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SAMPLING EVENT REPORT POTENTIAL SOURCE OF CONTAMINATION 29 (PSC29) ORGANIC DISPOSAL AREA NAS JACKSONVILLE FL

06/01/1999

HARDING LAWSON ASSOCIATES

SAMPLING EVENT REPORT

POTENTIAL SOURCE OF CONTAMINATION 29
ORGANIC DISPOSAL AREA

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Unit Identification Code: N00207

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

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June 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: June 28, 1999

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(DFAR 252.227-7036)

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Organic Disposal Area
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Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CompuChem	CompuChem Environmental Corporation
COPC	chemical of potential concern
EDS	Environmental Data Services
EP Tox	Extraction Procedure Toxicity Test
FDEP	Florida Department of Environmental Protection
HLA	Harding Lawson Associates
IAS	Initial Assessment Study
LUC	land-use control
mg/ℓ	milligrams per liter
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
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PSC	potential source of contamination
PCB	polychlorinated biphenyl
QA/QC	quality assurance and quality control
RBC	risk-based concentration
SCG	soil clean-up goal
SER	sampling event report
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), 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) 29, the Organic Disposal Area at Naval Air Station (NAS) Jacksonville, Jacksonville, Florida, hereafter referred to as PSC 29. PSC 29 is located to the east of Patrol Road near the southwest corner of NAS Jacksonville (Figures 1-1 and 1-2). The Organic Disposal Area was identified as a PSC during the Initial Assessment Study (IAS) when material other than organic debris was identified in the disposal area (Fred C. Hart Associates, Inc., 1983). Although the area was designated as an organic (e.g., shrubs, grass clippings, wood, and wood material) disposal area, the IAS report indicated evidence of crushed drums, construction debris, discolored soil, scrap metal, piles of abrasive blasting material, creosote-covered blocks, and polyvinyl chloride pipes. The IAS report suggested that PSC 29 was once a sand borrow pit. A review of aerial photographs from 1943 to 1988 indicated the area identified as the PSC was cleared as early as 1959 and also suggested that a 200-foot by 1,000-foot portion of the site may have been used as a borrow pit at one time. The report did not recommend a confirmation (verification) study for the Organic Disposal Area.

Based on Florida Department of Environmental Regulation comments (Farmer, 1983), PSC 29 was included in the verification study (Geraghty & Miller, Inc., 1985). During the verification study, two temporary monitoring wells were installed within the disposal area. Groundwater samples were collected from each well and analyzed for volatile organic compounds (VOCs), total organic carbon, dissolved inorganics, and cyanide. Three VOCs (trans-1,2-dichloroethene, 1,1,1-trichloroethane, and chloromethane) and two inorganics (copper and zinc) were detected in the samples.

Also during the verification study, one sample from each of three piles of blasting material was collected and submitted for Extraction Procedure Toxicity (EP Tox) testing for inorganics. Barium, cadmium, and chromium were detected in the leachate of at least one of the three samples, with cadmium exceeding the EP Tox threshold of 1 milligram per liter (mg/ℓ) in sample 3. The Verification Study report recommended additional soil samples in the vicinity of sample 3.

A characterization study was conducted in 1985 (Geraghty & Miller, 1986). Nine soil samples were collected from a sample grid around the sample 3 location and analyzed for EP Tox cadmium. Cadmium was detected in the leachate of only one sample. Because the concentration of cadmium did not exceed the 1 mg/ℓ EP Tox threshold level, no further action was recommended at PSC 29.

During a site visit in January 1990, Geraghty & Miller, Inc. personnel observed asbestos, fuel, glass, and paint wastes at PSC 29. PSC 29 was recommended for site screening because of the these disposal activities (Geraghty & Miller, Inc., 1991).

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

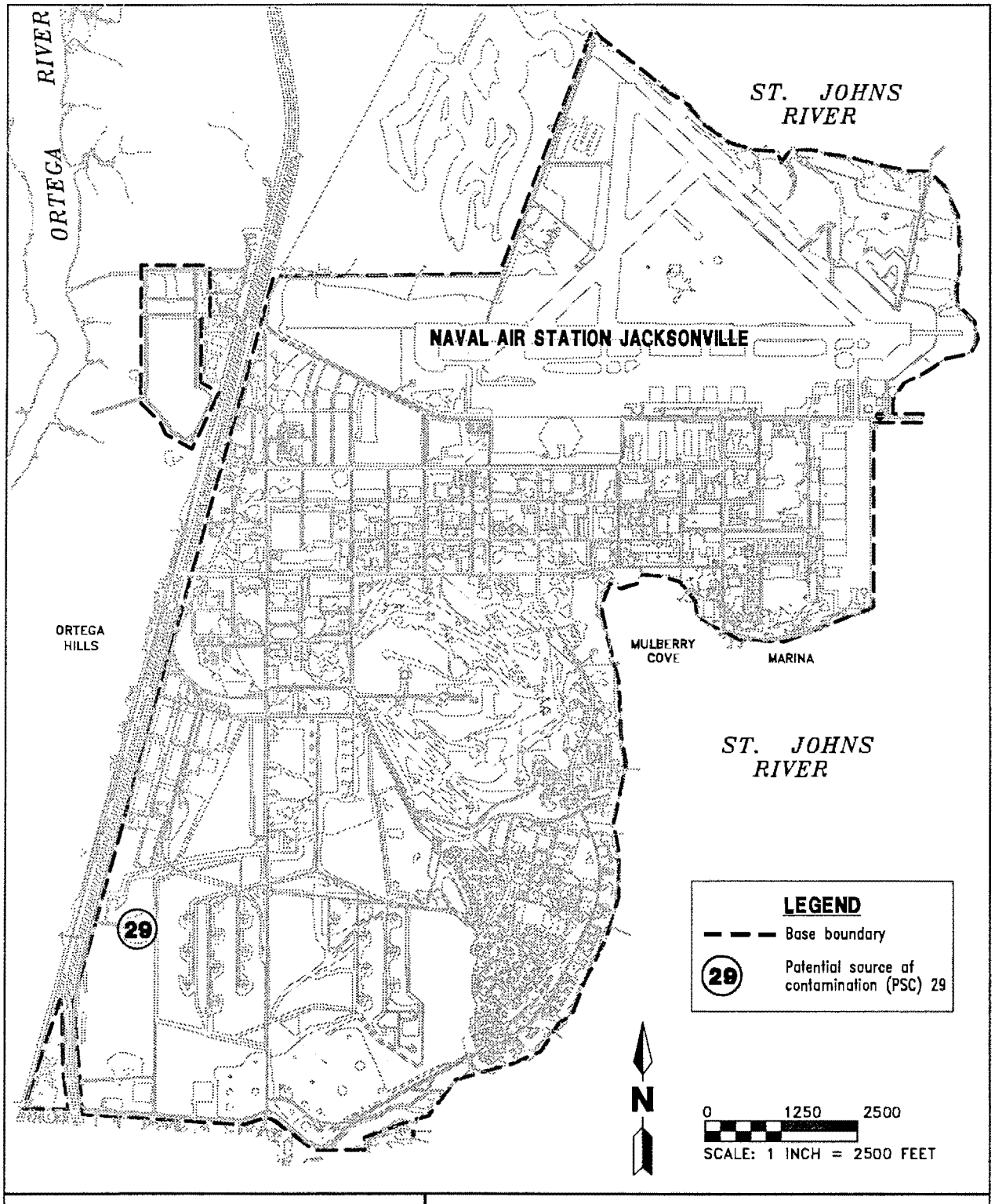

FIGURE 1-1
LOCATION OF PSC 29 AT
NAVAL AIR STATION JACKSONVILLE

SAMPLING EVENT REPORT
PSC 29

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

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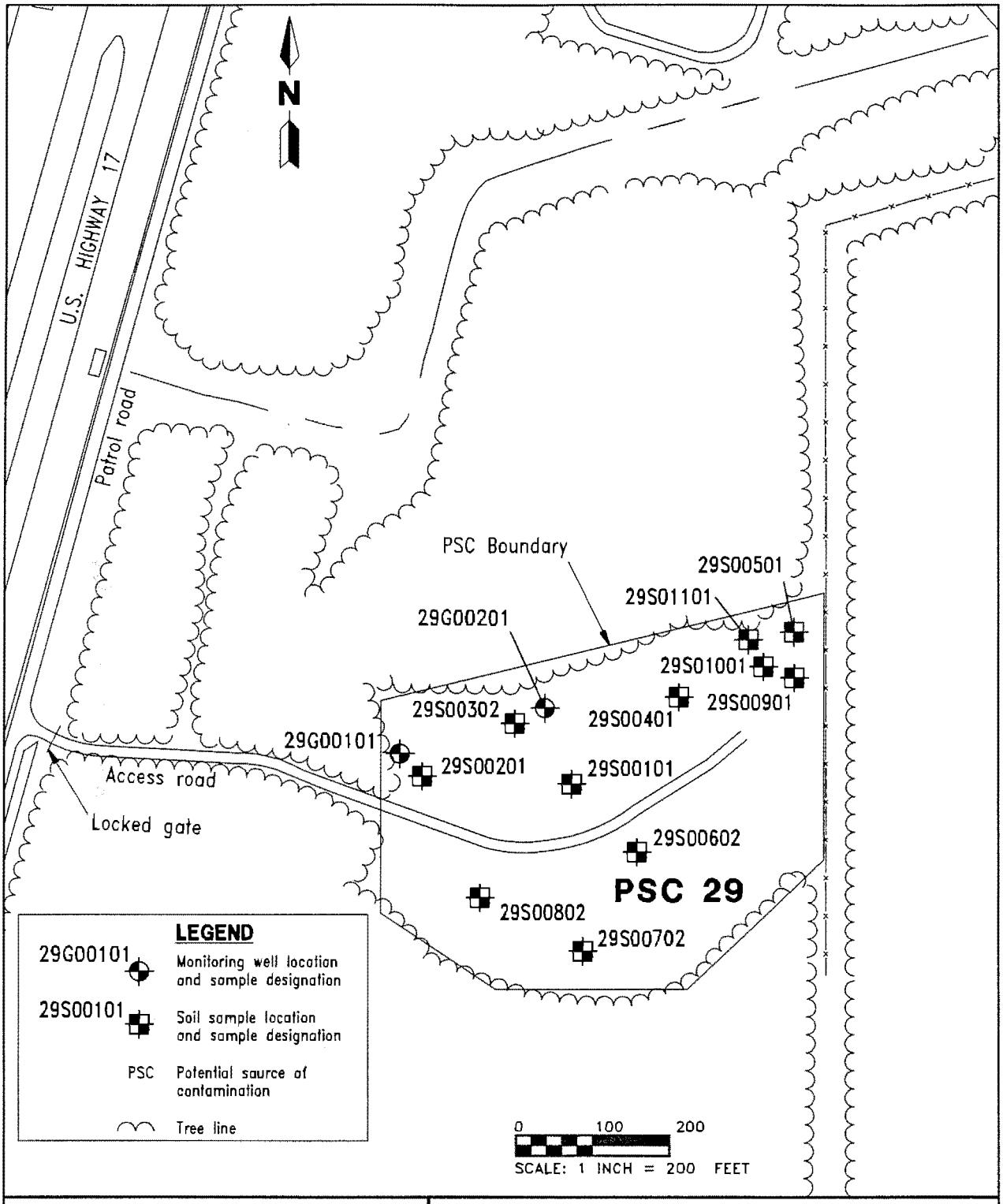

