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SAMPLING AND ANALYSIS REPORT FOR FACILITY 224LS REVISION 2 BASE  
REALIGNMENT AND CLOSURE NAS CECIL FIELD FL  
7/27/2000  
TETRA TECH NUS INC

**Sampling and Analysis Report**  
for  
**Facility 224LS**  
**Revision 2.0**  
**Base Realignment and Closure**

**Naval Air Station Cecil Field**  
Jacksonville, Florida



**Southern Division**  
**Naval Facilities Engineering Command**  
Contract Number N62467-94-D-0888  
Contract Task Order 0078

July 2000

**SAMPLING AND ANALYSIS REPORT  
FOR  
FACILITY 224LS  
REVISION 2.0  
BASE REALIGNMENT AND CLOSURE**

**NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT N62467-89-D-0088**

**Submitted to:  
Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29406**

**Submitted by:  
Tetra Tech NUS, Inc.  
661 Andersen Drive  
Foster Plaza 7  
Pittsburgh, Pennsylvania 15220**

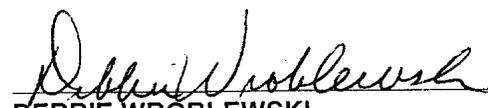
**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0078**

**JULY 2000**

**PREPARED UNDER THE SUPERVISION OF:**

  
MARK SPERANZA, P.E.  
TASK ORDER MANAGER  
TETRA TECH NUS, INC.  
PITTSBURGH, PENNSYLVANIA

**APPROVED FOR SUBMITTAL BY:**

  
DEBBIE WROBLEWSKI  
PROGRAM MANAGER  
TETRA TECH NUS, INC.  
PITTSBURGH, PENNSYLVANIA



The professional opinions rendered in this decision document identified as Sampling and Analysis Report for Facility 224LS, Revision 2.0, Naval Air Station Cecil Field, Jacksonville, Florida were developed in accordance with commonly accepted procedures consistent with applicable standards of practice. Decision documents are based on information obtained from others and under the supervision of the signing engineer. If conditions are determined to exist differently than those described in this document, then the undersigned professional engineer should be notified to evaluate the effects of any additional information on this project described in this report.

  
\_\_\_\_\_  
Mark Speranza, P.E.  
Professional Engineer No. PE0050304

Date: 7/27/00





CERTIFICATION OF TECHNICAL  
DATA CONFORMITY

The Contractor, Tetra Tech NUS, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-94-D-0888 are complete and accurate and comply with all requirements of this contract.

DATE: June 19, 2000

NAME AND TITLE OF CERTIFYING OFFICIAL:

Mark Speranza, P.E.  
Task Order Manager

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## ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Realignment and Closure
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
CTO	Contract Task Order
EBS	Environmental Baseline Survey
ELCR	excess lifetime cancer risk
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
HLA	Harding Lawson Associates
HQ	hazard quotient
IBDS	Inorganic Background Data Set
mg/kg	milligram per kilogram
NAS	Naval Air Station
PAH	polynuclear aromatic hydrocarbon
ppm	parts per million
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	Sampling and Analysis Outline
SAR	Sampling and Analysis Report
SCTL	Soil Cleanup Target Level
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SVOC	semivolatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	U.S. Environmental Protection Agency
UST	Underground storage tank

