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NAS CECIL FIELD
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SAMPLING AND ANALYSIS REPORT FACILITY 179 HAZARDOUS/FLAMMABLE MATERIALS
WAREHOUSE ZONE C DEVELOPED NONINDUSTRIAL AREA NAS CECIL FIELD FL
6/1/1998
HARDING LAWSON ASSOCIATES

SAMPLING AND ANALYSIS REPORT
FACILITY 179, HAZARDOUS/FLAMMABLE MATERIALS WAREHOUSE
BASE REALIGNMENT AND CLOSURE
ZONE C, DEVELOPED NONINDUSTRIAL AREA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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TABLE OF CONTENTS

Sampling and Analysis Report
Facility 179, Hazardous/Flammable Materials Warehouse
Zone C, Developed NonIndustrial Area
Base Realignment and Closure
Naval Air Station Cecil Field, Jacksonville, Florida

<u>Chapter</u>	<u>Title</u>	<u>Page No.</u>
1.0	INTRODUCTION	1
2.0	PHASE II INVESTIGATION	1
3.0	PRELIMINARY RISK EVALUATION	1
3.1	PUBLIC HEALTH PRE	1
3.2	ECOLOGICAL PRE	3
4.0	CONCLUSIONS AND RECOMMENDATIONS	4
REFERENCES		
APPENDICES		
	Appendix A: Preliminary Risk Evaluation Table	
	Appendix B: Soil Excavation Specifications	

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>	<u>Page No.</u>
1	Sample Location Plan, Facility 179	2

GLOSSARY

ABB-ES	ABB Environmental Services, Inc
BCT	Base Realignment and Closure (BRAC) cleanup team
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
HLA	Harding Lawson Associates
HI	hazard index
HQ	hazard quotient
mg/kg	milligrams per kilogram
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	Sampling and Analysis Outline
SCG	Soil Cleanup Goal
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Harding Lawson Associates (HLA) (formerly ABB Environmental Services, Inc. [ABB-ES]), under contract to the Southern Division, Naval Facilities Engineering Command, has completed the Phase II Sampling and Analysis Program for Facility 179, at Naval Air Station Cecil Field. This report summarizes the related field operations, results, conclusions, and recommendations of the Phase II investigation.

Facility 179 is referred to as a Defense Reutilization and Marketing Office (DRMO) storage building in the Environmental Baseline Survey (EBS) Report (ABB-ES, 1994). No specific environmental concerns were identified during the EBS. However, many DRMO facilities have historically involved storage of hazardous materials.

A facility contact reported an area near the northwest corner of the building, where palletized cans of new paint are known to have been staged. This area, and an area at the south end of the building adjacent to a paved lot, were identified as soil screening locations. A Sampling and Analysis Outline (SAO) for the assessment of surface soil in the two areas was prepared by ABB-ES (presently HLA) and approved by the Base Realignment and Closure cleanup team (BCT) (ABB-ES, 1995a). The results of the sampling and analysis program are discussed below.

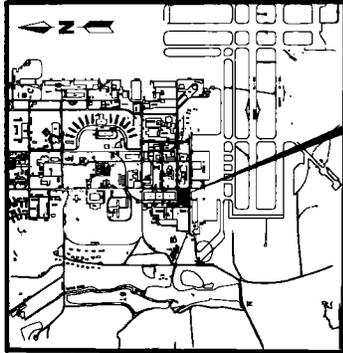
2.0 PHASE II INVESTIGATION

Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994b). The Phase II investigation included the collection of two surface soil samples, and analysis for the full Contract Laboratory Program suite of target compound list organics and target analyte list inorganics. Following a review of preliminary analytical data, the BCT identified a requirement for four additional surface soil samples to determine the extent of lead contamination in surface soil south of Facility 179. A general site plan indicating the sample locations is presented on Figure 1.