FIGURE 1-2
SAMPLING LOCATIONS AT PSC 29, ORGANIC DISPOSAL AREA

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SAMPLING EVENT REPORT
PSC 29

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

1.1 PURPOSE AND SCOPE. The purpose of the sampling event at PSC 29 was to gather sufficient information to support the next phase of the Remedial Response Decision System process. The scope of the sampling event, detailed in the Site Screening Workplan (SSW) (ABB Environmental Services, Inc. [ABB-ES], 1997), included the following:

- collection of ten soil samples at locations across the site. The sample locations were biased toward points with observed debris, stressed vegetation, and surface staining and included both surface and subsurface depths.

- installation of three "micro" monitoring wells located at one upgradient and two downgradient locations near the perimeter of the site.

- laboratory analysis of the soil and groundwater samples for U.S. Environmental Protection Agency (USEPA) target compound list (TCL) VOCs, TCL semivolatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), and target analyte list (TAL) metals.

Field work for this sampling event was completed between June 2, and October 21, 1997. A sample tracking log which includes sample and sample delivery group (SDG) identifiers, relevant dates, sample depths, and parameters analyzed is included in Appendix A. Lithologic and installation logs of the wells are presented in Appendix B. The validated laboratory analytical results are included in Appendix C.

1.2 SITE DESCRIPTION. PSC 29 is located east of Patrol Road near the southwest corner of NAS Jacksonville. Since March 1991 NAS Jacksonville has restricted access to PSC 29 with a locking gate across the access road. PSC 29 consists of an open area of approximately 15 acres surrounded by woods (Figure 1-2). The PSC is accessible from Patrol Road via an unpaved access road.

PSC 29 is relatively flat, with the exception of debris piles. PSC 29 is in the drainage basin of the Ortega River located approximately 1 mile to the west. Based on the groundwater model developed for NAS Jacksonville by the U.S. Geological Survey, the groundwater flows northwest toward a drainage ditch that discharges to tributaries of the Ortega River.

After March 1991, permissible dumping was limited to clean construction and demolition debris, dirt, street sweepings, organic material from landscaping and land clearing, grass clippings, trees, stumps, and clean lumber.

During the PSC reconnaissance by HLA in 1994, organic material, such as trees and grass cuttings, and construction debris, such as pallets, scrap metal, concrete blocks, asphalt, plastic, and telephone poles, were present. Tall grass and shrubs covered most of PSC 29. There was no evidence of drums, stressed vegetation, or stained soil.

2.0 SAMPLING APPROACH AND FIELD CHANGES

The work described herein was performed generally in accordance with the SSW (ABB-ES, 1997). Exceptions to the proposed sampling plan are described in this section.

Eight surface soil samples, four shallow (0 to 1 foot below land surface [bls]) and four deep (1 to 2 feet bls) were initially collected and analyzed for the full suite of TCL and TAL parameters. Based on the detection of benzo(a)pyrene in sample 29S00501 at a concentration of 1,300 micrograms per kilogram (μg/kg) versus a Florida Department of Environmental Protection (FDEP) industrial soil cleanup goal (SCG) of 500 μg/kg, three additional soil samples were collected west, southwest, and south of that sample location and analyzed for SVOCs only.

Two "micro" monitoring wells were installed downgradient along the west and northwest perimeter of the site. Each of the wells was installed using TerraProbe™ technology and consisted of a 9-foot long screen set between 1 and 10 feet bls. The proposed upgradient well was not installed because of very rough terrain and flooded conditions occurring at the proposed location.

Groundwater samples from each well were collected and analyzed for the full suite of TCL and TAL parameters. Based on the detection of lead in monitoring well sample 29G00201 at a concentration of 31.2 micrograms per liter (μg/ℓ) versus the USEPA maximum contaminant level of 15 μg/ℓ, monitoring well 29G002 was resampled and analyzed for TAL metals.

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. The samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL metals. A sample tracking log, which includes sample and SDG identifiers, relevant dates, sample depths, and parameters analyzed, is included in Appendix A.

Following laboratory analysis of the soil and groundwater samples, all analytical data were subjected to validation according to the Naval Facilities Engineering Service Center (NFESC) Level D protocol. The validated analytical results are included in Appendix B of this report.

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. 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*, February 1996 (NFESC, 1996). Other documents used in the data validation and review include the USEPA *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, February 1994 (USEPA, 1994a), and the USEPA *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, 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 five percent of the data requiring qualification (primarily estimated "J" qualifier).

4.0 ANALYTICAL RESULTS

4.1 ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES. The complete validated laboratory analytical data are included in Appendix B. A summary of detections in the soil samples are included in Appendix C.

4.1.1 Volatile Organic Compounds There were no VOCs detected in the soil samples analyzed.

4.1.2 Semivolatile Organic Compounds Nineteen SVOCs consisting primarily of polynuclear aromatic hydrocarbon compounds (PAHs), were detected in the eight original soil samples analyzed. Benzo(a)pyrene, detected at 1,300 μg/kg in one sample (29S00501), was at a concentration level of potential concern. Three subsequent samples (29S00901 through 29S01101) collected near that location detected benzo(a)pyrene between 54 μg/kg and 170 μg/kg, suggesting that the area of elevated benzo(a)pyrene concentrations exceeding the FDEP industrial SCG are localized to approximately a 30-foot radius around 29S005.

4.1.3 Pesticides and Polychlorinated Biphenyls Twenty pesticides and one PCB compound (Aroclor-1260) were identified in the soil samples analyzed. The detected concentrations are consistent with station-wide activities.

4.1.4 Inorganic Parameters Twenty-one inorganic parameters were identified in the soil samples analyzed. Arsenic was detected in three samples at concentrations ranging between 1.8 milligrams per kilogram (mg/kg) to 19.9 mg/kg. These concentrations are at levels of potential concern.

4.2 ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES. The complete validated laboratory analytical data are included in Appendix B. A summary of detections in the groundwater samples are included in Appendix C.

4.2.1 Volatile Organic Compounds Acetone was detected in one of two groundwater samples at 8 μg/ℓ. This detection is likely a field or laboratory artifact as there were no other VOC compounds present.

4.2.2 Semivolatile Organic Compounds Acenaphthene and naphthalene were detected in groundwater sample 29G00101, at 1 and 2 μg/ℓ, respectively.

4.2.3 Pesticides and Polychlorinated Biphenyls One pesticide compound, 4,4'-dichlorodiphenyldichloroethane (DDD), was detected in groundwater sample 29G00201 at 0.0055 μg/ℓ.

4.2.4 Inorganic Parameters Sixteen inorganic parameters were detected in the groundwater samples analyzed. Iron and manganese were detected at concentrations exceeding both their State and Federal secondary standards. Lead was originally detected in one sample, 29G00201, at a concentration of 31.2 μg/ℓ. This well was resampled, and the lead concentration was not detected above the reporting limit of 1.9 μg/ℓ. While the concentrations of zinc and copper were also drastically reduced upon resampling, other analytes have comparable concentrations between the initial and resampling data set.

5.0 RISK EVALUATION

The purpose of performing risk screening as part of the site screening evaluation is to assist in determining whether or not the existing risk at PSC 29 (1) supports a no further action decision (with or without the implementation of land-use controls [LUCs], (2) indicates the need for an interim remedial action, or (3) requires additional investigation to make a decision. Risk screening involves comparing concentrations of detected analytes to background screening levels (for inorganics) and to risk-based screening concentrations (RBCs) developed by the USEPA Region III (USEPA, 1998). USEPA developed RBCs using conservative pathway-specific models. Contaminants present below the RBCs are considered to pose no or only insignificant risk. Analytes detected both above the background screening concentrations and the RBCs are considered chemicals of potential concern (COPCs). If any COPCs are identified, a more detailed risk analysis may be appropriate.

5.1 HUMAN HEALTH RISK SCREENING. 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 non-detections) of background concentrations;
- the detected concentration did not exceed USEPA Region III RBCs (USEPA, 1998); or
- the analyte was an essential nutrient that did not have a Region III RBC but was detected below calculated screening concentrations based on the recommended dietary allowances.

5.1.1 Surface Soil For PSC 29, stationwide background screening concentrations developed during the Operable Unit (OU) 1 remedial investigation (ABB-ES, 1996) were used. Table 5-1 presents a comparison of the maximum detected concentration of analytes in surface soil to Region III RBCs and background levels.

Only benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and arsenic exceeded the Region III RBCs for residential exposure to surface soil and background screening levels (for arsenic only). Because all carcinogenic PAHs are essentially formed as part of the same process, it is considered appropriate to consider all carcinogenic PAHs COPCs even if only one of them exceeds RBCs. Therefore benzo(a)anthracene, benzo(k)fluoranthene, carbazole, chrysene, and indeno(1,2,3-cd)-pyrene are also shown as COPCs in Table 5-1.