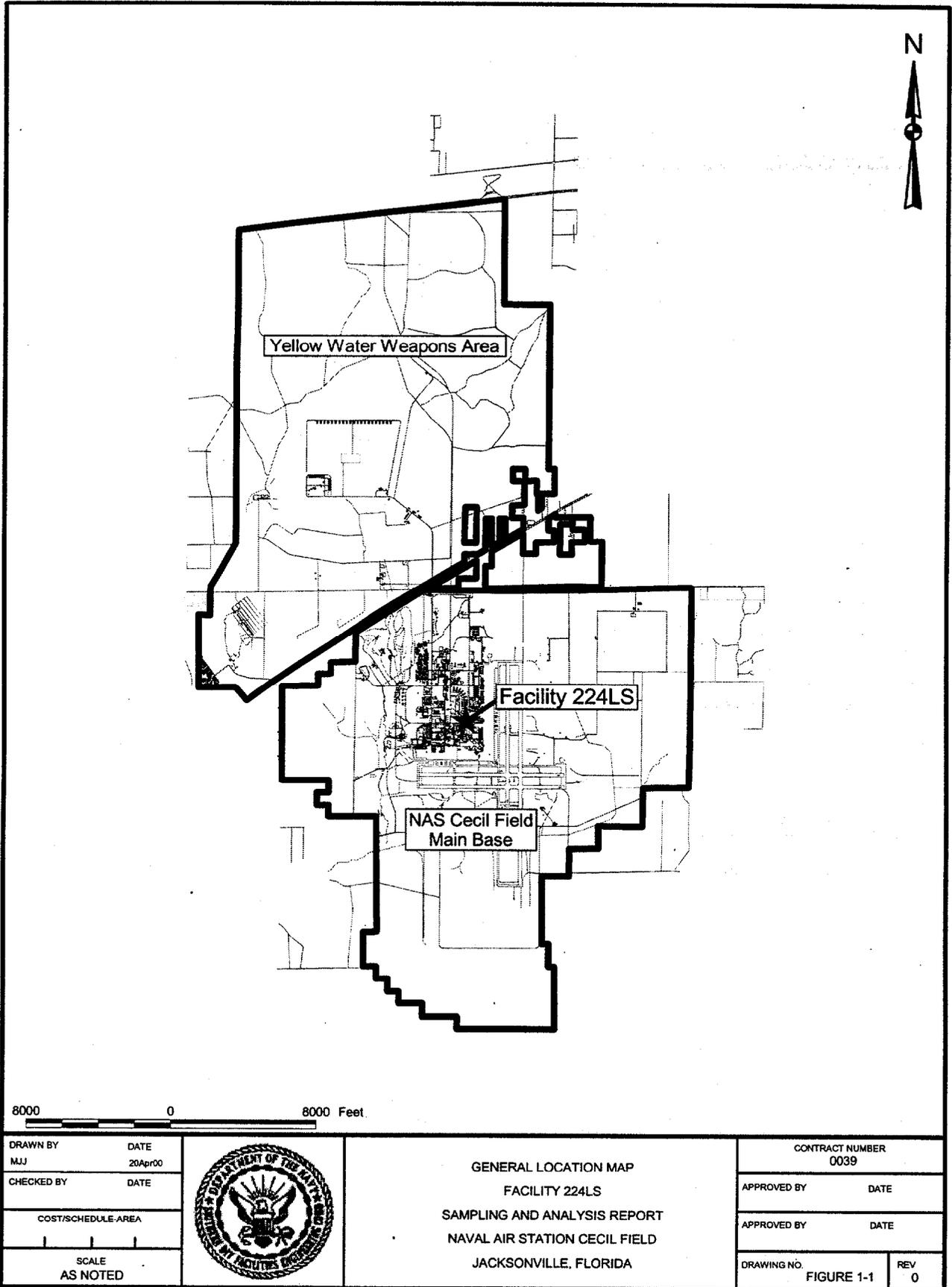
## 1.0 INTRODUCTION

This Sampling and Analysis Report (SAR) for Facility 224LS has been prepared by Tetra Tech NUS, Inc. (TtNUS), for the Department of the Navy Southern Division, Naval Facilities Engineering Command, (SOUTHNAVFACENGCOM). The work was conducted under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-088, Contract Task Order (CTO) 0078.

Facility 224LS is referred to as a Lift Station in the Base Realignment and Closure (BRAC) NAS Cecil Field Environmental Baseline Survey (EBS) Report (ABB Environmental Services, Inc [ABB-ES], 1994a). Facility 224LS is located northwest of the intersection of Lake Fretwell Street (formerly 4th Street) and Aviation Avenue (formerly "A" Avenue), at the Main Base, as shown in Figures 1-1 and 1-2. The BRAC Cleanup Team (BCT) regards lift stations as potential pathways for wastewater contaminants to enter the groundwater, and, therefore, Facility 224LS was color-coded Grey in the EBS Report (ABB-ES, 1994a). In addition, a pipefitting located on the south wall of the building could be used to pump liquid wastes directly into the lift station. The potential for spills and/or leaks at this pipe connection was identified as an environmental concern by the BCT. Facility 231, an emergency generator with an associated diesel fuel underground storage tank (UST), is located adjacent to and southwest of Facility 224LS (Harding Lawson Associates [HLA], 1999).

