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NAS CECIL FIELD
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SAMPLING AND ANALYSIS OUTLINE AND REPORT FOR FACILITY 647 NAS CECIL FIELD
FL
1/1/1995
HARDING LAWSON ASSOCIATES

SAMPLING AND ANALYSIS OUTLINE AND REPORT

FACILITY 647

BASE REALIGNMENT AND CLOSURE

ZONE A, YELLOW WATER WEAPONS AREA

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

Unit Identification Code: N60200

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Prepared by:

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

Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29419**

Scott Glass, Code 18B12, BRAC Environmental Coordinator

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
BCT	Base Realignment and Closure cleanup team
bls	below land surface
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
HQ	hazard quotient
mg/kg	milligrams per kilogram
NAS	Naval Air Station
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	sampling and analysis outline
SCTL	soil cleanup target level
TAL	target analyte list
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Facility 647 is a former weapons magazine that is currently used by the environmental department for storage of empty 55-gallon drums and other supplies, and as a temporary storage facility for hazardous waste. Facility 647 is located on the west side of "C" Street, in the Yellow Water Weapons Area.

Facility 647 was color-coded 7/Grey in the Naval Air Station (NAS) Cecil Field Environmental Baseline Survey (EBS) (ABB Environmental Services, Inc. [ABB-ES] 1994a) due to anecdotal accounts that the facility was formerly used to segregate empty aerosol cans and due to the potential for release of hazardous materials during activities at the facility. No indications of release were observed at the time of the EBS. This report outlines the plan for assessment of Facility 647, and provides conclusions and recommendations based upon data collected during the assessment.

2.0 SAMPLING AND ANALYSIS OUTLINE

A Phase II sampling and analysis outline (SAO) to assess whether or not surface soil has been contaminated by potential releases of hazardous materials handled and stored at Facility 647 was presented during the Base Realignment and Closure cleanup team (BCT) meeting on December 17, 1996. During the presentation, NAS Cecil Field environmental personnel indicated that aerosol cans were not processed at Facility 647. Additional information provided indicates that double-bagged asbestos and beryllium-containing wastes have previously been staged on the loading dock on the north side of Facility 647. In addition, low-level radioactive materials, including spent uranium counterweights from aircraft control surfaces, security sensors, divers watches, and xenon light bulbs, have been stored in 55-gallon drums at this facility. Radioactive materials are periodically collected by personnel from the Navy Radiological Safety Office.

Based upon the new information, the SAO for assessment of surface soil at Facility 647 was changed to include collection and analysis of four surface soil samples along the perimeter of the loading dock. The BCT concurred that the samples would be analyzed for the full Contract Laboratory Program suite of target analyte list (TAL) inorganics and analyzed for asbestos fibers. The results of the Phase II Sampling and Analysis program are discussed below.

3.0 PHASE II INVESTIGATION

Surface soil samples were collected at the east and west ends of the loading dock and at two locations along the north perimeter of the loading dock. All samples were collected at a depth of 0 to 1 foot below land surface (bls). Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994b). The soil samples were analyzed for the full Contract Laboratory Program suite of TAL inorganics and asbestos fibers.

A supplemental field investigation was conducted on September 23, 1998, to delineate the extent of elevated arsenic concentrations detected during the initial stage of the investigation. Three additional surface soil samples and one subsurface soil sample were collected north of the loading dock during the

supplemental investigation. The subsurface soil sample was collected from the interval between 1 and 2 feet bls. The additional samples were analyzed for arsenic (only). A site plan showing the location of the samples is presented on Figure 1.

4.0 PRELIMINARY RISK EVALUATION

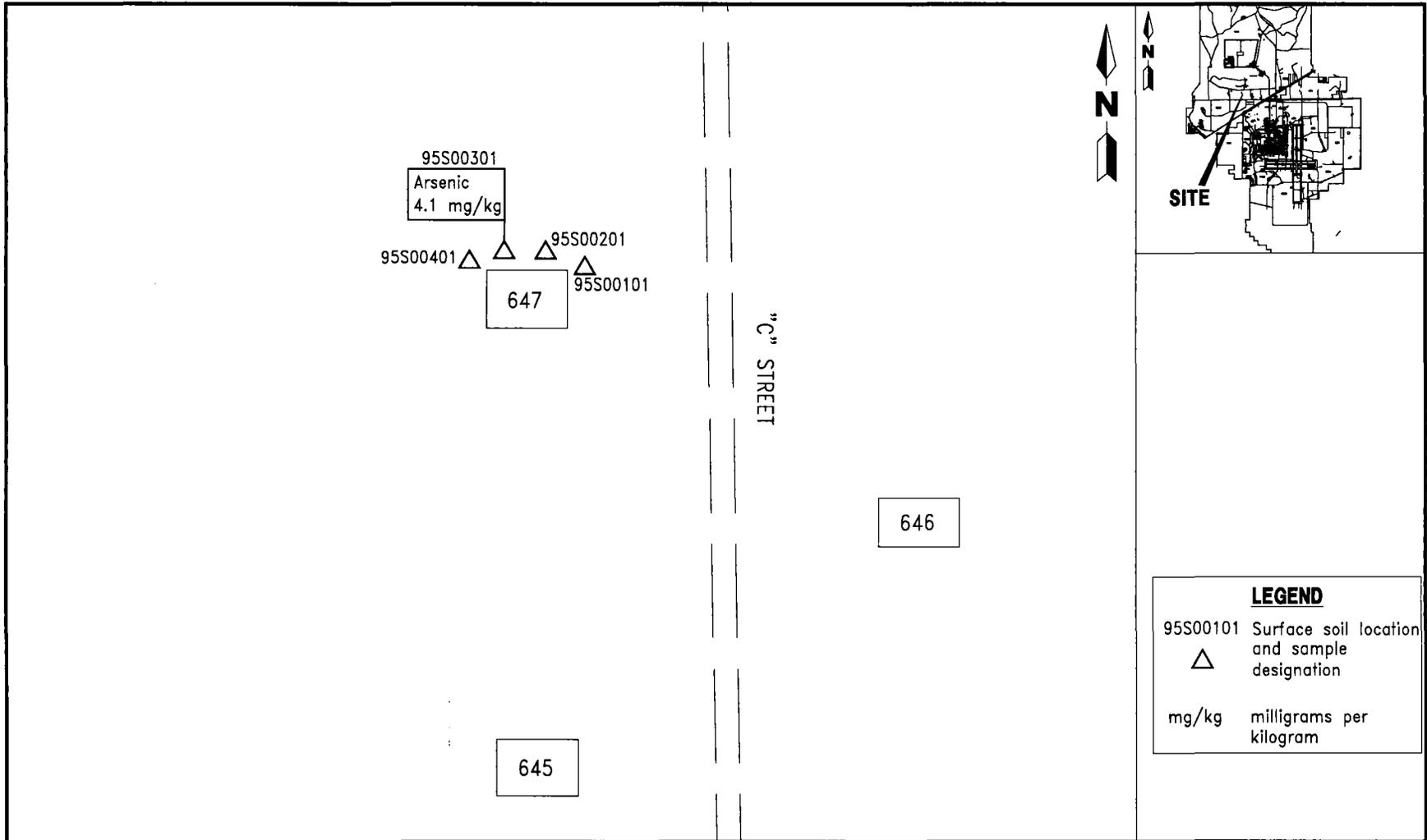
A preliminary risk evaluation (PRE) was conducted to assess potential risks to human and ecological receptors posed by contaminants in surface soil. Primary exposure pathways were evaluated to determine those pathways that potentially contribute to human health and ecological risks. The evaluation was 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, 1994), USEPA Region IV bulletins on ecological risk assessment (USEPA, 1995), and minutes of meetings with the USEPA and the Florida Department of Environmental Protection (FDEP) concerning PREs (ABB-ES, 1995).

Inorganic analytes were compared to NAS Cecil Field screening criteria for inorganics established by the NAS Cecil Field partnering team. The NAS Cecil Field screening criteria were determined by using the nonparametric upper-outside value cutoffs as described in *Understanding Robust and Exploratory Data Analysis* (Hoaglin et al., 1983). These screening values were developed from data collected throughout NAS Cecil Field. No risk evaluation is conducted for inorganic analytes detected below NAS Cecil Field screening criteria for inorganics.

4.1 PUBLIC HEALTH PRELIMINARY RISK EVALUATION. All 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. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, 1998), and FDEP Soil Cleanup Target Levels (SCTLs) (Florida Administrative Code, 1998). 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 (HQ of 1 or ELCR of 1×10^{-6}). For noncarcinogens, the HQs are summed to determine the cumulative noncancer risk or hazard index.

Thirteen inorganic analytes were detected in surface samples collected in the study area. Arsenic, calcium, and magnesium were detected at concentrations in excess of the NAS Cecil Field screening criteria for inorganics. Calcium and magnesium are essential nutrients and do not represent a hazard to human health.

There are no FDEP SCTLs or RBCs associated with these analytes. The detected concentration of arsenic at sample location 95S00301 was 4.1 milligrams per kilogram (mg/kg), which exceeds the FDEP SCTL. No other analytes were detected



0 50 100
SCALE: 1 INCH = 100 FEET

FIGURE 1
FACILITY 647
ENVIRONMENTAL DEPARTMENT STORAGE BUILDING
SAMPLE LOCATION PLAN



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in excess of SCTLs. The detected concentration of arsenic in the delineation sample collected from the area surrounding sample location 95S00301 did not exceed NAS Cecil Field screening criteria for inorganics.

Concentrations of detected analytes in surface soil have been compared with RBCs and SCTLs (see Appendix A). Arsenic is the only analyte detected at a concentration in excess of NAS Cecil Field screening criteria for inorganics and of its SCTL. An ELCR of 1×10^{-5} was calculated in association with a potential surface soil exposure scenario.

4.2 ECOLOGICAL PRELIMINARY RISK EVALUATION. Potential exposure pathways and ecological habitat associated with Facility 647 were characterized by Harding Lawson Associates ecological risk assessors in June 1996. 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).

Facility 647 is located within a remote area. Ecological habitat at Facility 647 is limited to grass surrounding the building. Soil invertebrates, such as the earthworm, are likely present in the grassy areas. Pathways of potential contaminant exposure at Facility 647 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 at Facility 647. Pathways for soil invertebrates include direct contact and incidental ingestion of surface soil. Pathways for terrestrial plants include direct contact with surface soil.

Arsenic is the only contaminant of concern detected at Facility 647. The ecological screening criteria for arsenic to plant, invertebrate, and vertebrate receptors are 10 mg/kg, 100 mg/kg, and 15 mg/kg, respectively. Therefore, surface soil analytes associated with Facility 647 are not expected to adversely impact terrestrial species within plant, invertebrate, or vertebrate groups.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Soil samples were collected along the north side of Facility 647 to determine whether past activities at the facility have impacted the environment. Arsenic was detected at a concentration in excess of the NAS Cecil Field inorganic screening criteria and Florida SCTL for a residential exposure scenario at one surface soil sample location on the north side of Facility 647. No other analytes were detected in excess of SCTLs.

No specific source has been identified for the elevated concentration of arsenic, and arsenic was not detected at concentrations in excess of NAS Cecil Field inorganic screening criteria in adjacent samples collected to delineate the extent of elevated arsenic concentrations. However, in order to reduce the potential for human exposure to elevated concentrations of arsenic, surface soil within the perimeter of the delineation samples should be excavated to a depth of 1-foot bls and removed from the site. Guidance notes for excavation are attached as Appendix C.

Based upon the findings of this evaluation, the color-code for Facility 647 should be reclassified to 5/Yellow to indicate that a removal action is pending.

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 (SOUTHNAVFACENGCOC), North Charleston, South Carolina (November).
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- USEPA. 1998. *Risk-Based Concentration Table*. Region III. Philadelphia, Pennsylvania.

APPENDIX A

PRELIMINARY RISK EVALUATION TABLE

**Preliminary Human Health Risk Evaluation Table for Analytes Detected in Surface Soil
Facility 647, Naval Air Station Cecil Field**

Analyte ¹	Samples					Screening Values			Calculated Risk Values ²				
	95S00101	95S00201	95S00301	95S00401	95S00501	95S00601	95S00701	95S00101	BKGRD	SCTL	RBC(R)	ELCR	HQ
Inorganic Analytes													
Aluminum	1400	1200	1100	1700					4432.5	72000	78000	n	
Antimony		2.8	6.8						9.44	26	31	n	
*Arsenic			4.1	0.6	0.9		1.5		2.0375	0.8	0.43	c	1 E-5
*Calcium	1600	2600	69000	2700					9.44				
Chromium	2.1		5.9	1.9					7.75	290	390	n	
Iron	280	180	480	500					1486	23000	23000	n	
Lead	5.3	3.2	8	4.1					196.9	500			
*Magnesium	45		420	36					328.65				
Manganese	1	2.5	16	1					21.95	1600	1600	n	
Potassium			30						101.8				
Sodium			22	7.6					343				
Vanadium	1		3	1.5					6.3	15	550	n	
Zinc	24	12	43	17					36.5	23000	23000	n	

Sum= 1 E-5

Notes:

¹ All detected analytes are reported. Concentrations and screening values are expressed in mg/kg

²ELCR and HQ are only calculated for analytes detected at concentrations in excess of BKGRD and SCTL

*= Background screening criteria or SCTLs have been exceeded

BKGRD=NAS Cecil Field Inorganic Background Data Set

SCTL = Soil Cleanup Target Level, Chapter 62-785, Florida Administrative Code

RBC(R)= Risk-based Concentration (Residential), USEPA Region III, April 1998

c=carcinogenic risk

n=non-carcinogenic risk

ELCR = calculated excess lifetime cancer risk, based on RBC(R) values. (ELCR = detected concentration/RBC(R) * 1 E-06)

HQ = calculated Hazard Quotient for non-carcinogenic analytes (HQ=detected concentration/RBC(R))

APPENDIX B

LABORATORY ANALYTICAL DATA

NAS CECIL FIELD -- FACILITY 647
 SURFACE AND SUBSURFACE SOIL -- INORGANICS -- REPORT REQUEST NO. 10183

Lab Sample Number:	JR75554	JR75555	JR75556	JR75557
Site	BRAC	BRAC	BRAC	BRAC
Locator	95S00101	95S00201	95S00301	95S00401
Collect Date:	09-OCT-97	09-OCT-97	09-OCT-97	09-OCT-97

	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	1400		mg/kg	230	1200		mg/kg	220	1100		mg/kg	220	1700		mg/kg	230
Antimony	2 U		mg/kg	2	2.8		mg/kg	2	6.8		mg/kg	2	2 U		mg/kg	2
Arsenic	.6 U		mg/kg	.6	.6 U		mg/kg	.6	4.1		mg/kg	.6	.6 J		mg/kg	.6
Barium	23 U		mg/kg	23	22 U		mg/kg	22	22 U		mg/kg	22	23 U		mg/kg	23
Beryllium	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1
Cadmium	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1
Calcium	1600		mg/kg	290	2600		mg/kg	280	69000		mg/kg	2800	2700		mg/kg	290
Chromium	2.1		mg/kg	1	1 U		mg/kg	1	5.9		mg/kg	1	1.9		mg/kg	1
Cobalt	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6
Copper	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6
Iron	280		mg/kg	11	180		mg/kg	11	480		mg/kg	11	500		mg/kg	12
Lead	5.3		mg/kg	1	3.2		mg/kg	1	8		mg/kg	1	4.1		mg/kg	1
Magnesium	45		mg/kg	29	28 U		mg/kg	28	420		mg/kg	28	36		mg/kg	29
Manganese	1		mg/kg	1	2.5		mg/kg	1	16		mg/kg	1	1		mg/kg	1
Mercury	.01 U		mg/kg	.01	.01 U		mg/kg	.01	.01 U		mg/kg	.01	.01 U		mg/kg	.01
Nickel	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6	6 U		mg/kg	6
Potassium	29 U		mg/kg	29	28 U		mg/kg	28	30		mg/kg	28	29 U		mg/kg	29
Selenium	2 U		mg/kg	2	2 U		mg/kg	2	2 U		mg/kg	2	2 U		mg/kg	2
Silver	2 U		mg/kg	2	2 U		mg/kg	2	2 U		mg/kg	2	2 U		mg/kg	2
Sodium	7.5 U		mg/kg	7.5	7.3 U		mg/kg	7.3	22 J		mg/kg	7.2	7.6 J		mg/kg	7.6
Thallium	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1	1 U		mg/kg	1
Vanadium	1		mg/kg	1	1 U		mg/kg	1	3		mg/kg	1	1.5		mg/kg	1
Zinc	24		mg/kg	6	12		mg/kg	6	43		mg/kg	6	17		mg/kg	6
Cyanide	-				-				-				-			

U = NOT DETECTED J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE

NAS CECIL FIELD -- FACILITY 647
 SURFACE AND SUBSURFACE SOIL -- ARSENIC -- REPORT REQUEST NO. 10444

Lab Sample Number:	JR333612		JR333613		JR333610		JR333611		
Site	BRAC		BRAC		BRAC		BRAC		
Locator	95S00501		95S00601		95S00701		95B00101		
Collect Date:	23-SEP-98		23-SEP-98		23-SEP-98		23-SEP-98		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

Arsenic	.9 J	mg/kg	.6	.6 U	mg/kg	.6	1.5 J	mg/kg	.6	.6 U	mg/kg	.6
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U = NOT DETECTED J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE

APPENDIX C

SOIL EXCAVATION SPECIFICATIONS