While several PAHs and arsenic exceeded residential RBCs, only arsenic and benzo(a)pyrene exceeded their corresponding industrial RBCs (Table 5-2). An industrial exposure scenario would be appropriate for PSC 29 considering its location. Human receptors performing maintenance or construction could be exposed to soil contaminants via dermal contact or ingestion. Implementation of LUCs would further prevent exposure to residents who are currently prohibited

Table 5-1
Comparison of Detected Compounds to Background and Risk Screening Levels in Surface Soil

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	Background Screening Level	USEPA Region III Risk-Based Concentration (Residential)	Analyte COPC? (Yes/No)
Semivolatile Organic Compounds (µg/kg)					
Acenaphthene	1/11	120	NA	4,700,000	No
Anthracene	1/11	230	NA	23,000,000	No
Benzo(a)anthracene	7/11	1,200	NA	870	Yes
Benzo(a)pyrene	7/11	1,300	NA	87	Yes
Benzo(b)fluoranthene	8/11	2,700	NA	870	Yes
Benzo(g,h,i)perylene	5/11	690	NA	[2]2,300,000	No
Benzo(k)fluoranthene	8/11	2,700	NA	8,700	Yes[1]
Butylbenzylphthalate	1/11	230	NA	16,000,000	No
Carbazole	2/11	380	NA	32,000	Yes[1]
Chrysene	7/11	1,400	NA	87,000	Yes[1]
Di-n-butylphthalate	3/11	143	NA	7,800,000	No
Dibenz(a,h)anthracene	1/11	210	NA	87	Yes
Dimethylphthalate	1/11	1,715	NA	780,000,000	No
Fluoranthene	8/11	3,200	NA	3,100,000	No
Fluorene	1/11	87	NA	3,100,000	No
Indeno(1,2,3-cd)pyrene	5/11	690	NA	870	Yes[1]
Phenanthrene	6/11	1,900	NA	[2]2,300,000	No
Pyrene	8/11	2,400	NA	2,300,000	No
bis(2-Ethylhexyl)phthalate	7/11	270	NA	46,000	No
Pesticides and PCBs (µg/kg)					
4,4'-DDD	8/8	88	NA	2,700	No
4,4'-DDE	7/8	37	NA	1,900	No
4,4'-DDT	7/8	140	NA	1,900	No
Aldrin	2/8	3.9	NA	38	No
Aroclor-1260	2/8	120	NA	320	No
Dieldrin	6/8	27	NA	40	No
Endosulfan I	2/8	1.5	NA	470,000	No
Endosulfan II	3/8	2.3	NA	470,000	No
Endosulfan sulfate	3/8	3	NA	[3]470,000	No
Endrin	5/8	2.7	NA	23,000	No

See notes at end of table.

Table 5-1 (Continued)
Comparison of Detected Compounds to Background and Risk Screening Levels in Surface Soil

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	Background Screening Level	USEPA Region III Risk-Based Concentration (Residential)	Analyte COPC? (Yes/No)
Pesticides and PCBs (µg/kg) (Continued)					
Endrin aldehyde	6/8	17	NA	[4]23,000	No
Endrin ketone	1/8	1.3	NA	[4]23,000	No
Heptachlor	2/8	10.2	NA	140	No
Heptachlor epoxide	6/8	3.4	NA	70	No
Methoxychlor	1/8	19	NA	39,000	No
alpha-BHC	1/8	0.59	NA	100	No
alpha-Chlordane	7/8	110	NA	1,800	No
beta-BHC	2/8	1.1	NA	350	No
delta-BHC	2/8	1.1	NA	[5]100	No
gamma-BHC (Lindane)	2/8	0.34	NA	490	No
gamma-Chlordane	7/8	100	NA	1,800	No
Inorganic Analytes (mg/kg)					
Aluminum	8/8	2,740	1,340	78,000	No
Antimony	3/8	3.2	ND	31	No
Arsenic	3/8	19.9	0.8	0.43	Yes
Barium	8/8	25.8	11.2	5,500	No
Beryllium	6/8	017	ND	160	No
Cadmium	7/8	1.8	ND	780	No
Calcium	8/8	54,200	2,360	[6] 1,000,000	No
Chromium	8/8	64.8	6.6	390	No
Cobalt	7/8	0.56	ND	4,700	No
Copper	8/8	62.7	5.8	3,100	No
Iron	8/8	3,320	852	23,000	No
Lead	8/8	102	24.4	400	No
Magnesium	8/8	920	99.8	[6] 460,468	No
Manganese	8/8	59.8	18	1,600	No
Mercury	6/8	0.12	ND	610	No
Nickel	8/8	4.1	11	1,600	No

See notes at end of table.

Table 5-1 (Continued)
Comparison of Detected Compounds to Background and Risk Screening Levels in Surface Soil

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	Background Screening Level	USEPA Region III Risk-Based Concentration (Residential)	Analyte COPC? (Yes/No)
Inorganic Analytes (mg/kg) (Continued)					
Potassium	7/8	176	ND	[6] 1,000,000	No
Selenium	1/8	0.81	ND	390	No
Silver	2/8	0.3	ND	390	No
Vanadium	8/8	8.9	3.8	550	No
Zinc	8/8	530	15.2	23,000	No

[1] All carcinogenic polycyclic aromatic hydrocarbons were selected as COPCs because members of the class were selected.
[2] The Region III risk-based concentration (RBC) for pyrene was used to screen those noncarcinogenic COPCs without RBCs.
[3] The RBC for endosulfan was used to screen endosulfan sulfate.
[4] The RBC for endrin was used to screen endrin aldehyde and endrin ketone.
[5] The RBC for alpha-BHC was used to screen delta-BHC.
[6] The RBCs for essential nutrients are calculated based on recommended dietary allowances.

Notes: USEPA = U.S. Environmental Protection Agency.
COPC = chemical of potential concern.
µg/kg = micrograms per kilogram.
NA = not applicable.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
BHC = benzene hexachloride.
mg/kg = milligrams per kilogram.
ND = not detected.

Table 5-2
Comparison of Selected Compounds to Industrial Risk Based Concentrations and FDEP Soil Cleanup Goals

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Maximum Detected Concentration	USEPA Region III Risk-Based Concentration (Industrial)	FDEP Soil Cleanup Goals (Industrial)	Analyte Greater Than RBC? (Yes/No)
Semivolatile Organic Compounds (µg/kg)				
Benzo(a)pyrene	1,300	780	500	Yes
Benzo(b)fluoranthene	2,700	7,800	5,000	No
Dibenz(a,h)anthracene	210	780	500	No
Inorganic Analytes (mg/kg)				
Arsenic (as carcinogen)	19.9	3.8	3.1	Yes
Arsenic (as noncarcinogen)	19.9	610	NA	No

Notes: USEPA = U.S. Environmental Protection Agency.
FDEP = Florida Department of Environmental Protection.
RBC = risk-based concentration.
µg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.
NA = not available.

access to PSC 29. Since March 1991, NAS Jacksonville has restricted access to PSC 29 with a locking gate across the access road.

The benzo(a)pyrene level of 1,300 µg/kg was collected from 0 to 1 foot bls at sampling location 29S005. SVOC results from three subsequent samples taken approximately 50 feet south (29S009), southwest (29S010), and west (29S011) of 29S005 suggested that the area of benzo(a)pyrene concentrations exceeding the industrial RBC is localized to an approximately 30-foot radius around 29S005.

Arsenic, detected at three of eight sampling locations (29S004, 29S006 and 29S007), was the only inorganic analyte detected at concentrations above the USEPA industrial RBC and Florida industrial SCG. Arsenic was detected at 29S004 at 19.9 mg/kg and 29S007 at 9.4 mg/kg. As shown in Table 5-2, arsenic levels are below the RBCs calculated for arsenic for noncarcinogenic endpoints.

Implementation of a removal action for this localized area of elevated PAH and arsenic contamination would be appropriate to reduce the human health risks.

5.1.2 Groundwater For PSC 29 groundwater, the only parameters which exceeded screening criteria were iron and manganese, both of which were detected at concentrations above the State and Federal secondary drinking water standards (Table 5-3). Both parameters exceeded the standard (300 µg/ℓ for iron and 50 µg/ℓ for manganese) by greater than an order of magnitude. Lead was initially detected in sample 29G00201 at 31.2 µg/ℓ. However, when the well was resampled, lead was below the detection limit. The metal concentrations may be related to the suspended solids naturally present in groundwater. Because current land use

prevents exposure to groundwater, risk evaluation was not conducted for groundwater exposure at PSC 29.

Table 5-3
Comparison of Detected Inorganic Analytes in Groundwater Exceeding Drinking Water Standards

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	FDEP Groundwater Guidance Concentration	USEPA Maximum Contaminant Level	Analyte COPC? (Yes/No)
Inorganic Analytes (µg/ℓ)					
Iron	2/2	11,800	300 s	300 s	Yes
Lead	1/2	(31.2) / ND[1]	15 p	15 a	No
Manganese	2/2	1,520	50 s	50 s	Yes

[1] Lead was initially detected in one of two groundwater wells (sample 29G00201) at 31.2 µg/ℓ. However, when the well was resampled and reanalyzed for target analyte metals analysis (sample 29G00202), lead was not detected at the reporting limit of 1.9 µg/ℓ.

Notes: FDEP = Florida Department of Environmental Protection.
USEPA = U.S. Environmental Protection Agency.
COPC = chemical of potential concern.
µg/ℓ = micrograms per liter.
s = secondary standard.
ND = not detected.
p = primary standard.
a = action level.

5.2 ECOLOGICAL RISK SCREENING. An ecological risk screening was performed on soil and groundwater at PSC 29. The 15-acre area is relatively flat with the exception of the debris piles and is in the process of becoming revegetated with various ruderal annual and perennial herbaceous plants and small shrubs.

This evaluation is qualitative in nature and intended to provide a screening level assessment of potential ecological risks associated with PSC 29. The evaluation consists of an exposure pathways analysis, comparison to ecological screening values and conclusions.

5.2.1 Exposure Pathway Analysis Chemical contaminants have been detected in PSC 29 surface soils and groundwater. Groundwater migration and subsequent discharge to the Ortega River could potentially result in exposure to aquatic receptors. Potential ecological receptors at the site include soil invertebrates, plants, and wildlife. Soil invertebrates, which include earthworms, nematodes, and life stages of various insect species, could be exposed by dermal absorption or by ingested contaminated soil particles. Plants could become exposed by direct contact or root uptake. No ecological characterization has been conducted at the site. However, wildlife typical of second growth habitat as documented at OU 1 (ABB-ES, 1996) would be anticipated to occur at PSC 29 as well. Wildlife would likely include various small mammals and birds, reptiles, and predators such as red fox and hawks. In addition, PSC 29 may provide habitat for the gopher tortoise (*Gopherus polyphemus*) and/or tortoise nest commensals.

Wildlife species at PSC 29 could potentially become exposed by inhalation, dermal absorption, and direct ingestion of contaminated soil, or indirectly by consuming contaminated prey items. There are no volatilization concerns at the site since no VOCs were detected in surface soil and only acetone, a likely laboratory artifact, was detected in groundwater. There is limited potential for particulate emissions due to the developing ground cover. Consequently, the inhalation pathway is unlikely to be significant at the site. Although it is not possible to evaluate the significance of the dermal absorptive route, contaminant concentrations detected in surface soil are unlikely to represent a substantial exposure potential to wildlife because fur, feathers, and other integument would limit contaminant absorption. The remaining exposure pathways are potentially complete at PSC 29.

5.2.2 Ecological Screening To evaluate potential ecological risks, maximum surface soil concentrations were compared to plant and earthworm screening benchmark values derived by Oak Ridge National Laboratories (Will and Suter, 1995a, and b) and presented in Table 5-4.

Very few soil screening standards are available for SVOCs (PAHs and phthalates). Maximum concentrations were generally below or on the same order of magnitude as the soil screening values. No toxicological benchmarks are shown for the detected pesticides; however these levels are all below 1 mg/kg and are consistent with pesticide levels detected elsewhere at NAS Jacksonville, including stationwide background samples (ABB-ES, 1996). Concentrations of a number of inorganic analytes exceed available plant and earthworm screening benchmarks. However, background levels for several of these inorganics also exceed available benchmarks, indicating that the benchmarks may be overly conservative for this location.

The concentrations of detected analytes in PSC 29 groundwater do not exceed their respective Region IV chronic screening values, except for iron with a maximum detected concentration of 21,000 $\mu g/\ell$, which exceeded USEPA Region IV chronic surface water criteria of 1,000 $\mu g/\ell$.

5.2.3 Conclusions Although iron concentrations exceed chronic surface water criteria, the Ortega River is approximately 1 mile from PSC 29 and it is extremely unlikely that groundwater discharge from the site would have any effect on river biota given the intervening distance.

In general, the plants present on this landfill are invasive herbaceous plants typical of disturbed areas, and do not tend to be sensitive to the low to moderate levels of inorganics detected at this PSC. In addition, no visible signs of vegetative stress were noted during field work. The screening evaluation suggests that sensitive soil invertebrate populations could be affected by the detected contamination at PSC 29. However, as with plant species, it is unlikely that sensitive invertebrate species would occur in this disturbed second growth habitat. Although some bioaccumulating compounds (e.g., pesticides, cadmium, mercury) were detected in PSC 29 soils, concentrations are below levels that would likely pose a food chain risk. No information regarding the presence of gopher tortoises or other species of special concern at the site is available. Although sensitive species are not expected at this site, their presence would obviously elevate potential ecological risk concerns.

Table 5-4
Comparison of Detected Compounds to Background and Ecological Risk Screening Levels in Surface Soil

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	Background Screening Level	Ecological Benchmarks		Analyte COPC? (Yes/No)
				Earthworm	Plants	
Semivolatile Organic Compounds (µg/kg)						
Acenaphthene	1/11	120	NA	NA	20,000	No
Anthracene	1/11	230	NA	NA	NA	
Benzo(a)anthracene	7/11	1,200	NA	NA	NA	
Benzo(a)pyrene	7/11	1,300	NA	NA	NA	
Benzo(b)fluoranthene	8/11	2,700	NA	NA	NA	
Benzo(g,h,i)perylene	5/11	690	NA	NA	NA	
Benzo(k)fluoranthene	8/11	2,700	NA	NA	NA	
Butylbenzylphthalate	1/11	230	NA	NA	NA	
Carbazole	2/11	380	NA	NA	NA	
Chrysene	7/11	1,400	NA	NA	NA	
Di-n-butylphthalate	3/11	143	NA	NA	200,000	No
Dibenz(a,h)anthracene	1/11	210	NA	NA	NA	
Dimethylphthalate	1/11	1,715	NA	200,000	NA	No
Fluoranthene	8/11	3,200	NA	NA	NA	
Fluorene	1/11	87	NA	30,000	200,000	No
Indeno(1,2,3-cd)pyrene	5/11	690	NA	NA	NA	
Phenanthrene	6/11	1,900	NA	NA	NA	
Pyrene	8/11	2,400	NA	NA	NA	
bis(2-Ethylhexyl)phthalate	7/11	270	NA	NA	NA	
Pesticides and PCBs (µg/kg)						
4,4'-DDD	8/8	88	NA	NA	NA	
4,4'-DDE	7/8	37	NA	NA	NA	
4,4'-DDT	7/8	140	NA	NA	NA	
Aldrin	2/8	3.9	NA	NA	NA	
Aroclor-1260	2/8	120	NA	NA	40,000	No
Dieldrin	6/8	27	NA	NA	NA	
Endosulfan I	2/8	1.5	NA	NA	NA	
Endosulfan II	3/8	2.3	NA	NA	NA	
Endosulfan sulfate	3/8	3	NA	NA	NA	
Endrin	5/8	2.7	NA	NA	NA	
Endrin aldehyde	6/8	17	NA	NA	NA	
Endrin ketone	1/8	1.3	NA	NA	NA	
Heptachlor	2/8	10.2	NA	NA	NA	
Heptachlor epoxide	6/8	3.4	NA	NA	NA	
Methoxychlor	1/8	19	NA	NA	NA	
alpha-BHC	1/8	0.59	NA	NA	NA	

See notes at end of table.

Table 5-4 (Continued)
Comparison of Detected Compounds to Background and Ecological Risk Screening Levels in Surface Soil

Sampling Event Report
Potential Source of Contamination 29
Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Chemical	Frequency of Detects	Maximum Detected Concentration	Background Screening Level	Ecological Benchmarks		Analyte COPC? (Yes/No)
				Earthworm	Plant	
alpha-Chlordane	7/8	110	NA	NA	NA	
beta-BHC	2/8	1.1	NA	NA	NA	
delta-BHC	2/8	1.1	NA	NA	NA	
gamma-BHC (Lindane)	2/8	0.34	NA	NA	NA	
gamma-Chlordane	7/8	100	NA	NA	NA	
Inorganic Analytes (mg/kg)						
Aluminum	8/8	2,740	1,340	NA	50	Yes
Antimony	3/8	3.2	ND	NA	5	No
Arsenic	3/8	19.9	0.8	60	10	
Barium	8/8	25.8	11.2	NA	500	No
Beryllium	6/8	0.17	ND	NA	10	
Cadmium	7/8	1.8	ND	20	3	No
Calcium	8/8	54,200	2,360	NA	NA	
Chromium	8/8	64.8	6.6	0.4	1	Yes
Cobalt	7/8	0.56	ND	NA	20	No
Copper	8/8	62.7	5.8	50	100	No
Iron	8/8	3,320	852	NA	NA	
Lead	8/8	102	24.4	500	50	Yes
Magnesium	8/8	920	99.8	NA	NA	
Manganese	8/8	59.8	18	NA	NA	
Mercury	6/8	0.12	ND	0.1	0.3	Yes
Nickel	8/8	4.1	11	200	30	No
Potassium	7/8	176	ND	NA	NA	
Selenium	1/8	0.81	ND	70	1	No
Silver	2/8	0.3	ND	NA	2	No
Vanadium	8/8	8.9	3.8	NA	2	Yes
Zinc	8/8	530	15.2	200	50	Yes

Notes: Ecological screening benchmarks taken from Will and Suter (1995a, 1995b).

COPC = chemical of potential concern.
µg/kg = micrograms per kilogram.
NA = not applicable or not available.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
BHC = benzene hexachloride.
mg/kg = milligrams per kilogram.
ND = not detected.

6.0 REFERENCES

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APPENDIX A

OFF-SITE SAMPLE TRACKING LOG

Appendix A

PSC 29
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 PEST/ PCB	DRFL	TAT	DSTV	DRFV
0017W	29G00101	8/4/97	1	10	Groundwater	X	X	X	X	8/28/97	22	8/28/97	8/9/97
0017W	29G00201	8/4/97	1	10	Groundwater	X	X	X	X	8/28/97	22	8/28/97	8/9/97
0026S	29G00202	10/21/97	1	2	Groundwater	X				11/11/97	21	11/11/97	12/11/97
00014	29S00101	6/2/97	0	1	soil	X	X	X	X	7/7/97	35	7/7/97	7/24/97
00014	29S00101D	6/2/97	0	1	soil	X	X	X	X	7/7/97	35	7/7/97	7/24/97
00014	29S00201	6/2/97	0	1	soil	X	X	X	X	7/7/97	35	7/7/97	7/24/97
00014	29S00302	6/2/97	1	1.5	soil	X	X	X	X	7/7/97	35	7/7/97	7/24/97
00015	29S00401	7/1/97	0	1	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
00015	29S00501	7/1/97	0	1	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
00015	29S00602	7/1/97	1	2	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
00015	29S00602D	7/1/97	1	2	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
00015	29S00702	7/1/97	1	2	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
00015	29S00802	7/1/97	1	2	soil	X	X	X	X	8/1/97	30	8/1/97	8/8/97
0025S	29S00901	10/20/97	0	1	soil			X		11/3/97	14	11/3/97	11/11/97
0025S	29S01001	10/20/97	0	1	soil			X		11/3/97	14	11/3/97	11/11/97
0025S	29S01101	10/20/97	0	1	soil			X		11/3/97	14	11/3/97	11/11/97
0025S	29S01101D	10/20/97	0	1	soil			X		11/3/97	14	11/3/97	11/11/97

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) ft bls = feet below land surface
MATRIX	Media Sampled
TAL MET	Target Analyte List Metals
TCL VOC	Target Compound List Volatile Organics
TCL SVOC	Target Compound List Semivolatile Organics
TCL PEST/PCB	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

VALIDATED ANALYTICAL DATA

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S00101		29S00101D		29S00201		29S00302		29S00401		29S00501		29S00602		29S00602D		29S00702		29S00802		29S00901	
Sampling Date	6/2/97		6/2/97		6/2/97		6/2/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		10/20/97	
Volatile organics, ug/kg																						
1,1,1-Trichloroethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
1,1,2,2-Tetrachloroethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
1,1,2-Trichloroethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
1,1-Dichloroethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
1,1-Dichloroethene	12	U	12	U	11	U	12	U	15	UJ	14	UJ	13	UJ	13	U	12	UJ	12	UJ	NA	
1,2-Dichloroethane	12	U	12	U	11	UJ	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
1,2-Dichloroethene (total)	12	U	12	U	11	U	12	U	15	UJ	14	UJ	13	UJ	13	U	12	UJ	12	UJ	NA	
1,2-Dichloropropane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
2-Butanone	12	UJ	12	UJ	11	U	12	UJ	15	U	14	U	13	U	13	UJ	12	U	12	U	NA	
2-Hexanone	12	U	12	U	11	U	12	U	15	UJ	14	UJ	13	UJ	13	U	12	UJ	12	UJ	NA	
4-Methyl-2-pentanone	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Acetone	12	UJ	12	UJ	11	UJ	12	UJ	17	U	14	U	19	U	21	UJ	15	U	15	U	NA	
Benzene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Bromodichloromethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Bromoform	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Bromomethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Carbon disulfide	12	U	12	U	11	U	12	U	15	UJ	14	UJ	13	UJ	13	U	12	UJ	12	UJ	NA	
Carbon tetrachloride	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Chlorobenzene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Chloroethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Chloroform	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Chloromethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	UJ	12	U	12	U	NA	
cis-1,3-Dichloropropene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Dibromochloromethane	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Ethylbenzene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Methylene chloride	12	U	12	U	11	U	12	U	15	UJ	14	UJ	13	UJ	44	UJ	12	UJ	12	UJ	NA	
Styrene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Tetrachloroethene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Toluene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
trans-1,3-Dichloropropene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Trichloroethene	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Vinyl chloride	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Xylene (total)	12	U	12	U	11	U	12	U	15	U	14	U	13	U	13	U	12	U	12	U	NA	
Semivolatile organics, ug/kg																						
1,2,4-Trichlorobenzene	410	U	410	U	370	U	410	U	490	U	440	U	420	U	410	U	400	U	390	U	420	U

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S00101	29S00101D	29S00201	29S00302	29S00401	29S00501	29S00602	29S00602D	29S00702	29S00802	29S00901
Sampling Date	6/2/97	6/2/97	6/2/97	6/2/97	7/1/97	7/1/97	7/1/97	7/1/97	7/1/97	7/1/97	10/20/97
1,2-Dichlorobenzene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
1,3-Dichlorobenzene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
1,4-Dichlorobenzene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,2'-oxybis(1-Chloropropane)	410 U	410 U	370 U	410 UJ	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,4,5-Trichlorophenol	1000 U	1000 U	920 U	1000 U	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
2,4,6-Trichlorophenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,4-Dichlorophenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,4-Dimethylphenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,4-Dinitrophenol	1000 U	1000 U	370 U	1000 UJ	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
2,4-Dinitrotoluene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2,6-Dinitrotoluene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2-Chloronaphthalene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2-Chlorophenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2-Methylnaphthalene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2-Methylphenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
2-Nitroaniline	1000 U	1000 U	920 U	1000 UJ	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
2-Nitrophenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
3,3'-Dichlorobenzidine	410 U	410 U	370 U	410 UJ	490 UJ	440 UJ	420 UJ	410 U	400 U	390 U	420 U
3-Nitroaniline	1000 U	1000 U	920 U	1000 U	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
4,6-Dinitro-2-methylphenol	1000 U	1000 U	920 U	1000 U	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
4-Bromophenyl-phenylether	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
4-Chloro-3-methylphenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 UJ
4-Chloroaniline	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
4-Chlorophenyl-phenylether	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
4-Methylphenol	410 UJ	410 UJ	370 UJ	410 UJ	490 U	440 U	420 U	410 U	400 U	390 U	420 U
4-Nitroaniline	1000 U	1000 U	920 U	1000 U	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
4-Nitrophenol	1000 U	1000 U	920 U	1000 UJ	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 U
Acenaphthene	410 U	410 U	370 U	410 U	490 U	120 J	420 U	410 U	400 U	390 U	420 U
Acenaphthylene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Anthracene	410 U	410 U	370 U	410 U	490 U	230 J	420 U	410 U	400 U	390 U	420 U
Benzo(a)anthracene	410 U	410 U	370 U	170 J	260 J	1200	89 J	69 J	100 J	390 U	420 U
Benzo(a)pyrene	410 U	410 U	370 U	350 J	250 J	1300	420 U	71 J	110 J	390 U	420 U
Benzo(b)fluoranthene	410 U	54 J	370 U	370 J	560 J	2700 J	220 J	150 J	180 J	390 U	420 U
Benzo(g,h,i)perylene	410 U	410 U	370 U	250 J	490 U	690	420 U	65 J	65 J	390 U	420 U
Benzo(k)fluoranthene	410 U	45 J	370 U	430 J	540 J	2700 J	220 J	170 J	200 J	390 U	420 U
bis(2-Chloroethoxy)methane	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S00101	29S00101D	29S00201	29S00302	29S00401	29S00501	29S00602	29S00602D	29S00702	29S00802	29S00901
Sampling Date	6/2/97	6/2/97	6/2/97	6/2/97	7/1/97	7/1/97	7/1/97	7/1/97	7/1/97	7/1/97	10/20/97
bis(2-Chloroethyl)ether	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
bis(2-Ethylhexyl)phthalate	410 UJ	410 UJ	370 UJ	200 J	270 J	150 J	77 J	74 J	78 J	390 U	420 U
Butylbenzylphthalate	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	230 J
Carbazole	410 U	410 U	370 U	410 U	65 J	380 J	420 U	410 U	400 U	390 U	420 U
Chrysene	410 U	410 U	370 U	210 J	290 J	1400	110 J	100 J	120 J	390 U	420 U
Di-n-butylphthalate	410 U	410 U	370 U	410 U	490 U	52 J	420 U	76 J	400 U	69 J	420 U
Di-n-octylphthalate	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 UJ
Dibenz(a,h)anthracene	410 U	410 U	370 U	410 U	490 U	210 J	420 U	410 U	400 U	390 U	420 U
Dibenzofuran	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Diethylphthalate	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Dimethylphthalate	410 U	410 U	370 U	410 U	490 U	440 U	230 J	3200	400 U	390 U	420 U
Fluoranthene	50 J	64 J	370 U	260 J	600	3200	170 J	130 J	170 J	390 U	420 U
Fluorene	410 U	410 U	370 U	410 UJ	490 U	87 J	420 U	410 U	400 U	390 U	420 U
Hexachlorobenzene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Hexachlorobutadiene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Hexachlorocyclopentadiene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 UJ
Hexachloroethane	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Indeno(1,2,3-cd)pyrene	410 U	410 U	370 U	100 J	490 U	690	420 U	54 J	60 J	390 U	420 U
Isophorone	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
N-Nitroso-di-n-propylamine	410 UJ	410 UJ	370 UJ	410 UJ	490 U	440 U	420 U	410 U	400 U	390 U	420 U
N-Nitrosodiphenylamine (1)	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Naphthalene	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Nitrobenzene	410 U	410 U	370 U	410 UJ	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Pentachlorophenol	1000 U	1000 U	920 U	1000 UJ	1200 U	1100 U	1000 U	1000 U	1000 U	990 U	1100 UJ
Phenanthrene	410 U	410 U	370 U	110 J	330 J	1900	420 U	48 J	86 J	390 U	420 U
Phenol	410 U	410 U	370 U	410 U	490 U	440 U	420 U	410 U	400 U	390 U	420 U
Pyrene	79 J	42 J	370 U	260 J	480 J	2400	150 J	120 J	150 J	390 U	420 U
Pesticides/PCBs, ug/kg											
4,4'-DDD	8.2 J	7.9	1.3 J	88 J	9.6 J	2.8 J	5.3 J	5 J	0.92 J	3.8 J	NA
4,4'-DDE	29	34	1 J	4.1 U	37	2.5 J	20	22	1.9 J	2.3 J	NA
4,4'-DDT	10	6.5 J	2.4 J	140 J	51 J	5.3 J	8.9 J	11 J	4 U	1.6 J	NA
Aldrin	4.4	3.4	1.9 U	2.1 U	13 U	0.46 J	2.1 U	2.1 U	2.1 U	2 U	NA
alpha-BHC	2.1 U	0.12 J	1.9 U	2.1 U	13 U	2.3 UJ	2.1 U	2.1 U	2.1 U	2 U	NA
alpha-Chlordane	7.8	7.6	1.9 U	17	110 J	1.4 J	23	29	2.9 J	0.29 J	NA
Aroclor-1016	41 U	41 U	37 U	41 U	240 U	44 UJ	41 U	42 U	40 U	39 U	NA
Aroclor-1221	83 U	83 U	75 U	83 U	500 U	90 UJ	84 U	84 U	82 U	80 U	NA

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S00101		29S00101D		29S00201		29S00302		29S00401		29S00501		29S00602		29S00602D		29S00702		29S00802		29S00901	
Sampling Date	6/2/97		6/2/97		6/2/97		6/2/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		10/20/97	
Aroclor-1232	41	U	41	U	37	U	41	U	240	U	44	UJ	41	U	42	U	40	U	39	U	NA	
Aroclor-1242	41	U	41	U	37	U	41	U	240	U	44	UJ	41	U	42	U	40	U	39	U	NA	
Aroclor-1248	41	U	41	U	37	U	41	U	240	U	44	UJ	41	U	42	U	40	U	39	U	NA	
Aroclor-1254	41	U	41	U	37	U	41	U	240	U	44	UJ	41	U	42	U	40	U	39	U	NA	
Aroclor-1260	37	J	39	J	37	U	41	U	240	U	44	UJ	41	U	42	U	120		39	U	NA	
beta-BHC	1.4	J	0.85	J	1.9	U	2.1	U	13	U	2.3	UJ	2.1	U	2.1	U	0.28	J	2	U	NA	
delta-BHC	1.2	J	0.91	J	0.47	J	2.1	U	13	U	2.3	UJ	2.1	U	2.1	U	2.1	U	2	U	NA	
Dieldrin	5.1		4.3		1.1	J	27		24	U	2.6	J	3.1	J	1.1	J	1.9	J	3.9	U	NA	
Endosulfan I	2.1	U	2.1	U	0.47	J	2.1	U	13	U	1.5	J	2.1	U	2.1	U	2.1	U	2	U	NA	
Endosulfan II	4.1	U	4.1	U	0.18	J	2.3	J	24	U	4.4	UJ	0.42	J	4.2	U	4	U	3.9	U	NA	
Endosulfan sulfate	0.74	J	0.27	J	3.7	U	4.1	U	24	U	4.4	UJ	4.1	U	0.27	J	3	J	3.9	U	NA	
Endrin	4.1	U	4.1	U	3.7	U	1.9	J	2.7	J	2.2	J	0.56	J	4.2	U	1.8	J	3.9	U	NA	
Endrin aldehyde	2.8	J	2.1	J	1.1	J	0.61	J	17	J	3.6	J	13	J	3.3	J	4	U	3.9	U	NA	
Endrin ketone	4.1	U	4.1	U	1.3	J	4.1	U	24	U	4.4	UJ	4.1	U	4.2	U	4	U	3.9	U	NA	
gamma-BHC (Lindane)	2.1	U	2.1	U	1.9	U	2.1	U	13	U	0.34	J	2.1	U	2.1	U	0.18	J	2	U	NA	
gamma-Chlordane	18	J	16	J	0.45	J	15	J	100	J	3.7	J	19		25		2.1	U	0.14	J	NA	
Heptachlor	12		8.3		1.9	U	2.1	U	13	U	3.6	J	2.1	U	2.1	U	2.1	U	2	U	NA	
Heptachlor epoxide	0.5	J	0.75	J	1.9	U	0.86	J	3.4	J	1.7	J	0.88	J	0.93	J	0.37	J	2	U	NA	
Methoxychlor	21	U	21	UJ	19	UJ	19	J	130	U	23	UJ	21	U	21	U	21	U	20	U	NA	
Toxaphene	210	U	210	U	190	U	210	U	1300	U	230	UJ	210	U	210	U	210	U	200	U	NA	
Inorganics, mg/kg																						
Aluminum	2470		3010		2730		2070		1830	J	1470	J	1660	J	1470	J	1700	J	163	J	NA	
Antimony	0.6	U	0.6	U	0.54	U	0.6	U	1.5	J	3.2	J	1	J	0.69	J	0.42	U	0.41	U	NA	
Arsenic	0.7	U	1.7	U	1.3	U	1.6	U	19.9		0.72	U	1.8	J	9.4		9.4		0.65	U	NA	
Barium	8.4	J	8.6	J	14.6	J	19.9	J	25.8	J	17.4	J	21.7	J	17	J	17.7	J	2.5	J	NA	
Beryllium	0.12	U	0.05	J	0.11	J	0.17	J	0.09	J	0.09	J	0.09	J	0.07	J	0.13	U	0.02	U	NA	
Cadmium	0.23	J	0.35	J	0.25	J	1.3		1.2	J	1.3	J	2.1		1.4		1.2	J	0.07	U	NA	
Calcium	4490	J	4950	J	51500	J	54200	J	17900		5070		12500		9180		18300		369	J	NA	
Chromium	5.4		5.7		9.1		15.1		64.8		6.4		7.3		15.3		11.3		1.1	J	NA	
Cobalt	0.22	U	0.25	J	0.56	J	0.45	J	0.36	J	0.27	J	0.43	J	0.41	J	0.33	J	0.14	U	NA	
Copper	12	J	7.3	J	62.7	J	25.7	J	59.6		10.5		38.5		51.6		14.8		0.98	J	NA	
Iron	687	J	813	J	3320	J	1760	J	1780		1980		2270		2200		1560		206		NA	
Lead	26	J	28.4	J	29.7	J	102	J	77.2		60.4		95.7		76		61.3		2.2		NA	
Magnesium	134	J	146	J	478	J	920	J	382	J	252	J	473	J	223	J	431	J	28	J	NA	
Manganese	13		14.2		21.4		59.8		44.9		17.1		36.2		35.2		37.3		5.1		NA	
Mercury	0.07	J	0.07	J	0.06	U	0.09	J	0.11	J	0.08	J	0.1	J	0.12	J	0.12		0.06	U	NA	

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Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S00101		29S00101D		29S00201		29S00302		29S00401		29S00501		29S00602		29S00602D		29S00702		29S00802		29S00901
Sampling Date	6/2/97		6/2/97		6/2/97		6/2/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		7/1/97		10/20/97
Nickel	2.9	J	1.9	J	3.4	J	4.1	J	4	J	2.1	J	2.9	J	5.1	J	2.2	J	0.33	J	NA
Potassium	63.4	J	66.1	J	176	J	173	J	133	J	60.7	J	102	J	87.2	J	92	J	31.8	U	NA
Selenium	1.1	U	1.1	U	0.97	U	1.1	U	0.83	U	0.75	U	0.71	J	1.7	U	0.69	U	0.67	U	NA
Silver	0.17	U	0.17	U	0.3	J	0.18	U	0.13	J	0.11	U	0.1	U	0.1	U	0.1	U	0.1	U	NA
Sodium	261	U	243	U	238	U	261	U	290	U	251	U	284	U	298	U	279	U	221	U	NA
Thallium	1.4	U	1.4	U	1.2	U	1.4	U	1.4	U	1.3	U	1.2	U	1.2	U	1.2	U	1.1	U	NA
Vanadium	3.3	J	3.6	J	8.9	J	5.7	J	5	J	6.4	J	6.3	J	4.7	J	4.7	J	1.2	J	NA
Zinc	28.7	J	29.1	J	27.5	J	56.5	J	105	J	105	J	291	J	115	J	530	J	1.8	J	NA

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Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S01001		29S01101		29S01101D	
Sampling Date	10/20/97		10/20/97		10/20/97	
Volatile organics, ug/kg						
1,1,1-Trichloroethane	NA		NA		NA	
1,1,2,2-Tetrachloroethane	NA		NA		NA	
1,1,2-Trichloroethane	NA		NA		NA	
1,1-Dichloroethane	NA		NA		NA	
1,1-Dichloroethene	NA		NA		NA	
1,2-Dichloroethane	NA		NA		NA	
1,2-Dichloroethene (total)	NA		NA		NA	
1,2-Dichloropropane	NA		NA		NA	
2-Butanone	NA		NA		NA	
2-Hexanone	NA		NA		NA	
4-Methyl-2-pentanone	NA		NA		NA	
Acetone	NA		NA		NA	
Benzene	NA		NA		NA	
Bromodichloromethane	NA		NA		NA	
Bromoform	NA		NA		NA	
Bromomethane	NA		NA		NA	
Carbon disulfide	NA		NA		NA	
Carbon tetrachloride	NA		NA		NA	
Chlorobenzene	NA		NA		NA	
Chloroethane	NA		NA		NA	
Chloroform	NA		NA		NA	
Chloromethane	NA		NA		NA	
cis-1,3-Dichloropropene	NA		NA		NA	
Dibromochloromethane	NA		NA		NA	
Ethylbenzene	NA		NA		NA	
Methylene chloride	NA		NA		NA	
Styrene	NA		NA		NA	
Tetrachloroethene	NA		NA		NA	
Toluene	NA		NA		NA	
trans-1,3-Dichloropropene	NA		NA		NA	
Trichloroethene	NA		NA		NA	
Vinyl chloride	NA		NA		NA	
Xylene (total)	NA		NA		NA	
Semivolatile organics, ug/kg						
1,2,4-Trichlorobenzene	380	U	380	U	380	U

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Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S01001		29S01101		29S01101D	
Sampling Date	10/20/97		10/20/97		10/20/97	
1,2-Dichlorobenzene	380	U	380	U	380	U
1,3-Dichlorobenzene	380	U	380	U	380	U
1,4-Dichlorobenzene	380	U	380	U	380	U
2,2'-oxybis(1-Chloropropane)	380	U	380	U	380	U
2,4,5-Trichlorophenol	950	U	950	U	940	U
2,4,6-Trichlorophenol	380	U	380	U	380	U
2,4-Dichlorophenol	380	U	380	U	380	U
2,4-Dimethylphenol	380	U	380	U	380	U
2,4-Dinitrophenol	950	U	950	U	940	U
2,4-Dinitrotoluene	380	U	380	U	380	U
2,6-Dinitrotoluene	380	U	380	U	380	U
2-Chloronaphthalene	380	U	380	U	380	U
2-Chlorophenol	380	U	380	U	380	U
2-Methylnaphthalene	380	U	380	U	380	U
2-Methylphenol	380	U	380	U	380	U
2-Nitroaniline	950	U	950	U	940	U
2-Nitrophenol	380	U	380	U	380	U
3,3'-Dichlorobenzidine	380	U	380	U	380	U
3-Nitroaniline	950	U	950	U	940	U
4,6-Dinitro-2-methylphenol	950	U	950	U	940	U
4-Bromophenyl-phenylether	380	U	380	U	380	U
4-Chloro-3-methylphenol	380	UJ	380	UJ	380	UJ
4-Chloroaniline	380	U	380	U	380	U
4-Chlorophenyl-phenylether	380	U	380	U	380	U
4-Methylphenol	380	U	380	U	380	U
4-Nitroaniline	950	U	950	U	940	U
4-Nitrophenol	950	U	950	U	940	U
Acenaphthene	380	U	380	U	380	U
Acenaphthylene	380	U	380	U	380	U
Anthracene	380	U	380	U	380	U
Benzo(a)anthracene	160	J	78	J	51	J
Benzo(a)pyrene	170	J	67	J	54	J
Benzo(b)fluoranthene	360	J	160	J	130	J
Benzo(g,h,i)perylene	39	J	380	U	380	U
Benzo(k)fluoranthene	340	J	150	J	120	J
bis(2-Chloroethoxy)methane	380	U	380	U	380	U

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S01001		29S01101		29S01101D	
Sampling Date	10/20/97		10/20/97		10/20/97	
bis(2-Chloroethyl)ether	380	U	380	U	380	U
bis(2-Ethylhexyl)phthalate	150	J	180	J	380	U
Butylbenzylphthalate	380	U	380	U	380	U
Carbazole	380	U	380	U	380	U
Chrysene	190	J	77	J	55	J
Di-n-butylphthalate	380	U	380	U	380	U
Di-n-octylphthalate	380	UJ	380	UJ	380	UJ
Dibenz(a,h)anthracene	380	U	380	U	380	U
Dibenzofuran	380	U	380	U	380	U
Diethylphthalate	380	U	380	U	380	U
Dimethylphthalate	380	U	380	U	380	U
Fluoranthene	340	J	97	J	51	J
Fluorene	380	U	380	U	380	U
Hexachlorobenzene	380	U	380	U	380	U
Hexachlorobutadiene	380	U	380	U	380	U
Hexachlorocyclopentadiene	380	UJ	380	UJ	380	UJ
Hexachloroethane	380	U	380	U	380	U
Indeno(1,2,3-cd)pyrene	73	J	380	U	380	U
Isophorone	380	U	380	U	380	U
N-Nitroso-di-n-propylamine	380	U	380	U	380	U
N-Nitrosodiphenylamine (1)	380	U	380	U	380	U
Naphthalene	380	U	380	U	380	U
Nitrobenzene	380	U	380	U	380	U
Pentachlorophenol	950	UJ	950	UJ	940	UJ
Phenanthrene	160	J	380	U	380	U
Phenol	380	U	380	U	380	U
Pyrene	280	J	110	J	62	J
Pesticides/PCBs, ug/kg						
4,4'-DDD	NA		NA		NA	
4,4'-DDE	NA		NA		NA	
4,4'-DDT	NA		NA		NA	
Aldrin	NA		NA		NA	
alpha-BHC	NA		NA		NA	
alpha-Chlordane	NA		NA		NA	
Aroclor-1016	NA		NA		NA	
Aroclor-1221	NA		NA		NA	

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Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID Sampling Date	29S01001 10/20/97	29S01101 10/20/97	29S01101D 10/20/97
Aroclor-1232	NA	NA	NA
Aroclor-1242	NA	NA	NA
Aroclor-1248	NA	NA	NA
Aroclor-1254	NA	NA	NA
Aroclor-1260	NA	NA	NA
beta-BHC	NA	NA	NA
delta-BHC	NA	NA	NA
Dieldrin	NA	NA	NA
Endosulfan I	NA	NA	NA
Endosulfan II	NA	NA	NA
Endosulfan sulfate	NA	NA	NA
Endrin	NA	NA	NA
Endrin aldehyde	NA	NA	NA
Endrin ketone	NA	NA	NA
gamma-BHC (Lindane)	NA	NA	NA
gamma-Chlordane	NA	NA	NA
Heptachlor	NA	NA	NA
Heptachlor epoxide	NA	NA	NA
Methoxychlor	NA	NA	NA
Toxaphene	NA	NA	NA
Inorganics, mg/kg			
Aluminum	NA	NA	NA
Antimony	NA	NA	NA
Arsenic	NA	NA	NA
Barium	NA	NA	NA
Beryllium	NA	NA	NA
Cadmium	NA	NA	NA
Calcium	NA	NA	NA
Chromium	NA	NA	NA
Cobalt	NA	NA	NA
Copper	NA	NA	NA
Iron	NA	NA	NA
Lead	NA	NA	NA
Magnesium	NA	NA	NA
Manganese	NA	NA	NA
Mercury	NA	NA	NA

Appendix B-1

Validated Analytical Results
Surface Soil - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29S01001	29S01101	29S01101D
Sampling Date	10/20/97	10/20/97	10/20/97
Nickel	NA	NA	NA
Potassium	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Sodium	NA	NA	NA
Thallium	NA	NA	NA
Vanadium	NA	NA	NA
Zinc	NA	NA	NA

Appendix B-2

Validated Analytical Results
Groundwater - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29G00101		29G00201		29G00202	
Sampling Date	8/4/97		8/4/97		10/20/97	
Volatile organics, ug/L						
1,1,1-Trichloroethane	10	U	10	U	NA	
1,1,2,2-Tetrachloroethane	10	U	10	U	NA	
1,1,2-Trichloroethane	10	U	10	U	NA	
1,1-Dichloroethane	10	U	10	U	NA	
1,1-Dichloroethene	10	U	10	U	NA	
1,2-Dichloroethane	10	U	10	U	NA	
1,2-Dichloroethene (total)	10	U	10	U	NA	
1,2-Dichloropropane	10	U	10	U	NA	
2-Butanone	10	U	10	U	NA	
2-Hexanone	10	U	10	U	NA	
4-Methyl-2-pentanone	10	U	10	U	NA	
Acetone	10	U	8	J	NA	
Benzene	10	U	10	U	NA	
Bromodichloromethane	10	U	10	U	NA	
Bromoform	10	U	10	U	NA	
Bromomethane	10	U	10	U	NA	
Carbon disulfide	10	U	10	U	NA	
Carbon tetrachloride	10	U	10	U	NA	
Chlorobenzene	10	U	10	U	NA	
Chloroethane	10	U	10	U	NA	
Chloroform	10	U	10	U	NA	
Chloromethane	10	U	10	U	NA	
cis-1,3-Dichloropropene	10	U	10	U	NA	
Dibromochloromethane	10	U	10	U	NA	
Ethylbenzene	10	U	10	U	NA	
Methylene chloride	10	U	10	U	NA	
Styrene	10	U	10	U	NA	
Tetrachloroethene	10	U	10	U	NA	
Toluene	10	U	10	U	NA	
trans-1,3-Dichloropropene	10	U	10	U	NA	
Trichloroethene	10	U	10	U	NA	
Vinyl chloride	10	U	10	U	NA	
Xylene (total)	10	U	10	U	NA	
Semivolatile organics, ug/L						
1,2,4-Trichlorobenzene	10	U	10	U	NA	
1,2-Dichlorobenzene	10	U	10	U	NA	
1,3-Dichlorobenzene	10	U	10	U	NA	
1,4-Dichlorobenzene	10	U	10	U	NA	
2,2'-oxybis(1-Chloropropane)	10	U	10	U	NA	
2,4,5-Trichlorophenol	25	U	25	U	NA	
2,4,6-Trichlorophenol	10	U	10	U	NA	
2,4-Dichlorophenol	10	U	10	U	NA	
2,4-Dimethylphenol	10	U	10	U	NA	
2,4-Dinitrophenol	25	U	25	U	NA	
2,4-Dinitrotoluene	10	U	10	U	NA	
2,6-Dinitrotoluene	10	U	10	U	NA	
2-Chloronaphthalene	10	U	10	U	NA	
2-Chlorophenol	10	U	10	U	NA	
2-Methylnaphthalene	10	U	10	U	NA	
2-Methylphenol	10	U	10	U	NA	
2-Nitroaniline	25	U	25	U	NA	

Appendix B-2

Validated Analytical Results
Groundwater - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29G00101		29G00201		29G00202	
Sampling Date	8/4/97		8/4/97		10/20/97	
2-Nitrophenol	10	U	10	U	NA	
3,3'-Dichlorobenzidine	10	U	10	U	NA	
3-Nitroaniline	25	U	25	U	NA	
4,6-Dinitro-2-methylphenol	25	U	25	U	NA	
4-Bromophenyl-phenylether	10	U	10	U	NA	
4-Chloro-3-methylphenol	10	U	10	U	NA	
4-Chloroaniline	10	U	10	U	NA	
4-Chlorophenyl-phenylether	10	U	10	U	NA	
4-Methylphenol	10	U	10	U	NA	
4-Nitroaniline	25	U	25	U	NA	
4-Nitrophenol	25	U	25	U	NA	
Acenaphthene	1	J	10	U	NA	
Acenaphthylene	10	U	10	U	NA	
Anthracene	10	U	10	U	NA	
Benzo(a)anthracene	10	U	10	U	NA	
Benzo(a)pyrene	10	U	10	U	NA	
Benzo(b)fluoranthene	10	U	10	U	NA	
Benzo(g,h,i)perylene	10	U	10	U	NA	
Benzo(k)fluoranthene	10	U	10	U	NA	
bis(2-Chloroethoxy)methane	10	U	10	U	NA	
bis(2-Chloroethyl)ether	10	U	10	U	NA	
bis(2-Ethylhexyl)phthalate	10	U	10	U	NA	
Butylbenzylphthalate	10	U	10	U	NA	
Carbazole	10	U	10	U	NA	
Chrysene	10	U	10	U	NA	
Di-n-butylphthalate	10	U	10	U	NA	
Di-n-octylphthalate	10	U	10	U	NA	
Dibenz(a,h)anthracene	10	U	10	U	NA	
Dibenzofuran	10	U	10	U	NA	
Diethylphthalate	10	U	10	U	NA	
Dimethylphthalate	10	U	10	U	NA	
Fluoranthene	10	U	10	U	NA	
Fluorene	10	U	10	U	NA	
Hexachlorobenzene	10	U	10	U	NA	
Hexachlorobutadiene	10	U	10	U	NA	
Hexachlorocyclopentadiene	10	U	10	U	NA	
Hexachloroethane	10	U	10	U	NA	
Indeno(1,2,3-cd)pyrene	10	U	10	U	NA	
Isophorone	10	U	10	U	NA	
N-Nitroso-di-n-propylamine	10	U	10	U	NA	
N-Nitrosodiphenylamine (1)	10	U	10	U	NA	
Naphthalene	2	J	10	U	NA	
Nitrobenzene	10	U	10	U	NA	
Pentachlorophenol	25	U	25	U	NA	
Phenanthrene	10	U	10	U	NA	
Phenol	10	U	10	U	NA	
Pyrene	10	U	10	U	NA	
Pesticides/PCBs, ug/L						
4,4'-DDD	0.1	U	0.0055	J	NA	
4,4'-DDE	0.1	U	0.1	U	NA	
4,4'-DDT	0.1	U	0.1	U	NA	
Aldrin	0.05	U	0.05	U	NA	

Appendix B-2

Validated Analytical Results
Groundwater - TAL Metals and TCL Organics
PSC 29

Naval Air Station, Jacksonville
Jacksonville, FL

Sample ID	29G00101		29G00201		29G00202	
Sampling Date	8/4/97		8/4/97		10/20/97	
alpha-BHC	0.05	U	0.05	U	NA	
alpha-Chlordane	0.05	U	0.05	U	NA	
Aroclor-1016	1	U	1	U	NA	
Aroclor-1221	2	U	2	U	NA	
Aroclor-1232	1	U	1	U	NA	
Aroclor-1242	1	U	1	U	NA	
Aroclor-1248	1	U	1	U	NA	
Aroclor-1254	1	U	1	U	NA	
Aroclor-1260	1	U	1	U	NA	
beta-BHC	0.05	U	0.05	U	NA	
delta-BHC	0.05	U	0.05	U	NA	
Dieldrin	0.1	U	0.1	U	NA	
Endosulfan I	0.05	U	0.05	U	NA	
Endosulfan II	0.1	U	0.1	U	NA	
Endosulfan sulfate	0.1	U	0.1	U	NA	
Endrin	0.1	U	0.1	U	NA	
Endrin aldehyde	0.1	U	0.1	U	NA	
Endrin ketone	0.1	U	0.1	U	NA	
gamma-BHC (Lindane)	0.05	U	0.05	U	NA	
gamma-Chlordane	0.05	U	0.05	U	NA	
Heptachlor	0.05	U	0.05	U	NA	
Heptachlor epoxide	0.05	U	0.05	U	NA	
Methoxychlor	0.5	U	0.5	U	NA	
Toxaphene	5	U	5	U	NA	
Inorganics, ug/L						
Aluminum	113	U	127	U	91.2	J
Antimony	4.1	U	2.8	U	2.9	U
Arsenic	14.2		13.7		7	J
Barium	187	J	163	J	200	J
Beryllium	0.23	U	0.18	U	0.21	U
Cadmium	0.3	U	0.92	J	0.3	U
Calcium	333000		347000		336000	
Chromium	4.2	J	3.7	J	3.3	J
Cobalt	0.6	U	2.4	J	1.7	J
Copper	3	U	20.1	J	4.2	U
Iron	7180		11800		21000	
Lead	3.2	U	31.2		1.9	U
Magnesium	29700		38800		44400	
Manganese	1520	J	1490	J	1080	
Mercury	0.1	U	0.1	U	0.1	U
Nickel	3.1	U	10.6	J	3.8	J
Potassium	20600	J	22300	J	33300	J
Selenium	2.8	U	2.8	U	4.4	U
Silver	0.4	U	0.4	U	0.8	U
Sodium	7960		21000		27400	
Thallium	4.7	U	4.7	U	5	U
Vanadium	0.6	U	1.6	J	4.5	J
Zinc	32.7	U	223		1.5	J

Appendix B-1, B-2

Notes for Analytical Results Tables
PSC 29

Naval Air Station Jacksonville
Jacksonville, Florida

Sample ID = Sample Identifier
NA = Not Analyzed.

Units:

ug/L	microgram per liter
mg/kg	milligram per kilogram
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. 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.

APPENDIX C

SUMMARY OF DETECTIONS IN ANALYTICAL RESULTS

APPENDIX C
SUMMARY OF DETECTIONS

PSC 29, Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Surface Soil						
Chemical	Frequency of Detects	Range of Detects	Reported CRQLs	Average (Detects)	Average (All)	Maximum Detected
Semivolatiles (ug/kg)						
Acenaphthene	1/11	120 - 120	370 - 490	120	196	120
Anthracene	1/11	230 - 230	370 - 490	230	206	230
Benzo(a)anthracene	7/11	64.5* - 1,200	370 - 490	291	257	1,200
Benzo(a)pyrene	7/11	60.5* - 1,300	370 - 490	340	289	1,300
Benzo(b)fluoranthene	8/11	129.5* - 2,700	370 - 490	579	475	2,700
Benzo(g,h,i)perylene	5/11	39 - 690	370 - 490	236	219	690
Benzo(k)fluoranthene	8/11	125* - 2,700	370 - 490	583	478	2,700
Butylbenzylphthalate	1/11	230 - 230	370 - 490	230	207	230
Carbazole	2/11	65 - 380	370 - 490	223	203	380
Chrysene	7/11	66* - 1,400	370 - 490	340	289	1,400
Di-n-butylphthalate	3/11	52 - 143*	370 - 490	88	172	143
Dibenz(a,h)anthracene	1/11	210 - 210	370 - 490	210	204	210
Dimethylphthalate	1/11	1,715* - 1,715*	370 - 490	1,715	342	1,715
Fluoranthene	8/11	57* - 3,200	370 - 490	606	495	3,200
Fluorene	1/11	87 - 87	370 - 490	87	193	87
Indeno(1,2,3-cd)pyrene	5/11	60 - 690	370 - 490	211	208	690
Phenanthrene	6/11	86 - 1,900	370 - 490	453	336	1,900
Pyrene	8/11	60.5* - 2,400	370 - 490	481	404	2,400
bis(2-Ethylhexyl)phthalate	7/11	75.5* - 270	370 - 490	158	173	270
Pesticides/PCBs (ug/kg)						
4,4'-DDD	8/8	0.92 - 88	9 - 61	15	15	88
4,4'-DDE	7/8	1 - 37	4.1 - 61	13.9	12.4	37
4,4'-DDT	7/8	1.6 - 140	4 - 61	31.2	27.6	140
Aldrin	2/8	0.46 - 3.9*	1.9 - 13	2.2	2	3.9
Aroclor-1260	2/8	38* - 120	37 - 240	79	47.4	120
Dieldrin	6/8	1.1 - 27	3.9 - 24	6.6	6.7	27
Endosulfan I	2/8	0.47 - 1.5	2 - 13	0.99	1.7	1.5
Endosulfan II	3/8	0.18 - 2.3	3.9 - 24	1.2	3	2.3
Endosulfan sulfate	3/8	0.505* - 3	3.7 - 24	1.6	3.1	3
Endrin	5/8	1.33* - 2.7	3.7 - 61	2	2	2.7
Endrin aldehyde	6/8	0.61 - 17	3.9 - 61	5.5	4.6	17
Endrin ketone	1/8	1.3 - 1.3	3.9 - 24	1.3	3.2	1.3
Heptachlor	2/8	3.6 - 10.15*	1.9 - 13	6.9	3.2	10.2
Heptachlor epoxide	6/8	0.37 - 3.4	1.9 - 32	1.3	1.2	3.4
Methoxychlor	1/8	19 - 19	20 - 130	19	27.2	19

APPENDIX C
SUMMARY OF DETECTIONS

PSC 29, Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Surface Soil

Chemical	Frequency of Detects	Range of Detects	Reported CRQLs	Average (Detects)	Average (All)	Maximum Detected
alpha-BHC	1/8	0.585* - 0.585*	1.9 - 13	0.59	1.7	0.59
alpha-Chlordane	7/8	0.29 - 110	1.9 - 32	23.6	20.8	110
beta-BHC	2/8	0.28 - 1.125*	1.9 - 13	0.7	1.6	1.1
delta-BHC	2/8	0.47 - 1.055*	2 - 13	0.76	1.7	1.1
gamma-BHC (Lindane)	2/8	0.18 - 0.34	1.9 - 13	0.26	1.5	0.34
gamma-Chlordane	7/8	0.14 - 100	2.1 - 32	22.6	19.9	100
Inorganics (mg/kg)						
Aluminum	8/8	163 - 2,740*	10.8 - 36.8	1,784	1,784	2,740
Antimony	3/8	0.845* - 3.2	0.99 - 5	1.8	1.1	3.2
Arsenic	3/8	5.6* - 19.9	1.6 - 8	11.6	5.7	19.9
Barium	8/8	2.5 - 25.8	0.24 - 0.5	15.7	15.7	25.8
Beryllium	6/8	0.055* - 0.17	0.048 - 0.5	0.1	0.09	0.17
Cadmium	7/8	0.25 - 1.75*	0.17 - 1	1	0.92	1.8
Calcium	8/8	369 - 54,200	13.5 - 18.3	20,362	20,362	54,200
Chromium	8/8	1.1 - 64.8	1.9 - 2.4	15.6	15.6	64.8
Cobalt	7/8	0.2625* - 0.56	0.34 - 2.2	0.38	0.35	0.56
Copper	8/8	0.98 - 62.7	1.2 - 1.5	28.6	28.6	62.7
Iron	8/8	206 - 3,320	28.2 - 36.3	1,699	1,699	3,320
Lead	8/8	2.2 - 102	2.6 - 5.5	55.7	55.7	102
Magnesium	8/8	28 - 920	8.2 - 16	372	372	920
Manganese	8/8	5.1 - 59.8	0.22 - 0.59	29.4	29.4	59.8
Mercury	6/8	0.07* - 0.12	0.068 - 0.15	0.1	0.08	0.12
Nickel	8/8	0.33 - 4.1	2.2 - 3.2	2.8	2.8	4.1
Potassium	7/8	60.7 - 176	49.2 - 69.3	113	102	176
Selenium	1/8	0.805* - 0.805*	1.6 - 4.45	0.81	1.1	0.81
Silver	2/8	0.13 - 0.3	0.24 - 1.6	0.22	0.17	0.3
Vanadium	8/8	1.2 - 8.9	1.4 - 2	5.1	5.1	8.9
Zinc	8/8	1.8 - 530	0.68 - 0.89	132	132	530

NOTES:

* = Value is average of sample and field duplicate
CRQL = Contract Required Quantitation Limits
PCBs = Polychlorinated Biphenyls
Average detects = mean of detected concentrations only.
Average (all) = mean of all analytical results with nondetects taken at one-half the reporting limit.

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

APPENDIX C
SUMMARY OF DETECTIONS

PSC 29, Organic Disposal Area
Naval Air Station Jacksonville
Jacksonville, Florida

Groundwater

Chemical	Frequency of Detects	Range of Detects	Reported CRQLs	Average (Detects)	Average (All)	Maximum Detected
Volatiles (ug/l)						
Acetone	1/2	8 - 8	10 - 10	8	6.5	8
Semivolatiles (ug/l)						
Acenaphthene	1/2	1 - 1	0.01 - 10	1	3	1
Naphthalene	1/2	2 - 2	0.01 - 10	2	3.5	2
Pesticides (ug/l)						
4,4'-DDD	1/2	0.0055 - 0.0055	0.1 - 0.1	0.01	0.03	0.01
Inorganics (ug/l)						
Aluminum	1/2	91.2 - 91.2	4.5 - 19.5	91.2	46.7	91.2
Arsenic	2/2	7 - 14.2	2.7 - 5.9	10.6	10.6	14.2
Barium	2/2	187 - 200	0.1 - 0.1	194	194	200
Beryllium	1/2	0.21 - 0.21	0.1 - 0.1	0.21	0.13	0.21
Calcium	2/2	333,000 - 336,000	5.6 - 7.4	334,500	334,500	336,000
Chromium	2/2	3.3 - 4.2	0.8 - 0.8	3.8	3.8	4.2
Cobalt	1/2	1.7 - 1.7	0.6 - 0.7	1.7	1	1.7
Copper	1/2	4.2 - 4.2	0.5 - 0.6	4.2	2.2	4.2
Iron	2/2	7,180 - 21,000	11.7 - 13.4	14,090	14,090	21,000
Magnesium	2/2	29,700 - 44,400	3.4 - 5.4	37,050	37,050	44,400
Manganese	2/2	1,080 - 1,520	0.1 - 0.2	1,300	1,300	1,520
Nickel	1/2	3.8 - 3.8	0.9 - 1.3	3.8	2.1	3.8
Potassium	2/2	20,600 - 33,300	20.4 - 30	26,950	26,950	33,300
Sodium	2/2	7,960 - 27,400	222 - 286	17,680	17,680	27,400
Vanadium	1/2	4.5 - 4.5	0.6 - 0.7	4.5	2.4	4.5
Zinc	1/2	1.5 - 1.5	0.3 - 0.3	1.5	0.83	1.5

NOTES:
* = Value is average of sample and field duplicate
ug/L = microgram per liter
CRQL = Contract Required Quantitation Limits
PCBs = Polychlorinated Biphenyls
Average detects = mean of detected concentrations only.
Average (all) = mean of all analytical results with nondetects taken at one-half the reporting limit.