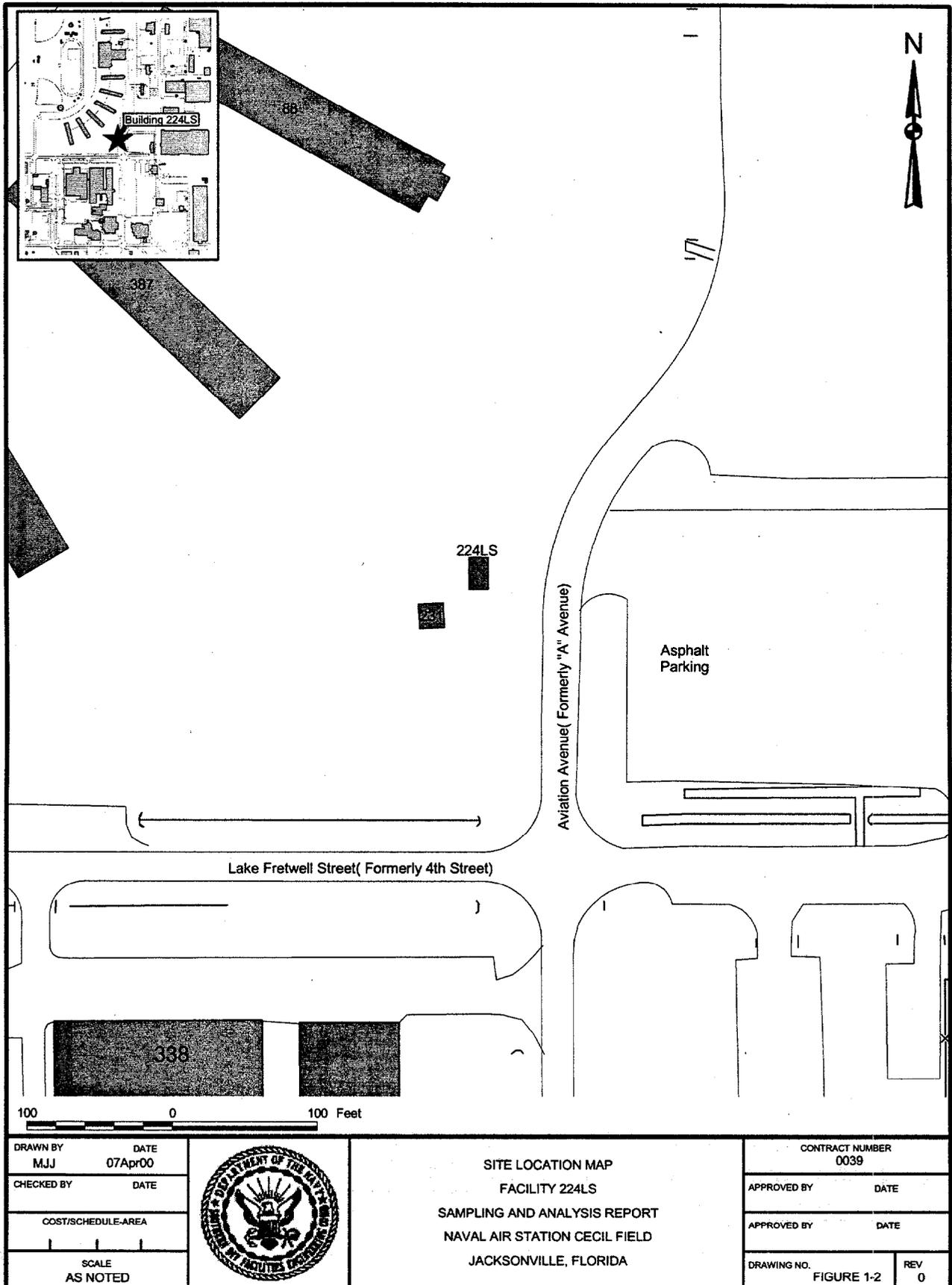
A Sampling and Analysis Outline (SAO) for assessment of surface soil and shallow groundwater at Facility 224LS was prepared by HLA (then ABB-ES) and approved by the BCT (ABB-ES, 1995). This was used as the basis for the field investigations discussed in Section 2.0.

A SAR was issued by HLA in August 1998. The SAR concluded that, although numerous semivolatile organic compounds (SVOCs), pesticide compounds, and inorganic analytes were detected in the single soil sample collected in the study area, only benzo(a)pyrene was detected at a concentration in excess of its Soil Cleanup Target Level (SCTL) and U.S. EPA risk-based concentration (RBC) value for the residential exposure scenario. The SAR recommended that additional surface soil samples should be collected to delineate the extent of soil exceeding the SCTL for benzo(a)pyrene and the soil in the delineated area should be properly removed and disposed (HLA, 1998b). Revision 1.0 of the SAR was submitted in June 1999 with the results of three additional surface soil samples that were used to delineate the extent of the benzo(a)pyrene contamination (HLA, 1999). A source removal was conducted for the contaminated soil in this area on January 25 and 26, 2000.



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**SITE LOCATION MAP**  
**FACILITY 224LS**  
**SAMPLING AND ANALYSIS REPORT**  
**NAVAL AIR STATION CECIL FIELD**  
**JACKSONVILLE, FLORIDA**

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This SAR (Revision 2.0) presents information from the previous investigations at Facility 224LS and summarizes the activities related to the removal action as described in the Source Removal Report for Excavation of Petroleum-Contaminated Soil at Facility 224LS (CH2MHill, 2000). The results of the investigation and removal action indicate that no further action is needed at this site.

