4-Chlorophenyl-phenylether	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
4-Methylphenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
4-Nitroaniline	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
4-Nitrophenol	890	UJ	900	UJ	870	UJ	880	UJ	890	UJ	NA		NA		1000	UJ	870	UJ
Acenaphthene	350	UJ	360	UJ	350	UJ	350	UJ	350	UJ	NA		NA		400	UJ	350	UJ
Acenaphthylene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Anthracene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Benzo(a)anthracene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Benzo(a)pyrene	350	U	360	U	350	U	55	J	350	U	NA		NA		400	U	350	U
Benzo(b)fluoranthene	350	U	360	U	350	U	76	J	350	U	NA		NA		51	J	350	U
Benzo(g,h,i)perylene	350	U	360	U	350	U	630		350	U	NA		NA		96	J	350	U
Benzo(k)fluoranthene	350	U	360	U	350	U	74	J	350	U	NA		NA		50	J	350	U
bis(2-Chloroethoxy)methane	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
bis(2-Chloroethyl)ether	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
bis(2-Ethylhexyl)phthalate	41	J	63	J	57	J	37	J	38	J	NA		NA		400	U	350	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00402		47S00501		47S00502		47S00601		47S00602		47S00701		47S00702		47S00801		47S00802	
Sampling Date	4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Butylbenzylphthalate	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Carbazole	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Chrysene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Di-n-butylphthalate	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Di-n-octylphthalate	350	U	360	U	350	U	38	J	350	U	NA		NA		400	U	24	J
Dibenz(a,h)anthracene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Dibenzofuran	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Diethylphthalate	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Dimethylphthalate	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Fluoranthene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Fluorene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Hexachlorobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Hexachlorobutadiene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Hexachlorocyclopentadiene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Hexachloroethane	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Indeno(1,2,3-cd)pyrene	350	U	360	U	350	U	140	J	350	U	NA		NA		29	J	350	U
Isophorone	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
N-Nitroso-di-n-propylamine	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
N-Nitrosodiphenylamine (1)	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Naphthalene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Nitrobenzene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Pentachlorophenol	890	U	900	U	870	U	880	U	890	U	NA		NA		1000	U	870	U
Phenanthrene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Phenol	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Pyrene	350	U	360	U	350	U	350	U	350	U	NA		NA		400	U	350	U
Pesticides/PCB, ug/kg																		
4,4'-DDD	120		18		100000	J	2000	J	120	J	460	J	5.6	J	1100000	J	680	J
4,4'-DDE	88		120		34000	J	16000		1000		760		71	J	410000		200	J
4,4'-DDT	2300		330		2100000		71000		3100		660	J	220		12000000	J	18000	
Aldrin	36	U	1.8	U	18000	U	66	J	7	J	180	U	15	J	51000	U	180	U
alpha-BHC	36	U	1.8	U	18000	U	890	U	36	U	180	U	18	U	51000	U	180	U
alpha-Chlordane	18	J	0.31	J	23000	J	2800	J	170	J	3600	J	220	J	88000		42	J
Aroclor-1016	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U
Aroclor-1221	1400	U	72	U	700000	U	35000	U	1400	U	7100	U	710	U	2000000	U	7000	U
Aroclor-1232	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U
Aroclor-1242	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U
Aroclor-1248	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00402		47S00501		47S00502		47S00601		47S00602		47S00701		47S00702		47S00801		47S00802	
Sampling Date	4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Aroclor-1254	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U
Aroclor-1260	700	U	36	U	350000	U	17000	U	700	U	3500	U	350	U	990000	U	3500	U
beta-BHC	36	U	1.8	U	2500	J	890	U	6.1	J	180	U	4	J	5300	J	180	U
delta-BHC	36	U	1.8	U	18000	U	890	U	36	U	180	U	18	U	51000	U	180	U
Dieldrin	130		0.46	J	35000	U	1700	U	70	U	350	U	29	J	21000	J	8.5	J
Endosulfan I	36	U	1.8	U	18000	U	890	U	36	U	180	U	18	U	51000	U	180	U
Endosulfan II	70	U	3.6	U	35000	U	1700	U	70	U	350	U	35	U	99000	U	350	U
Endosulfan sulfate	70	U	3.6	U	35000	U	1700	U	70	U	350	U	35	U	99000	U	350	U
Endrin	70	U	3.6	U	1600	J	1700	U	70	U	130	J	36	J	7900	J	350	U
Endrin aldehyde	70	U	3.6	U	35000	U	1700	U	70	U	350	U	1.4	J	99000	U	350	U
Endrin ketone	70	U	3.6	U	35000	U	1700	U	70	U	350	U	35	U	99000	U	350	U
gamma-BHC (Lindane)	36	U	1.8	U	18000	U	890	U	0.94	J	180	U	0.52	J	51000	U	180	U
gamma-Chlordane	18	J	4.2		24000	J	4600	J	290	J	3800	J	260	J	100000		45	J
Heptachlor	1.9	J	0.93	J	4200	J	1800		110		50	J	18	U	12000	J	180	U
Heptachlor epoxide	36	U	0.18	J	18000	U	890	U	50	J	180	U	40	J	51000	U	180	U
Methoxychlor	360	U	18	U	180000	U	8900	U	360	U	1800	U	180	U	510000	U	1800	U
Toxaphene	3600	U	180	U	1800000	U	89000	U	3600	U	18000	U	1800	U	5100000	U	18000	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	0.58	J	0.88	J	1.7	J	0.51	J	0.37	J	6	J	0.03	J	0.5	J	0.2	J
2,4,5-T	1.2	J	6.5		5.2	J	2.8	J	2.8		5	J	0.58	J	1.5	J	3.5	J
2,4-D	0.34	J	21	J	16	J	23		15	J	9.6	U	11	J	23	J	3	J
2,4-DB	16	UJ	4.3	J	4	J	40	J	14	J	180	J	52	J	180	J	15	J
Dalapon	3.9	J	6.2	J	6.7	J	5.8	J	31		4.2	J	8	J	10	J	4.3	J
Dicamba	7		4.2	J	14	J	4.2	J	3.9	J	3.9	J	2.8	J	4.7	J	5.2	J
Dichloroprop	16	J	41		45	J	24	J	3.7	J	30	J	16	J	58	J	5	UJ
Dinoseb	4	J	0.14	J	5	J	25	J	1.1	J	50	J	2.8	J	12	J	3.9	J
MCPA	150	J	40	J	8000	J	45	J	4000	J	16000	J	760	J	140	UJ	120	U
MCPP	190	U	200	J	5500	J	2200	J	46	J	13000	J	260	J	1400	J	190	U
Inorganics, mg/kg																		
Aluminum	835	J	1330	J	275	J	408	J	1840	J	1530	J	935	J	1100	J	116	U
Antimony	0.56	U	1.1	UJ	1.1	UJ	1.1	UJ	0.53	U	1.1	UJ	1.1	UJ	0.66	U	1	UJ
Arsenic	3.5		15.5		3.1		1.3	J	4.9		6.8		3.9		1.6	U	1.2	U
Barium	4.4	J	10.3	J	2.9	J	5	J	2.4	J	5.3	J	3.2	J	8.5	J	3.1	J
Beryllium	0.09	U	0.08	U	0.08	U	0.05	U	0.09	U	0.09	U	0.09	U	0.1	U	0.08	U
Cadmium	0.19	U	0.09	J	0.17	U	0.11	J	0.19	U	0.32	J	0.19	U	0.29	J	0.17	U
Calcium	5590		116000		3070		124000		1400		631	J	333	J	154000		2180	
Chromium	1.5	J	5.3		1.1	U	4.4		2	J	4		1.8	J	21.6		0.83	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00402		47S00501		47S00502		47S00601		47S00602		47S00701		47S00702		47S00801		47S00802	
Sampling Date	4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97		4/10/97	
Cobalt	0.41	U	0.43	U	0.4	U	0.4	U	0.41	U	0.4	U	0.4	U	0.55	J	0.4	U
Copper	2	J	2.6	J	1.8	J	2.4	J	2.5	J	10		2.9	J	4.8	J	2	J
Iron	238		546		181		229		240		545		183		577		109	
Lead	3.7		26.8		2.9		3.8		1.9		28.9		4.5		5.6		2.2	
Magnesium	56.5	J	800	J	34.8	J	770	J	37.8	J	86.4	J	41.3	J	996	J	29.2	J
Manganese	10.3	J	24	J	9.9	J	16.7	J	3.3	J	12.3	J	5.1	J	28.1	J	7.9	J
Mercury	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.07	U	0.05	U
Nickel	0.41	J	1	J	0.32	J	1.2	J	1	J	1.8	J	0.72	J	7.9	J	0.43	J
Potassium	49.2	U	95.4	J	43.7	U	74.8	U	35.8	U	46.8	U	34.1	U	139	J	42.2	U
Selenium	2	U	2	U	1.9	U	1.9	U	2	U	1.9	U	2	U	2.4	U	1.9	U
Silver	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.32	U	0.29	J	0.31	U
Sodium	250	U	275	U	244	U	284	U	231	U	266	U	215	U	381	U	223	U
Thallium	2.6	U	2.6	U	2.5	U	2.5	U	2.6	U	2.6	U	2.6	U	3.2	U	2.5	U
Vanadium	1	J	4.6	J	1	J	3.7	J	2	J	2.1	J	1	J	4.7	J	1	J
Zinc	3.6	J	6.6	J	3.2	J	4.7	J	5.1	J	28.4	J	4.5	J	8	J	4.8	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00901		47S00902		47S01001		47S01002		47S01101		47S01102		47S01201		47S01202		47S01301	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,1,2,2-Tetrachloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,1,2-Trichloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,1-Dichloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,1-Dichloroethene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,2-Dichloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,2-Dichloroethene (total)	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
1,2-Dichloropropane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
2-Butanone	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
2-Hexanone	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
4-Methyl-2-pentanone	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Acetone	NA		19	U	NA		11	U	NA		11	UJ	NA		11	U	NA	
Benzene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Bromodichloromethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Bromoform	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Bromomethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Carbon disulfide	NA		10	UJ	NA		11	UJ	NA		11	UJ	NA		11	UJ	NA	
Carbon tetrachloride	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chlorobenzene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloroethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloroform	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Chloromethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
cis-1,3-Dichloropropene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Dibromochloromethane	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Ethylbenzene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Methylene chloride	NA		1	J	NA		11	U	NA		1	J	NA		2	J	NA	
Styrene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Tetrachloroethene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Toluene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
trans-1,3-Dichloropropene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Trichloroethene	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Vinyl chloride	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Xylene (total)	NA		10	U	NA		11	U	NA		11	U	NA		11	U	NA	
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
1,2-Dichlorobenzene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00901	47S00902	47S01001	47S01002	47S01101	47S01102	47S01201	47S01202	47S01301
Sampling Date	4/11/97	4/11/97	4/11/97	4/11/97	4/11/97	4/11/97	4/11/97	4/11/97	4/11/97
1,3-Dichlorobenzene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
1,4-Dichlorobenzene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,2'-oxybis(1-Chloropropane)	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,4,5-Trichlorophenol	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
2,4,6-Trichlorophenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,4-Dichlorophenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,4-Dimethylphenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,4-Dinitrophenol	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
2,4-Dinitrotoluene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2,6-Dinitrotoluene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2-Chloronaphthalene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2-Chlorophenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2-Methylnaphthalene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2-Methylphenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
2-Nitroaniline	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
2-Nitrophenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
3,3'-Dichlorobenzidine	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
3-Nitroaniline	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
4,6-Dinitro-2-methylphenol	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
4-Bromophenyl-phenylether	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
4-Chloro-3-methylphenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
4-Chloroaniline	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
4-Chlorophenyl-phenylether	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
4-Methylphenol	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
4-Nitroaniline	860 U	850 U	890 U	880 U	840 U	890 U	840 U	900 U	860 U
4-Nitrophenol	860 UJ	850 UJ	890 UJ	880 UJ	840 UJ	890 UJ	840 U	900 U	860 UJ
Acenaphthene	340 UJ	340 UJ	350 UJ	350 UJ	330 UJ	350 UJ	330 U	360 U	340 UJ
Acenaphthylene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Anthracene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Benzo(a)anthracene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Benzo(a)pyrene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Benzo(b)fluoranthene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Benzo(g,h,i)perylene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
Benzo(k)fluoranthene	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
bis(2-Chloroethoxy)methane	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
bis(2-Chloroethyl)ether	340 U	340 U	350 U	350 U	330 U	350 U	330 U	360 U	340 U
bis(2-Ethylhexyl)phthalate	60 J	340 U	350 U	350 U	330 U	350 U	40 J	360 U	340 U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00901		47S00902		47S01001		47S01002		47S01101		47S01102		47S01201		47S01202		47S01301	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97	
Butylbenzylphthalate	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Carbazole	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Chrysene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Di-n-butylphthalate	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Di-n-octylphthalate	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Dibenz(a,h)anthracene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Dibenzofuran	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Diethylphthalate	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Dimethylphthalate	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Fluoranthene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Fluorene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Hexachlorobenzene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Hexachlorobutadiene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Hexachlorocyclopentadiene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Hexachloroethane	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Indeno(1,2,3-cd)pyrene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Isophorone	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
N-Nitroso-di-n-propylamine	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
N-Nitrosodiphenylamine (1)	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Naphthalene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Nitrobenzene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Pentachlorophenol	860	U	850	U	890	U	880	U	840	U	890	U	840	U	900	U	860	U
Phenanthrene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Phenol	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Pyrene	340	U	340	U	350	U	350	U	330	U	350	U	330	U	360	U	340	U
Pesticides/PCB, ug/kg																		
4,4'-DDD	170	J	18	J	3.5	U	0.28	J	200	J	3.5	U	9.7	J	0.58	J	1.7	J
4,4'-DDE	900		220		16		2.8	J	610	J	18		340		11		21	
4,4'-DDT	5200	J	770		15		11		4900		29		380		30		37	
Aldrin	18	U	8.6	U	1.8	U	1.8	U	86	U	0.33	J	1.7	U	0.39	J	1.8	U
alpha-BHC	18	U	8.6	U	1.8	U	1.8	U	86	U	1.8	U	1.7	U	1.8	U	1.8	U
alpha-Chlordane	23	J	8	J	0.26	J	1.8	U	100	J	1.7	J	15	J	0.34	J	1.8	U
Aroclor-1016	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U
Aroclor-1221	700	U	340	U	72	U	70	U	3400	U	72	U	66	U	72	U	70	U
Aroclor-1232	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U
Aroclor-1242	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U
Aroclor-1248	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00901		47S00902		47S01001		47S01002		47S01101		47S01102		47S01201		47S01202		47S01301	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97	
Aroclor-1254	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U
Aroclor-1260	340	U	170	U	35	U	35	U	1700	U	35	U	33	U	35	U	34	U
beta-BHC	18	U	8.6	U	1.8	U	1.8	U	86	U	1.8	U	1.7	U	1.8	U	1.8	U
delta-BHC	18	U	8.6	U	0.32	J	1.8	U	86	U	0.66	J	1.7	U	0.17	J	0.9	J
Dieldrin	34	U	7.3	J	1.2	J	3.5	U	170	U	1.1	J	9.3	J	0.78	J	0.72	J
Endosulfan I	18	U	8.6	U	1.8	U	1.8	U	86	U	1.8	U	0.65	J	1.8	U	1.8	U
Endosulfan II	34	U	17	U	0.28	J	3.5	U	170	U	3.5	U	3.3	U	3.5	U	3.4	U
Endosulfan sulfate	34	U	17	U	3.5	U	3.5	U	170	U	3.5	U	3.3	U	3.5	U	3.4	U
Endrin	2.2	J	17	U	3.5	U	3.5	U	100	J	3.5	U	13	J	3.5	U	3.4	U
Endrin aldehyde	34	U	17	U	3.5	U	3.5	U	170	U	3.5	U	1.2	J	3.5	U	3.4	U
Endrin ketone	34	U	17	U	3.5	U	3.5	U	170	U	3.5	U	3.3	U	3.5	U	3.4	U
gamma-BHC (Lindane)	18	U	8.6	U	1.8	U	1.8	U	86	U	0.19	J	0.12	J	0.18	J	1.8	U
gamma-Chlordane	22	J	8.3	J	0.27	J	0.18	J	190		1.8	U	17		0.29	J	1.8	U
Heptachlor	18	U	8.6	U	1.8	U	1.8	U	49	J	0.36	J	3.4		0.64	J	1.8	U
Heptachlor epoxide	18	U	8.6	U	1.8	U	1.8	U	86	U	0.21	J	1.7	U	1.8	U	1.8	U
Methoxychlor	180	U	2.1	J	18	U	18	U	860	U	18	U	8.9	J	18	U	18	U
Toxaphene	1800	U	860	U	180	U	180	U	8600	U	180	U	170	U	180	U	180	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	2.8	J	12	U	1.1	J	0.74	J	8.4	J	0.92	J	0.55	J	0.26	J	3	J
2,4,5-T	0.79	J	2.3	J	2.1	J	5.8	J	4.5	J	9.4	J	0.82	J	4.6	J	1.6	J
2,4-D	33		46	J	1.7	J	11	J	50		8	J	1.3	J	1.5	J	1.6	J
2,4-DB	78	U	62	J	31	J	37	J	17	J	67	J	2.7	J	5.4	J	24	J
Dalapon	1.5	J	16	J	5.5	J	30	J	7.4	J	21	J	45	J	9.2	J	8.3	J
Dicamba	6.4	J	4.3	J	9.6		2.9	J	7	J	3	J	17	J	6.7	J	3.1	J
Dichloroprop	25	U	49	UJ	5.9	J	86	J	4.3	J	88		18	J	30	J	5	J
Dinoseb	6.7	J	7.8	J	12	J	150		71	J	25	J	9.8	J	18	J	10	J
MCPA	2100	J	1700	J	3700	J	1100	U	6000	J	1100	U	1000	U	5300		3700	J
MCPP	190	U	11000	J	3000	J	1600	U	23000	J	1600	U	1100	J	14000	J	3800	J
Inorganics, mg/kg																		
Aluminum	5760	J	804	J	425		2740		198		1580		665		2220		1230	
Antimony	1	UJ	1	UJ	0.61	UJ	1.1	UJ	1	UJ	1.1	UJ	0.99	UJ	1.1	UJ	1	UJ
Arsenic	1.3	J	1.2	U	1.3	U	1.3	U	1.2	U	1.3	U	1.2	U	1.3	U	1.2	U
Barium	15.9	J	4.8	J	4.4	J	3.8	J	4.7	J	3.7	J	4.8	J	4	J	3.8	J
Beryllium	0.04	U	0.08	U	0.09	U	0.09	U	0.08	U	0.09	U	0.08	U	0.09	U	0.08	U
Cadmium	0.17	U	0.16	J	0.19	U	0.19	U	0.09	J	0.19	U	0.13	J	0.2	U	0.12	J
Calcium	444	J	398	J	345	J	185	J	332	J	252	J	168	J	132	J	312	J
Chromium	10.1		2.2		1.6	J	3		1.2	J	2.2		1.8	J	2.7		2	J

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S00901		47S00902		47S01001		47S01002		47S01101		47S01102		47S01201		47S01202		47S01301	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97	
Cobalt	0.4	U	0.37	U	0.41	U	0.4	U	0.37	U	0.41	U	0.36	U	0.44	U	0.4	U
Copper	2.2	J	2.1	J	3	J	3	J	1.8	J	0.86	J	2.2	J	1.2	J	1.9	J
Iron	4500		742		358		241		267		111		543		206		319	
Lead	46.1		27.9		23.7		4.2		11.9		3.9		18.9		3.1		15.1	
Magnesium	102	J	35.5	J	48.7	J	36.9	J	46.8	J	30.7	J	41.7	J	30.9	J	49.3	J
Manganese	8.6	J	7.1	J	6.7		2.1	J	4.8		2.4	J	5.3		4.2		8.7	
Mercury	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Nickel	1.3	J	0.74	J	0.56	U	0.94	U	0.58	U	0.58	U	0.55	U	0.8	U	0.72	U
Potassium	55.7	U	32.4	U	43.1	U	49.6	U	35.3	U	39.8	U	40.7	U	45.5	U	56.1	U
Selenium	1.9	U	1.8	U	2	U	2	U	1.8	U	2	U	1.8	U	2	U	1.9	U
Silver	0.31	U	0.29	U	0.32	U	0.32	U	0.29	U	0.32	U	0.28	U	0.33	U	0.31	U
Sodium	241	U	252	U	279	U	304	U	236	U	280	U	228	U	255	U	273	U
Thallium	2.5	U	2.2	U	2.6	U	2.6	U	2.2	U	2.6	U	2.2	U	2.6	U	2.3	U
Vanadium	10.2	J	2	J	1.6	J	2	J	1.1	J	1	J	2.2	J	1	J	2.2	J
Zinc	13.3	J	4.9	J	13.7	J	4.4	J	18.8	J	4.9	J	12.1	J	4.1	J	26.1	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01302		47S01401		47S01402		47S01501		47S01601		47S01602		47S01701		47S01702		47S01801	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/14/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	10	U	NA		NA		NA		NA		2	J	NA		11	U	NA	
1,1,2,2-Tetrachloroethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
1,1,2-Trichloroethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
1,1-Dichloroethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
1,1-Dichloroethene	10	U	NA		NA		NA		NA		2	J	NA		11	U	NA	
1,2-Dichloroethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
1,2-Dichloroethene (total)	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
1,2-Dichloropropane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
2-Butanone	10	U	NA		NA		NA		NA		11	U	NA		11	UJ	NA	
2-Hexanone	10	U	NA		NA		NA		NA		11	U	NA		11	UJ	NA	
4-Methyl-2-pentanone	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Acetone	15	U	NA		NA		NA		NA		14	U	NA		20	UJ	NA	
Benzene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Bromodichloromethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Bromoform	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Bromomethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Carbon disulfide	10	UJ	NA		NA		NA		NA		11	UJ	NA		11	UJ	NA	
Carbon tetrachloride	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Chlorobenzene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Chloroethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Chloroform	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Chloromethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
cis-1,3-Dichloropropene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Dibromochloromethane	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Ethylbenzene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Methylene chloride	1	J	NA		NA		NA		NA		1	J	NA		1	J	NA	
Styrene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Tetrachloroethene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Toluene	10	U	NA		NA		NA		NA		11		NA		1	J	NA	
trans-1,3-Dichloropropene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Trichloroethene	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Vinyl chloride	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Xylene (total)	10	U	NA		NA		NA		NA		11	U	NA		11	U	NA	
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
1,2-Dichlorobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01302		47S01401		47S01402		47S01501		47S01601		47S01602		47S01701		47S01702		47S01801	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/14/97	
1,3-Dichlorobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
1,4-Dichlorobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,2'-oxybis(1-Chloropropane)	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,4,5-Trichlorophenol	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
2,4,6-Trichlorophenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,4-Dichlorophenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,4-Dimethylphenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,4-Dinitrophenol	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
2,4-Dinitrotoluene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2,6-Dinitrotoluene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2-Chloronaphthalene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2-Chlorophenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2-Methylnaphthalene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2-Methylphenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
2-Nitroaniline	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
2-Nitrophenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
3,3'-Dichlorobenzidine	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
3-Nitroaniline	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
4,6-Dinitro-2-methylphenol	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
4-Bromophenyl-phenylether	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
4-Chloro-3-methylphenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
4-Chloroaniline	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
4-Chlorophenyl-phenylether	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
4-Methylphenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
4-Nitroaniline	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
4-Nitrophenol	860	UJ	NA		NA		NA		890	UJ	890	UJ	860	UJ	870	U	870	U
Acenaphthene	340	UJ	NA		NA		NA		350	UJ	350	UJ	340	UJ	350	U	350	U
Acenaphthylene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Anthracene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Benzo(a)anthracene	340	U	NA		NA		NA		53	J	350	U	340	U	350	U	350	U
Benzo(a)pyrene	340	U	NA		NA		NA		140	J	350	U	340	U	350	U	350	U
Benzo(b)fluoranthene	340	U	NA		NA		NA		250	J	350	U	340	U	350	U	350	U
Benzo(g,h,i)perylene	340	U	NA		NA		NA		160	J	350	U	340	U	350	U	350	U
Benzo(k)fluoranthene	340	U	NA		NA		NA		260	J	350	U	340	U	350	U	350	U
bis(2-Chloroethoxy)methane	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
bis(2-Chloroethyl)ether	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
bis(2-Ethylhexyl)phthalate	340	U	NA		NA		NA		31	J	350	U	41	J	350	U	81	J