3.0 PRELIMINARY RISK EVALUATION

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

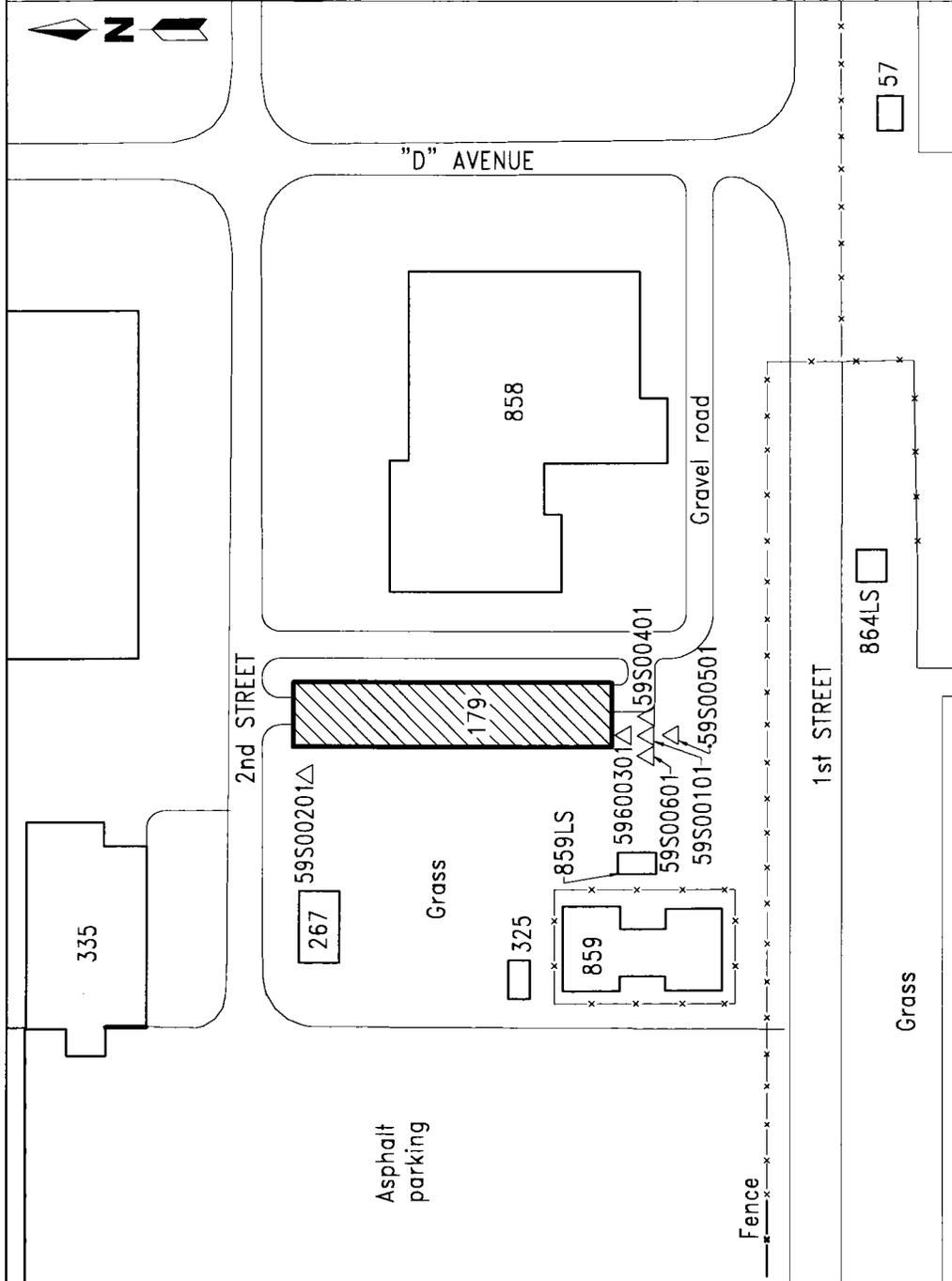
3.1 PUBLIC HEALTH PRE. Inorganic analytes exceeding the background screening concentrations and all detected organic analytes were compared to readily available risk-based screening values to assess the likelihood of adverse human



SITE

LEGEND

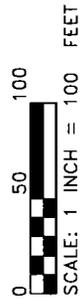
- △ Surface soil sample location and designation
- LS Lift station
- x— Fence



SAMPLING AND ANALYSIS REPORT

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

**FIGURE 1
SAMPLE LOCATION PLAN
FACILITY 179**



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health effects associated with potential exposure to surface soil. Background screening values have been defined as two times the arithmetic mean of analytes detected in samples collected from nonsite-related areas near the site. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, 1996) and Soil Cleanup Goals (SCGs) for Florida (FDEP, 1995). Industrial and residential exposure scenarios were considered for Facility 179 because of the potential for future residential development.

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. The level of risk for carcinogenic chemicals is based on an excess lifetime cancer risk (ELCR) of 1×10^{-6} . Cancer and noncancer risks associated with industrial and residential land use are estimated by dividing the maximum detected analyte concentration by the corresponding USEPA Region III RBC value at the designated level of risk (ELCR of 1×10^{-6} or HQ of 1).