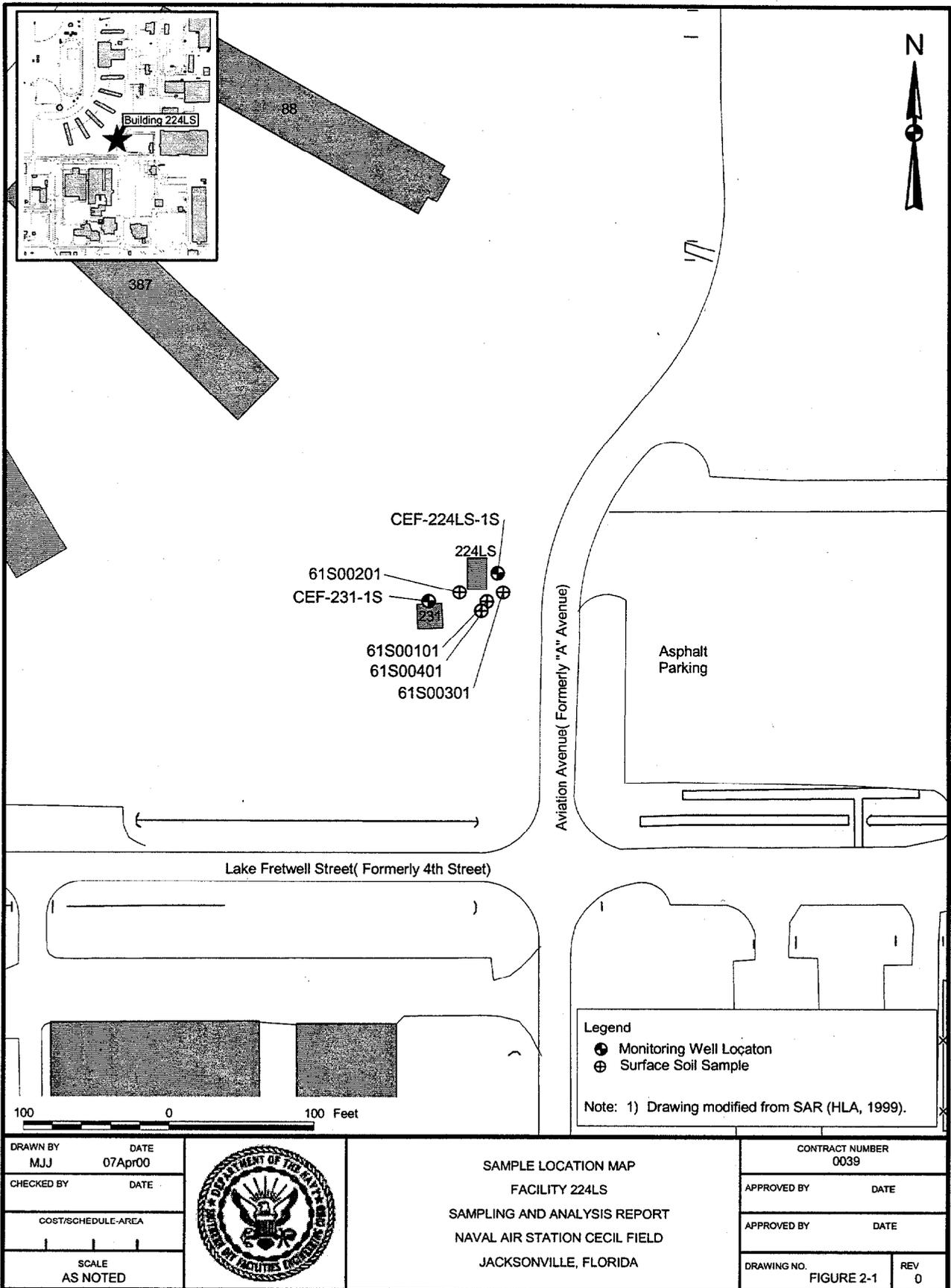
## 2.0 FIELD INVESTIGATIONS

Previous field investigations at Facility 224LS were conducted by ABB-ES and HLA, and the results of the investigations are presented in the Sampling and Analysis Report, Revision 1.0 (HLA, 1999).

The initial Phase II investigation, which took place between December 3, 1995 and February 21, 1996, included the installation of one shallow groundwater monitoring well and the collection and analysis of one groundwater sample and one surface soil sample. The groundwater monitoring well was installed near the southeastern corner of Facility 224LS. The selected location was downgradient of the lift station. The well was completed at a depth of 17 feet below ground surface (bgs). One surface soil sample was collected in the area where the pipefitting protrudes from the south wall of the lift station (HLA, 1999).

The groundwater and surface soil samples were analyzed for the full Contract Laboratory Program (CLP) suite of Target Compound List (TCL) organics and Target Analyte List (TAL) inorganics. A site plan indicating the location of the monitoring well and surface soil sample is presented as Figure 2-1. Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994b).

A supplemental field investigation was conducted on August 28, 1998 to delineate the extent of soil with elevated benzo(a)pyrene concentrations detected during the initial investigation. Three additional surface soil samples (61S00201, 61S00301, and 61S00401) were collected in the vicinity surrounding the initial surface soil sampling point (61S00101) and analyzed for PAHs (see Figure 2-1).



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**SAMPLE LOCATION MAP**  
**FACILITY 224LS**  
**SAMPLING AND ANALYSIS REPORT**  
**NAVAL AIR STATION CECIL FIELD**  
**JACKSONVILLE, FLORIDA**

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### 3.0 DATA EVALUATION AND REMOVAL ACTION

A preliminary risk evaluation (PRE) was conducted by ABB-ES to assess potential risks to human and ecological receptors posed by contaminants in groundwater, surface water, and sediment. Primary exposure pathways were evaluated to determine those pathways that potentially contribute to human health and ecological risks. The evaluation was conducted in conformance with methodology provided in the U.S. EPA Region IV memorandum entitled Amended Guidance on PREs for the Purpose of Reaching a Finding of Suitability to Lease, U.S. EPA Region IV bulletins on ecological risk assessment, and minutes of meetings between U.S. EPA and the Florida Department of Environmental Protection (FDEP) concerning PREs. Site background information and rationale for sample collection and analysis are detailed in the EBS Report (ABB-ES, 1994a) and the SAO (ABB-ES, 1995).