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01302		47S01401		47S01402		47S01501		47S01601		47S01602		47S01701		47S01702		47S01801	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/14/97	
Butylbenzylphthalate	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Carbazole	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Chrysene	340	U	NA		NA		NA		75	J	350	U	340	U	350	U	350	U
Di-n-butylphthalate	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	58	J
Di-n-octylphthalate	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Dibenz(a,h)anthracene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Dibenzofuran	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Diethylphthalate	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Dimethylphthalate	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Fluoranthene	340	U	NA		NA		NA		60	J	350	U	26	J	350	U	350	U
Fluorene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Hexachlorobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Hexachlorobutadiene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Hexachlorocyclopentadiene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Hexachloroethane	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Indeno(1,2,3-cd)pyrene	340	U	NA		NA		NA		120	J	350	U	340	U	350	U	350	U
Isophorone	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
N-Nitroso-di-n-propylamine	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
N-Nitrosodiphenylamine (1)	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Naphthalene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Nitrobenzene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Pentachlorophenol	860	U	NA		NA		NA		890	U	890	U	860	U	870	U	870	U
Phenanthrene	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Phenol	340	U	NA		NA		NA		350	U	350	U	340	U	350	U	350	U
Pyrene	340	U	NA		NA		NA		51	J	350	U	340	U	350	U	350	U
Pesticides/PCB, ug/kg																		
4,4'-DDD	5.9	J	530	J	15	J	17000	J	460	J	4.6	J	26	J	5.7	J	35	J
4,4'-DDE	47		380	J	68		63000	J	640		13		990		110		76	
4,4'-DDT	100		6300		940		560000		7800		110		510		86		380	J
Aldrin	5.3	U	88	U	18	U	96	U	90	U	1.8	U	18	U	3.6	U	8.9	U
alpha-BHC	5.3	U	88	U	18	U	96	U	90	U	1.8	U	18	U	3.6	U	8.9	U
alpha-Chlordane	1.8	J	510	J	220		5000	J	550		7.1		12	J	2.6	J	1.8	J
Aroclor-1016	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U
Aroclor-1221	210	U	3500	U	700	U	3800	U	3600	U	71	U	700	U	140	U	350	U
Aroclor-1232	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U
Aroclor-1242	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U
Aroclor-1248	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01302		47S01401		47S01402		47S01501		47S01601		47S01602		47S01701		47S01702		47S01801	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/14/97	
Aroclor-1254	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U
Aroclor-1260	100	U	1700	U	340	U	1900	U	1800	U	35	U	340	U	70	U	170	U
beta-BHC	5.3	U	88	U	12	J	870	J	90	U	0.97	J	18	U	3.6	U	8.9	U
delta-BHC	5.3	U	88	U	8.8	J	96	U	90	U	0.95	J	18	U	3.6	U	8.9	U
Dieldrin	1.2	J	360	J	160	J	1100	J	260	J	5	J	31	J	6	J	17	U
Endosulfan I	5.3	U	88	U	18	U	280	J	90	U	1.8	U	18	U	3.6	U	8.9	U
Endosulfan II	10	U	170	U	34	U	190	U	180	U	3.5	U	34	U	7	U	17	U
Endosulfan sulfate	10	U	170	U	34	U	190	U	180	U	3.5	U	34	U	7	U	2.8	J
Endrin	1.2	J	120	J	34	U	190	U	200		3.5	U	10	J	3.2	J	5.7	J
Endrin aldehyde	10	U	170	U	34	U	190	U	21	J	3.5	U	34	U	7	U	17	U
Endrin ketone	10	U	170	U	2.9	J	17	J	180	U	3.5	U	34	U	7	U	17	U
gamma-BHC (Lindane)	5.3	U	88	U	18	U	33	J	90	U	1.8	U	18	U	3.6	U	8.9	U
gamma-Chlordane	1.8	J	550	J	240		24000	J	470		5.3		12	J	2.6	J	3	J
Heptachlor	5.3	U	7.6	J	3.8	J	5600	J	90	U	0.31	J	18	U	3.6	U	8.9	U
Heptachlor epoxide	5.3	U	21	J	12	J	21	J	26	J	0.66	J	18	U	3.6	U	8.9	U
Methoxychlor	53	U	880	U	180	U	960	U	900	U	18	U	180	U	2.4	J	2.8	J
Toxaphene	530	U	8800	U	1800	U	9600	U	9000	U	180	U	1800	U	360	U	890	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	0.82	J	24	J	2.1	U	18	J	0.34	J	0.77	J	1	J	1.9	J	2.1	U
2,4,5-T	3	J	22	J	5.2	U	42	J	1.6	J	1.9	J	0.34	J	0.52	J	32	J
2,4-D	1.9	J	45	J	76	J	450	J	27	U	5.4	U	5.2	U	12	J	8	J
2,4-DB	27	J	110	J	100	J	3700	J	130	U	10	J	26	U	28	J	28	J
Dalapon	12	J	29	J	14	J	7.1	J	5.9	J	8	J	1.7	J	26	J	26	U
Dicamba	6.5	J	9.1	J	5.8		5.6	J	13	U	2.9	J	4.6	J	3.3		2.6	U
Dichloroprop	36	J	19	J	21	J	330		43	U	26	J	8.3	U	4.6	J	1.2	J
Dinoseb	0.72	J	6.5	J	11	J	250	J	23	J	9	J	5.2	U	53	J	20	J
MCPA	4200	J	8600	J	2400	J	3900	J	6800	J	2200	U	13000	J	7000	J	3000	J
MCPP	310	U	16000	J	84000	J	150000	J	42000	J	8500	J	13000	J	320	U	7600	
Inorganics, mg/kg																		
Aluminum	1690		403		2110		1860		864		1960		1040		574		913	
Antimony	1	UJ	0.57	UJ	1	UJ	0.84	UJ	1.1	UJ	1.1	UJ	1	UJ	1.1	UJ	1.1	UJ
Arsenic	1.2	U	2.9		38.9		18.4		2.1	J	1.3	U	1.1	J	0.6	J	1.2	U
Barium	2.8	J	5.8	J	6.8	J	24.3	J	8	J	2.4	J	7	J	3.7	J	4.3	J
Beryllium	0.08	U	0.08	U	0.08	U	0.23	J	0.09	U	0.09	U	0.05	J	0.09	U	0.08	U
Cadmium	0.17	U	1.1		0.11	J	0.94	J	0.54	J	0.19	U	0.3	J	0.09	J	0.2	J
Calcium	128	J	1840	J	1300	J	33000	J	957	J	321	J	14500	J	3180	J	50100	J
Chromium	2	J	3.1		2.4		5.9		11.8		2.3		3.3		1.6	J	3.1	

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01302		47S01401		47S01402		47S01501		47S01601		47S01602		47S01701		47S01702		47S01801	
Sampling Date	4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/11/97		4/14/97	
Cobalt	0.4	U	0.39	U	0.39	U	0.21	U	0.23	J	0.41	U	0.4	U	0.4	U	0.4	U
Copper	1	J	7.9		2.7	J	12.7		4.2	J	1.1	J	3.7	J	1.6	J	2.9	J
Iron	311		327		152		1120		447		255		517		213		394	
Lead	3		29.9		7.7		53.4		48.2		3		25.2		8		13.8	
Magnesium	40	J	78.2	J	48.7	J	748	J	149	J	46.4	J	320	J	82.4	J	397	J
Manganese	4.3		9.5		2.3	J	57.6		15.2		4.3		20.6		10.4		9.3	
Mercury	0.05	U	0.05	U	0.05	U	0.07	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U
Nickel	0.82	U	0.82	U	1.2	U	1.5	U	2.3	U	1	U	0.92	U	0.53	U	0.87	U
Potassium	56.1	U	42.2	U	44	U	231	J	71.4	J	53.3	U	91	J	54.5	U	78.2	J
Selenium	1.9	U	1.8	U	1.8	U	0.99	U	2	U	2	U	1.9	U	1.9	U	1.9	U
Silver	0.31	U	0.31	U	0.31	U	0.28	J	0.15	J	0.32	U	0.17	J	0.32	U	0.32	U
Sodium	279	U	268	U	261	U	335	U	279	U	266	U	277	U	283	U	296	U
Thallium	2.3	U	2.3	U	2.3	U	1.3	U	2.6	U	2.6	U	2.3	U	2.5	U	2.5	U
Vanadium	2	J	1.3	J	1	J	4.2	J	2.1	J	2	J	2.4	J	1	J	2.2	J
Zinc	8.6	J	25.9	J	9.3	J	117	J	36.5	J	5.7	J	32.7	J	13	J	13.4	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01802		47S01901		47S02001		47S02002		47S02101		47S02201		47S02202		47S02301		47S02302	
Sampling Date	4/14/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	12	U	NA		NA		11	U	26	UJ	NA		11	U	NA		11	U
1,1,2,2-Tetrachloroethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,1,2-Trichloroethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,1-Dichloroethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,1-Dichloroethene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,2-Dichloroethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,2-Dichloroethene (total)	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
1,2-Dichloropropane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
2-Butanone	12	UJ	NA		NA		11	U	26	UJ	NA		11	UJ	NA		11	UJ
2-Hexanone	12	UJ	NA		NA		11	U	26	U	NA		11	U	NA		11	U
4-Methyl-2-pentanone	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Acetone	40	UJ	NA		NA		19	UJ	150	J	NA		24	UJ	NA		23	UJ
Benzene	12	U	NA		NA		11	U	26		NA		11	U	NA		11	U
Bromodichloromethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Bromoform	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Bromomethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Carbon disulfide	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Carbon tetrachloride	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Chlorobenzene	12	U	NA		NA		11	U	110		NA		11	U	NA		11	U
Chloroethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Chloroform	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Chloromethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
cis-1,3-Dichloropropene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Dibromochloromethane	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Ethylbenzene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Methylene chloride	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Styrene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Tetrachloroethene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Toluene	12	U	NA		NA		11	UJ	26	U	NA		11	U	NA		11	U
trans-1,3-Dichloropropene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Trichloroethene	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Vinyl chloride	12	U	NA		NA		11	U	26	U	NA		11	U	NA		11	U
Xylene (total)	12	U	NA		NA		11	U	52		NA		11	U	NA		11	U
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	380	U	350	U	360	U	350	U	21000		350	U	360	U	360	U	360	U
1,2-Dichlorobenzene	380	U	350	U	360	U	350	U	2900	J	350	U	360	U	360	U	360	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01802		47S01901		47S02001		47S02002		47S02101		47S02201		47S02202		47S02301		47S02302	
Sampling Date	4/14/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97	
1,3-Dichlorobenzene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
1,4-Dichlorobenzene	380	U	350	U	360	U	350	U	4400	J	350	U	360	U	360	U	360	U
2,2'-oxybis(1-Chloropropane)	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2,4,5-Trichlorophenol	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
2,4,6-Trichlorophenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2,4-Dichlorophenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2,4-Dimethylphenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2,4-Dinitrophenol	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
2,4-Dinitrotoluene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2,6-Dinitrotoluene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2-Chloronaphthalene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2-Chlorophenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2-Methylnaphthalene	380	U	350	U	360	U	350	U	28000		350	U	360	U	360	U	360	U
2-Methylphenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
2-Nitroaniline	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
2-Nitrophenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
3,3'-Dichlorobenzidine	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
3-Nitroaniline	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
4,6-Dinitro-2-methylphenol	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
4-Bromophenyl-phenylether	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
4-Chloro-3-methylphenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
4-Chloroaniline	380	U	350	U	360	U	350	U	16000		350	U	360	U	360	U	360	U
4-Chlorophenyl-phenylether	380	U	350	U	360	U	350	U	5900	UJ	350	U	360	U	360	U	360	U
4-Methylphenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
4-Nitroaniline	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
4-Nitrophenol	960	U	880	UJ	900	UJ	880	UJ	15000	UJ	880	UJ	900	UJ	910	UJ	900	UJ
Acenaphthene	380	U	350	U	360	U	350	U	13000		350	U	360	U	360	U	360	U
Acenaphthylene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Anthracene	380	U	350	U	360	U	350	U	1700	J	350	U	360	U	360	U	360	U
Benzo(a)anthracene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Benzo(a)pyrene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Benzo(b)fluoranthene	380	U	350	U	360	U	350	U	680	J	350	U	360	U	360	U	360	U
Benzo(g,h,i)perylene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Benzo(k)fluoranthene	380	U	350	U	360	U	350	U	600	J	350	U	360	U	360	U	360	U
bis(2-Chloroethoxy)methane	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
bis(2-Chloroethyl)ether	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
bis(2-Ethylhexyl)phthalate	43	J	43	J	360	U	350	U	630	J	350	U	360	U	360	U	360	U

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01802		47S01901		47S02001		47S02002		47S02101		47S02201		47S02202		47S02301		47S02302	
Sampling Date	4/14/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97	
Butylbenzylphthalate	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Carbazole	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Chrysene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Di-n-butylphthalate	84	J	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Di-n-octylphthalate	380	U	350	U	360	U	350	U	5900	U	43	J	360	U	360	U	360	U
Dibenz(a,h)anthracene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Dibenzofuran	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Diethylphthalate	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Dimethylphthalate	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Fluoranthene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Fluorene	380	U	350	U	360	U	350	U	9300	J	350	U	360	U	360	U	360	U
Hexachlorobenzene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Hexachlorobutadiene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Hexachlorocyclopentadiene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Hexachloroethane	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Indeno(1,2,3-cd)pyrene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Isophorone	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
N-Nitroso-di-n-propylamine	380	U	350	U	360	U	350	U	5900	UJ	350	U	360	U	360	U	360	U
N-Nitrosodiphenylamine (1)	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Naphthalene	380	U	350	U	360	U	350	U	2500	J	350	U	360	U	360	U	360	U
Nitrobenzene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Pentachlorophenol	960	U	880	U	900	U	880	U	15000	U	880	U	900	U	910	U	900	U
Phenanthrene	380	U	350	U	360	U	350	U	25000		350	U	360	U	360	U	360	U
Phenol	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Pyrene	380	U	350	U	360	U	350	U	5900	U	350	U	360	U	360	U	360	U
Pesticides/PCB, ug/kg																		
4,4'-DDD	5.7	J	8100		2800	J	190	J	3100000		30	J	6100		47	J	13	
4,4'-DDE	20		6200		6400		300		26000	J	46		120	J	110		9.9	
4,4'-DDT	18	J	7400		11000		480		370	J	53		350	U	160		12	
Aldrin	9.8	U	28	J	91	U	1.8	U	4500	J	3.6	U	180	U	1.8	U	0.15	J
alpha-BHC	9.8	U	9	U	91	U	1.8	U	61000	J	3.6	U	150	J	0.32	J	0.1	J
alpha-Chlordane	9.8	U	1300		240		3.1	J	280000		7		690	J	27		10	
Aroclor-1016	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U
Aroclor-1221	390	U	360	U	3600	U	70	U	12000	U	140	U	7200	U	72	U	72	U
Aroclor-1232	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U
Aroclor-1242	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U
Aroclor-1248	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01802		47S01901		47S02001		47S02002		47S02101		47S02201		47S02202		47S02301		47S02302	
Sampling Date	4/14/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97	
Aroclor-1254	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U
Aroclor-1260	190	U	170	U	1800	U	35	U	5800	U	70	U	3500	U	36	U	36	U
beta-BHC	9.8	U	9	U	91	U	1.8	U	17000	J	3.6	U	130	J	1.8	U	1.8	U
delta-BHC	9.8	U	9	U	91	U	1.8	U	77000	J	3.6	U	350		1.5	J	0.62	J
Dieldrin	1.3	J	190	J	150	J	4	J	77000	J	5.8	J	260	J	2.2	J	0.52	J
Endosulfan I	9.8	U	12	J	91	U	1.8	U	300	U	3.6	U	180	U	0.27	J	1.8	U
Endosulfan II	19	U	17	U	180	U	3.5	U	580	U	7	U	350	U	3.6	U	3.6	U
Endosulfan sulfate	19	U	17	U	180	U	3.5	U	580	U	7	U	350	U	3.6	U	3.6	U
Endrin	19	U	520	J	180	U	3.5	U	94000	J	6.4	J	170	J	3.6	U	2	J
Endrin aldehyde	19	U	18	J	180	U	3.5	U	580	U	7	U	350	U	0.68	J	3.6	U
Endrin ketone	19	U	17	U	180	U	0.59	J	73	J	7	U	350	U	3.6	U	3.6	U
gamma-BHC (Lindane)	9.8	U	9	U	91	U	1.8	U	650	J	3.6	U	180	U	1.8	U	1.8	U
gamma-Chlordane	9.8	U	1400		270		5.6	J	310000		6.3		720	J	28		11	
Heptachlor	9.8	U	9	U	91	U	1.8	U	300	U	3.6	U	180	U	4.6		0.68	J
Heptachlor epoxide	9.8	U	6.2	J	91	U	0.42	J	4200	J	3.6	U	180	U	1.4	J	1.8	U
Methoxychlor	98	U	90	U	910	U	18	U	3000	U	36	U	1800	U	18	U	18	U
Toxaphene	980	U	900	U	9100	U	180	U	30000	U	360	U	18000	U	180	U	180	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	4	J	10	U	11	U	11	J	36	U	2.1	U	11	U	2.2	U	10	J
2,4,5-T	7.9	J	90	J	14	UJ	2.6	U	3100	J	21	J	14	UJ	2.7	UJ	2.7	UJ
2,4-D	14		26	U	27	U	5.3	U	520	J	5.3	U	27	U	22	J	5.4	U
2,4-DB	79	J	2000	U	1500	J	26	U	440	U	26	U	140	U	27	U	27	U
Dalapon	29	U	130	U	140	U	26	U	440	U	26	U	140	U	27	U	27	U
Dicamba	2.9	U	64		76	J	42	J	240	J	19	J	14	U	19	J	36	J
Dichloroprop	55	J	220		43	U	48	J	140	U	95	J	43	U	25	J	8.6	U
Dinoseb	12	J	26	U	27	U	5.3	U	89	U	39	J	27	U	12	J	17	J
MCPA	16000	J	1000	U	150000	J	210	U	4600000	J	210	U	1100	U	98000		220	U
MCPP	8400	J	1600	U	1600	U	320	U	5300	U	320	U	1600	U	330	U	320	U
Inorganics, mg/kg																		
Aluminum	1210		1660		816		2100		5240		1770		1950		934		1690	
Antimony	0.56	UJ	0.63	J	0.52	U	0.51	U	21.3	J	1.1	U	0.52	U	0.53	U	0.52	U
Arsenic	1.5	U	1.7	J	0.61	U	0.88	J	1570		77.4		65.3		8.8		17.2	
Barium	8.6	J	75.6		6.2	J	1.5	J	305		3	J	1.8	J	7.6	J	2	J
Beryllium	0.12	U	0.29	U	0.04	U	0.04	U	0.65	J	0.04	U	0.04	U	0.04	U	0.04	U
Cadmium	0.21	U	2.3		0.25	U	0.08	U	15.4		0.09	U	0.09	U	0.09	U	0.09	U
Calcium	4570	J	41900		87900		2420		18000		664	J	134	J	115000		10000	
Chromium	2.2	J	8		4.8		1.7	J	463		2.7		1.7	J	4.8		2.1	J