Seven semivolatile organic compounds, 6 pesticide compounds, and 19 inorganic analytes were detected in surface soil samples collected at Facility 179. Concentrations of detected analytes are compared to background screening values, SCGs, and residential and industrial risk-based screening values in a table in Appendix A. Several inorganic compounds were present at concentrations in excess of background screening values, and lead was detected at a concentration in excess of the FDEP SCG for residential areas. No other compounds were detected at concentrations in excess of FDEP SCGs. An ELCR of 3×10^{-7} and a noncancer hazard index (HI) of 2 were calculated based upon a residential exposure scenario.

The lead concentration exceeded the background screening value but was less than the SCG in two of the four samples collected to determine the extent of contamination.

3.2 ECOLOGICAL PRE. An ecological PRE was conducted to evaluate potential risks to ecological receptors in the vicinity of Facility 179. Exposure pathways and ecological habitats were characterized during a site walkover conducted by ABB-ES (presently HLA) ecological risk assessors in September 1995. The methods and assumptions used in derivation of ecological screening values applied in this evaluation are presented in the Project Operations Plan (ABB-ES, 1994b).

Ecological habitat at Facility 179 is limited to maintained grass between buildings and paved areas. Ecological receptors that might occasionally use the study area are likely limited to terrestrial species that are tolerant to human and industrial activity. Small passerines, such as the American robin (*Turdus migratorius*), could occasionally forage for terrestrial invertebrates in the grassy portions of the study area. Small mammals, such as the cotton mouse (*Peromyscus gossypinus*), could potentially feed on grasses and seeds in the grassy strips of the study area. Larger predatory mammals, such as the red fox (*Vulpes vulpes*), could potentially utilize the installation, but are unlikely to forage in the highly developed area surrounding Facility 179. Soil invertebrates (such as the earthworm) are likely present in the maintained grassy areas, which are subject to regular mowing.

Pathways of potential contaminant exposure at Facility 179 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. Protected species were not observed and are unlikely to utilize the limited habitat at Facility 179. Pathways for soil invertebrates include direct contact and incidental ingestion of surface soil. Pathways for terrestrial plants include direct contact with surface soil.

The table in Appendix A compares concentrations of detected analytes to background and ecological screening values. Terrestrial plant toxicity screening values for seven inorganic analytes, including lead, were exceeded in sample 59S00101. Wildlife toxicity screening criteria for cadmium and lead, and invertebrate toxicity screening criteria for chromium, copper, and zinc were also exceeded in sample 59S00101.

Chromium and vanadium were detected at concentrations slightly in excess of terrestrial plant toxicity screening values (3 milligrams per kilogram [mg/kg] vs. 1 mg/kg, and 2.2 mg/kg vs. 2 mg/kg, respectively) in sample 59S00201. No other ecological screening criteria were exceeded for sample 59S00201.

4.0 CONCLUSIONS AND RECOMMENDATIONS

One surface soil sample was collected from each of two areas of potential contamination identified in the vicinity of Facility 179. The samples were analyzed to determine the concentrations of organic and inorganic compounds.

A cumulative noncancer risk, or HI, of 2 and an ELCR of 3×10^{-7} were calculated based upon RBCs for residential surface soil exposure scenario. The FDEP SCG for lead was exceeded in one surface soil sample collected south of Facility 179. Plant, invertebrate, and wildlife toxicity screening values were exceeded for numerous inorganic elements detected in the same area. Due to the limited ecological habitat in the area of surface soil contamination, further ecological screening was not required.

Four additional surface soil samples were collected from the area surrounding the lead-contaminated sample location. The lead concentration in each of the four additional samples was less than the SCG for lead. A plan to remove all soil within the perimeter of the area defined by the uncontaminated samples has been developed. The boundaries of the area to be excavated are illustrated on Figure B-1 in Appendix B.

Based on the information obtained for this assessment, the concentrations of lead detected in surface soil at Facility 179 may represent a hazard to human health. The area of contaminated soil has been delineated, and is scheduled for removal. The color classification for Facility 179 should be changed to 5/Yellow, to indicate that remedial action is in progress, and should not be changed until such remedial action has been completed.

REFERENCES

- ABB Environmental Services, Inc. (ABB-ES). 1994a. *Base Realignment and Closure Environmental Baseline Survey Report, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOCOM), North Charleston, South Carolina (November).
- ABB-ES. 1994b. *Project Operations Plan for Cecil Field and Health and Safety Plan*. Prepared for SOUTHNAVFACENGCOCOM, North Charleston, South Carolina (December).
- ABB-ES. 1995a. *Sampling and Analysis Outline, Building 179, Base Realignment and Closure, Zone C, Developed Nonindustrial Area, Group VI, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOCOM, North Charleston, South Carolina (October).
- ABB-ES. 1995b. Minutes of September 25, 1995 conference call to discuss preliminary risk evaluations.
- Florida Department of Environmental Protection (FDEP). 1995. *Soil Cleanup Goals for Florida*. Tallahassee, Florida (September 29).
- U.S. Environmental Protection Agency (USEPA), Region IV, 1994. Memorandum from USEPA Region IV. Subject: Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL). Atlanta, Georgia (December 20).
- USEPA. 1995a. Region IV Waste Management Division. *Preliminary Risk Evaluation, Ecological Risk Assessment, Supplemental Guidance to Risk Assessment Guidance for Superfund (RAGS): Region IV Bulletin No. 1* (November).
- USEPA. 1995b. Region IV, Waste Management Division. *Chronic Fresh Water/Surface Water Screening Values for Hazardous Waste Sites, Supplemental Guidance to RAGS: Region IV Bulletin Number 2* (November).
- USEPA. 1996. *Region III Risk-Based Screening Table, Technical Guidance Manual*. Risk Assessment. EPA/903/R-93-001 (May).

APPENDIX A

PRELIMINARY RISK EVALUATION TABLE

**BRAC Preliminary Risk Evaluation Table for Analytes Detected in Surface Soil
Facility 179, Naval Air Station Cecil Field**

F-179 SAR
FGW.06.98

Analyte	Samples						Screening Values			Calculated Risk Values	
	59S00101	59S00201	59S00301	59S00401	59S00501	59S00601	Background	SCG	RBC(R)	ELCR	HI
Semi-Volatile Organic Compounds											
Benzo (a) pyrene	20							100	88 c	2 E-7	
Benzo (b) fluoranthene	32							1400	880 c	4 E-8	
Benzo (g,h,i) perylene	21							14000			
Chrysene	24							140000	88000 c	3 E-10	
Fluoranthene	27							2900000	3100000 n		0.0
Pyrene	21							2200000	2300000 n		0.0
bis(2-Ethylhexyl) phthalate		22						48000	46000 c	5 E-10	
Pesticides/PCBs											
4,4-DDT	0.97							3100	1900 c	5 E-10	
Aldrin	0.36	0.33						60	38 c	9 E-9	
Dieldrin	0.16							70	40 c	4 E-9	
Endrin	0.31							23000	23000 n		0.0
Endrin aldehyde	0.36	0.33						23000	23000 n		0.0
Methoxychlor		2.2						380000	390000 n		0.0
Inorganic Analytes											
Aluminum	1500	1270					29086	75000	78000 n		
Antimony	5.4							26	31 n		0.2
Arsenic	2.4						3.6	0.7 *	0.43 c		
Barium	531	7.4					21 *	5200	5500 n		0.1
Cadmium	32.7	0.26						37	39 n		0.8
Calcium	2140	2090									
Chromium	143	3					31.2 *	290	390 n		0.4
Cobalt	4.9							4700	4700 n		0.0
Copper	92.5	2.3							3100 n		0.0
Iron	1310	383					8060		23000 n		
Lead	670	12.2	26.4	3.9	3.3	20.9	15.6 *	500 *			
Magnesium	83.9	70.4						474			
Manganese	146	12.8					17 *	370	1800 n		0.1
Nickel	15	2.5					7.2 *	1500	1600 n		0.0
Potassium	26.3	21.3					310				
Silver	0.46							390	390 n		0.0
Sodium	188	179									
Vanadium	8.7	2.2						490	550 n		0.0
Zinc	724	11.9						23000	23000 n		0.0
General Chemistry											
Total petroleum hydrocarbons	66	38									
									Sum=	3 E-7	2

Notes:

Inorganic Analytes and General Chemistry are reported in mg/kg, all others are in ug/kg
BKGRD=Background screening concentration for surface soil, ABB-ES OU2 Remedial Investigation Report, May 1995

*= values that exceed background screening criteria, or Soil Cleanup Goals

SCG = Soil Cleanup Goals (Residential scenario), September 1995

RBC(R)= Risk-based Concentration (Residential), USEPA Region III, May 1996

c=carcinogenic risk

n=non-carcinogenic risk

A-1

**Comparison of Detected Analytes In Surface Soil Samples to Ecological Screening Criteria
Facility 179 , NAS Cecil Field, Jacksonville, FL**

Analyte	Sample Identifier						Screening Criteria				Criteria Exceeded ⁵
	59S00101	59S00201	59S00301	59S00401	59S00501	59S00601	BKGRD ¹	Plant ²	Invert ³	Vert ⁴	
Semi-Volatile Organic											
Benzo (a) pyrene	20							34000	910000		
Benzo (b) fluoranthene	32							34000	910000		
Benzo (g,h,i) perylene	21							34000	910000		
Chrysene	24							34000	910000		
Fluoranthene	27							34000	910000		
Pyrene	21							34000	910000		
bis(2-Ethylhexyl) phthalate		22						200000	630000	1700000	
Pesticides/PCBs											
4,4-DDT	0.97							12500	12000	3900	
Aldrin	0.36	0.33						12500	2200	83000	
Dieldrin	0.16							12500	30000	1900	
Endrin	0.31							12500		8300	
Endrin aldehyde	0.36	0.33						12500		8300	
Methoxychlor		2.2						12500		1300000	
Inorganic Analytes											
Aluminum	1500	1270					29086	50		54000	
Antimony	5.4							5		5100	B P
Arsenic	2.4						3.6	10	100	15	
Barium	531	7.4					21	500		23000	B P
Cadmium	32.7	0.26						3	50	5.3	B P V
Calcium	2140	2090									B
Chromium	143	3					31.2	1	50	14000	B P I
Cobalt	4.9							20		1600	B
Copper	92.5	2.3						100	30	1000	B I
Iron	1310	383					8060				
Lead	670	12.2	26.4	3.9	3.3	20.9	15.6	50	1190	260	B P V
Magnesium	83.9	70.4					474				
Manganese	146	12.8					17	500		5800	B
Nickel	15	2.5					7.2	30	400	550	B
Potassium	26.3	21.3					310				
Silver	0.46							2		500	B
Sodium	188	179									B
Vanadium	8.7	2.2						2		1100	B P
Zinc	724	11.9						50	130	1600	B P I
General Chemistry											
Total petroleum hydrocarbons	66	38									

Notes:

Inorganic and General Chemistry Analytes are reported in mg/kg. All other values are reported in ug/kg.

Screening Criteria (refer to the Project Operations Plan, ABB-ES, 1995, Appendix A for details)

¹ Background screening value for inorganic analytes in surface soil at NAS Cecil Field. This value is equal to two times the average concentration detected during the NAS Cecil Field background sampling program (Refer to Remedial Investigation Report for OU2, ABB-ES, 1995, Appendix J).

² Terrestrial Plant Toxicity Screening Value

³ Invertebrate Toxicity Screening Value

⁴ Vertebrate (Wildlife) Toxicity Screening Value

⁵ Screening criteria have been exceeded for background, and the receptor group(s) represented by the following letter codes:

B=Background, P=Plant, I= Invertebrate, V=Vertebrate (Wildlife)

APPENDIX B

SOIL EXCAVATION SPECIFICATIONS

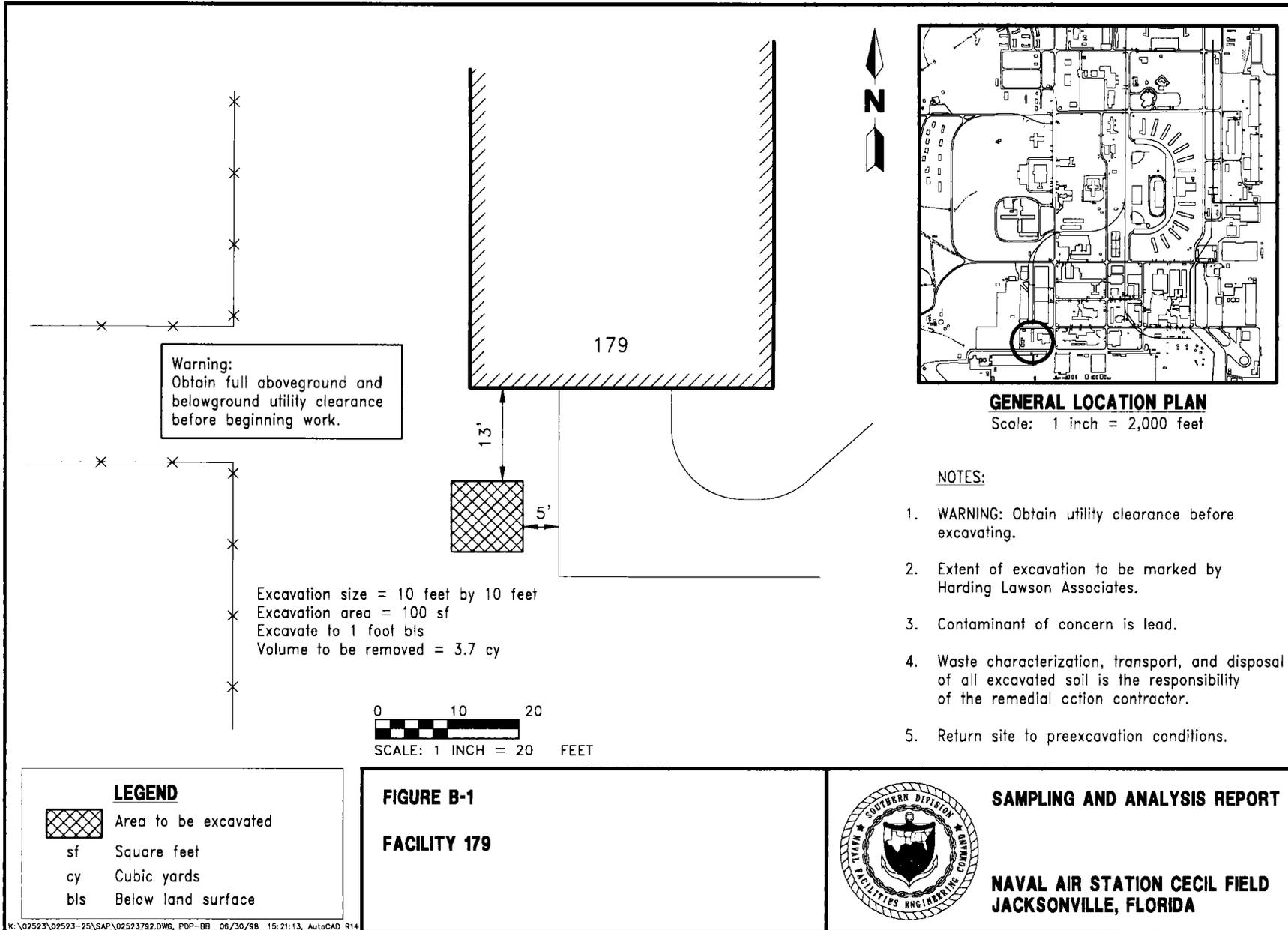
Building 179

Site Background

Lead was detected at a concentration in excess of the residential soil cleanup goal (500 mg/kg) in a surface soil sample collected in the area to be excavated. The contaminant may be related to release of stored materials adjacent to a nearby DRMO building (179). Analytical results were reviewed by the BCT (November 1996), and a decision was made to delineate the extent of contaminated surface soil. Additional site background information may be obtained through reference to the Sampling and Analysis Outline for Building 179 (ABB-ES, October 1995) and the Environmental Baseline Survey (ABB-ES, November, 1994).

Guidance Notes

1. This information is provided for general guidance purposes only. The actual extent of the excavation will be defined by HLA with white spray-down paint (or equivalent), prior to the execution of the removal action.
2. The schedule, and methods of excavation will be determined by the RAC.
3. All aspects of work-site health and safety will be the responsibility of the RAC.
4. Verification and avoidance of all aboveground and underground utilities or other manmade structures will be the responsibility of the RAC.
5. Except where necessary for avoidance of structures or utilities, or where otherwise specified by HLA, the depth of the excavation should extend to 1' below ground surface. If observations indicate contaminants may extend beyond the planned lateral or vertical limits of the excavation, the RAC should notify ABB-ES.
6. Excavated soil should be stockpiled on, and covered with, heavy duty polyethylene sheeting. This should be done in such a manner as to avoid the potential for contaminating surrounding soil or surface water. Alternatively, soils may be stockpiled in properly covered rolloff bins.
7. The BCT may approve stockpiling of materials from different sites, provided that similar types and concentrations of contaminants are involved, and contaminants were generated by similar processes.
8. Waste characterization, transport (both on and off site), and disposal of all excavated soils will be completed by the RAC.
9. Materials used to backfill the excavations should be from an uncontaminated source, and should be capable of supporting the same type of vegetation as the soils removed. Except where otherwise approved by the installation manager, the ground surface should be restored to a similar, or better condition, than that which existed prior to excavation.



Warning:
Obtain full aboveground and
belowground utility clearance
before beginning work.

Excavation size = 10 feet by 10 feet
Excavation area = 100 sf
Excavate to 1 foot bls
Volume to be removed = 3.7 cy

0 10 20
SCALE: 1 INCH = 20 FEET

LEGEND

 Area to be excavated

sf Square feet

cy Cubic yards

bls Below land surface

FIGURE B-1
FACILITY 179

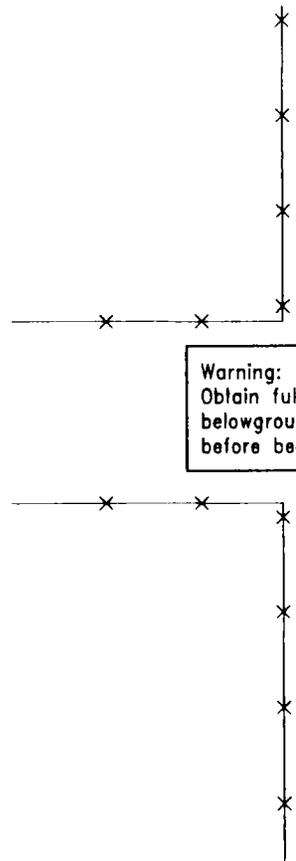


SAMPLING AND ANALYSIS REPORT

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

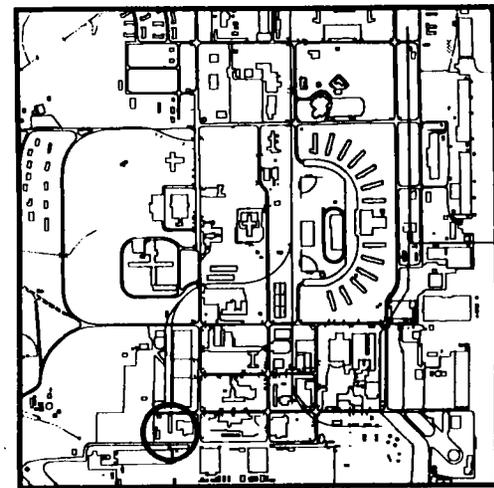
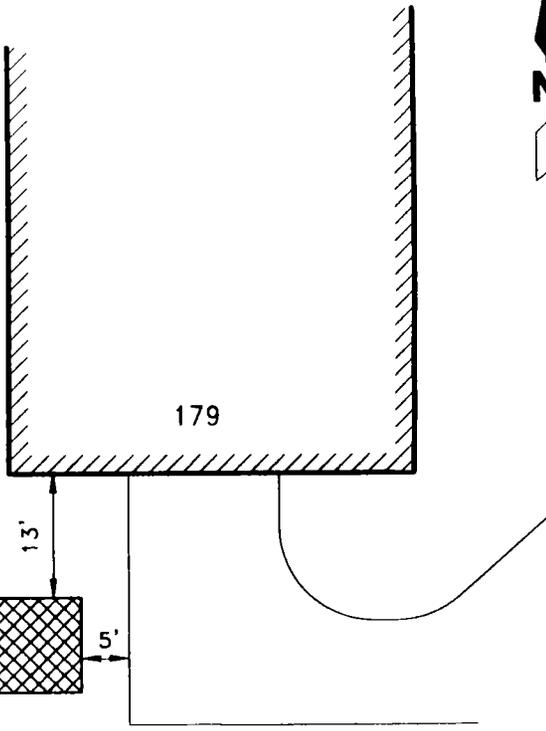
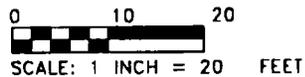
NOTES:

1. WARNING: Obtain utility clearance before excavating.
2. Extent of excavation to be marked by Harding Lawson Associates.
3. Contaminant of concern is lead.
4. Waste characterization, transport, and disposal of all excavated soil is the responsibility of the remedial action contractor.
5. Return site to preexcavation conditions.



Warning:
Obtain full aboveground and belowground utility clearance before beginning work.

Excavation size = 10 feet by 10 feet
Excavation area = 100 sf
Excavate to 1 foot bls
Volume to be removed = 3.7 cy



GENERAL LOCATION PLAN
Scale: 1 inch = 2,000 feet

NOTES:

1. **WARNING:** Obtain utility clearance before excavating.
2. Extent of excavation to be marked by Harding Lawson Associates.
3. Contaminant of concern is lead.
4. Waste characterization, transport, and disposal of all excavated soil is the responsibility of the remedial action contractor.
5. Return site to preexcavation conditions.

LEGEND

 Area to be excavated

sf Square feet

cy Cubic yards

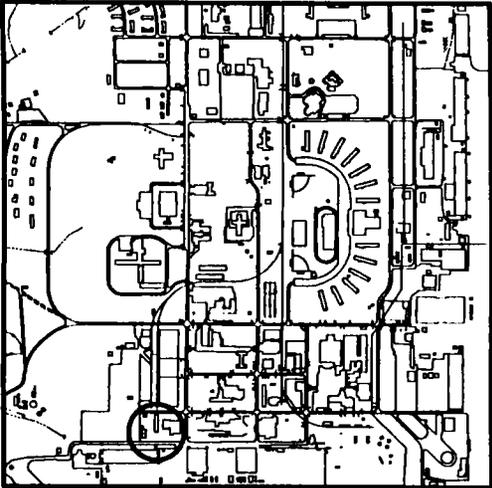
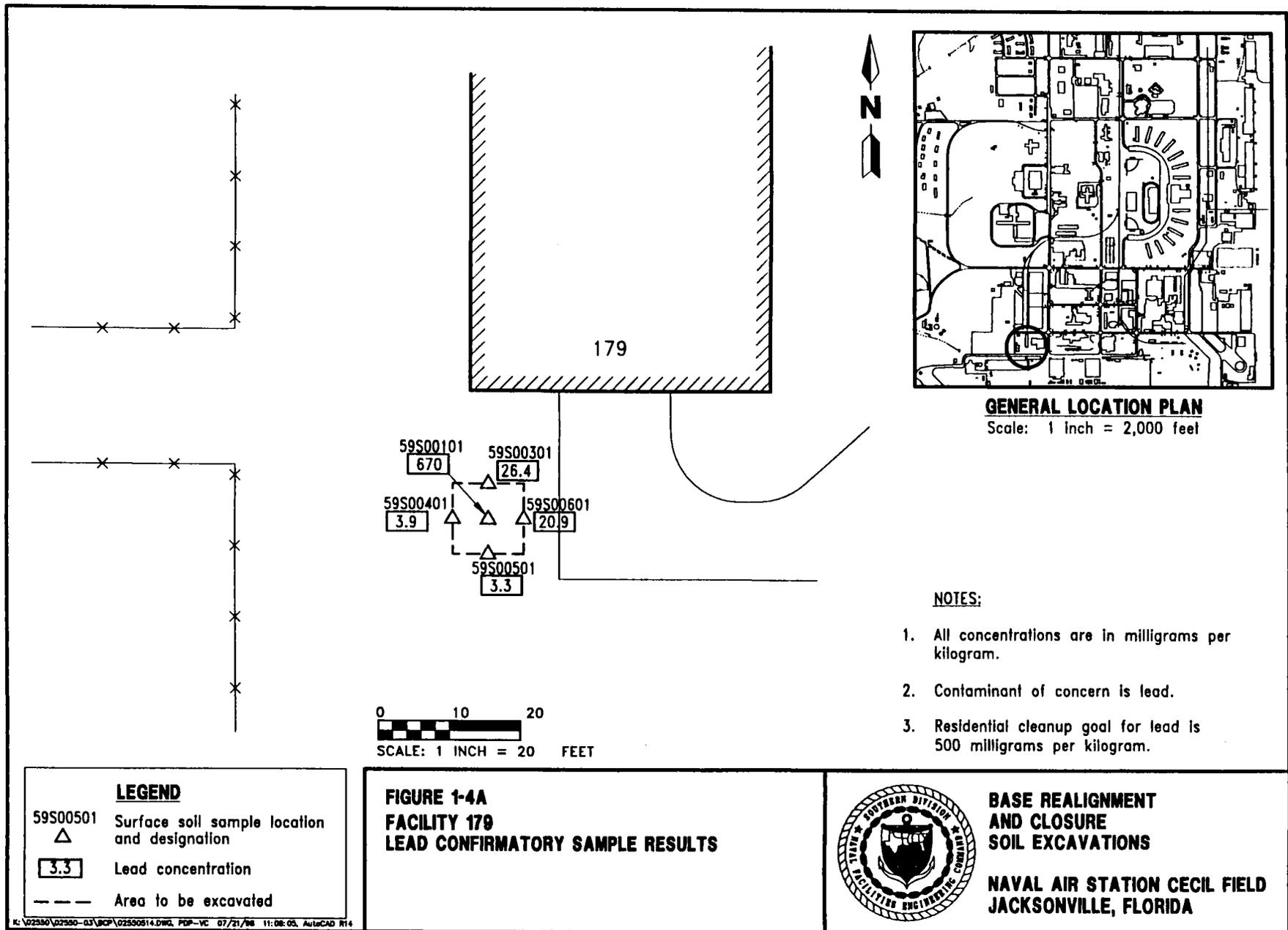
bls Below land surface

FIGURE 1-4
BUILDING 179



BASE REALIGNMENT AND CLOSURE SOIL EXCAVATIONS

NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA



GENERAL LOCATION PLAN
Scale: 1 inch = 2,000 feet

NOTES:

1. All concentrations are in milligrams per kilogram.
2. Contaminant of concern is lead.
3. Residential cleanup goal for lead is 500 milligrams per kilogram.

LEGEND	
59S00501 △	Surface soil sample location and designation
3.3	Lead concentration
---	Area to be excavated

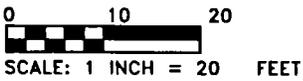


FIGURE 1-4A
FACILITY 179
LEAD CONFIRMATORY SAMPLE RESULTS



BASE REALIGNMENT AND CLOSURE SOIL EXCAVATIONS

NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA