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NAS JACKSONVILLE
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SAMPLING EVENT REPORT FOR POTENTIAL SOURCE OF CONTAMINATION 50 (PSC50) EAST SIDE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA NAS JACKSONVILLE FL

3/1/1999

HARDING LAWSON ASSOCIATES

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:

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

Prepared for:

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

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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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).

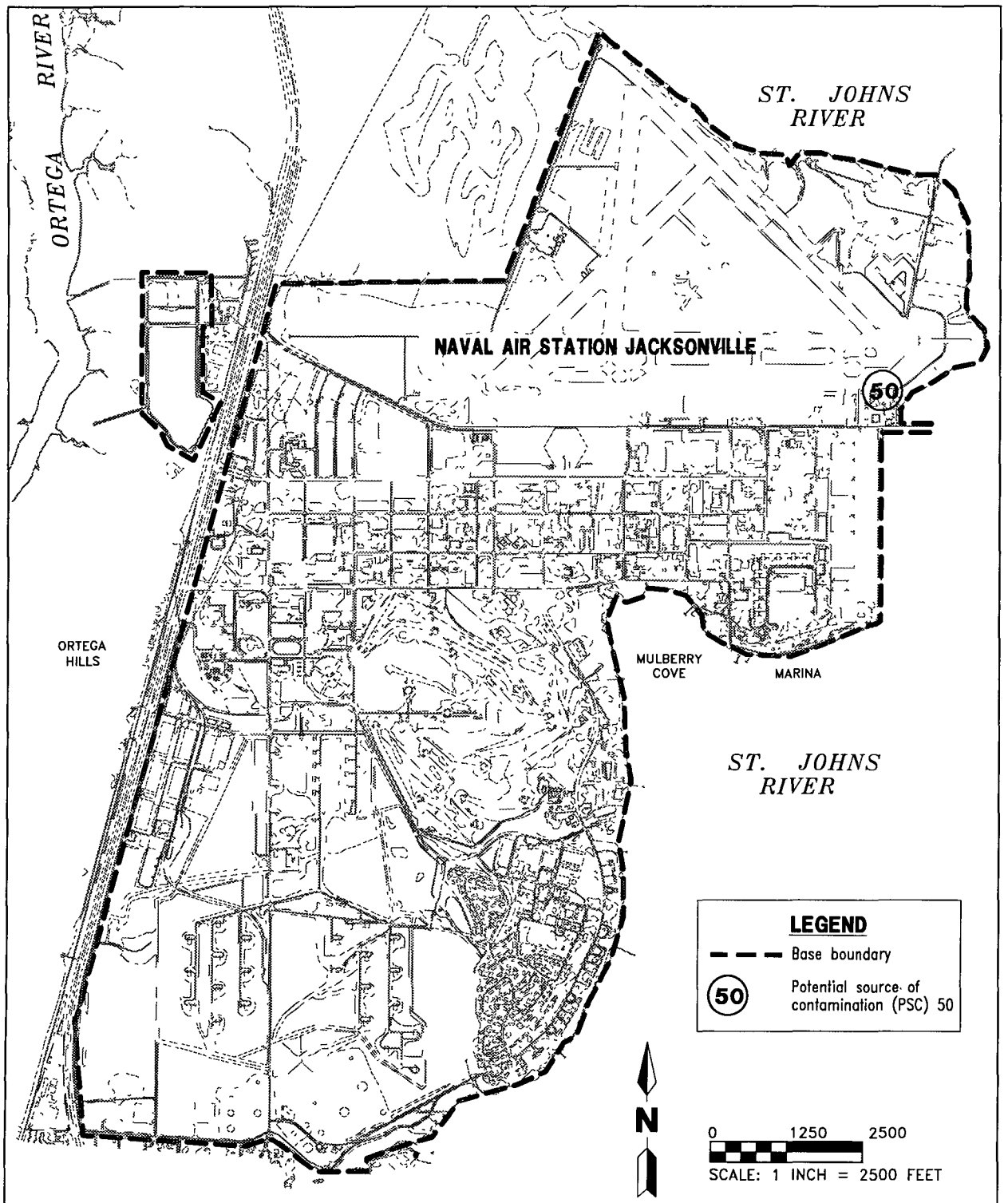

FIGURE 1-1
LOCATION OF PSC 50 AT
NAVAL AIR STATION JACKSONVILLE

K \02508\02508-09\SER\02508512 DWG, BB-VC 12/31/98 14 29 05, AutoCAD R1

SAMPLING EVENT REPORT
PSC 50

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

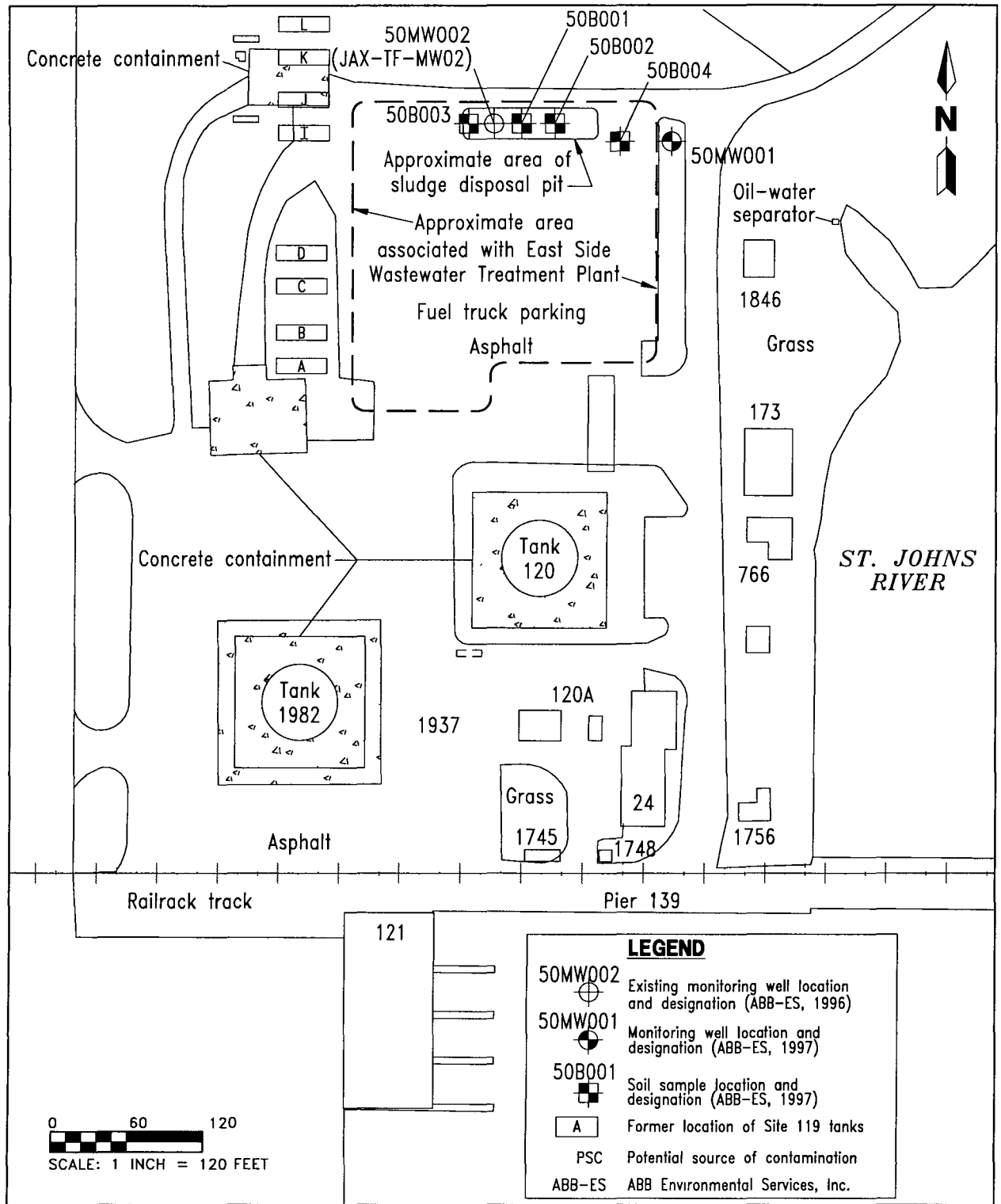

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 50, EAST SIDE WASTEWATER TREATMENT PLANT SLUDGE DISPOSAL AREA

K \02508\02508-09\SER\02508521 DWG, NP-VC 01/04/99 09 02 29

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 μg/kg. The two samples detected above the 2,900 μg/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 μg/ℓ, which is above the 0.47 μg/ℓ, 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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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.				
5								
				Hole remained open to 8 feet bls. Below that depth, native material caved around well screen.				
10								
				Well set at 11.5' bls.				
15								

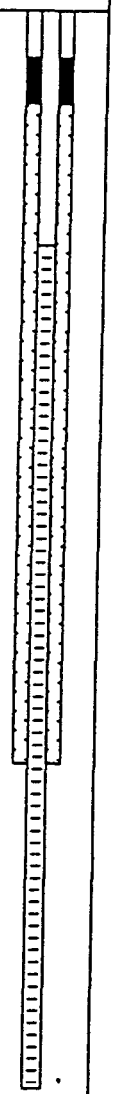


 ABB ENVIRONMENTAL SERVICES, INC.

WELL COMPLETION LOG

ATION NAS JACKSONVILLE - SITE 119 WORK ORDER # 5326

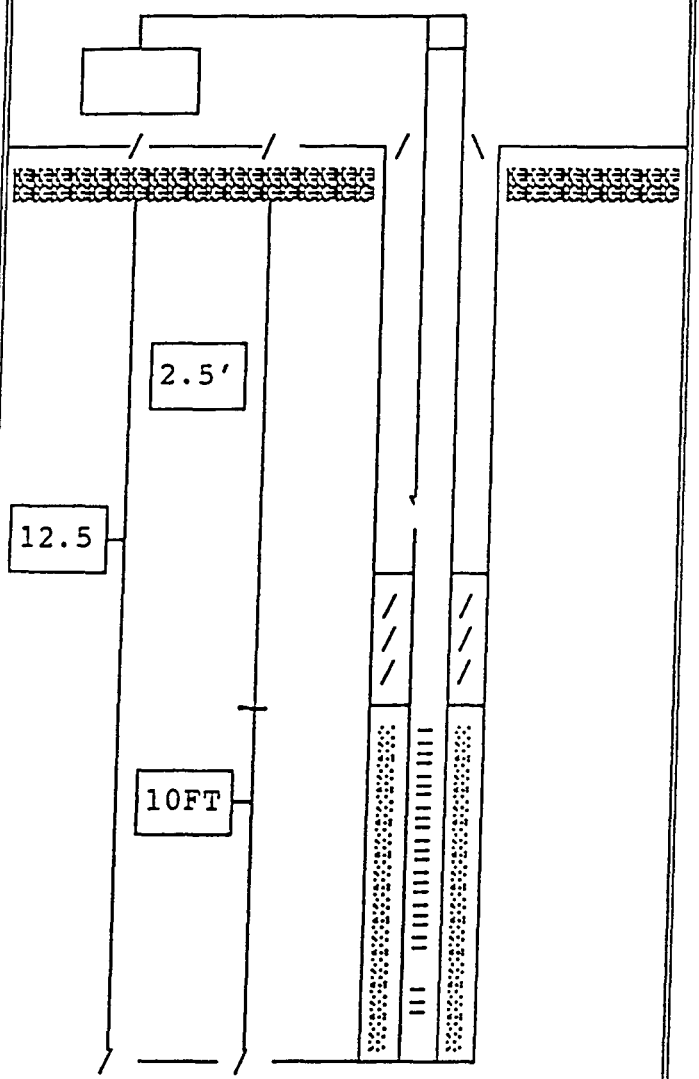
ADDRESS: HIGHWAY 17, JACKSONVILLE, FL

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

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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

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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 [1]	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 - milligram 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