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S01802		47S01901		47S02001		47S02002		47S02101		47S02201		47S02202		47S02301		47S02302	
Sampling Date	4/14/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97		4/17/97	
Cobalt	0.49	U	0.4	J	0.19	U	0.19	U	2	J	0.19	U	0.2	U	0.2	U	0.2	U
Copper	1.6	J	11.5		4.4	J	0.72	J	155		1.8	J	0.82	J	2.5	J	0.94	J
Iron	148		993	J	265	J	300	J	9240	J	280	J	175	J	211	J	178	J
Lead	6.9		83.3		35.8		3.2		2040		7.4		2.4		11.2		2.9	
Magnesium	56.2	J	2010		616	J	70.8	J	3230		44.7	J	21.9	J	676	J	81.2	J
Manganese	3.6		55.9		15.5		2.4	J	114		5.7		1	J	17		2.2	J
Mercury	0.07	U	0.11		0.05	U	0.05	U	0.41		0.06	J	0.05	U	0.05	J	0.05	U
Nickel	0.43	U	3.3	J	0.79	J	0.5	J	14	J	0.61	J	0.64	J	0.47	J	0.71	J
Potassium	41.1	U	220	J	64.3	J	45.4	J	600	J	42.9	J	44.2	J	66.7	J	43.9	J
Selenium	2.3	U	0.91	U	0.93	U	0.91	U	1.5	U	0.92	U	0.94	U	0.94	U	0.94	U
Silver	0.37	U	0.82	J	0.15	U	0.15	U	0.46	J	0.15	U	0.15	U	0.15	U	0.15	U
Sodium	264	U	340	U	351	U	319	U	706	J	310	U	355	U	392	U	284	U
Thallium	3	U	1.2	U	1.2	U	1.2	U	2	U	1.2	U	1.2	U	1.2	U	1.2	U
Vanadium	1	J	2.6	J	2.6	J	2	J	20.2		1.1	J	1	J	2.3	J	1	J
Zinc	13.3	J	59.3		8.5		1.7	J	1100		18		4.2	J	11.3		2.8	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02401		47S02402		47S02501		47S02501D		47S02502		47S02502D		47S02601		47S02701		47S02801	
Sampling Date	4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		5/8/97		5/8/97	
Volatile Organics, ug/kg																		
1,1,1-Trichloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,1,2,2-Tetrachloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,1,2-Trichloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,1-Dichloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,1-Dichloroethene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,2-Dichloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,2-Dichloroethene (total)	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
1,2-Dichloropropane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
2-Butanone	NA		NA		NA		NA		11	UJ	11	UJ	11	UJ	21	UJ	12	UJ
2-Hexanone	NA		NA		NA		NA		11	U	11	U	11	U	21	UJ	12	UJ
4-Methyl-2-pentanone	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Acetone	NA		NA		NA		NA		21	UJ	29	UJ	59	UJ	21	UJ	12	UJ
Benzene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Bromodichloromethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Bromoform	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Bromomethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Carbon disulfide	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Carbon tetrachloride	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Chlorobenzene	NA		NA		NA		NA		11	U	11	U	6	J	21	U	12	U
Chloroethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Chloroform	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Chloromethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
cis-1,3-Dichloropropene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Dibromochloromethane	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Ethylbenzene	NA		NA		NA		NA		11	U	11	U	13		21	U	12	U
Methylene chloride	NA		NA		NA		NA		11	U	11	U	11	U	7	J	3	J
Styrene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Tetrachloroethene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Toluene	NA		NA		NA		NA		11	U	11	U	2	J	21	U	12	U
trans-1,3-Dichloropropene	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Trichloroethene	NA		NA		NA		NA		11	U	11	U	1	J	21	U	12	U
Vinyl chloride	NA		NA		NA		NA		11	U	11	U	11	U	21	U	12	U
Xylene (total)	NA		NA		NA		NA		11	U	11	U	110		21	U	12	U
Semivolatile Organics, ug/kg																		
1,2,4-Trichlorobenzene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
1,2-Dichlorobenzene	NA		NA		350	U	350	U	350	U	350	U	2600	J	690	U	410	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02401		47S02402		47S02501		47S02501D		47S02502		47S02502D		47S02601		47S02701		47S02801	
Sampling Date	4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		5/8/97		5/8/97	
1,3-Dichlorobenzene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
1,4-Dichlorobenzene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2,2'-oxybis(1-Chloropropane)	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	UJ	410	UJ
2,4,5-Trichlorophenol	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	U	1000	U
2,4,6-Trichlorophenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2,4-Dichlorophenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2,4-Dimethylphenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2,4-Dinitrophenol	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	U	1000	U
2,4-Dinitrotoluene	NA		NA		350	U	350	U	350	U	36	J	3500	U	690	U	410	U
2,6-Dinitrotoluene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2-Chloronaphthalene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2-Chlorophenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2-Methylnaphthalene	NA		NA		350	U	350	U	350	U	350	U	720	J	690	U	410	U
2-Methylphenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
2-Nitroaniline	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	UJ	1000	U
2-Nitrophenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
3,3'-Dichlorobenzidine	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
3-Nitroaniline	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	U	1000	U
4,6-Dinitro-2-methylphenol	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	U	1000	U
4-Bromophenyl-phenylether	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
4-Chloro-3-methylphenol	NA		NA		350	U	36	J	350	U	59	J	3500	U	690	U	410	U
4-Chloroaniline	NA		NA		350	U	350	U	350	U	350	U	3000	J	690	U	410	U
4-Chlorophenyl-phenylether	NA		NA		350	U	350	U	350	U	350	U	3500	UJ	690	U	410	U
4-Methylphenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
4-Nitroaniline	NA		NA		880	U	880	U	870	U	890	U	8800	U	1700	U	1000	UJ
4-Nitrophenol	NA		NA		880	UJ	40	J	870	UJ	60	J	8800	UJ	1700	UJ	1000	UJ
Acenaphthene	NA		NA		350	U	350	U	350	U	38	J	3500	U	690	U	410	U
Acenaphthylene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Anthracene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Benzo(a)anthracene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	230	J
Benzo(a)pyrene	NA		NA		350	U	350	U	350	U	350	U	3500	U	56	J	290	J
Benzo(b)fluoranthene	NA		NA		350	U	350	U	350	U	350	U	3500	U	100	J	760	J
Benzo(g,h,i)perylene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	39	J
Benzo(k)fluoranthene	NA		NA		350	U	350	U	350	U	350	U	3500	U	110	J	810	J
bis(2-Chloroethoxy)methane	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
bis(2-Chloroethyl)ether	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
bis(2-Ethylhexyl)phthalate	NA		NA		43	J	350	U	350	U	350	U	750	J	52	J	420	

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Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02401		47S02402		47S02501		47S02501D		47S02502		47S02502D		47S02601		47S02701		47S02801	
Sampling Date	4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		5/8/97		5/8/97	
Butylbenzylphthalate	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	47	J
Carbazole	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	35	J
Chrysene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	390	J
Di-n-butylphthalate	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Di-n-octylphthalate	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Dibenz(a,h)anthracene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	30	J
Dibenzofuran	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Diethylphthalate	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Dimethylphthalate	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Fluoranthene	NA		NA		350	U	350	U	350	U	350	U	3500	U	99	J	480	
Fluorene	NA		NA		350	U	350	U	350	U	350	U	3500	UJ	690	U	410	U
Hexachlorobenzene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Hexachlorobutadiene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Hexachlorocyclopentadiene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Hexachloroethane	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Indeno(1,2,3-cd)pyrene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	110	J
Isophorone	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
N-Nitroso-di-n-propylamine	NA		NA		350	U	350	U	350	U	40	J	3500	UJ	690	UJ	410	UJ
N-Nitrosodiphenylamine (1)	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Naphthalene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Nitrobenzene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Pentachlorophenol	NA		NA		880	U	880	U	870	U	54	J	8800	U	1700	U	1000	U
Phenanthrene	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	120	J
Phenol	NA		NA		350	U	350	U	350	U	350	U	3500	U	690	U	410	U
Pyrene	NA		NA		350	U	350	U	350	U	50	J	400	J	100	J	430	
Pesticides/PCB, ug/kg																		
4,4'-DDD	9.2	J	1.7	J	170	J	12	J	1.3	J	12		5200	J	6800		13	J
4,4'-DDE	44		5.4		600		160		7.4		8.2		170	U	890		180	J
4,4'-DDT	45		7.9		920	J	190		11		12		170	U	2000		84	J
Aldrin	1.8	U	1.8	U	18	U	9	U	1.8	U	0.37	J	310	J	180	U	2.1	U
alpha-BHC	1.8	U	1.8	U	2.2	J	9	U	1.8	U	1.8	U	62	J	180	U	2.1	U
alpha-Chlordane	1.3	J	1.8	U	93	J	28	J	0.57	J	0.86	J	24000		560	J	5.4	J
Aroclor-1016	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U
Aroclor-1221	71	U	71	U	710	U	360	U	70	U	72	U	3500	U	7100	U	82	U
Aroclor-1232	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U
Aroclor-1242	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U
Aroclor-1248	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02401		47S02402		47S02501		47S02501D		47S02502		47S02502D		47S02601		47S02701		47S02801	
Sampling Date	4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		5/8/97		5/8/97	
Aroclor-1254	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U
Aroclor-1260	35	U	35	U	350	U	170	U	35	U	35	U	1700	U	3500	U	41	U
beta-BHC	1.8	U	1.8	U	18	U	9	U	1.8	U	1.8	U	90	U	180	U	2.1	U
delta-BHC	0.73	J	1.8	U	18	U	9	U	0.58	J	0.64	J	870	J	180	U	2.1	U
Dieldrin	2.4	J	0.22	J	45	J	15	J	0.67	J	1.7	J	350	J	120	J	1.2	J
Endosulfan I	1.8	U	1.8	U	18	U	9	U	1.8	U	1.8	U	90	U	180	U	2.1	U
Endosulfan II	3.5	U	3.5	U	35	U	17	U	3.5	U	3.5	U	170	U	350	U	4.1	U
Endosulfan sulfate	3.5	U	3.5	U	35	U	17	U	3.5	U	3.5	U	170	U	350	U	0.74	J
Endrin	1.8	J	3.5	U	2.4	J	17	U	3.5	U	3.5	U	170	U	350	U	4.1	U
Endrin aldehyde	2	J	3.5	U	35	U	17	U	3.5	U	3.5	U	170	U	350	U	1.1	J
Endrin ketone	3.5	U	3.5	U	35	U	17	U	3.5	U	3.5	U	170	U	350	U	4.1	U
gamma-BHC (Lindane)	1.8	U	1.8	U	18	U	9	U	1.8	U	0.37	J	66	J	180	U	2.1	U
gamma-Chlordane	1.4	J	1.8	U	18	U	9	U	1.8	U	1.8	U	27000		550	J	11	
Heptachlor	1.8	U	1.8	U	18	U	0.42	J	1.8	U	0.44	J	90	U	180	U	1	J
Heptachlor epoxide	1.8	U	1.8	U	5.2	J	2.6	J	1.8	U	1.8	U	90	U	180	U	15	
Methoxychlor	0.96	J	18	U	180	U	90	U	18	U	18	U	900	U	1800	U	21	UJ
Toxaphene	180	U	180	U	1800	U	900	U	180	U	180	U	9000	U	18000	U	210	U
Herbicides, ug/kg																		
2,4 5-TP (Silvex)	2.1	U	2.1	U	15	J	2.1	U	10	U	2.1	U	82	J	NA		NA	
2,4,5-T	2.6	UJ	2.6	UJ	22	J	2.6	U	110	J	2.7	UJ	2400	J	NA		NA	
2,4-D	15	J	5.3	U	5.3	U	5.3	UJ	26	U	5.4	U	26	U	NA		NA	
2,4-DB	110	J	26	U	280	J	260	J	130	U	27	U	6800	J	NA		NA	
Dalapon	26	U	26	U	26	U	26	U	130	U	27	U	130	U	NA		NA	
Dicamba	24	J	2.6	U	2.6	U	2.6	U	13	U	20	J	58	J	NA		NA	
Dichloroprop	8.5	U	8.4	U	17	J	52	J	42	U	47	J	42	U	NA		NA	
Dinoseb	21	J	5.8	J	5.3	U	5.3	U	82	J	8.9	J	1600		NA		NA	
MCPA	210	U	210	U	210	U	210	U	56000	J	210	U	1000	U	NA		NA	
MCPP	320	U	320	U	320	U	320	U	1600	U	320	U	200000	J	NA		NA	
Inorganics, mg/kg																		
Aluminum	867		1610		801	J	675	J	1620		1600		1920		2200	J	1680	J
Antimony	0.51	U	0.51	U	0.51	U	0.51	U	0.51	U	0.52	U	1.6	J	1	U	0.59	U
Arsenic	0.6	U	0.6	U	0.79	J	0.59	U	20.5		19.8		39.3		3	U	0.73	U
Barium	5.5	J	1.8	J	8	J	7	J	1.8	J	1.9	J	51.2		34.3	J	14.5	J
Beryllium	0.04	U	0.05	U	0.08	U	0.05	U	0.04	U	0.04	U	0.29	U	0.18	U	0.17	U
Cadmium	0.19	U	0.09	U	0.33	U	0.26	U	0.08	U	0.09	U	1.6		1.4	J	0.67	J
Calcium	683	J	261	J	1030	J	908	J	383	J	412	J	70000		7870		18600	
Chromium	2.5		1.5	J	9.6	J	2.8	J	1.7	J	1.7	J	26.3		14		8.6	

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02401		47S02402		47S02501		47S02501D		47S02502		47S02502D		47S02601		47S02701		47S02801	
Sampling Date	4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		4/18/97		5/8/97		5/8/97	
Cobalt	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	0.19	U	1.4	J	1.6	J	0.41	J
Copper	7.8		0.9	J	3.8	J	3.3	J	1.6	J	2.1	J	4990		25.6		13.5	
Iron	220	J	144	J	384		294		141	J	121	J	25300	J	2390		1500	
Lead	24.8		3.4		43	J	27.2	J	2.4		2.8		2820		196		83.2	
Magnesium	60.8	J	23.8	J	110	J	94.2	J	23	J	27.2	J	17400		586	J	566	J
Manganese	7.7		1.1	J	15.9		13.9		0.89	J	1	J	152		44.7		79.9	
Mercury	0.05	J	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.05	U	0.11	U	0.07	U
Nickel	9.1		2.4	J	7.7	J	0.91	J	0.42	J	0.49	J	14.4		9.1	J	3.4	J
Potassium	42.8	J	37.6	J	111	J	55.4	J	32.7	U	33.6	U	268	J	170	J	176	J
Selenium	0.92	U	0.91	U	0.91	U	0.91	U	0.91	U	0.93	U	1.2		1.8	U	1.1	U
Silver	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.15	U	0.51	J	0.3	U	0.17	U
Sodium	340	J	315	U	387	J	326	U	328	U	308	U	589	J	775	J	378	U
Thallium	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	2.3	U	1.4	U
Vanadium	2	J	1	J	2	J	2	J	1	J	1	J	9	J	10	J	5	J
Zinc	16.8		3	J	21	J	15.2	J	2	J	2.5	J	417		356	J	271	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02901		47S02901D		47S02902		47S03001		47S03002		47S03101		47S03102	
Sampling Date	7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97	
Volatile Organics, ug/kg														
1,1,1-Trichloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
1,1,2-Trichloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
1,1-Dichloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
1,1-Dichloroethene	11	UJ	11	UJ	11	UJ	11	UJ	12	UJ	11	UJ	12	U
1,2-Dichloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
1,2-Dichloroethene (total)	11	UJ	11	UJ	11	UJ	11	UJ	12	UJ	11	UJ	12	U
1,2-Dichloropropane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
2-Butanone	11	U	11	U	11	U	11	U	12	U	11	U	12	UJ
2-Hexanone	11	UJ	11	UJ	11	UJ	11	UJ	12	UJ	11	UJ	12	U
4-Methyl-2-pentanone	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Acetone	13	U	11	U	11	U	13	U	12	U	13	U	17	UJ
Benzene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Bromodichloromethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Bromoform	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Bromomethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Carbon disulfide	11	UJ	11	UJ	11	UJ	11	UJ	12	UJ	11	UJ	12	U
Carbon tetrachloride	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Chlorobenzene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Chloroethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Chloroform	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Chloromethane	11	U	11	U	11	U	11	U	12	U	11	U	12	UJ
cis-1,3-Dichloropropene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Dibromochloromethane	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Ethylbenzene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Methylene chloride	11	UJ	11	UJ	11	UJ	11	UJ	12	UJ	11	UJ	35	UJ
Styrene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Tetrachloroethene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Toluene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
trans-1,3-Dichloropropene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Trichloroethene	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Vinyl chloride	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Xylene (total)	11	U	11	U	11	U	11	U	12	U	11	U	12	U
Semivolatile Organics, ug/kg														
1,2,4-Trichlorobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
1,2-Dichlorobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02901		47S02901D		47S02902		47S03001		47S03002		47S03101		47S03102	
Sampling Date	7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97	
1,3-Dichlorobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
1,4-Dichlorobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,2'-oxybis(1-Chloropropane)	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,4,5-Trichlorophenol	890	U	900	U	940	U	870	U	980	U	920	U	980	U
2,4,6-Trichlorophenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,4-Dichlorophenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,4-Dimethylphenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,4-Dinitrophenol	890	U	900	U	940	U	870	U	980	U	920	U	980	U
2,4-Dinitrotoluene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2,6-Dinitrotoluene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2-Chloronaphthalene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2-Chlorophenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2-Methylnaphthalene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2-Methylphenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
2-Nitroaniline	890	U	900	U	940	U	870	U	980	U	920	U	980	U
2-Nitrophenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
3,3'-Dichlorobenzidine	350	U	360	UJ	370	UJ	350	UJ	390	UJ	370	UJ	390	UJ
3-Nitroaniline	890	U	900	U	940	U	870	U	980	U	920	U	980	U
4,6-Dinitro-2-methylphenol	890	U	900	U	940	U	870	U	980	U	920	U	980	U
4-Bromophenyl-phenylether	350	U	360	U	370	U	350	U	390	U	370	U	390	U
4-Chloro-3-methylphenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
4-Chloroaniline	350	U	360	U	370	U	350	U	390	U	370	U	390	U
4-Chlorophenyl-phenylether	350	U	360	U	370	U	350	U	390	U	370	U	390	U
4-Methylphenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
4-Nitroaniline	890	U	900	U	940	U	870	U	980	U	920	U	980	U
4-Nitrophenol	890	U	900	U	940	U	870	U	980	U	920	U	980	U
Acenaphthene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Acenaphthylene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Anthracene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Benzo(a)anthracene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Benzo(a)pyrene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Benzo(b)fluoranthene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Benzo(g,h,i)perylene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Benzo(k)fluoranthene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
bis(2-Chloroethoxy)methane	350	U	360	U	370	U	350	U	390	U	370	U	390	U
bis(2-Chloroethyl)ether	350	U	360	U	370	U	350	U	390	U	370	U	390	U
bis(2-Ethylhexyl)phthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02901		47S02901D		47S02902		47S03001		47S03002		47S03101		47S03102	
Sampling Date	7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97	
Butylbenzylphthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Carbazole	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Chrysene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Di-n-butylphthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Di-n-octylphthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Dibenz(a,h)anthracene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Dibenzofuran	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Diethylphthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Dimethylphthalate	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Fluoranthene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Fluorene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Hexachlorobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Hexachlorobutadiene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Hexachlorocyclopentadiene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Hexachloroethane	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Indeno(1,2,3-cd)pyrene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Isophorone	350	U	360	U	370	U	350	U	390	U	370	U	390	U
N-Nitroso-di-n-propylamine	350	U	360	U	370	U	350	U	390	U	370	U	390	U
N-Nitrosodiphenylamine (1)	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Naphthalene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Nitrobenzene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Pentachlorophenol	890	U	900	U	940	U	870	U	980	U	920	U	980	U
Phenanthrene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Phenol	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Pyrene	350	U	360	U	370	U	350	U	390	U	370	U	390	U
Pesticides/PCB, ug/kg														
4,4'-DDD	14	J	23	J	8.7	J	0.5	J	3.9	U	0.26	J	0.18	J
4,4'-DDE	200	J	280		35	J	2.1	J	1.4	J	3.2	J	0.59	J
4,4'-DDT	150		220		56		1.4	J	1.2	J	2.5	J	0.74	J
Aldrin	36	U	37	U	4.5	J	1.8	U	2	U	0.17	J	2	U
alpha-BHC	36	U	37	U	9.7	U	1.8	U	2	U	1.9	U	2	U
alpha-Chlordane	1000	J	1200		130	J	0.99	J	1.1	J	1.9	U	1.1	J
Aroclor-1016	710	U	710	U	190	U	35	U	39	U	36	U	39	U
Aroclor-1221	1400	U	1400	U	380	U	71	U	78	U	74	U	79	U
Aroclor-1232	710	U	710	U	190	U	35	U	39	U	36	U	39	U
Aroclor-1242	710	U	710	U	190	U	35	U	39	U	36	U	39	U
Aroclor-1248	710	U	710	U	190	U	35	U	39	U	36	U	39	U

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02901		47S02901D		47S02902		47S03001		47S03002		47S03101		47S03102	
Sampling Date	7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97	
Aroclor-1254	710	U	710	U	190	U	35	U	39	U	36	U	39	U
Aroclor-1260	710	U	710	U	190	U	35	U	39	U	36	U	39	U
beta-BHC	36	U	2.4	J	9.7	U	1.8	U	2	U	1.9	U	2	U
delta-BHC	36	U	37	U	9.7	U	0.04	J	2	U	1.9	U	2	U
Dieldrin	34	J	71	U	46		0.38	J	0.38	J	0.42	J	0.31	J
Endosulfan I	36	U	37	U	9.7	U	1.8	U	2	U	1.9	U	2	U
Endosulfan II	71	U	71	U	19	U	3.5	U	3.9	U	3.6	U	3.9	U
Endosulfan sulfate	3.3	J	71	U	19	U	3.5	U	3.9	U	3.6	U	3.9	U
Endrin	27	J	30	J	14	J	0.33	J	3.9	U	0.41	J	0.31	J
Endrin aldehyde	71	U	71	U	19	U	3.5	U	3.9	U	3.6	U	3.9	U
Endrin ketone	71	U	71	U	19	U	3.5	U	3.9	U	3.6	U	3.9	U
gamma-BHC (Lindane)	1.1	J	1	J	5.1	J	1.8	U	2	U	0.14	J	0.1	J
gamma-Chlordane	950	J	1000	J	120	J	0.89	J	1	J	0.18	J	0.92	J
Heptachlor	36	U	37	U	9.7	U	0.16	J	2	U	1.9	U	0.16	J
Heptachlor epoxide	26	J	30	J	9.7	U	1.8	U	0.42	J	1.9	U	2	U
Methoxychlor	360	U	370	U	97	U	18	U	20	U	19	U	20	U
Toxaphene	3600	U	3700	U	970	U	180	U	200	U	190	U	200	U
Herbicides, ug/kg														
2,4 5-TP (Silvex)	2	U	2.2	U	2.3	U	2.1	U	7	J	2.2	U	2.4	U
2,4,5-T	2.5	U	2.7	U	2.9	U	2.6	U	3.7	J	1.7	J	2.9	U
2,4-D	5	U	61	J	5.7	U	5.3	U	5.8	U	5.5	U	5.9	U
2,4-DB	25	U	27	U	29	U	26	U	170	J	180	J	110	J
Dalapon	25	U	27	U	29	U	26	U	29	U	9.9	J	29	U
Dicamba	19	J	2.7	U	160	J	2.6	U	2.9	U	2.8	U	2.9	U
Dichloroprop	8	U	8.7	U	9.2	U	8.5	U	9.3	U	49	J	9.4	U
Dinoseb	5	U	5.4	U	5.7	U	5.3	U	5.8	U	3.7	J	5.9	U
MCPA	93000	J	150000	J	27000	J	33000	J	35000	J	76000	J	240	U
MCPP	250000	J	360000	J	320000	J	52000	J	89000	J	160000	J	96000	J
Inorganics, mg/kg														
Aluminum	307	J	337	J	1690	J	122	J	476	J	1170	J	1470	J
Antimony	0.37	U	0.38	U	0.39	U	0.36	U	0.4	U	0.38	U	0.4	U
Arsenic	2	J	1.8	J	6.2		0.58	U	0.63	U	0.6	U	0.64	U
Barium	6.3	J	6.5	J	4.5	J	4	J	3.9	J	7.2	J	3.2	J
Beryllium	0.03	U	0.02	U	0.03	U	0.02	U	0.02	U	0.02	U	0.02	U
Cadmium	0.11	U	0.17	U	0.07	U	0.19	U	0.07	U	0.07	U	0.07	U
Calcium	936	J	2730		993	J	306	J	394	J	737	J	195	J
Chromium	1.9	J	2.2	J	2.5		0.93	J	1.8	J	2.1	J	1.9	J

Appendix B-1

Summary of Surface Soil Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47S02901		47S02901D		47S02902		47S03001		47S03002		47S03101		47S03102	
Sampling Date	7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97		7/2/97	
Cobalt	0.13	U	0.13	U	0.14	U	0.27	J	0.14	U	0.13	U	0.14	U
Copper	2.8	J	2.9	J	1.1	J	1	J	0.82	J	1.5	J	0.66	J
Iron	273		300		147		138		138		217		199	
Lead	10.9		12		3.7		3.1		3.1		9.4		2.2	
Magnesium	37.6	J	67.3	J	27.3	J	17	J	26.3	J	38.4	J	36.2	J
Manganese	6.7		7.7		8.2		6.4		7.3		5.6		3.5	J
Mercury	0.07	J	0.06	J	0.06	U	0.05	U	0.06	U	0.11	J	0.06	U
Nickel	0.83	J	0.57	J	0.52	J	0.37	J	0.5	J	0.44	J	0.87	J
Potassium	26.8	U	32.3	U	38.4	J	27.4	U	34.5	U	27.1	U	34.2	U
Selenium	0.7	J	0.62	U	0.64	U	0.6	U	0.65	U	0.62	U	0.67	U
Silver	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.09	U	0.1	U
Sodium	195	U	229	U	256	U	257	U	232	U	204	U	285	U
Thallium	1	U	1	U	1.1	U	1	U	1.1	U	2.2	U	1.1	U
Vanadium	1	J	1	J	1	J	1	J	1	J	2	J	1	J
Zinc	7.8	J	12.1	J	1.6	J	0.99	J	1.8	J	8.4	J	1.4	J

Appendix B-2

Summary of Groundwater Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47G00101		47G00201		47G00301	
Sampling Date	4/22/97		5/7/97		8/13/97	
Volatile organics, ug/L						
1,1,1-Trichloroethane	10	U	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U	10	U
1,1-Dichloroethane	10	U	10	U	10	U
1,1-Dichloroethene	10	U	10	U	10	U
1,2-Dichloroethane	10	UJ	10	U	10	U
1,2-Dichloroethene (total)	10	U	10	U	6	J
1,2-Dichloropropane	10	U	10	U	10	U
2-Butanone	10	UJ	10	UJ	10	U
2-Hexanone	10	U	10	UJ	10	U
4-Methyl-2-pentanone	10	U	10	UJ	10	U
Acetone	10	UJ	10	U	22	
Benzene	10	U	10	U	2	J
Bromodichloromethane	10	U	10	U	10	U
Bromoform	10	U	10	U	10	U
Bromomethane	10	U	10	U	10	U
Carbon disulfide	10	U	10	U	10	U
Carbon tetrachloride	10	U	10	U	10	U
Chlorobenzene	10	U	10	U	6	J
Chloroethane	10	U	10	U	10	U
Chloroform	10	U	10	U	10	U
Chloromethane	10	UJ	10	U	10	U
cis-1,3-Dichloropropene	10	U	10	U	10	U
Dibromochloromethane	10	U	10	U	10	U
Ethylbenzene	10	U	10	U	7	J
Methylene chloride	10	U	10	U	10	U
Styrene	10	U	10	U	10	U
Tetrachloroethene	10	U	10	U	10	U
Toluene	10	U	10	U	2	J
trans-1,3-Dichloropropene	10	U	10	U	10	U
Trichloroethene	10	U	10	U	5	J
Vinyl chloride	10	U	10	U	10	U
Xylene (total)	10	U	10	U	21	
Semivolatile organics, ug/L						
1,2,4-Trichlorobenzene	10	U	10	U	50	U
1,2-Dichlorobenzene	10	U	10	U	50	U
1,3-Dichlorobenzene	10	U	10	U	50	U
1,4-Dichlorobenzene	10	U	10	U	50	U

Appendix B-2

Summary of Groundwater Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47G00101		47G00201		47G00301	
Sampling Date	4/22/97		5/7/97		8/13/97	
2,2'-oxybis(1-Chloropropane)	10	U	10	U	50	U
2,4,5-Trichlorophenol	25	U	25	U	8	J
2,4,6-Trichlorophenol	10	U	10	U	50	U
2,4-Dichlorophenol	10	U	10	U	50	U
2,4-Dimethylphenol	10	U	10	U	50	U
2,4-Dinitrophenol	25	U	25	U	120	U
2,4-Dinitrotoluene	10	U	10	U	50	U
2,6-Dinitrotoluene	10	U	10	U	50	U
2-Chloronaphthalene	10	U	10	U	50	U
2-Chlorophenol	10	U	10	U	50	U
2-Methylnaphthalene	10	U	10	U	40	J
2-Methylphenol	10	U	10	U	50	U
2-Nitroaniline	25	U	25	U	120	U
2-Nitrophenol	10	U	10	U	50	U
3,3'-Dichlorobenzidine	10	U	10	UJ	50	U
3-Nitroaniline	25	U	25	U	120	U
4,6-Dinitro-2-methylphenol	25	U	25	U	120	U
4-Bromophenyl-phenylether	10	U	10	U	50	U
4-Chloro-3-methylphenol	10	U	10	U	50	U
4-Chloroaniline	10	U	10	U	50	U
4-Chlorophenyl-phenylether	10	U	10	U	50	U
4-Methylphenol	10	U	10	U	16	J
4-Nitroaniline	25	U	25	U	120	U
4-Nitrophenol	25	U	25	U	120	UJ
Acenaphthene	10	U	10	U	6	J
Acenaphthylene	10	U	10	U	50	U
Anthracene	10	U	10	U	50	U
Benzo(a)anthracene	10	U	10	U	50	U
Benzo(a)pyrene	10	U	10	U	50	U
Benzo(b)fluoranthene	10	U	10	U	50	U
Benzo(g,h,i)perylene	10	U	10	U	50	U
Benzo(k)fluoranthene	10	U	10	U	50	U
bis(2-Chloroethoxy)methane	10	U	10	U	50	U
bis(2-Chloroethyl)ether	10	U	10	U	50	U
bis(2-Ethylhexyl)phthalate	10	U	10	U	50	U
Butylbenzylphthalate	10	U	10	U	50	U
Carbazole	10	U	10	U	50	U
Chrysene	10	U	10	U	50	U
Di-n-butylphthalate	10	U	10	U	50	U

Appendix B-2

Summary of Groundwater Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47G00101		47G00201		47G00301	
Sampling Date	4/22/97		5/7/97		8/13/97	
Di-n-octylphthalate	10	U	10	U	50	U
Dibenz(a,h)anthracene	10	U	10	U	50	U
Dibenzofuran	10	U	10	U	50	U
Diethylphthalate	10	U	10	U	50	U
Dimethylphthalate	10	U	10	U	50	U
Fluoranthene	10	U	10	U	50	U
Fluorene	10	U	10	U	50	U
Hexachlorobenzene	10	U	10	U	50	U
Hexachlorobutadiene	10	U	10	U	50	U
Hexachlorocyclopentadiene	10	U	10	U	50	U
Hexachloroethane	10	U	10	U	50	U
Indeno(1,2,3-cd)pyrene	10	U	10	U	50	U
Isophorone	10	U	10	U	50	U
N-Nitroso-di-n-propylamine	10	U	10	U	50	U
N-Nitrosodiphenylamine (1)	10	U	10	U	50	U
Naphthalene	10	U	10	U	7	J
Nitrobenzene	10	U	10	U	50	U
Pentachlorophenol	25	U	25	U	120	U
Phenanthrene	10	U	10	U	50	U
Phenol	10	U	10	U	50	U
Pyrene	10	U	10	U	50	U
Pesticides/PCBs, ug/L						
4,4'-DDD	0.1		6.1	J	18	J
4,4'-DDE	0.02	J	2.5		0.02	J
4,4'-DDT	0.15		9		0.1	UJ
Aldrin	0.05	U	0.68	J	0.05	UJ
alpha-BHC	0.05	U	0.05	U	3.2	J
alpha-Chlordane	0.05	U	11	J	0.14	J
Aroclor-1016	1	U	1	U	1	UJ
Aroclor-1221	2	U	2	U	2	UJ
Aroclor-1232	1	U	1	U	1	UJ
Aroclor-1242	1	U	1	U	1	UJ
Aroclor-1248	1	U	1	U	1	UJ
Aroclor-1254	1	U	1	U	1	UJ
Aroclor-1260	1	U	1	U	1	UJ
beta-BHC	0.05	U	3.8	J	0.05	UJ
delta-BHC	0.05	U	5.2	J	1.5	J
Dieldrin	0.1	U	0.1	U	0.93	J
Endosulfan I	0.05	U	0.45		0.05	UJ

Appendix B-2

Summary of Groundwater Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47G00101		47G00201		47G00301	
Sampling Date	4/22/97		5/7/97		8/13/97	
Endosulfan II	0.1	U	0.53	J	0.1	UJ
Endosulfan sulfate	0.1	U	0.1	U	0.02	J
Endrin	0.1	U	3.4	J	1.4	J
Endrin aldehyde	0.1	U	0.1	U	0.06	J
Endrin ketone	0.1	U	0.03	J	0.1	UJ
gamma-BHC (Lindane)	0.05	U	0.24	J	1.3	J
gamma-Chlordane	0.05	U	9	J	0.26	J
Heptachlor	0.05	U	1.1	J	0.05	UJ
Heptachlor epoxide	0.05	U	0.56	U	0.06	J
Methoxychlor	0.5	U	0.5	U	0.02	J
Toxaphene	5	U	5	U	5	UJ
Herbicides, ug/L						
2,4 5-TP (Silvex)	0.001	J	0.08	J	2.1	J
2,4,5-T	0.03	J	0.01	J	0.51	J
2,4-D	0.26	U	1.5	U	7.5	U
2,4-DB	0.07	U	2.3	J	25	U
Dalapon	0.15	U	1.5	J	3	J
Dicamba	4.7	J	0.06	J	91	J
Dichloroprop	2.5	J	2.8	J	17	J
Dinoseb	0.03	J	0.02	J	4.8	J
MCPA	50	U	50	U	2000	J
MCPP	60	U	60	U	6800	J
Inorganics, ug/L						
Aluminum	283	U	1260		200	J
Antimony	2.4	U	6.3	J	3	J
Arsenic	2.8	U	332		17.6	
Barium	65.4	J	23.7	J	19.5	J
Beryllium	0.2	U	0.35	U	0.1	U
Cadmium	0.4	U	1	J	0.3	U
Calcium	11800		17600		76100	
Chromium	0.9	U	2.5	J	1.7	J
Cobalt	3.1	U	2.7	U	0.75	J
Copper	4.8	J	10.2	J	3.6	U
Iron	2060		469		18700	
Lead	2.3	J	2.2	U	3.8	
Magnesium	2220	J	791	J	4450	J
Manganese	194		16.2		34	
Mercury	0.11	J	0.1	UJ	0.1	U
Nickel	384		6.9	U	3.6	J

Appendix B-2

Summary of Groundwater Analytical Results
TAL Metals, TCL Organics, and Herbicides
PSC 47

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	47G00101		47G00201		47G00301	
Sampling Date	4/22/97		5/7/97		8/13/97	
Potassium	536	J	1750	J	989	J
Selenium	4.3	U	5.8		2.8	U
Silver	0.7	U	0.79	J	0.6	U
Sodium	2870	U	3080	J	2190	J
Thallium	5.5	U	5.5	U	4.7	U
Vanadium	0.8	U	8.8	J	3.9	J
Zinc	24.2	J	30.4		23.8	J

Appendix B

Notes to Full Analytical Results Tables
PSC 47

Naval Air Station Jacksonville
Jacksonville, Florida

TAL = Target Analyte List
TCL = Target Compound List
NA = Identified parameter not analyzed.
Sample ID = Sample Identifier
Lab ID = Laboratory identifier

Units:

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

The following standard validation qualifiers have the following definitions:

U	The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit The number preceding the U qualifier is the reported sample quantitation limit.
J	The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample. For most detected analytes and compounds, the J qualifier is also used to indicate that the reported concentration is below the contract required detection or quantitation limit.
UJ	The analyte/compound was not detected above the reported sample quantitation limit. The reported quantitation limit, however, is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte/compound in the sample.
R	The sample results are rejected during data validation because of serious deficiencies in meeting quality control criteria.

APPENDIX C

SUMMARY OF DETECTIONS IN ANALYTICAL RESULTS

APPENDIX C
SUMMARY OF DETECTIONS
PSC 47

Naval Air Station Jacksonville
Jacksonville, FL

Surface Soil

Chemical	Frequency of Detects	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Volatile Organic Compounds (ug/kg)						
1,1,1-Trichloroethane	1/29	2 to 2	10 to 26	2	5.9	2
1,1-Dichloroethene	1/29	2 to 2	10 to 26	2	5.9	2
Acetone	8/29	18 to 150	10 to 59	42.1	18.6	150
Benzene	1/29	26 to 26	10 to 26	26	6.4	26
Chlorobenzene	2/29	6 to 110	10 to 26	58	9.4	110
Ethylbenzene	1/29	13 to 13	10 to 26	13	6.3	13
Methylene chloride	8/29	1 to 7	10 to 35	2.1	5.3	7
Toluene	3/29	1 to 11	10 to 26	4.7	5.9	11
Trichloroethene	1/29	1 to 1	10 to 26	1	5.8	1
Xylene (total)	2/29	52 to 410	10 to 26	81	10.9	110
Semivolatile Organic Compounds (ug/kg)						
1,2,4-Trichlorobenzene	1/47	21,000 to 21,000	330 to 5,900	21,000	690	21,000
1,2-Dichlorobenzene	2/47	2,600 to 2,900	330 to 5,900	2,750	323	2,900
1,4-Dichlorobenzene	1/47	4,400 to 4,400	330 to 5,900	4,400	337	4,400
2,4-Dinitrotoluene	1/47	105.5* to 105.5*	330 to 5,900	106	305	106
2-Methylnaphthalene	2/47	720 to 28,000	330 to 5,900	14,360	817	28,000
4-Chloro-3-methylphenol	2/47	105.5* to 117*	330 to 5,900	111	304	117
4-Chloroaniline	2/47	3,000 to 16,000	330 to 5,900	9,500	611	16,000
4-Nitrophenol	2/47	240* to 247.5*	840 to 15,000	244	764	248
Acenaphthene	2/47	106.5* to 13,000	330 to 5,900	6,553	519	13,000
Anthracene	1/47	1,700 to 1,700	330 to 5,900	1,700	280	1,700
Benzo(a)anthracene	3/47	53 to 230	330 to 5,900	114	302	230
Benzo(a)pyrene	5/47	55 to 290	330 to 5,900	120	296	290
Benzo(b)fluoranthene	7/47	51 to 760	330 to 5,900	290	259	760
Benzo(g,h,i)perylene	5/47	39 to 630	330 to 5,900	194	307	630
Benzo(k)fluoranthene	7/47	50 to 810	330 to 5,900	291	260	810
Butylbenzylphthalate	1/47	47 to 47	330 to 5,900	47	303	47
Carbazole	1/47	35 to 35	330 to 5,900	35	303	35
Chrysene	3/47	66 to 390	330 to 5,900	177	306	390
Di-n-butylphthalate	2/47	58 to 84	330 to 5,900	71	302	84
Di-n-octylphthalate	4/47	24 to 43	330 to 5,900	35.8	294	43
Dibenz(a,h)anthracene	1/47	30 to 30	330 to 5,900	30	303	30
Fluoranthene	5/47	26 to 480	330 to 5,900	143	299	480
Fluorene	1/47	9,300 to 9,300	330 to 5,900	9,300	441	9,300
Indeno(1,2,3-cd)pyrene	5/47	29 to 140	330 to 5,900	87.6	296	140
N-Nitroso-di-n-propylamine	1/47	107.5* to 107.5*	330 to 5,900	108	305	108
Naphthalene	1/47	2,500 to 2,500	330 to 5,900	2,500	297	2,500
Pentachlorophenol	1/47	244.5* to 244.5*	840 to 15,000	245	768	245
Phenanthrene	2/47	120 to 25,000	330 to 5,900	12,560	774	25,000
Pyrene	6/47	32 to 430	330 to 5,900	188	270	430
bis(2-Ethylhexyl)phthalate	19/47	31 to 750	330 to 5,900	138	195	750
Pesticides/PCBs (ug/kg)						
4,4'-DDD	53/56	0.18 to 3,100,000	3.5 to 265,000	95,734	90,605	3,100,000
4,4'-DDE	55/56	0.59 to 410,000	8 to 265,000	12,034	11,820	410,000
4,4'-DDT	54/56	0.74 to 12,000,000	8 to 265,000	422,437	407,355	12,000,000
Aldrin	13/56	0.15 to 4,500	1.7 to 54,500	380	1,423	4,500
Dieldrin	43/56	0.22 to 77,000	3.5 to 250,000	2,359	3,499	77,000
Endosulfan I	4/56	0.27 to 280	1.8 to 54,500	73.2	1,351	280