The concentrations of individual samples were screened against the NAS Cecil Field site-specific Inorganic Background Data Set (IBDS) and the FDEP criteria, as proposed in Florida Administrative Code (FAC) Chapter 62-777. The remediation goal for any site should never be less than the IBDS values. However, if a FDEP criterion is greater than the IBDS value, the FDEP criterion is regarded as the remediation goal.

Tables 3-1 and 3-2 present summaries of analytical results for soil and groundwater, and Figure 3-1 shows the SCTL exceedances for the Facility 224LS analyses.

#### 3.1 HUMAN HEALTH PRELIMINARY RISK EVALUATION

The detected analytes were compared to readily available risk-based screening values to assess the likelihood of adverse human health effects associated with potential exposure to surface soil or groundwater. Risk-based screening values were obtained from U.S. EPA Region III RBCs (U.S. EPA, 1998) and FDEP SCTLs and Groundwater Cleanup Target Levels (GCTLs) (FDEP, 1999). Most screening values published in the references listed above are based on toxicity constants and standard human exposure scenarios and correspond to fixed levels of risk. The designated level of risk for noncarcinogenic chemicals is based on a hazard quotient (HQ) of 1.0. The level of risk for carcinogenic chemicals is based on an excess lifetime cancer risk (ELCR) of  $1 \times 10^{-6}$ . Cancer and noncancer risks associated with industrial and residential land use are estimated by dividing the maximum detected analyte concentration by the corresponding U.S. EPA Region III RBC value at the designated level of risk

**PRELIMINARY HUMAN HEALTH RISK EVALUATION TABLE FOR SURFACE SOIL  
FACILITY 224LS  
SAMPLING AND ANALYSIS REPORT  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

Analysis	61S00101	61S00201	61S00301	61S00401	IBDS <sup>(1)</sup> Conc.	FDEP <sup>(2)</sup> SCTL	USEPA <sup>(3)</sup> RBC(R)
<b>Semivolatile Organic Compounds, mg/kg</b>							
Acenaphthene	ND	0.13	ND	ND	NC	2.1	4700
Benzo(a)anthracene	0.19	0.024	0.031	0.013	NC	1.4	0.87
Benzo(a)pyrene	<b>0.24</b>	0.051	0.049	0.042	NC	0.10	0.09
Benzo(b)fluoranthene	0.30	0.052	0.055	0.032	NC	1.4	0.87
Benzo(g,h,i)perylene	0.096	0.047	0.044	0.036	NC	2300	NC
Benzo(k)fluoranthene	0.13	0.021	0.023	0.019	NC	15	8.7
Chrysene	0.25	0.032	0.043	0.025	NC	77	87
Dibenzo(a,h)anthracene	0.026	ND	ND	ND	NC	0.10	0.09
Fluoranthene	0.29	0.074	0.072	0.046	NC	1200	3100
Fluorene	ND	0.004	ND	ND	NC	160	3100
Indeno(1,2,3-cd)pyrene	0.10	0.038	0.044	0.030	NC	1.5	0.87
Phenanthrene	0.05	0.032	0.024	0.018	NC	250	NC
Pyrene	0.26	0.038	0.036	0.033	NC	880	2300
bis(2-Ethylhexyl)phthalate	0.039	NA	NA	NA	NC	76	46,000
<b>Pesticides/PCBs, mg/kg</b>							
4,4'-DDE	0.002	NA	NA	NA	NC	3.3	1.9
4,4'-DDT	0.008	NA	NA	NA	NC	3.3	1.9
Aldrin	0.0005	NA	NA	NA	NC	0.07	0.04
alpha-Chlordane	0.00008	NA	NA	NA	NC	3.1	1.8
<b>Inorganic Analytes, mg/kg</b>							
Aluminum	1780	NA	NA	NA	4430	72,000	78,000
Arsenic	0.78	NA	NA	NA	2.0	0.80	0.43
Barium	5.6	NA	NA	NA	14.4	110	5500
Calcium	1380	NA	NA	NA	9.44	NC	NC
Chromium	3.0	NA	NA	NA	7.75	38	230
Copper	3.3	NA	NA	NA	5.97	110	3100
Iron	858	NA	NA	NA	1490	23,000	23,000
Lead	12.7	NA	NA	NA	197	400	NC
Magnesium	75.4	NA	NA	NA	329	NC	NC
Manganese	7.7	NA	NA	NA	22	1600	1600
Nickel	0.98	NA	NA	NA	3.89	110	1600
Potassium	45.9	NA	NA	NA	102	NC	NC
Sodium	123	NA	NA	NA	343	NC	NC
Vanadium	3.3	NA	NA	NA	6.3	15	550
Zinc	15.3	NA	NA	NA	37	6000	23,000
<b>Petroleum Hydrocarbons, mg/kg</b>							
TPH	170	NA	NA	NA	NC	340	NC

## NOTES:

Only detected analytes are reported.

NA - Not Analyzed

NC - No criteria

ND - Not Detected

1 Background - NAS Cecil Field Inorganic Background Data Set (IBDS) (HLA, 1998a)

2 SCTL - Florida Soil Cleanup Target Level, FAC Chapter 62-777 (FDEP, 1999)

3 RBC(R) - Residential Risk-Based Concentration (U.S. EPA, 1998)

TABLE 3-2

**PRELIMINARY HUMAN HEALTH RISK EVALUATION TABLE FOR GROUNDWATER  
FACILITY 224LS  
SAMPLING AND ANALYSIS REPORT  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

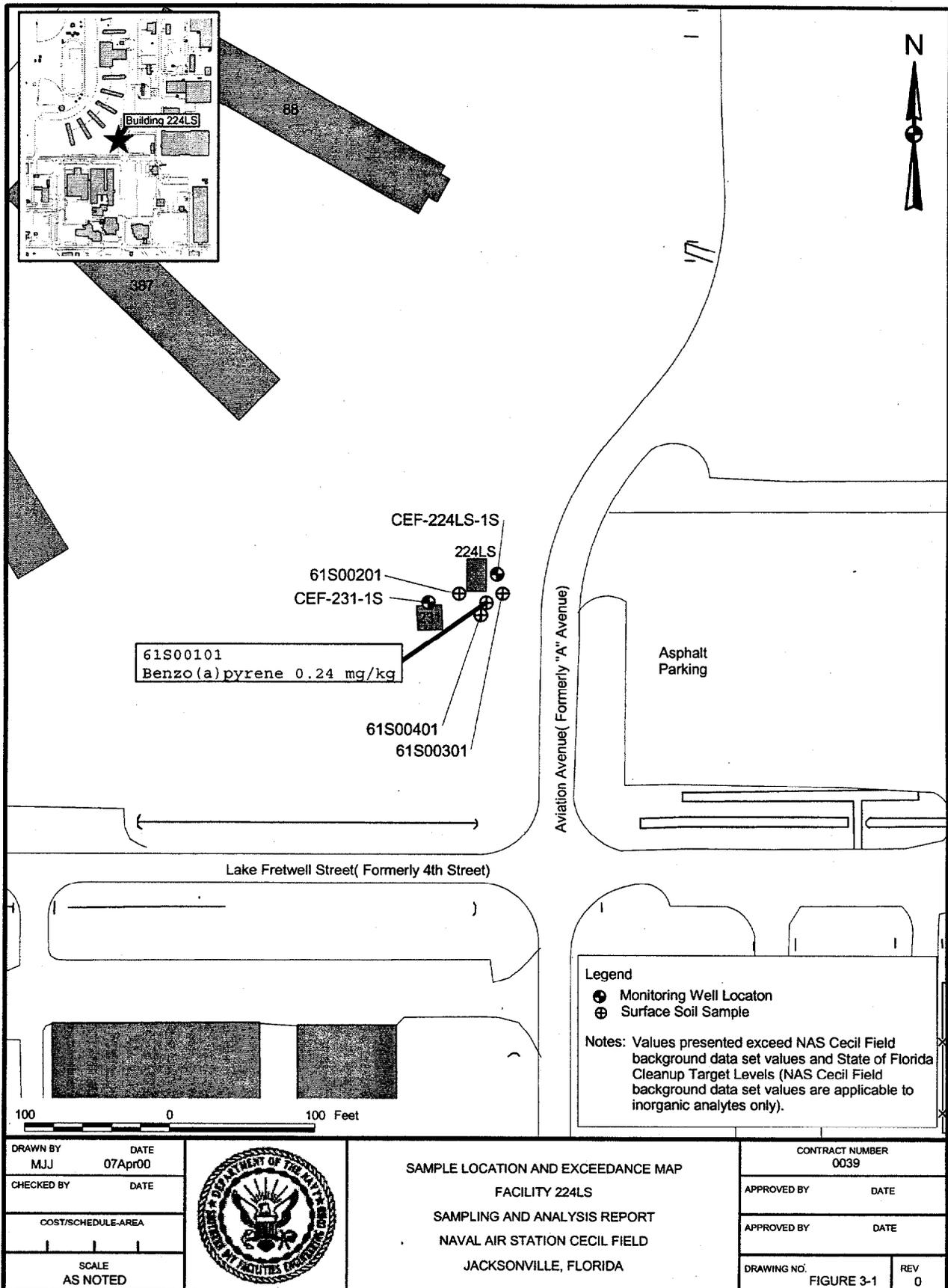
Analysis	61G00101	IBDS <sup>(1)</sup> Conc.	FDEP <sup>(2)</sup> GCTL	USEPA <sup>(3)</sup> RBC(TW)
<b>Inorganic Analytes, ug/L</b>				
Aluminum	389	13,100	200	37,000
Barium	6.8	88.2	2000	2600
Calcium	33,100	81,100	NC	NC
Copper	4.7	12.5	1000	1500
Iron	380	7760	300	11,000
Magnesium	1180	10,000	NC	NC
Manganese	69.1	96.2	50	730
Potassium	689	4330	NC	NC
Sodium	7600	16,500	160,000	NC
Vanadium	1.3	20.2	49	260
Zinc	22.3	76.8	5000	11,000
Cyanide	2.3	22.0	200	730

## NOTES:

Only detected analytes are reported.

NC - No criteria

- 1 Background - NAS Cecil Field Inorganic Background Data Set (IBDS) (HLA, 1998a)
- 2 GCTL - Florida Groundwater Cleanup Target Level, FAC Chapter 62-777 (FDEP, 1999)
- 3 RBC(TW) - Tap Water Risk-Based Concentration (U.S. EPA, 1998)



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**SAMPLE LOCATION AND EXCEEDANCE MAP**  
**FACILITY 224LS**  
**SAMPLING AND ANALYSIS REPORT**  
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**JACKSONVILLE, FLORIDA**

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(ELCR of  $1 \times 10^{-6}$  or HQ of 1.0, respectively). For noncarcinogens, the HQs are summed to determine the cumulative noncancer risk or hazard index (HLA, 1999).

### **3.1.1 Surface Soil**

Fifteen inorganic analytes, 12 semivolatile organic compounds (SVOCs), and 4 pesticide compounds, were detected in surface soil samples collected at Facility 224LS. Calcium and magnesium were detected at concentrations in excess of the NAS Cecil Field IBDS; however, no inorganic FDEP SCTL was exceeded. With the exception of bis(2-ethylhexyl)phthalate, the detected SVOCs are PAHs. Benzo(a)pyrene was detected at a concentration of 0.24 milligrams per kilogram (mg/kg), which exceeds the FDEP SCTL of 0.1 mg/kg. No other SVOCs and no pesticide compounds were detected at concentrations in excess of FDEP SCTLs. Table 3-1 shows a comparison of organic compound and inorganic analyte data to FDEP SCTLs, U.S. EPA Region IV RBCs (based on residential exposure scenario), and IBDS concentrations (HLA, 1999).

### **3.1.2 Groundwater**

Twelve inorganic analytes were detected in the groundwater sample collected at Facility 224LS. No inorganic analytes were detected at concentrations in excess of the NAS Cecil Field IBDS for inorganics. No organic compounds were detected in groundwater. Table 3-2 shows a comparison of inorganic analyte data to FDEP GCTLs, U.S. EPA Region IV RBCs for tap water, and IBDS concentrations (HLA, 1999).

## **3.2 ECOLOGICAL PRELIMINARY RISK EVALUATION**

Potential exposure pathways and ecological habitat associated with Facility 224LS were characterized by HLA (then ABB-ES) ecological risk assessors in June 1996. Facility 224LS is located within a developed area and is surrounded by maintained grass (ABB-ES, 1994a).

Ecological receptors that might occasionally use the study area are likely limited to terrestrial species that are tolerant to human and industrial activity. Soil invertebrates are likely to be present in the maintained grassy areas, which are subject to regular mowing. Protected species were not observed and are unlikely to utilize the limited habitat at Facility 224LS (HLA, 1999).

Pathways of potential contaminant exposure for wildlife receptors include direct contact, incidental ingestion of surface soil, and limited terrestrial food-web model exposure to contaminants in surface soil that may bioaccumulate. Pathways for soil invertebrates include direct contact and incidental ingestion of surface soil. Pathways for terrestrial plants include direct contact with surface soil. Due to the limited extent and significance of the habitat associated with the study area, no further ecological risk evaluation for surface soil was conducted (HLA, 1999).

No exposure pathway from groundwater to surface water was identified in the study area. In addition, no analytes were detected at concentrations in excess of the criteria for groundwater; therefore, no further ecological risk evaluation for groundwater was conducted (HLA, 1999).

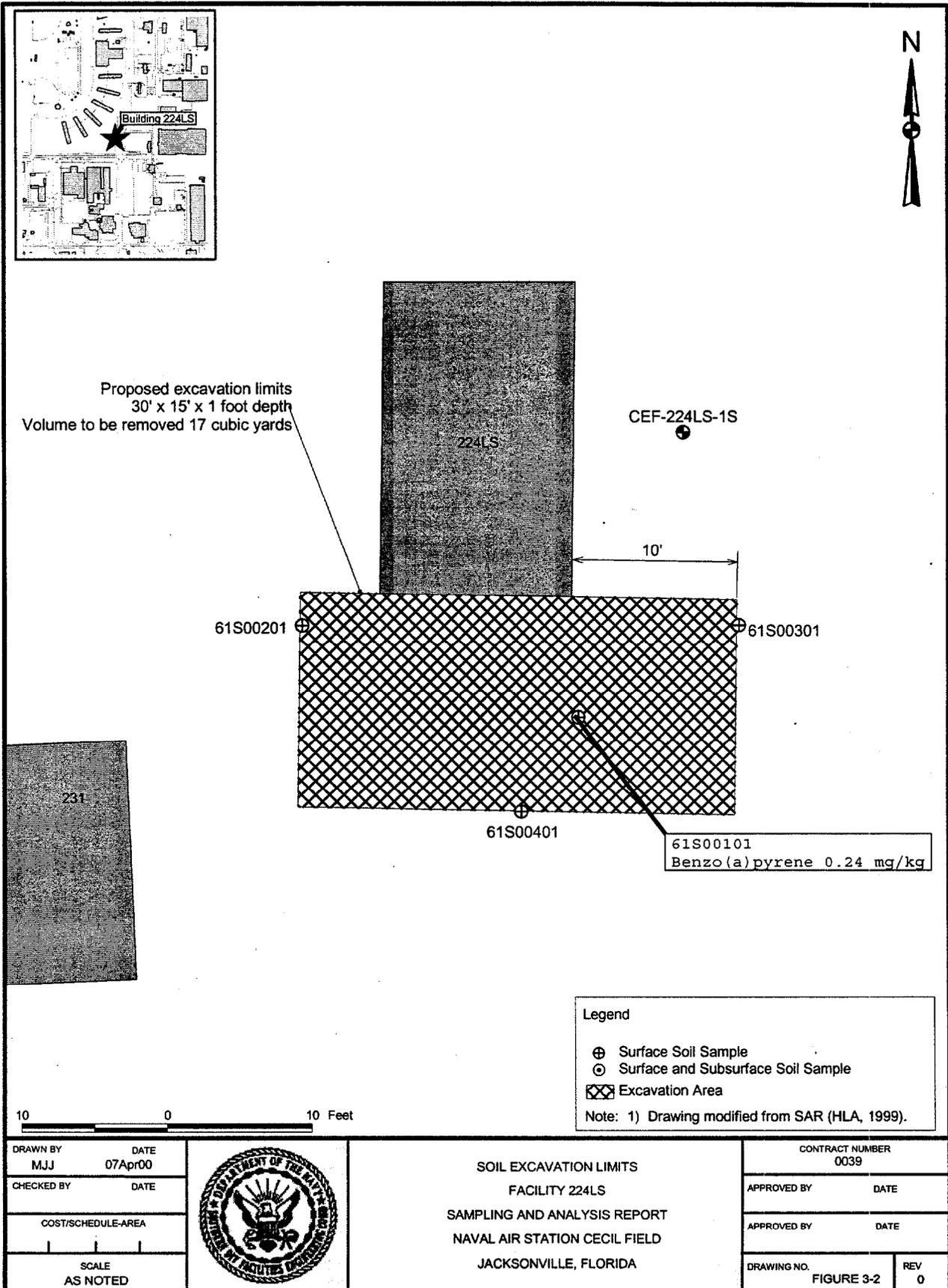
### **3.3 REMOVAL ACTION**

The SAR, Revision 1.0 (HLA, 1999) indicated that PAH contamination associated with the pipefitting located on the south wall of Building 224LS had been delineated and that the top one foot of soil over an area of 30 feet by 15 feet adjacent to the south wall of the building should be removed.

A source removal was conducted on January 25 and 26, 2000, and a total of 15.24 tons of PAH-contaminated soil was excavated. The excavated soil was transported and disposed off site on January 26, 2000. Figure 3-2 shows the horizontal excavation limits where the soil was removed in accordance with the specifications in the SAR, Revision 1.0 (HLA, 1999). The soil was excavated to a depth of 1 foot bgs over the entire 450 square foot area using a mini-excavator and was stockpiled, bermed, and covered prior to being loaded into a truck for transportation and disposal. The excavated soil was transported by Pritchett Trucking to the Chesser Island Road Landfill, a Subtitle D solid waste disposal facility in Folkston, Georgia. Clark Environmental, Inc. coordinated transportation and disposal of the PAH-contaminated soil (CH2MHill, 2000).

Clean fill material from the Dallas Harts Borrow Pit in Jacksonville, Florida, was used to backfill the excavation. The site was graded and seeded with a mixture of rye and bahia grass. No confirmatory soil sampling was performed, based on the SAR, Revision 1.0 (HLA, 1999).

Detailed information on the remedial activities, including photographs, laboratory results, copies of the soil manifests, certificates of disposal, and certificate of clean fill, is also provided in the Source Removal Report (CH2MHill, 2000).



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#### 4.0 CONCLUSIONS AND RECOMMENDATION

Field investigations determined that PAH contamination had occurred at Facility 224LS and that an estimated 15 tons of soil (17 cubic yards) contained PAHs at concentrations greater than FDEP SCTLs.

A removal action was performed to excavate and dispose off site the soil contaminated with PAHs above the SCTLs. The removal action occurred on January 25 and 26, 2000. Since the removal action, the soil at Facility 224LS no longer represents a risk to human health or the environment.

Based upon these conclusions, the recommendation for Facility 224LS is No Further Action. It is also recommended that the color-code for Facility 224LS be reclassified to Dark Green to denote that releases of hazardous substances have occurred and remedial actions to protect human health and the environment have been taken. Residual PAH concentrations in soil at the site no longer represent a hazard to human health or the environment.

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