APPENDIX C
SUMMARY OF DETECTIONS
PSC 47

Naval Air Station Jacksonville
Jacksonville, FL

Surface Soil

Chemical	Frequency of Detects	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Endosulfan II	1/56	0.28 to 0.28	3.3 to 105,000	0.28	2,599	0.28
Endosulfan sulfate	3/56	0.74 to 19.4*	3.3 to 105,000	7.6	2,599	19.4
Endrin	29/56	0.31 to 94,000	3.4 to 250,000	4,530	2,375	94,000
Endrin aldehyde	8/56	0.68 to 22	3.4 to 105,000	8.4	2,592	22
Endrin ketone	5/56	0.59 to 73	3.3 to 105,000	19.1	2,594	73
Heptachlor	27/56	0.16 to 12,000	1.8 to 136,000	1,278	708	12,000
Heptachlor epoxide	17/56	0.18 to 4,200	1.7 to 54,500	260	1,420	4,200
Methoxychlor	5/56	0.96 to 8.9	18 to 545,000	3.4	13,468	8.9
alpha-BHC	6/56	0.099 to 61,000	1.7 to 54,500	10,203	2,435	61,000
alpha-Chlordane	50/56	0.26 to 280,000	1.8 to 136,000	9,798	8,749	280,000
beta-BHC	13/56	0.97 to 23,600*	1.7 to 130,000	3,824	1,123	23,600
delta-BHC	16/56	0.037 to 77,000	1.7 to 54,500	5,234	2,698	77,000
gamma-BHC (Lindane)	14/56	0.1 to 650	1.8 to 54,500	54.9	1,352	650
gamma-Chlordane	50/56	0.18 to 310,000	1.8 to 136,000	11,556	10,318	310,000
Herbicides (ug/kg)						
2,4 5-TP (Silvex)	37/54	0.027 to 82	1.05 to 36.5	6.6	5.5	82
2,4,5-T	42/54	0.34 to 3,100	1.3 to 14	142	111	3,100
2,4-D	33/54	0.34 to 520	0.72 to 90	61.8	40	520
2,4-DB	38/54	2.7 to 10,550*	16 to 2,000	710	528	10,550
Dalapon	34/54	1.5 to 185*	26 to 440	17.6	24.4	185
Dicamba	44/54	0.63 to 240	1.35 to 14	22.3	18.7	240
Dichloroprop	36/54	1.2 to 330	5 to 145	54.6	41	330
Dinoseb	42/54	0.14 to 1,600	5.2 to 89	80.3	64.4	1,600
MCPA	36/54	40 to 4,600,000	105 to 2,200	149,866	100,023	4,600,000
MCPP	32/54	46 to 320,000	190 to 5,300	51,396	30,656	320,000
Inorganics (mg/kg)						
Aluminum	54/56	122 to 5,760	9.6 to 116	1,363	1,316	5,760
Antimony	4/56	0.63 to 21.3	0.36 to 8.6	6.1	0.82	21.3
Arsenic	31/56	0.5425* to 1,570	0.58 to 10	62	34.6	1,570
Barium	56/56	1.5 to 305	0.21 to 0.84	14	14	305
Beryllium	3/56	0.05 to 0.65	0.02 to 0.72	0.31	0.05	0.65
Cadmium	25/56	0.09 to 15.4	0.07 to 1.7	1.2	0.6	15.4
Calcium	56/56	128 to 235,000	11.9 to 30.8	21,734	21,734	235,000
Chromium	55/56	0.83 to 463	1.1 to 3.8	12.8	12.6	463
Cobalt	11/56	0.23 to 2	0.13 to 3.8	0.73	0.27	2
Copper	56/56	0.66 to 4,990	1.1 to 2.5	95.7	95.7	4,990
Iron	56/56	109 to 25,300	24.9 to 61.2	1,158	1,158	25,300
Lead	56/56	1.9 to 2,820	2.3 to 9.3	108	108	2,820
Magnesium	56/56	15.325* to 17,400	7.2 to 27	591	591	17,400
Manganese	56/56	0.945* to 152	0.2 to 0.48	17.3	17.3	152
Mercury	7/56	0.05 to 0.41	0.051 to 0.18	0.12	0.04	0.41
Nickel	39/56	0.32 to 14.4	0.43 to 5.5	2.5	1.9	14.4
Potassium	22/56	37.6 to 600	27.1 to 117	125	62.6	600
Selenium	2/56	0.505* to 1.2	0.6 to 9.2	0.85	0.8	1.2
Silver	8/56	0.15 to 1.2	0.09 to 2.5	0.49	0.18	1.2
Sodium	5/56	275* to 775	204 to 928	537	175	775
Vanadium	56/56	0.81 to 20.2	1.3 to 3.4	2.7	2.7	20.2
Zinc	56/56	0.99 to 1,100	0.61 to 1.3	52.2	52.2	1,100

APPENDIX C
SUMMARY OF DETECTIONS

Naval Air Station Jacksonville
Jacksonville, FL

Groundwater

Chemical	Frequency of Detects	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Volatile Organic Compounds (ug/kg)						
1,2-Dichloroethene (total)	1/3	6 to 6	10 to 10	6	5.3	6
Acetone	1/3	22 to 22	10 to 10	22	10.7	22
Benzene	1/3	2 to 2	10 to 10	2	4	2
Chlorobenzene	1/3	6 to 6	10 to 10	6	5.3	6
Ethylbenzene	1/3	7 to 7	10 to 10	7	5.7	7
Toluene	1/3	2 to 2	10 to 10	2	4	2
Trichloroethene	1/3	5 to 5	10 to 10	5	5	5
Xylene (total)	1/3	21 to 21	10 to 10	21	10.3	21
Semivolatile Organic Compounds (ug/kg)						
2,4,5-Trichlorophenol	1/3	8 to 8	0.2 to 25	8	11	8
2-Methylnaphthalene	1/3	40 to 40	0.05 to 10	40	16.7	40
4-Methylphenol	1/3	16 to 16	0.05 to 10	16	8.7	16
Acenaphthene	1/3	6 to 6	0.05 to 10	6	5.3	6
Naphthalene	1/3	7 to 7	0.05 to 10	7	5.7	7
Pesticides/PCBs (ug/kg)						
4,4'-DDD	3/3	0.1 to 18	0.1 to 0.1	8.1	8.1	18
4,4'-DDE	3/3	0.016 to 2.5	0.1 to 0.1	0.84	0.84	2.5
4,4'-DDT	2/3	0.15 to 9	0.1 to 0.1	4.6	3.1	9
Aldrin	1/3	0.68 to 0.68	0.05 to 0.05	0.68	0.24	0.68
Dieldrin	1/3	0.93 to 0.93	0.099 to 0.1	0.93	0.34	0.93
Endosulfan I	1/3	0.45 to 0.45	0.05 to 0.05	0.45	0.17	0.45
Endosulfan II	1/3	0.53 to 0.53	0.1 to 0.1	0.53	0.21	0.53
Endosulfan sulfate	1/3	0.024 to 0.024	0.099 to 0.1	0.02	0.04	0.02
Endrin	2/3	1.4 to 3.4	0.1 to 0.1	2.4	1.6	3.4
Endrin aldehyde	1/3	0.064 to 0.064	0.099 to 0.1	0.06	0.05	0.06
Endrin ketone	1/3	0.025 to 0.025	0.1 to 0.1	0.03	0.04	0.03
Heptachlor	1/3	1.1 to 1.1	0.05 to 0.05	1.1	0.38	1.1
Heptachlor epoxide	1/3	0.063 to 0.063	0.05 to 0.56	0.06	0.12	0.06
Methoxychlor	1/3	0.02 to 0.02	0.5 to 0.5	0.02	0.17	0.02
alpha-BHC	1/3	3.2 to 3.2	0.05 to 0.05	3.2	1.1	3.2
alpha-Chlordane	2/3	0.14 to 11	0.05 to 0.05	5.6	3.7	11
beta-BHC	1/3	3.8 to 3.8	0.05 to 0.05	3.8	1.3	3.8
delta-BHC	2/3	1.5 to 5.2	0.05 to 0.05	3.4	2.2	5.2
gamma-BHC (Lindane)	2/3	0.24 to 1.3	0.05 to 0.05	0.77	0.52	1.3
gamma-Chlordane	2/3	0.26 to 9	0.05 to 0.05	4.6	3.1	9
Herbicides (ug/kg)						
2,4 5-TP (Silvex)	3/3	0.0012 to 2.1	NA -10,000	0.73	0.73	2.1
2,4,5-T	3/3	0.009 to 0.51	NA -10,000	0.18	0.18	0.51
2,4-DB	1/3	2.3 to 2.3	0.075 to 25	2.3	5	2.3
Dalapon	2/3	1.5 to 3	0.15 to 0.15	2.3	1.5	3
Dicamba	3/3	0.06 to 91	NA -10,000	31.9	31.9	91
Dichloroprop	3/3	2.5 to 17	NA -10,000	7.4	7.4	17
Dinoseb	3/3	0.023 to 4.8	NA -10,000	1.6	1.6	4.8
MCPA	1/3	2,000 to 2,000	50 to 50	2,000	683	2,000
MCPP	1/3	6,800 to 6,800	60 to 60	6,800	2,287	6,800
Inorganics (mg/kg)						
Aluminum	2/3	200 to 1,260	4.5 to 283	730	534	1,260
Antimony	2/3	3 to 6.3	1.7 to 2.4	4.7	3.5	6.3
Arsenic	2/3	17.6 to 332	2.7 to 2.8	175	117	332
Barium	3/3	19.5 to 65.4	0.1 to 0.2	36.2	36.2	65.4
Cadmium	1/3	1 to 1	0.3 to 0.4	1	0.45	1

APPENDIX C
SUMMARY OF DETECTIONS

Naval Air Station Jacksonville
Jacksonville, FL

Groundwater

Chemical	Frequency of Detects	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Calcium	3/3	11,800 to 76,100	5.6 to 7.3	35,167	35,167	76,100
Chromium	2/3	1.7 to 2.5	0.8 to 0.9	2.1	1.6	2.5
Cobalt	1/3	0.75 to 0.75	0.6 to 3.1	0.75	1.2	0.75
Copper	2/3	4.8 to 10.2	0.6 to 3.6	7.5	5.6	10.2
Iron	3/3	469 to 18,700	11.7 to 14.5	7,076	7,076	18,700
Lead	2/3	2.3 to 3.8	1.1 to 2.2	3.1	2.4	3.8
Magnesium	3/3	791 to 4,450	3.4 to 6.4	2,487	2,487	4,450
Manganese	3/3	16.2 to 194	0.1 to 0.2	81.4	81.4	194
Mercury	1/3	0.11 to 0.11	0.1 to 0.1	0.11	0.07	0.11
Nickel	2/3	3.6 to 384	0.9 to 6.9	194	130	384
Potassium	3/3	536 to 1,750	20.4 to 27.7	1,092	1,092	1,750
Selenium	1/3	5.8 to 5.8	2.8 to 4.3	5.8	3.1	5.8
Silver	1/3	0.79 to 0.79	0.6 to 0.7	0.79	0.48	0.79
Sodium	2/3	2,190 to 3,080	220 to 2,870	2,635	2,235	3,080
Vanadium	2/3	3.9 to 8.8	0.6 to 0.8	6.4	4.4	8.8
Zinc	3/3	23.8 to 30.4	0.3 to 0.3	26.1	26.1	30.4

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 50
EAST SIDE WASTEWATER TREATMENT PLANT
SLUDGE DISPOSAL AREA

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

UNIT IDENTIFICATION CODE: N00207
CONTRACT NO.: N62467-89-D-0317/040

MARCH 1999

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

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 50
EAST SIDE WASTEWATER TREATMENT PLANT
SLUDGE DISPOSAL AREA

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contract Task Order No. 040

Contract No. N62467-89-D-0317

Prepared by:

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Prepared for:

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2155 Eagle Drive
North Charleston, South Carolina 29418

Dana Gaskins, Engineer-in-Charge

March 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-0317/040 are complete and accurate and comply with all requirements of this contract.

DATE: March 5, 1999

NAME AND TITLE OF CERTIFYING OFFICIAL: Phylissa Miller
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Alexander C. Olis, Ph.D., CPSS
Project Technical Lead

(DFAR 252.227-7036)

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East Side Wastewater Treatment Plant, Sludge Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

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Potential Source of Contamination 50
East Side Wastewater Treatment Plant, Sludge Disposal Area
Naval Air Station Jacksonville
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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CompuChem	CompuChem Environmental Corporation
COPCs	chemicals of potential concern
EDS	Environmental Data Services
FDEP	Florida Department of Environmental Protection
FRE	focused risk evaluations
$\mu g/\ell$	micrograms per liter
$\mu g/kg$	micrograms per kilogram
MCL	maximum contaminant level
NAS	Naval Air Station
NFESC	Naval Facilities Engineering Service Center
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCBs	polychlorinated biphenyls
PSC	potential source of contamination
QA/QC	quality assurance and quality control
RRDS	Remedial Response Decision System
SDG	sample delivery group
SSW	Site Screening Workplan
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

Harding Lawson Associates, under contract to the Department of Navy (Contract No. N62467-89-D-0317, Task Order No. 040) is submitting this Sampling Event Report for potential source of contamination (PSC) 50, the former East Side Wastewater Treatment Plant (WWTP) Sludge Disposal Area at Naval Air Station (NAS) Jacksonville, Jacksonville, Florida. PSC 50 is a sludge disposal pit associated with the demolition of the East Side WWTP in 1974. The pit is located east of and near the northern end of Bravo Taxiway (Figures 1-1 and 1-2).

This Sampling Event Report summarizes the methods and results of the field investigation and transmits the field and analytical data.

1.1 PURPOSE AND SCOPE. The purpose of the sampling event at PSC 50 was to gather sufficient information to support the next phase of the Remedial Response Decision System (RRDS) process. The scope of the sampling event, detailed in the Site Screening Workplan (SSW) (ABB Environmental Services, Inc. [ABB-ES], 1997) at PSC 50 included the following:

- collection of up to 20 surface and subsurface soil/sludge samples;
- collection of groundwater samples from two monitoring wells located in the vicinity of the pit;
- laboratory analysis of the soil/sludge and groundwater samples for U.S. Environmental Protection Agency (USEPA) target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), and target analyte list (TAL) inorganics.

Fieldwork for this sampling event was completed during April 1, 1997, through April 15, 1997.

1.2 SITE DESCRIPTION. PSC 50 was previously the site of the east side trickling filter WWTP for the base. The east side WWTP was in operation from 1940 to 1972. When the east side plant was demolished around 1974, the remaining sludge from the digester and the sludge drying beds was disposed of in a pit on the site. Figure 1-2 shows the approximate boundary of the sludge disposal pit. PSC 50 is presently paved and used for fuel truck parking.

The pit was rectangular in shape, measuring approximately 108 feet long by 25 feet wide. The sludge is visibly distinguishable from the surrounding soil by its blackish color and organic claylike texture.

Monitoring well JAX-TF-MW02 was installed within the sludge disposal pit prior to this investigation (ABB-ES, 1996a). The well is screened in clayey sand to sandy clay at a depth of 7.5 to 12.5 feet below land surface (bls). The lithologic log, generated during the installation of JAX-TF-MW02, encountered the sludge layer between 5 and 7.5 feet bls. Additional background information including the findings of previous studies at PSC 50, is presented in the SSW (ABB-ES, 1997).

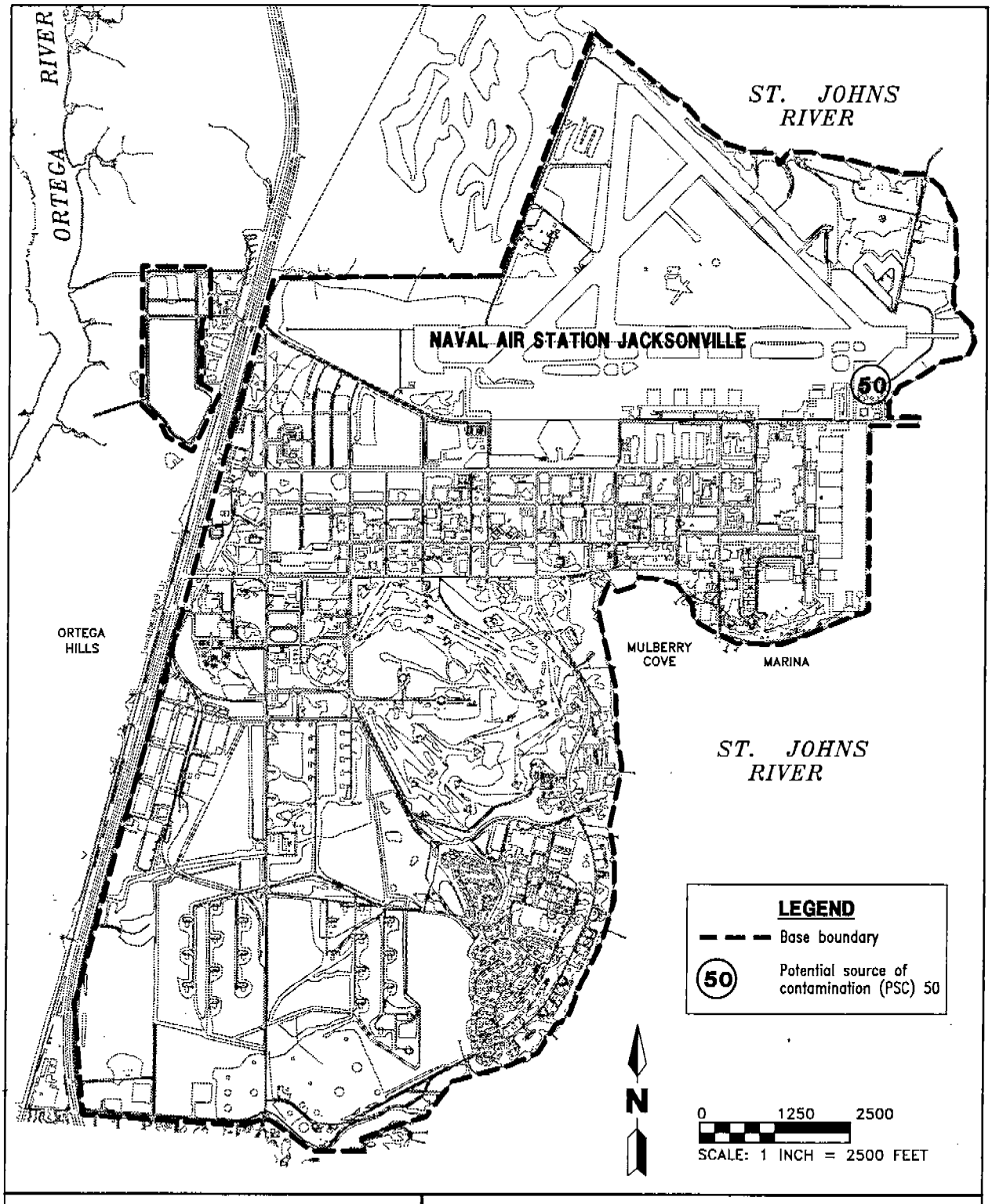

FIGURE 1-1
LOCATION OF PSC 50 AT
NAVAL AIR STATION JACKSONVILLE

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SAMPLING EVENT REPORT
PSC 50

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

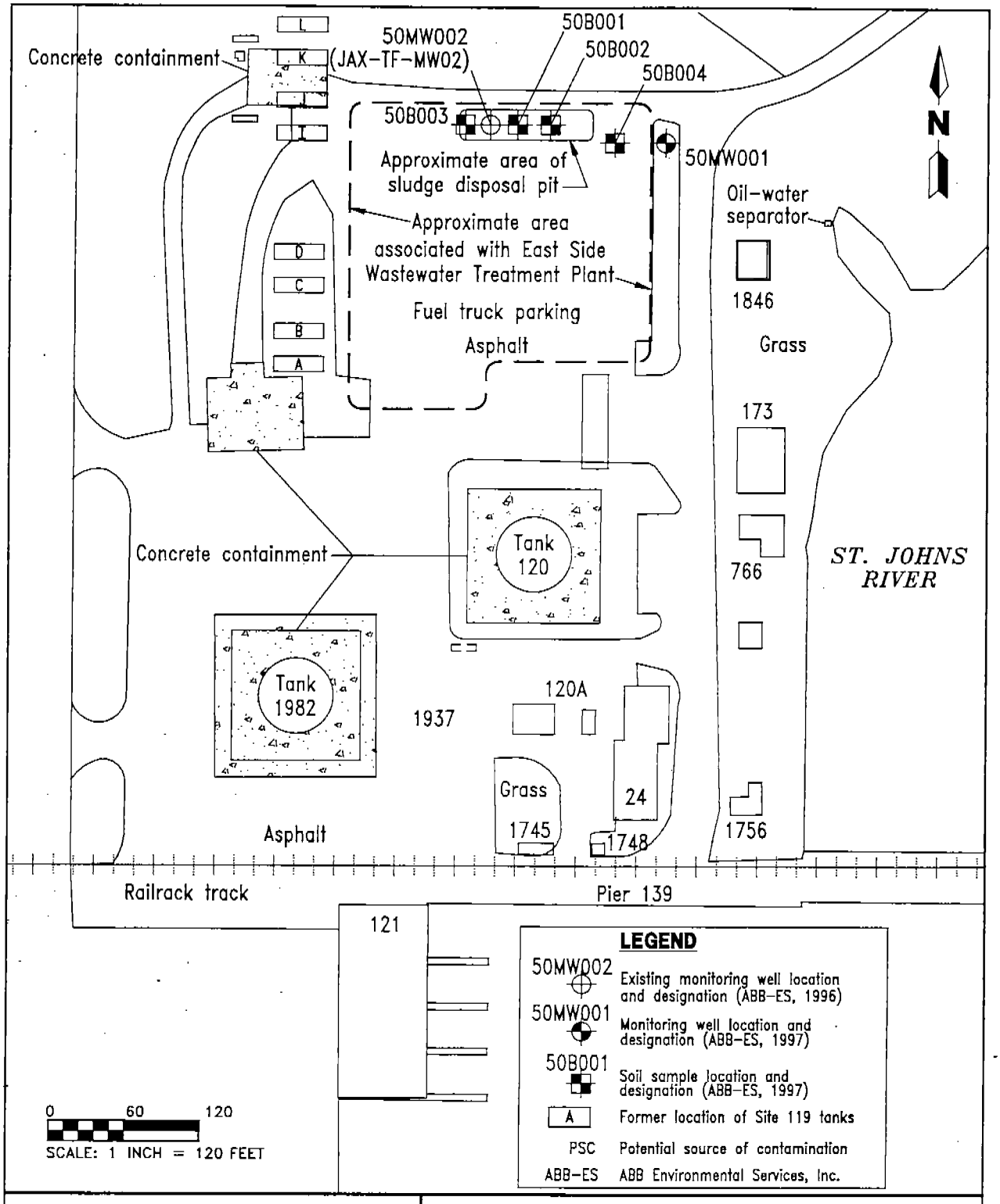

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 50, EAST SIDE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

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SAMPLING EVENT REPORT
PSC 50

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

2.0 SAMPLING APPROACH AND FIELD CHANGES

The work described herein was performed in accordance with the SSW (ABB-ES, 1997). Exceptions to the proposed methods are described in this section.

Because buried sludge was encountered at the first three sample locations, only 12 of the originally proposed 20 samples were collected. Eight of the 12 soil/sludge samples were collected at one-foot intervals from ground surface (beneath the asphalt pavement) to the boring termination depth of 8 feet bls at location 50B001. The sludge was encountered from approximately 4.5 to 6.5 feet bls at this location. Samples were collected from 0 to 1 foot bls and 5 to 6 feet bls at location 50B002. Sludge was encountered in the 5 to 6 foot bls sample (50B00202). Samples were collected from the 4 to 6 feet bls interval at locations 50B003 and 50B004. Sludge was only encountered at the 50B003 location. A sample tracking log, which includes sample and sample data group (SDG) identifiers, relevant dates, sample depths, and parameters analyzed, is included in Appendix A.

A new monitoring well was installed in the grassy area downgradient of the buried sludge (pit). Groundwater samples were collected from the new well, 50MW01 (sample 50G00101), and the existing well, JAX-TF-MW02 (sample 50G00201). Lithologic and well installation logs for both wells are presented in Appendix B. The soil/sludge sample and monitoring well locations are shown on Figure 1-2.

The 12 soil/sludge samples and 2 groundwater samples collected for laboratory analysis were sent by overnight carrier to the subcontract laboratory, Compuchem Environmental Corporation (CompuChem), Cary, North Carolina. The samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganic compounds. Following the laboratory analysis all data were validated in accordance with the Naval Facilities Engineering Service Center (NFESC) Level D protocol. The validated analytical results are included in Appendix C. A summary of the detections in the soil and groundwater analytical results is presented in Appendix D.

3.0 QUALITY ASSURANCE AND QUALITY CONTROL

Field samples and associated quality assurance and quality control (QA/QC) samples were collected and analyzed according to USEPA Contract Laboratory Program and NFESC requirements by a NFESC certified laboratory, CompuChem Laboratories (Cary, North Carolina). The analytical data packages, submitted by SDGs were independently validated by a subcontract data validation company, Environmental Data Services (EDS) (Concord, New Hampshire), in accordance with validation requirements contained in NFESC document *Navy Installation Restoration Laboratory Quality Assurance Guide*, (NFESC, 1996). Other documents utilized in the data validation and review include the USEPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, (USEPA, 1994a) and the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (USEPA, 1994b).

A detailed QA/QC evaluation can be found in the EDS report (EDS, 1997), which summarizes the results of the data quality assessment according to the precision, accuracy, representativeness, completeness and comparability (PARCC) parameters for the entire site screening activity. The EDS report was issued as Appendix B of the SSW. The generated analytical data were found to be acceptable according to the PARCC criteria, with less than 5 percent of the data requiring qualification (primarily estimated "J" qualifier).

4.0 ANALYTICAL RESULTS

4.1 ANALYTICAL RESULTS FOR SOIL SAMPLES. Twelve soil samples were collected at multiple depths from four locations. All samples, regardless of depth, have been evaluated as subsurface soil because they were collected below a paved surface. The complete validated analytical data are included in Appendix C. Appendix D presents a summary of the parameters detected in soil samples collected at PSC 50.

4.1.1 Volatile Organic Compounds Eleven VOCs were detected in the soil samples analyzed. Most of the VOCs were detected in samples collected from the horizon of buried sludge material.

4.1.2 Semivolatile Organic Compounds Twelve SVOCs were detected in the soil samples analyzed. The greatest number of detections and highest concentration were encountered in the sludge material.

4.1.3 Pesticides and Polychlorinated Biphenyls Fifteen pesticide and one PCB compound were identified in soil samples analyzed. While these parameters were detected in both soil fill and the sludge material, the concentrations levels were generally higher in the sludge. Aroclor-1260 was detected at concentrations of 4,900 micrograms per kilogram (μg/kg) and 5,800 μg/kg in the sludge between 5 and 6 feet bls and 6 and 7 feet bls, respectively.

4.1.4 Inorganic Parameters Twenty-one inorganic parameters were identified in soil samples analyzed. Nineteen of the highest concentrations for each parameter were detected in the sludge material.

4.2 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES. Two wells, MW001, a microwell installed as part of this study, and MW002, a standard 2-inch polyvinyl chloride well installed previously (JAX-TF-MW02; ABB-ES, 1996a), were sampled for this investigation. The complete validated analytical data are included in Appendix C. A summary of the parameters detected in soil and groundwater samples collected is presented in Appendix D.

4.2.1 Volatile Organic Compounds Three VOCs, acetone, 1,2-dichloroethene, and chlorobenzene,. were detected in the groundwater samples analyzed. Acetone, detected at both well locations, is most likely an artifact of laboratory or decontamination procedures. Chlorobenzene and 1,2-dichloroethene were detected at low concentrations in MW002, which is located within the buried sludge disposal area.

4.2.2 Semivolatile Organic Compounds Four SVOCs were detected in the groundwater samples analyzed. Three SVOCs were detected at low levels in the groundwater from MW002. Only one SVOC, phenol, was detected at the downgradient well location (MW001).

4.2.3 Pesticides and Polychlorinated Biphenyls Ten pesticide compounds were identified in the groundwater from MW002. The detected concentrations ranged from 0.0011 micrograms per liter (μg/ℓ) (endosulfan I) to 0.026 μg/ℓ (endosulfan II).

4.2.4 Inorganic Parameters Sixteen inorganic parameters were identified in the groundwater samples analyzed. Of the thirteen parameters detected in both wells, nine were detected at higher concentrations in MW002.

5.0 FOCUSED RISK EVALUATION

The purpose of performing focused risk evaluations (FREs) as part of the site screening evaluation is to assist in determining whether or not the existing risk at a PSC (1) supports a no further action decision, (2) indicates the need for an interim remedial action, or (3) requires additional investigation to make a decision. The documentation of the decision for PSC 50 will be included in a revision to the RRDS document for PSC 50 (ABB-ES, 1995).

5.1 FOCUSED HUMAN HEALTH RISK EVALUATION. The focused human health evaluation completed for PSC 50 at NAS Jacksonville follows relevant USEPA guidance for conducting risk assessments at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites and USEPA Region 4 guidance for CERCLA risk assessments as each applies to a focused risk evaluation.

The focused human health risk evaluation addresses potential risk associated with exposure from current exposure pathways at PSC 50 and preliminarily evaluates risks associated with potential future exposure. The evaluation is restricted to presentation of the human health chemicals of potential concern (COPCs), a simple exposure assessment, a toxicity assessment, a risk characterization, and a summary and review of uncertainties.

5.1.1 Identification of COPCs Exposure point concentrations of analytes in subsurface soil were compared with NAS Jacksonville background data collected to support the Operable Unit 1 Remedial Investigation (ABB-ES, 1996b). Analytes were excluded as COPCs if they met the following criteria:

- the exposure point concentration of a contaminant (the lesser of the upper 95 percent confidence limit or the maximum detected concentration) did not exceed 2 times the arithmetic mean (with one-half the reported quantitation limit averaged for nondetections) of background concentrations (this only applies to inorganic parameters) (Appendix E);

- the exposure point concentration did not exceed USEPA Region 3 risk-based concentrations (USEPA, 1998); and

- the analyte was an essential nutrient that did not have a Region 3 risk-based concentration.

Calcium, magnesium, potassium, and sodium were the COPCs excluded as essential nutrients.

Following the above procedure, only Aroclor-1260 was selected as a human health COPC for subsurface soil (Appendix E). Aroclor-1260 was detected in 8 of 12 subsurface soil samples, ranging from 150 to 5,800 $\mu g/kg$. The two samples detected above the 2,900 $\mu g/kg$ risk-based screening concentration for Aroclor-1260 were collected from 5 to 6 feet bls and 6 to 7 feet bls at sampling location 1 in the center of the sludge disposal pit.

Following the above procedure (Appendix E) for groundwater resulted in the selection of only 1,4-dichlorobenzene as a COPC. 1,4-Dichlorobenzene was detected in one of two groundwater samples at 4 $\mu g/\ell$, which is above the 0.47 $\mu g/\ell$, risk-

based screening concentration. However, the detected concentration is less than one percent of the Florida Department of Environmental Protection (FDEP) groundwater guidance concentration and Federal maximum contaminant level (MCL) of 75 $\mu g/\ell$.

5.1.2 Exposure Assessment For the foreseeable future, land use at PSC 50 will remain industrial. The entire PSC is located under an asphalt cover. Therefore, the only potential human exposure to PSC 50 is from construction or utility work in the area that involves excavation of the soil and sludge that constitute PSC 50. Excavation workers could come in direct contact with the contaminated soil, and, as a result of the direct contact, also incidentally ingest the soil. In addition, they can inhale particulates generated during the excavation process. The calculation of exposure via the different routes is shown in Appendix F.

Because current land prevents exposure to groundwater and, even were that to change, the only COPC is present at less than one percent of the FDEP groundwater guidance concentration and Federal MCL, further risk evaluation was not conducted for groundwater exposure.

5.1.3 Toxicity Assessment Toxicity dose-response data in the form of a reference dose for noncarcinogenic effects and a slope factor for carcinogenic effects are presented in Appendix F. Data for Aroclor-1260 were obtained from the Integrated Risk Information System maintained by USEPA.

5.1.4 Risk Characterization Appendix F contains the calculation that forms the basis of the risk characterization of exposure to subsurface soil at PSC 50. A summary of the risks associated with PSC 50 is presented in Table 5-1 below.

Table 5-1
Risk Summary for Subsurface Soil,
Current Land Use for PSC 50

Potential Source of Contamination 50
East Side Wastewater Treatment Plant, Sludge Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Land Use	Exposure Route	Excess Lifetime Cancer Risk	Hazard Index
Excavation Worker			
	Direct Contact	6×10^{-7}	1
	Incidental Ingestion	9×10^{-8}	0.2
	Inhalation	6×10^{-13}	No data

5.1.5 Summary The concentration of Aroclor-1260 from 5 to 7 feet in one sampling location results in a hazard index of 1 for direct contact with soil, which is at the acceptable limit according to USEPA and FDEP screening values. The cancer risk of 7×10^{-7} is below the 10^{-4} to 10^{-6} acceptable risk range. The concentrations of Aroclor-1260 in these locations (4,900 to 5,800 $\mu g/kg$) are approximately 5 times higher than the next highest samples. The next highest samples (50B00102 and 50B00201) had Aroclor-1260 values of approximately 1,000 $\mu g/kg$ and were both located in the shallow subsurface soil above the sludge. No Aroclor-1260 was detected in the deep subsurface soil.

Because the high levels of Aroclor-1260 are isolated both vertically and horizontally, it is very likely that the risk evaluation based on the maximum detected concentration is overly conservative. With such a limited area of contamination, it is unlikely that an excavation worker would remain in contact with the soil for a period of 30 days. In that case, the total exposure to Aroclor-1260 would be greatly reduced; therefore, so would the risk. In addition, because PSC 50 is located in the flightline area of the station, the types of excavation and construction that are likely to occur in the area are limited and unlikely to result in 30 days worth of exposure.

Overall, based on soil analysis only, the results of the FRE for human health do not suggest the need for implementation of further remedial action at PSC 50.

5.2 FOCUSED ECOLOGICAL RISK EVALUATION. An ecological risk evaluation was not conducted because there are no complete exposure pathways to ecological receptors. PSC 50 is located under an asphalt cover and contaminants have not spread to surface water.

6.0 REFERENCES

ABB Environmental Services, Inc. (ABB-ES). 1995. *Naval Installation Restoration Program Plan, Naval Air Station Jacksonville, Florida, Volume 2, Appendix D, Remedial Response Decision System*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina.

ABB-ES. 1996a. *Contamination Assessment Report for Site 119, Naval Air Station Jacksonville, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB-ES. 1996b. *Remedial Investigation and Feasibility Study, Operable Unit 1, Naval Air Station Jacksonville, Jacksonville, Florida*. Prepared for SOUTHNAV-FACENGCOM, North Charleston, South Carolina.

ABB-ES. 1997. *Naval Installation Restoration Program Plan, Naval Air Station Jacksonville, Jacksonville, Florida, Volume 3, Site Screening Workplan*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

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U.S. Environmental Protection Agency (USEPA). 1994a. *Contact Laboratory Program National Functional Guidelines for Organic Data Review*. Washington, D.C. (February).

USEPA. 1994b. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February).

USEPA. 1998. *USEPA Region 3 Risk-Based Concentrations*. Philadelphia, Pennsylvania (April 15).

APPENDIX A

OFF-SITE SAMPLE TRACKING LOG

Appendix A

PSC 50
OFFSITE SAMPLE TRACKING LOG
SITE SCREENING, NAS JACKSONVILLE

SDG	SAMPLE ID	SAMP DATE	UDEPTH (ft bls)	LDEPTH (ft bls)	MATRIX	TAL_MET	TCL VOC	TCL SVOC	TCL PESTPCB	DRFL	TAT	DSTV	DRFV
00003	50B00101	4/15/97	0	1	soil	X	X	X	X	5/22/97	37	6/20/97	7/8/97
00003	50B00102	4/15/97	1	2	soil	X	X	X	X	5/22/97	37	6/20/97	7/8/97
00003	50B00103	4/15/97	2	3	soil	X	X	X	X	5/22/97	37	6/20/97	7/8/97
00004	50B00104	4/15/97	3	4	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00105	4/15/97	4	5	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00106	4/15/97	5	6	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00107	4/15/97	6	7	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00108	4/15/97	7	8	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00201	4/15/97	0	1	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00202	4/15/97	5	6	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00306	4/16/97	4	6	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00004	50B00406	4/16/97	4	6	soil	X	X	X	X	5/22/97	36	6/20/97	7/9/97
00001	50G00101	4/2/97	2.5	11.5	groundwater	X	X	X	X	5/8/97	30	6/20/97	7/7/97
00001	50G00201	4/2/97	3.35	12.35	groundwater	X	X	X	X	5/8/97	30	6/20/97	7/7/97

NOTES:

SDG	Sample Delivery Group (defined group of 20 samples or less collected not more than 14 days of each other.
SAMPLE ID	Sample Identifier
SAMP DATE	Date of Sample Collection
UDEPTH, LDEPTH	Depths, upper (UDEPTH) and lower (LDEPTH)
MATRIX	Media Sampled
TAL_MET	Target Analyte List Metals
TCL VOC	Target Compound List Volatile Organics
TCL SVOC	Target Compound List Semivolatile Organics
TCL PESTPCB	Target Compound List Pesticides and Polychlorinated Biphenyls
DRFL	Date Package Received from Laboratory
TAT	Turnaround Time (days)
DSTV	Date Package Sent to Validators
DRFV	Date Package Received from Validators

APPENDIX B

LITHOLOGIC AND WELL INSTALLATION LOGS

PROJECT: Site Screening, NAS JAX		SITE: PSC 50	LOG of WELL: MW01
CLIENT: SOUTHNAVFACENGCOM	PROJECT NO: 2508.05	DATE STARTED: 4-1-97	COMPLETED: 4-1-97
DRILLING SUBCONTRACTOR: ABB-ES			
METHOD: TerraProbe	WELL CASE DIAM.: NA	SCREEN INT.: 2.5-11.5' FT.	SCREEN SLOT SIZE: NA
TOC ELEVATION: NA		NORTHING: NA	EASTING: NA
WELL DEVELOP. DATE: 4-1-97	TOTAL DEPTH: 11.5 FT. BLS	DEPTH TO ∇ NA	LOGGED BY: Tom Fish

DEPTH FT.	SAMPLE ID	SAMPLE INTERVAL	RECOVERY	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				Topsoil/vegetation Gray sand with pebbles		SW		
				Gray sand (fill)		SP		
				Hand augured to 4 feet bls. Well installed with geoprobe below that depth, therefore no lithologic information below that depth.				
				Hole remained open to 8 feet bls. Below that depth, native material caved around well screen.				
10								
				Well set at 11.5' bls.				
15								

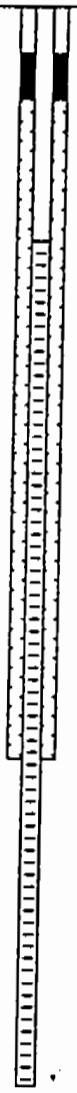


 ABB ENVIRONMENTAL SERVICES, INC.

WELL COMPLETION LOG

ATION NAS JACKSONVILLE - SITE 119 WORK ORDER # 5326

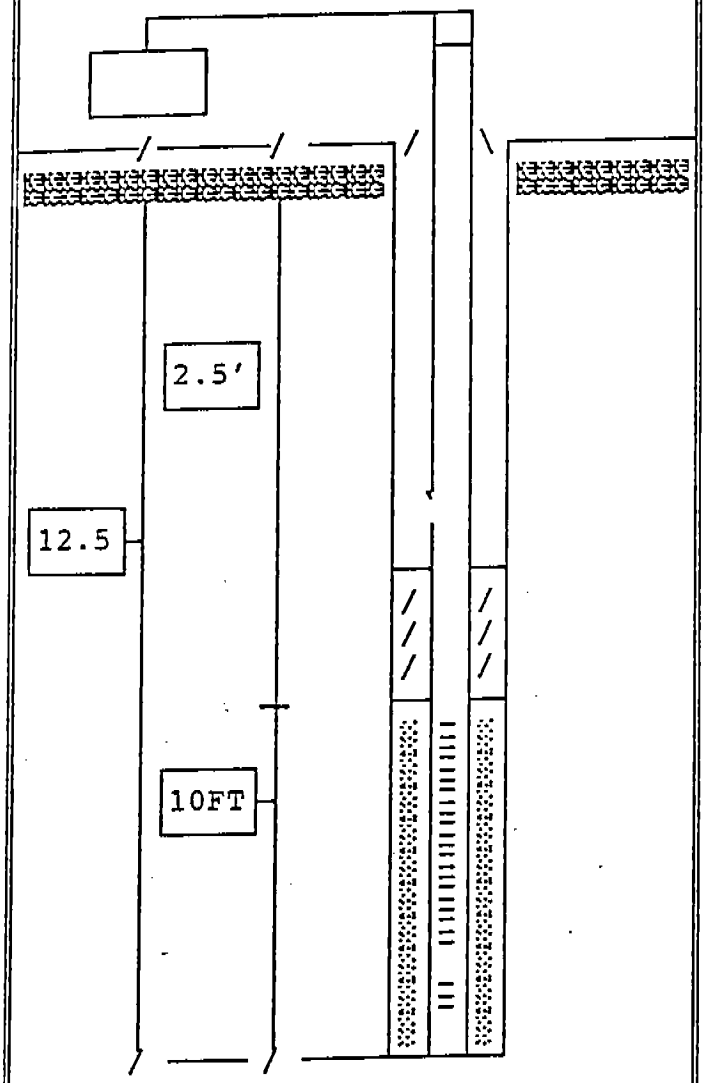
ADDRESS: HIGHWAY 17, JACKSONVILLE, FL

CLIENT: ABB ENV. SERVICES DATE 9/2/94

WELL NUMBER: MW-2 CONTACT: MARK JOOP

INSTALLED BY: JOHN WARD

Well designation JAX-TF-MW02



X FLUSH MANHOLE

ABOVE GRADE PROTECTOR

OTHER

GROUT 1 BAGS

RISER - TYPE PVC

RISER - SIZE 2"

BENTONITE

FINE SAND X

SCREEN - TYPE PVC

SCREEN - SIZE .010

FILTER TYPE 20/30

6X50LB

DEVELOPMENT: BAILED PUMPED X AIR LIFT SURGE SWAB NONE

TOTAL TIME: 45 MINUTES TOTAL GALLONS:

WATER APPEARANCE: START - BROWN FINISH CLEAR

APPENDIX C

VALIDATED ANALYTICAL DATA

Appendix C-1

Summary of Subsurface Soil Analytical Results, TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50B00101		50B00102		50B00103		50B00104		50B00105		50B00106		50B00107		50B00108		50B00201		50B00202		50B00306		50B00406	
Sampling Date	4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/16/97		4/16/97	
Volatile organics, ug/kg																								
1,1,1-Trichloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,1,2,2-Tetrachloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,1,2-Trichloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,1-Dichloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,1-Dichloroethene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,2-Dichloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,2-Dichloroethene (total)	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
1,2-Dichloropropane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
2-Butanone	11	UJ	11	UJ	11	UJ	12	UJ	30	J	160	J	250	J	12	UJ	11	UJ	130	UJ	33	J	12	UJ
2-Hexanone	11	U	11	UJ	11	UJ	12	UJ	11	UJ	26	UR	39	UR	12	UJ	11	UJ	12	U	12	UJ	12	U
4-Methyl-2-pentanone	11	U	11	U	11	U	12	U	11	U	26	UJ	39	UJ	12	U	11	U	12	UJ	12	U	12	UJ
Acetone	31	UJ	34	UJ	45	U	33	UJ	120	UJ	280	J	450	J	32	UJ	18	UJ	180	J	110	J	46	U
Benzene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	2	J	12	U	12	U
Bromodichloromethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Bromoform	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Bromomethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Carbon disulfide	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	3	J	12	U	12	U
Carbon tetrachloride	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Chlorobenzene	11	U	11	U	11	U	12	U	5	J	50		190		2	J	11	U	74		12	U	12	U
Chloroethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Chloroform	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Chloromethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	UJ	12	U	12	U
cis-1,3-Dichloropropene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Dibromochloromethane	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Ethylbenzene	11	U	11	U	11	U	12	U	11	U	5	J	20	J	12	U	11	U	6	J	12	U	12	U
Methylene chloride	11	UJ	11	U	18	U	12	U	11	U	26	U	39	U	12	U	11	U	2	J	12	U	12	U
Styrene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Tetrachloroethene	1	J	2	J	11	U	12	U	11	U	26	U	39	U	12	U	11	U	2	J	12	U	12	U
Toluene	1	J	11	U	11	U	12	U	11	U	3	J	10	J	12	U	11	U	4	J	12	U	12	U
trans-1,3-Dichloropropene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Trichloroethene	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	1	J	12	U	12	U
Vinyl chloride	11	U	11	U	11	U	12	U	11	U	26	U	39	U	12	U	11	U	12	U	12	U	12	U
Xylene (total)	11	U	11	U	11	U	12	U	11	U	10	J	65		12	U	11	U	7	J	12	U	12	U
Semivolatile organics, ug/kg																								
1,2,4-Trichlorobenzene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
1,2-Dichlorobenzene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
1,3-Dichlorobenzene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U

Appendix C-1

Summary of Subsurface Soil Analytical Results, TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50B00101	50B00102	50B00103	50B00104	50B00105	50B00106	50B00107	50B00108	50B00201	50B00202	50B00306	50B00406
Sampling Date	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/15/97	4/16/97	4/16/97
1,4-Dichlorobenzene	350 U	350 U	370 U	380 UR	130 J	4700 U	2500 J	400 UJ	340 U	300 J	390 U	400 U
2,2'-oxybis(1-Chloropropane)	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2,4,5-Trichlorophenol	880 U	890 U	930 U	960 U	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
2,4,6-Trichlorophenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2,4-Dichlorophenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2,4-Dimethylphenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2,4-Dinitrophenol	880 U	890 U	930 U	960 U	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
2,4-Dinitrotoluene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2,6-Dinitrotoluene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2-Chloronaphthalene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2-Chlorophenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2-Methylnaphthalene	350 U	350 U	820	380 UR	790	11000	18000	42 J	340 U	2600	880	400 U
2-Methylphenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
2-Nitroaniline	880 U	890 U	930 U	960 UR	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
2-Nitrophenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
3,3'-Dichlorobenzidine	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
3-Nitroaniline	880 U	890 U	930 U	960 UR	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
4,6-Dinitro-2-methylphenol	880 U	890 U	930 U	960 U	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
4-Bromophenyl-phenylether	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
4-Chloro-3-methylphenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
4-Chloroaniline	350 U	270 J	370 U	94 J	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
4-Chlorophenyl-phenylether	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
4-Methylphenol	350 U	350 U	370 U	380 U	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
4-Nitroaniline	880 U	890 U	930 U	960 UR	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
4-Nitrophenol	880 U	890 U	930 U	960 U	950 U	12000 U	13000 U	1000 UJ	860 U	1000 U	980 U	1000 U
Acenaphthene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Acenaphthylene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Anthracene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Benzo(a)anthracene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Benzo(a)pyrene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Benzo(b)fluoranthene	48 J	350 U	370 U	380 UR	68 J	4700 U	5100 U	400 UJ	340 U	46 J	390 U	400 U
Benzo(g,h,i)perylene	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Benzo(k)fluoranthene	45 J	350 U	370 U	380 UR	74 J	4700 U	5100 U	400 UJ	340 U	50 J	390 U	400 U
bis(2-Chloroethoxy)methane	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
bis(2-Chloroethyl)ether	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
bis(2-Ethylhexyl)phthalate	50 J	110 J	48 J	49 J	610	2600 J	7400	52 J	340 U	580	490	400 U
Butylbenzylphthalate	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U
Carbazole	350 U	350 U	370 U	380 UR	380 U	4700 U	5100 U	400 UJ	340 U	400 U	390 U	400 U

Appendix C-1

Summary of Subsurface Soil Analytical Results, TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50B00101		50B00102		50B00103		50B00104		50B00105		50B00106		50B00107		50B00108		50B00201		50B00202		50B00306		50B00406	
Sampling Date	4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/16/97		4/16/97	
Chrysene	350	U	350	U	370	U	380	UR	48	J	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Di-n-butylphthalate	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Di-n-octylphthalate	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Dibenz(a,h)anthracene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Dibenzofuran	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	190	J	390	U	400	U
Diethylphthalate	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Dimethylphthalate	350	U	350	U			380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Fluoranthene	350	U	39	J	370	U	380	UR	110	J	610	J	560	J	400	UJ	340	U	99	J	65	J	400	U
Fluorene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Hexachlorobenzene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Hexachlorobutadiene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Hexachlorocyclopentadiene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Hexachloroethane	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Indeno(1,2,3-cd)pyrene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Isophorone	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
N-Nitroso-di-n-propylamine	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
N-Nitrosodiphenylamine (1)	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Naphthalene	350	U	350	U	280	J	380	UR	270	J	3700	J	6300		400	UJ	340	U	810		140	J	400	U
Nitrobenzene	350	U	350	U	370	U	380	UR	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Pentachlorophenol	880	U	890	U	930	U	960	UJ	950	U	12000	U	13000	U	1000	UJ	860	U	1000	U	980	U	1000	U
Phenanthrene	350	U	350	U	55	J	380	UR	96	J	700	J	840	J	400	UJ	340	U	160	J	68	J	400	U
Phenol	350	U	350	U	370	U	380	U	380	U	4700	U	5100	U	400	UJ	340	U	400	U	390	U	400	U
Pyrene	350	U	43	J	50	J	380	UR	87	J	500	J	5100	U	400	UJ	340	U	72	J	49	J	400	U
Pesticides/PCB, ug/kg																								
4,4'-DDD	44	J	53	J	10	J	8.2	J	19	U	56	J	63	J	4	U	4	J	20	U	3.3	J	100	J
4,4'-DDE	17	J	48		18	J	14	J	79	J	760		540		1.5	J	2	J	160		22		12	J
4,4'-DDT	240		18	U	13	J	180	J	19	U	47	J	45	J	130		7.7	J	20	U	4.3	U	1600	
Aldrin	9	U	3.6	J	0.24	J	2	U	9.6	U	12	U	13	U	2	U	1.8	U	10	U	2	U	41	U
alpha-BHC	9	U	9.1	U	1.9	U	2	U	9.6	U	12	U	13	U	2	U	1.8	U	10	U	2	U	41	U
alpha-Chlordane	1.3	J	9.1	U	1.9	U	2	U	9.6	U	87	J	13	U	2	U	1.8	U	10	U	2	U	41	U
Aroclor-1016	170	U	180	U	37	U	38	U	190	U	240	U	260	U	40	U	35	U	200	U	39	U	800	U
Aroclor-1221	350	U	360	U	75	U	78	U	380	U	480	U	520	U	81	U	70	U	410	U	80	U	1600	U
Aroclor-1232	170	U	180	U	37	U	38	U	190	U	240	U	260	U	40	U	35	U	200	U	39	U	800	U
Aroclor-1242	170	U	180	U	37	U	38	U	190	U	240	U	260	U	40	U	35	U	200	U	39	U	800	U
Aroclor-1248	170	U	180	U	37	U	38	U	190	U	240	U	260	U	40	U	35	U	200	U	39	U	800	U
Aroclor-1254	170	U	180	U	37	U	38	U	190	U	240	U	260	U	40	U	35	U	200	U	39	U	800	U
Aroclor-1260	170	U	1100	J	450		320		710	J	4900		5800		40	U	35	U	1000	J	150		800	U
beta-BHC	9	U	9.1	U	1.9	U	2	U	9.6	U	12	U	13	U	2	U	1.8	U	10	U	2	U	41	U

Appendix C-1

Summary of Subsurface Soil Analytical Results, TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50B00101		50B00102		50B00103		50B00104		50B00105		50B00106		50B00107		50B00108		50B00201		50B00202		50B00306		50B00406	
Sampling Date	4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/15/97		4/16/97		4/16/97	
delta-BHC	9	U	9.1	U	2.6		2	U	9.6	U	12	U	13	U	2	U	0.31	J	10	U	2	U	41	U
Dieldrin	2.1	J	18	U	40	J	6	J	19	U	180	J	26	U	4	U	0.74	J	20	U	3.9	U	80	U
Endosulfan I	9	U	2.9	J	1.9	U	0.26	J	2.5	J	12	U	42	J	2	U	1.8	U	4.2	J	0.54	J	41	U
Endosulfan II	17	U	18	U	3.7	U	3.8	U	32	J	24	U	26	U	4	U	3.5	U	43	J	3.9	U	80	U
Endosulfan sulfate	17	U	18	U	3.7	U	3.8	U	19	U	24	U	26	U	4	U	3.5	U	20	U	3.9	U	80	U
Endrin	17	U	18	U	3.7	U	3.8	U	19	U	24	U	26	U	0.65	J	2.3	J	20	U	3.9	U	80	U
Endrin aldehyde	2.8	J	18	U	3.7	U	13	J	19	U	24	U	26	U	4	U	3	J	20	U	3.9	U	80	U
Endrin ketone	17	U	18	U	3.7	U	3.8	U	19	U	24	U	26	U	4	U	3.5	U	20	U	3.9	U	80	U
gamma-BHC (Lindane)	9	U	9.1	U	1.9	U	2	U	9.6	U	12	U	13	U	2	U	1.8	U	10	U	2	U	41	U
gamma-Chlordane	1.9	J	9	J	2.7	J	1.9	J	8	J	12	U	13	U	2	U	1.4	J	17	J	1.8	J	2.7	J
Heptachlor	9	U	9.1	U	1.9	U	2	U	9.6	U	12	U	13	U	0.19	J	1.8	U	10	U	2	U	41	U
Heptachlor epoxide	9	U	5.6	J	2.4	J	1.8	J	9.6	U	12	U	13	U	2	U	0.08	J	10	U	2	U	41	U
Methoxychlor	7.8	J	10	J	3.1	J	1.1	J	96	U	14	J	13	J	20	U	18	U	4.2	J	0.58	J	410	U
Toxaphene	900	U	910	U	190	U	200	U	960	U	1200	U	1300	U	200	U	180	U	1000	U	200	U	4100	U
Inorganics, mg/kg																								
Aluminum	1040		894		1860		876	J	838	J	3090	J	4860	J	11400	J	1020	J	1420	J	1300	J	2950	J
Antimony	1.1	UJ	4.8	J	0.79	UJ	1.2	U	0.81	U	6.9	J	18.3	J	0.59	U	1	U	1.2	U	0.87	U	1.4	U
Arsenic	1.2	U	1.3	U	1.4	U	0.85	J	1.5	U	1.1	J	1.8	J	1.9	J	1.2	U	1.7	U	1.6	U	1.7	U
Barium	9.5	J	45.6		19.3	J	15.1	J	16.4	J	80.3		165		30.9	J	8.8	J	20.5	J	13.9	J	11.2	J
Beryllium	0.07	J	0.06	J	0.14	J	0.11	U	0.11	U	0.09	U	0.2	U	0.23	J	0.07	J	0.07	J	0.05	J	0.12	U
Cadmium	1.2		15.4		4.2		3.5	J	6.1	J	29.8	J	67.3	J	0.24	U	0.86	J	5.1	J	2.2	J	0.24	U
Calcium	88800	J	2950	J	3820	J	2140		2740		5400		10700		630	J	148000		5710		1060	J	608	J
Chromium	11.3		156		34.2		33.2		43.8		268		535		20		11.6		44.7		20.8		5.3	
Cobalt	0.29	J	0.5	J	0.61	J	0.41	J	0.4	J	0.85	J	1.8	J	0.49	J	0.34	J	0.33	J	0.5	U	0.54	U
Copper	6.8		85.4		18.5		19.7	J	22.3	J	135	J	280	J	2.3	J	5.1	J	24.8	J	15	J	2	J
Iron	1100		2310		2020		3200	J	1580	J	5030	J	10200	J	8550	J	840	J	1770	J	1180	J	2110	J
Lead	11.2		115		31.1		39	J	29.4	J	184	J	420	J	10.2	J	7.7	J	33.5	J	21.9	J	4.1	J
Magnesium	698	J	177	J	461	J	171	J	143	J	488	J	1010	J	662	J	1100		271	J	143	J	188	J
Manganese	17.8		15.2		42.6		22.5	J	13.8	J	25.5	J	67.8	J	7.9	J	22.6	J	14.5	J	8.6	J	3.8	J
Mercury	0.14		1.7		0.39		0.35		1.8		3.7		9.1		0.07	U	0.17		0.19		0.06	J	0.07	U
Nickel	1.5	U	6.4	J	2.5	U	3.2	J	329	J	14.5	J	27.3	J	3.1	J	1.9	J	6.7	J	3.4	J	1.8	J
Potassium	132	J	65.5	U	144	J	85.4	J	63.7	U	140	J	231	J	388	J	221	J	106	J	76	J	104	J
Selenium	1.9	U	2	U	2.2	U	2.3	U	2.2	U	1.5		1.4	J	2.4	U	1.9	U	2.7	U	2.4	U	2.7	U
Silver	10		217		35.4		41.8		47.1		330		470		0.45	U	10	U	57.6	U	29.4	U	0.42	U
Sodium	325	U	338	U	457	U	318	U	261	U	425	U	545	U	363	U	320	U	307	U	289	U	361	U
Thallium	2.5	U	2.6	U	2.7	U	3	U	3	U	4.6	U	5.3	U	3.2	U	2.5	U	3.2	U	3.1	U	3.2	U
Vanadium	4.2	J	3.1	J	4.6	J	4.4	J	2.6	J	6.2	J	11.2	J	31.3		4.6	J	4.2	J	2.8	J	4.9	J
Zinc	19.6	J	173	J	61.5	J	67.9	J	68.2	J	453	J	940	J	6	J	14.8	J	75.2	J	38.5	J	7.1	J

Appendix C-2

Summary of Groundwater Analytical Results
TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50G00101		50G00201	
Sampling Date	4/2/97		4/2/97	
Volatile Organics, ug/L				
1,1,1-Trichloroethane	10	U	10	U
1,1,2,2-Tetrachloroethane	10	U	10	U
1,1,2-Trichloroethane	10	U	10	U
1,1-Dichloroethane	10	U	10	U
1,1-Dichloroethene	10	U	10	U
1,2-Dichloroethane	10	U	10	U
1,2-Dichloroethene (total)	10	U	1	J
1,2-Dichloropropane	10	U	10	U
2-Butanone	10	UJ	10	UJ
2-Hexanone	10	UR	10	UR
4-Methyl-2-pentanone	10	U	10	U
Acetone	19	J	22	J
Benzene	10	U	10	U
Bromodichloromethane	10	U	10	U
Bromoform	10	U	10	U
Bromomethane	10	U	10	U
Carbon disulfide	10	U	10	U
Carbon tetrachloride	10	U	10	U
Chlorobenzene	10	U	11	
Chloroethane	10	UJ	10	U
Chloroform	10	U	10	U
Chloromethane	10	U	10	UJ
cis-1,3-Dichloropropene	10	U	10	U
Dibromochloromethane	10	U	10	U
Ethylbenzene	10	U	10	U
Methylene chloride	10	U	10	U
Styrene	10	U	10	U
Tetrachloroethene	10	U	10	U
Toluene	10	U	10	U
trans-1,3-Dichloropropene	10	U	10	U
Trichloroethene	10	U	10	U
Vinyl chloride	10	U	10	U
Xylene (total)	10	U	10	U
Semivolatiles, ug/L				
1,2,4-Trichlorobenzene	10	U	10	U
1,2-Dichlorobenzene	10	U	10	U
1,3-Dichlorobenzene	10	U	10	U
1,4-Dichlorobenzene	10	U	4	J
2,2'-oxybis(1-Chloropropane)	10	U	10	U
2,4,5-Trichlorophenol	25	U	25	U
2,4,6-Trichlorophenol	10	U	10	U
2,4-Dichlorophenol	10	U	10	U
2,4-Dimethylphenol	10	U	10	U
2,4-Dinitrophenol	25	U	25	U
2,4-Dinitrotoluene	10	U	10	U
2,6-Dinitrotoluene	10	U	10	U
2-Chloronaphthalene	10	U	10	U
2-Chlorophenol	10	U	10	U
2-Methylnaphthalene	10	U	10	U
2-Methylphenol	10	U	10	U
2-Nitroaniline	25	U	25	U
2-Nitrophenol	10	U	10	U
3,3'-Dichlorobenzidine	10	U	10	U
3-Nitroaniline	25	U	25	U

Appendix C-2

Summary of Groundwater Analytical Results
TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50G00101		50G00201	
Sampling Date	4/2/97		4/2/97	
4,6-Dinitro-2-methylphenol	25	U	25	U
4-Bromophenyl-phenylether	10	U	10	U
4-Chloro-3-methylphenol	10	U	10	U
4-Chloroaniline	10	U	10	U
4-Chlorophenyl-phenylether	10	U	10	U
4-Methylphenol	10	U	10	U
4-Nitroaniline	25	U	25	U
4-Nitrophenol	25	U	25	U
Acenaphthene	10	U	10	U
Acenaphthylene	10	U	10	U
Anthracene	10	U	10	U
Benzo(a)anthracene	10	U	10	U
Benzo(a)pyrene	10	U	10	U
Benzo(b)fluoranthene	10	U	10	U
Benzo(g,h,i)perylene	10	U	10	U
Benzo(k)fluoranthene	10	U	10	U
bis(2-Chloroethoxy)methane	10	U	10	U
bis(2-Chloroethyl)ether	10	U	10	U
bis(2-Ethylhexyl)phthalate	10	U	10	U
Butylbenzylphthalate	10	U	10	U
Carbazole	10	U	10	U
Chrysene	10	U	10	U
Di-n-butylphthalate	10	U	4	J
Di-n-octylphthalate	10	U	10	U
Dibenz(a,h)anthracene	10	U	10	U
Dibenzofuran	10	U	10	U
Diethylphthalate	10	U	2	J
Dimethylphthalate	10	U	10	U
Fluoranthene	10	U	10	U
Fluorene	10	U	10	U
Hexachlorobenzene	10	U	10	U
Hexachlorobutadiene	10	U	10	U
Hexachlorocyclopentadiene	10	U	10	U
Hexachloroethane	10	U	10	U
Indeno(1,2,3-cd)pyrene	10	U	10	U
Isophorone	10	U	10	U
N-Nitroso-di-n-propylamine	10	U	10	U
N-Nitrosodiphenylamine (1)	10	U	10	U
Naphthalene	10	U	10	U
Nitrobenzene	10	U	10	U
Pentachlorophenol	25	U	25	U
Phenanthrene	10	U	10	U
Phenol	5	J	10	U
Pyrene	10	U	10	U
Pesticides/PCBs, ug/L				
4,4'-DDD	0.1	U	0.0095	J
4,4'-DDE	0.1	U	0.1	U
4,4'-DDT	0.1	U	0.004	J
Aldrin	0.05	U	0.0022	J
alpha-BHC	0.05	U	0.05	U
alpha-Chlordane	0.05	U	0.0066	J
Aroclor-1016	1	U	1	U
Aroclor-1221	2	U	2	U
Aroclor-1232	1	U	1	U
Aroclor-1242	1	U	1	U

Appendix C-2

Summary of Groundwater Analytical Results
TAL Metals and TCL Organics
PSC 50

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	50G00101		50G00201	
Sampling Date	4/2/97		4/2/97	
Aroclor-1248	1	U	1	U
Aroclor-1254	1	U	1	U
Aroclor-1260	1	U	1	U
beta-BHC	0.05	U	0.0082	J
delta-BHC	0.05	U	0.05	U
Dieldrin	0.1	U	0.1	U
Endosulfan I	0.05	U	0.0011	J
Endosulfan II	0.1	U	0.026	J
Endosulfan sulfate	0.1	U	0.0031	J
Endrin	0.1	U	0.1	U
Endrin aldehyde	0.1	U	0.0064	J
Endrin ketone	0.1	U	0.1	U
gamma-BHC (Lindane)	0.05	U	0.0082	J
gamma-Chlordane	0.05	U	0.05	U
Heptachlor	0.05	U	0.05	U
Heptachlor epoxide	0.05	U	0.05	U
Methoxychlor	0.5	U	0.5	U
Toxaphene	5	U	5	U
Inorganics, ug/L				
Aluminum	249	U	143	U
Antimony	2.4	U	5	J
Arsenic	2.8	U	5.1	J
Barium	70.9	J	64.3	J
Beryllium	0.2	U	0.24	U
Cadmium	0.4	U	0.89	U
Calcium	85700		309000	
Chromium	1.9	J	10.1	
Cobalt	2.5	J	6.6	J
Copper	1.7	J	5.7	J
Iron	14900		2300	
Lead	2.2	U	2.2	U
Magnesium	14600		41300	
Manganese	245		210	
Mercury	0.1	U	0.12	J
Nickel	28	J	6.7	J
Potassium	2510	J	13500	
Selenium	4.3	U	4.3	U
Silver	0.7	U	0.7	U
Sodium	21100		28200	
Thallium	5.5	U	5.5	U
Vanadium	1.8	J	6	J
Zinc	20.9		144	

Appendix C-1, C-2

Notes for Analytical Results Tables
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Sample ID = Sample Identifier
Lab ID = Laboratory identifier

Units:

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

The following standard validation qualifiers have the following definitions:

U	The analyte/compound was analyzed for but was not detected above the reported sample quantitation limit The number preceding the U qualifier is the reported sample quantitation limit.
J	The analyte/compound was positively identified and the associated numerical value is an estimated concentration of the analyte/compound in the sample. For most detected analytes and compounds, the J qualifier is also used to indicate that the reported concentration is *below the contract required detection or quantitation limit.*
UJ	The analyte/compound was not detected above the reported sample quantitation limit. The reported quantitation limit, however, is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte/compound in the sample.
R	The sample results are rejected during data validation because of serious deficiencies in meeting quality control criteria.

APPENDIX D

SUMMARY OF DETECTION IN ANALYTICAL RESULTS

APPENDIX D
SUMMARY OF DETECTED COMPOUNDS
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsuface Soil

Chemical	Frequency of Detect	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected	%95 UCL	Exposure Point Conc
Volatile Organic Compounds (ug/kg)								
Acetone	4/12	110 - 450	12 - 120	255	100	450	433	433
Benzene	1/12	2 - 2	11 - 39	2	7.2	2	10.3	2
2-Butanone	4/12	30 - 250	11 - 130	118	48.2	250	255	250
Carbon disulfide	1/12	3 - 3	11 - 39	3	7.3	3	9.7	3
Chlorobenzene	5/12	2 - 190	11 - 39	64.2	30.1	190	119	119
Ethylbenzene	3/12	5 - 20	11 - 39	10.3	6.9	20	8.4	8.4
Methylene chloride	1/12	2 - 2	11 - 39	2	7.5	2	10.9	2
Tetrachloroethene	3/12	1 - 2	11 - 39	1.7	6.5	2	12.9	2
Toluene	4/12	1 - 10	11 - 39	4.5	5.3	10	8.3	8.3
Trichloroethene	1/12	1 - 1	11 - 39	1	7.1	1	12.3	1
Xylene (total)	3/12	7 - 65	11 - 39	27.3	11.1	65	16	16
Semivolatile Organic Compounds (ug/kg)								
Benzo(b)fluoranthene	3/12	46 - 68	340 - 5,100	54	531	68	1,826	68
Benzo(k)fluoranthene	3/12	45 - 74	340 - 5,100	56.3	532	74	1,826	74
bis(2-Ethylhexyl)phthalate	10/12	48 - 7,400	340 - 5,100	1,199	1,030	7,400	8,604	7400
4-Chloroaniline	2/12	94 - 270	340 - 5,100	182	565	270	1,224	270
Chrysene	1/12	48 - 48	340 - 5,100	48	553	48	1,408	48
Dibenzofuran	1/12	190 - 190	340 - 5,100	190	564	190	1,141	190
1,4-Dichlorobenzene	3/12	130 - 2,500	340 - 5,100	977	564	2,500	1,164	1164
Fluoranthene	6/12	39 - 610	340 - 5,100	247	217	610	407	407
2-Methylnaphthalene	7/12	42 - 18,000	340 - 5,100	4,876	2,920	18,000	41,773	18000
Naphthalene	6/12	140 - 6,300	340 - 5,100	1,917	1,051	6,300	3,262	3262
Phenanthrene	6/12	55 - 840	340 - 5,100	320	252	840	464	464
Pyrene	6/12	43 - 500	340 - 5,100	134	357	500	907	500

APPENDIX D
SUMMARY OF DETECTED COMPOUNDS
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsuface Soil

Chemical	Frequency of Detect	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected	%95 UCL	Exposure Point Conc
Pesticides/PCBs (ug/kg)								
Aldrin	2/12	0.24 - 3.6	1.8 - 41	1.9	4.6	3.6	18.4	3.6
Aroclor-1260	8/12	150 - 5,800	35 - 800	1,804	1,246	5,800	26,108	5800
delta-BHC	2/12	0.31 - 2.6	2 - 41	1.5	4.8	2.6	16.6	2.6
alpha-Chlordane	2/12	1.3 - 87	1.8 - 41	44.2	11.2	87	50.9	50.9
gamma-Chlordane	9/12	1.4 - 17	2 - 100	5.2	5	17	10.6	10.6
4,4'-DDD	9/12	3.3 - 100	4 - 200	37.9	30.3	100	151	100
4,4'-DDE	12/12	1.5 - 760	9 - 200	139	139	760	3,294	760
4,4'-DDT	8/12	7.7 - 1,600	4.3 - 200	283	191	1,600	3,011	1600
Dieldrin	5/12	0.74 - 180	3.9 - 80	45.8	26.2	180	187	180
Endosulfan I	6/12	0.26 - 42	1.8 - 41	8.7	7.2	42	44.7	42
Endosulfan II	2/12	32 - 43	3.5 - 80	37.5	13.9	43	61.6	43
Endrin	2/12	0.65 - 2.3	3.7 - 80	1.5	9.2	2.3	33.1	2.3
Endrin aldehyde	3/12	2.8 - 13	3.7 - 80	6.3	9.8	13	24.5	13
Heptachlor	1/12	0.19 - 0.19	1.8 - 41	0.19	4.7	0.19	21.8	0.19
Heptachlor epoxide	4/12	0.078 - 5.6	2 - 41	2.5	4.9	5.6	36.2	5.6
Methoxychlor	8/12	0.58 - 14	18 - 410	6.7	27.2	14	181	14
Inorganics (mg/kg)								
Aluminum	12/12	838 - 11,400	30.9 - 45.6	2,629	2,629	11,400	4,866	4866
Antimony	3/12	4.8 - 18.3	0.59 - 7.4	10	2.9	18.3	10.5	10.5
Arsenic	4/12	0.85 - 1.9	1.2 - 8.7	1.4	0.95	1.9	1.2	1.2
Barium	12/12	8.8 - 165	0.42 - 0.62	36.4	36.4	165	71.5	71.5
Beryllium	7/12	0.05 - 0.23	0.09 - 0.49	0.1	0.08	0.23	0.11	0.11
Cadmium	10/12	0.86 - 67.3	0.24 - 1.2	13.6	11.3	67.3	347	67.3
Calcium	12/12	608 - 148,000	15.3 - 22.7	22,713	22,713	148,000	217,510	148000

APPENDIX D
SUMMARY OF DETECTED COMPOUNDS
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsuface Soil

Chemical	Frequency of Detect	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected	%95 UCL	Exposure Point Conc
Chromium	12/12	5.3 - 535	1.9 - 2.8	98.7	98.7	535	446	446
Cobalt	10/12	0.29 - 1.8	0.5 - 2.8	0.6	0.55	1.8	0.78	0.78
Copper	12/12	2 - 280	1.3 - 1.9	51.4	51.4	280	376	280
Iron	12/12	840 - 10,200	30.5 - 45	3,324	3,324	10,200	6,124	6124
Lead	12/12	4.1 - 420	4.6 - 6.8	75.6	75.6	420	330	330
Magnesium	12/12	143 - 1,100	13.4 - 19.9	459	459	1,100	854	854
Manganese	12/12	3.8 - 67.8	0.21 - 0.31	21.9	21.9	67.8	40.9	40.9
Mercury	10/12	0.06 - 9.1	0.073 - 0.16	1.8	1.5	9.1	23.8	9.1
Nickel	10/12	1.8 - 329	1.5 - 4	39.7	33.3	329	167	167
Potassium	10/12	76 - 388	58.2 - 86	163	141	388	252	252
Selenium	2/12	1.4 - 1.5	1.9 - 13.4	1.5	1.2	1.5	1.3	1.3
Silver	7/12	10 - 470	0.42 - 57.6	164	100	470	42,193	470
Vanadium	12/12	2.6 - 31.3	1.7 - 2.5	7	7	31.3	10.9	10.9
Zinc	12/12	6 - 940	0.63 - 0.93	160	160	940	1,141	940

Notes:
UCL - Upper confidence limit
ug/kg - microgram per kilogram
mg/kg - miligram per kilogram
BHC - benzenehexachloride (common name for hexachlorocyclohexane)
PCBs - polychlorinated biphenyls

APPENDIX D
SUMMARY OF DETECTED COMPOUNDS
PSC 50

Naval Air Station Jacksonville
Jacksonville, Floriday

Groundwater

Chemical	Frequency of Detect	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Volatile Organic Compounds (ug/L)						
Acetone	2/2	19 - 22	10 - 10	20.5	20.5	22
Chlorobenzene	1/2	11 - 11	10 - 10	11	8	11
1,2-Dichloroethene (total)	1/2	1 - 1	10 - 10	1	3	1
Semivolatile Organic Compounds (ug/L)						
Di-n-butylphthalate	1/2	4 - 4	0.01 - 10	4	4.5	4
1,4-Dichlorobenzene	1/2	4 - 4	0.01 - 10	4	4.5	4
Diethylphthalate	1/2	2 - 2	0.01 - 10	2	3.5	2
Phenol	1/2	5 - 5	0.01 - 10	5	5	5
Pesticides/PCBs (ug/L)						
Aldrin	1/2	0.0022 - 0.0022	0.05 - 0.05	0.0022	0.014	0.0022
beta-BHC	1/2	0.0082 - 0.0082	0.05 - 0.05	0.0082	0.017	0.0082
gamma-BHC (Lindane)	1/2	0.0082 - 0.0082	0.05 - 0.05	0.0082	0.017	0.0082
alpha-Chlordane	1/2	0.0066 - 0.0066	0.05 - 0.05	0.0066	0.016	0.0066
4,4'-DDD	1/2	0.0095 - 0.0095	0.1 - 0.1	0.01	0.030	0.01
4,4'-DDT	1/2	0.004 - 0.004	0.1 - 0.1	0.004	0.027	0.004
Endosulfan I	1/2	0.0011 - 0.0011	0.05 - 0.05	0.0011	0.013	0.0011
Endosulfan II	1/2	0.026 - 0.026	0.1 - 0.1	0.026	0.038	0.026
Endosulfan sulfate	1/2	0.0031 - 0.0031	0.1 - 0.1	0.0031	0.027	0.0031
Endrin aldehyde	1/2	0.0064 - 0.0064	0.1 - 0.1	0.0064	0.028	0.0064
Inorganics (ug/L)						
Antimony	1/2	5 - 5	2.4 - 2.4	5	3.1	5
Arsenic	1/2	5.1 - 5.1	2.8 - 2.8	5.1	3.3	5.1
Barium	2/2	64.3 - 70.9	0.2 - 0.2	67.6	67.6	70.9
Calcium	2/2	85,700 - 309,000	7.3 - 7.3	197,350	197,350	309,000

APPENDIX D
SUMMARY OF DETECTED COMPOUNDS
PSC 50

Naval Air Station Jacksonville
Jacksonville, Floriday

Groundwater

Chemical	Frequency of Detect	Range of Detects	Reported Detection Limits	Average (Detects)	Average (All)	Maximum Detected
Chromium	2/2	1.9 - 10.1	0.9 - 0.9	6	6	10.1
Cobalt	2/2	2.5 - 6.6	0.9 - 0.9	4.6	4.6	6.6
Copper	2/2	1.7 - 5.7	0.6 - 0.6	3.7	3.7	5.7
Iron	2/2	2,300 - 14,900	14.5 - 14.5	8,600	8,600	14,900
Magnesium	2/2	14,600 - 41,300	6.4 - 6.4	27,950	27,950	41,300
Manganese	2/2	210 - 245	0.1 - 0.1	228	228	245
Mercury	1/2	0.12 - 0.12	0.1 - 0.1	0.12	0.09	0.12
Nickel	2/2	6.7 - 28	1.3 - 1.3	17.4	17.4	28
Potassium	2/2	2,510 - 13,500	27.7 - 27.7	8,005	8,005	13,500
Sodium	2/2	21,100 - 28,200	220 - 220	24,650	24,650	28,200
Vanadium	2/2	1.8 - 6	0.8 - 0.8	3.9	3.9	6
Zinc	2/2	20.9 - 144	0.3 - 0.3	82.5	82.5	144

Notes:
ug/L- microgram per liter
BHC - benzenehexachloride (common name for hexachlorocyclohexane)
PCBs - polychlorinated biphenyls

APPENDIX E

SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN

APPENDIX E
SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsurface Soil					
Chemical	Frequency of Detect	Exposure Point Conc	2X Background Concentration	Region 3 Risk-Based Conc (Industrial)	Analyte COPC? (Yes/No)
Volatile Organic Compounds (ug/kg)					
Acetone	4/12	433	NA	2.00E+08	No
Benzene	1/12	2	NA	200,000	No
2-Butanone	4/12	250	NA	1.30E+09	No
Carbon disulfide	1/12	3	NA	2.00E+08	No
Chlorobenzene	5/12	119	NA	4.10E+07	No
Ethylbenzene	3/12	8.4	NA	2.00E+08	No
Methylene chloride	1/12	2	NA	760,000	No
Tetrachloroethene	3/12	2	NA	110,000	No
Toluene	4/12	8.3	NA	4.10E+08	No
Trichloroethene	1/12	1	NA	520,000	No
Xylene (total)	3/12	16	NA	4.10E+09	No
Semivolatile Organic Compounds (ug/kg)					
Benzo(b)fluoranthene	3/12	68	NA	7,800	No
Benzo(k)fluoranthene	3/12	74	NA	78,000	No
bis(2-Ethylhexyl)phthalat	10/12	7,400	NA	410,000	No
4-Chloroaniline	2/12	270	NA	8.20E+06	No
Chrysene	1/12	48	NA	780,000	No
Dibenzofuran	1/12	190	NA	8.20E+06	No
1,4-Dichlorobenzene	3/12	1,164	NA	2.40E+05	No
Fluoranthene	6/12	407	NA	8.20E+07	No
2-Methylnaphthalene	7/12	18,000	NA	8.20E+07	No
Naphthalene	6/12	3262	NA	8.20E+07	No
Phenanthrene	6/12	464	NA	6.10E+07	No
Pyrene	6/12	500	NA	6.10E+07	No
Pesticides/PCBs (ug/kg)					
Aldrin	2/12	3.6	NA	340	No
Aroclor-1260	8/12	5,800	NA	2,900	Yes
delta-BHC	2/12	2.6	NA	910	No

APPENDIX E
SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsurface Soil					
Chemical	Frequency of Detect	Exposure Point Conc	2X Background Concentration	Region 3 Risk-Based Conc (Industrial)	Analyte COPC? (Yes/No)
alpha-Chlordane	2/12	50.9	NA	16,000	No
gamma-Chlordane	9/12	10.6	NA	16,000	No
4,4'-DDD	9/12	100	NA	24,000	No
4,4'-DDE	12/12	760	NA	17,000	No
4,4'-DDT	8/12	1,600	NA	17,000	No
Dieldrin	5/12	180	NA	360	No
Endosulfan I	6/12	42	NA	1.20E+07	No
Endosulfan II	2/12	43	NA	1.20E+07	No
Endrin	2/12	2.3	NA	610,000	No
Endrin aldehyde	3/12	13	NA	610,000 [3]	No
Heptachlor	1/12	0.19	NA	1,300	No
Heptachlor epoxide	4/12	5.6	NA	630	No
Methoxychlor	8/12	14	NA	1.00E+07	No
Inorganics (mg/kg)					
Aluminum	12/12	4,866	6,823	2.00E+06	No
Antimony	3/12	10.5	ND	820	No
Arsenic	4/12	1.2	1.48	3.8	No
Barium	12/12	71.5	20.8	140,000	No
Beryllium	7/12	0.11	49	4,100	No
Cadmium	10/12	67.3	ND	2,000	No
Calcium	12/12	148,000	668	NA	No
Chromium	12/12	446	14.1	2.0E+06/10,000 [4]	No
Cobalt	10/12	0.78	ND	120,000	No
Copper	12/12	280	ND	82,000	No
Iron	12/12	6,124	5,818	610,000	No
Lead	12/12	330	6.46	1,000	No
Magnesium	12/12	854	500	NA	No
Manganese	12/12	40.9	6.9	41,000	No
Mercury	10/12	9.1	ND	610 [5]	No

APPENDIX E
SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Subsurface Soil					
Chemical	Frequency of Detect	Exposure Point Conc	2X Background Concentration	Region 3 Risk-Based Conc (Industrial)	Analyte COPC? (Yes/No)
Nickel	10/12	167	ND	41,000	No
Potassium	10/12	252	451	NA	No
Selenium	2/12	1.3	ND	10,000	No
Silver	7/12	470	ND	10,000	No
Vanadium	12/12	10.9	ND	14,000	No
Zinc	12/12	940	14.5	610,000	No

Notes:
[1] The Region 3 RBC for pyrene was used to screen those non-carcinogenic COPCs without RBCs members of the class were selected.
[2] The RBC for alpha-BHC was used to screen delta-BHC.
[3] The RBC for endrin was used to screen endrin aldehyde.
[4] Trivalent/hexavalent chromium screening concentrations.
[5] The RBC for mercuric chloride was used to screen mercury.
USEPA - U.S. Environmental Protection Agency
COPC - Chemical of potential concern
RBC - Risk-based concentration
NA - Not applicable
ND- No data
ug/kg - microgram per kilogram
mg/kg - miligram per kilogram
BHC - benzenehexachloride (common name for hexachlorocyclohexane)
PCBs - polychlorinated biphenyls

APPENDIX E
SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Groundwater							
Chemical	Frequency of Detect	Maximum Detected	2x Background Concentration	USEPA Region 3 Risk-Based Concentration	FDEP Groundwater Guidance Conc	Federal MCL	Analyte COPC? (Yes/No)
Volatile Organic Compounds (ug/L)							
Acetone	2/2	22	NA	3,700	700	ND	No
Chlorobenzene	1/2	11	NA	35	100	100	No
1,2-Dichloroethene (tot	1/2	1	NA	55	70	70	No
Semivolatile Organic Compounds (ug/L)							
Di-n-butylphthalate	1/2	4	NA	3,700	700	ND	No
1,4-Dichlorobenzene	1/2	4	NA	0.47	75	75	Yes
Diethylphthalate	1/2	2	NA	29,000	5,600	ND	No
Phenol	1/2	5	NA	22,000	10	ND	No
Pesticides/PCBs (ug/L)							
Aldrin	1/2	0.0022	NA	0.0039	0.05	7	No
beta-BHC	1/2	0.0082	NA	0.037	0.1	ND	No
gamma-BHC (Lindane)	1/2	0.0082	NA	0.052	0.2	0.2	No
alpha-Chlordane	1/2	0.0066	NA	0.19	2	2	No
4,4'-DDD	1/2	0.0095	NA	0.28	0.1	ND	No
4,4'-DDT	1/2	0.004	NA	0.2	0.1	ND	No
Endosulfan I	1/2	0.0011	NA	220	0.35	ND	No
Endosulfan II	1/2	0.026	NA	220	0.35	ND	No
Endosulfan sulfate	1/2	0.0031	NA	220 [1]	0.3	ND	No
Endrin aldehyde	1/2	0.0064	NA	11	0.1	ND	No
Inorganics (ug/L)							
Antimony	1/2	5	43	15	6	6	No
Arsenic	1/2	5.1	13.2	0.045	50	50	No
Barium	2/2	70.9	616	2,600	2,000	2,000	No
Calcium	2/2	309,000	59,066	ND	ND	ND	No
Chromium	2/2	10.1	208	37,000/180 [2]	100	100	No
Cobalt	2/2	6.6	22.6	2,200	ND	ND	No
Copper	2/2	5.7	40.4	1,500	1,000	1,000	No

APPENDIX E
SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN
PSC 50

Naval Air Station Jacksonville
Jacksonville, Florida

Groundwater							
Chemical	Frequency of Detect	Maximum Detected	2x Background Concentration	USEPA Region 3 Risk-Based Concentration	FDEP Groundwater Guidance Conc	Federal MCL	Analyte COPC? (Yes/No)
Iron	2/2	14,900	68,292	11,000	300	300	No
Magnesium	2/2	41,300	19,316	ND	ND	ND	No
Manganese	2/2	245	204	730	50	50	No
Mercury	1/2	0.12	0.98	11	2	2	No
Nickel	2/2	28	74.8	730	100	100	No
Potassium	2/2	13,500	9,038	ND	ND	ND	No
Sodium	2/2	28,200	24,626	ND	160,000	ND	No
Vanadium	2/2	6	294	260	49	ND	No
Zinc	2/2	144	173.2	11,000	5,000	5,000	No

Notes:
[1] The RBC for enodulfan was used to screen endosulfan sulfate.
[2] Trivalent/hexavalent chromium screening concentrations.
FDEP - Florida Department of Environmental Protection
USEPA - U.S. Environmental Protection Agency
COPC - Chemical of potential concern
RBC - Risk-based concentration
MCL - Maximum Contaminant Level
NA - Not Applicable
ND - No Data
ug/kg - microgram per kilogram
mg/kg - milligram per kilogram
BHC - benzenehexachloride (common name for hexachlorocyclohexane)
PCBs - polychlorinated biphenyls

APPENDIX F

FOCUSED RISK EVALUATION SPREADSHEETS

TABLE F-1

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA
PSC 50, EAST SIDE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

CARCINOGENIC EFFECTS
June 5, 1998

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
Aroclor 1260	O	5800	ug/kg	4.7E-08	2	9.3E-08	0.5	2.8E-07	2.2	6.2E-07	7.1E-07
SUMMARY CANCER RISK						9E-08				6E-07	7E-07

[1] USEPA Region IV guidance specifies absorption factors of 50% for semi-volatile organic compounds (USEPA, 1995).
[2] Calculated from Oral CSFs.
NE = not evaluated.

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
Aroclor 1260	O	5800	ug/kg	3.3E-06	0.00002	1.6E-01	0.5	2.0E-05	0.000018	1.1E+00	1.3E+00
SUMMARY HAZARD INDEX						2E-01				1E+00	1E+00

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (February 10, 1992).
[2] Calculated from Oral RfDs.
ND = no data available.

TABLE F-1

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SUBSURFACE SOIL
EXCAVATION WORKER
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA
PSC 50, EAST SIDE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

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/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DAevent	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	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, 1992a. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. USEPA Region IV Supplemental Guidance. Human Health Risk Assessment Bulletins.

EQUATIONS

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)

$$\text{INTAKE-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ \text{days/year}}$$

Where:
DAevent = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED

TABLE F-2

INHALATION OF PARTICULATES - SUBSURFACE SOIL
EXCAVATION WORKER
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA
PSC 50, EAST SITE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF [1] (mg/kg-day)^-1	CANCER RISK
Aroclor 1260	O	5800	ug/kg	4.68E-09	1.6E-12	0.4	6.3E-13
					SUMMARY CANCER RISK		6E-13

[1] From IRIS.

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
Aroclor 1260	O	5800	ug/kg	4.68E-09	1.1E-10	ND	
					SUMMARY HAZARD INDEX		0E+00

ND = no data available.

TABLE F-2

INHALATION OF PARTICULATES - SUBSURFACE SOIL
EXCAVATION WORKER
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA
PSC 50, EAST SITE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	FDEP 1995
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

FEDP, 1995. Soil Cleanup Goals for Florida. Table 2
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-day) -1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CA x IR x ET x EF x ED}}{\text{BW x AT x 365 days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED