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NAS CECIL FIELD
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SAMPLING AND ANALYSIS REPORT FOR FACILITY 504 ZONE H AVIATION ORDNANCE AREA NAS CECIL FIELD FL

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HARDING LAWSON ASSOCIATES

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SAMPLING AND ANALYSIS REPORT

FACILITY 504

BASE REALIGNMENT AND CLOSURE

ZONE H, AVIATION ORDNANCE AREA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Unit Identification Code: N60200

Contract No.: N62467-89-D-0317/090

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc
BCT	Base Realignment and Closure cleanup team
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
FOSL	Finding of Suitability to Lease
HI	hazard index
HLA	Harding Lawson Associates
HQ	hazard quotient
$\mu g/\ell$	micrograms per liter
NAS	Naval Air Station
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	Sampling and Analysis Outline
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 504 at Naval Air Station (NAS) Cecil Field. This report summarizes the related field operations, results, conclusions, and recommendations of the Phase II investigation.

Facility 504 is an inert storage building located approximately 700 feet south of Perimeter Road, on the eastern side of the entrance road to the Aviation Ordnance Area. Potential environmental concerns identified for the facility include the presence of a septic system and lift station, located to the west of the building. The Base Realignment and Closure cleanup team (BCT) regards septic tank and leachfield systems as potential pathways for contaminants to enter the groundwater. No other environmental concerns were identified for this facility in the Environmental Baseline Survey (EBS) (ABB-ES, 1994b).

A Sampling and Analysis Outline (SAO) for the assessment of groundwater downgradient of the septic system at Facility 504 was prepared by ABB-ES (presently HLA) and approved by the BCT (ABB-ES, 1996). The results of the Phase II Sampling and Analysis program developed in the SAO are discussed below.

2.0 PHASE II INVESTIGATION

The Phase II investigation included the installation of one shallow groundwater monitoring well and collection and analysis of one groundwater sample. Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994a).

A groundwater monitoring well was installed downgradient (southwest) of the septic leach field and lift station to a depth of 13 feet below land surface. One groundwater sample was collected and analyzed for the full Contract Laboratory program suite of target compound list organics and target analyte list inorganics. A general site plan indicating the location of the monitoring well is presented on Figure 1. The soil boring log is included in Appendix A.

3.0 PRELIMINARY RISK EVALUATION

A preliminary risk evaluation (PRE) was conducted to assess potential risks to human and ecological receptors posed by contaminants in groundwater. Primary exposure pathways were evaluated to determine which pathways 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 bulletin 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). Site background information and rationale for sample collection and analysis are detailed in the EBS Report (ABB-ES, 1994b) and the SAO (ABB-ES, 1996).

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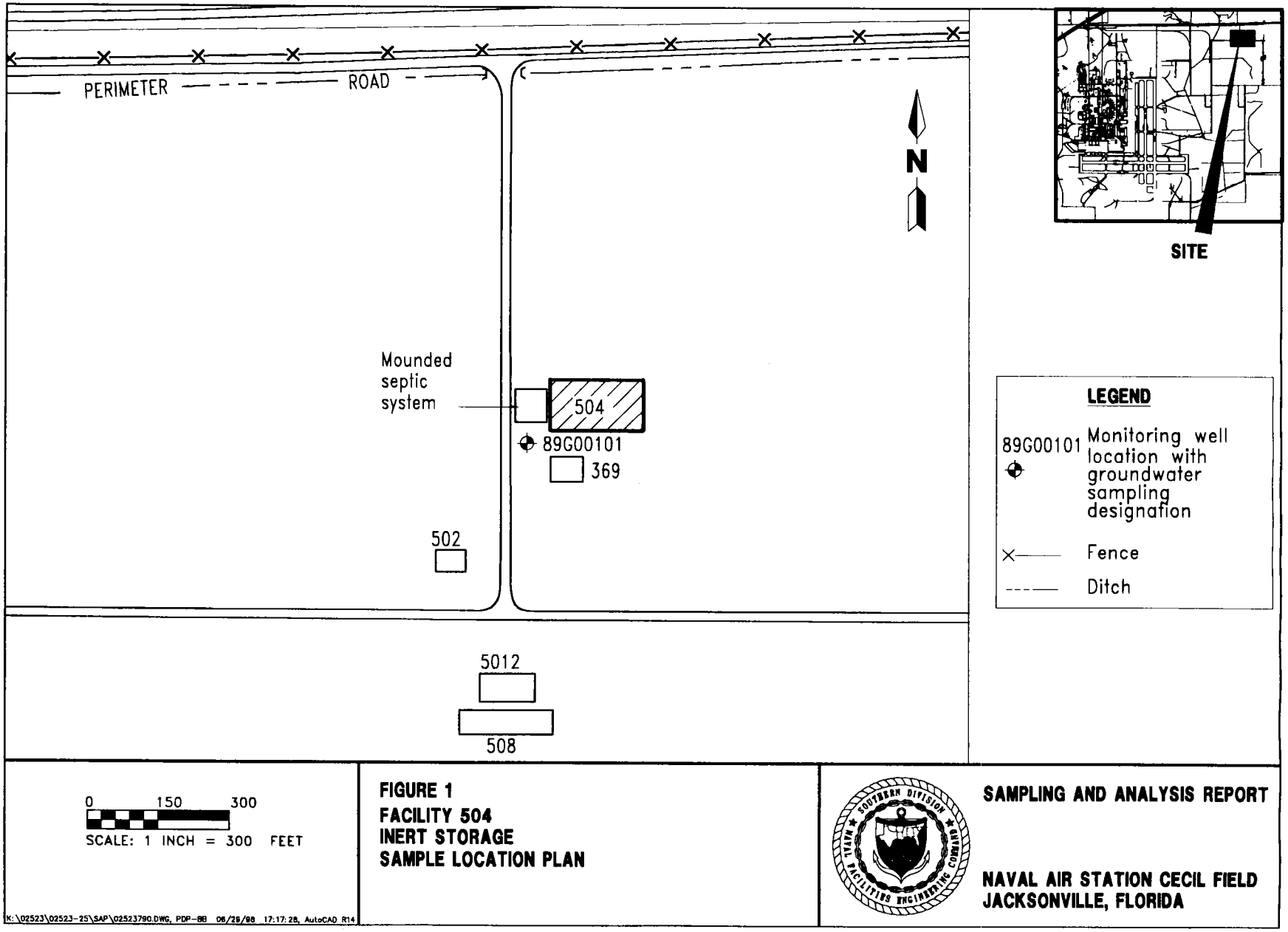

FIGURE 1
FACILITY 504
INERT STORAGE
SAMPLE LOCATION PLAN

SAMPLING AND ANALYSIS REPORT

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

3.1 **PUBLIC HEALTH PRE**. 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 groundwater. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, 1996) and FDEP Groundwater Guidance Concentrations (FDEP, 1994). 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 HQ are summed to determine the cumulative noncancer risk or hazard index (HI).

Eight inorganic analytes were detected in the groundwater sample collected downgradient of the septic system at Facility 504. A comparison between concentrations of detected analytes in groundwater, and RBCs for tap water and FDEP groundwater guidance concentrations, is included in Appendix A. The cumulative noncancer risk or HI calculated for all detected analytes is 1.2, based upon RBCs for tap water. No carcinogenic analytes were detected; therefore, an ELCR was not calculated.

Thallium was detected at a concentration of 3.4 micrograms per liter ($\mu g/\ell$), exceeding the FDEP groundwater guidance concentration of 2 $\mu g/\ell$, and the RBC for tap water of 2.9 $\mu g/\ell$. The USEPA maximum contaminant level for thallium in groundwater is 2 $\mu g/\ell$. The analytical result for thallium was less than the contract-required detection limit of 10 $\mu g/\ell$; therefore, it qualified as an estimated concentration. No other analytes were detected in excess of screening criteria.

There is some uncertainty concerning the detections of thallium in groundwater above the State and Federal MCLs. Thallium has been observed, below the laboratory detection level, at similar concentrations (2 to 6 $\mu g/\ell$) at many sites throughout NAS Cecil Field, including upgradient groundwater samples at Operable Units 3 and 6. The detection of thallium may be from its presence as a naturally occurring element or from interelemental interference with iron or other cations during the analysis from thallium. Due to the widespread occurrence of thallium at similar concentrations and the potential for interelemental interference, it does not appear that the detection of thallium is site related.

3.2 **ECOLOGICAL PRE**. Potential exposure pathways and ecological habitat associated with Facility 504 were characterized by ABB-ES (presently HLA) ecological risk assessors in June 1996. Facility 504 is surrounded by mowed grass and pavement. No complete exposure pathways to groundwater were confirmed within the immediate study area. Therefore, no further ecological risk evaluation was conducted.

4.0 CONCLUSIONS AND RECOMMENDATIONS

A cumulative hazard index of 1.2 was calculated for all detected analytes in groundwater. Thallium was the only analyte detected at a concentration in excess of its respective RBC. However, due to the widespread occurrence of thallium (a naturally occurring element) at NAS Cecil Field and the potential for inter-elemental interference during analysis, it does not appear that the detection of thallium is site related. Potable water is supplied to Facility 504 from a remote source; therefore, a groundwater-to-receptor pathway does not currently exist.

No complete exposure pathways to ecological receptors were identified for groundwater in the study area. Therefore, no further ecological risk evaluation was conducted.

Based upon the information obtained for this assessment, the concentrations of analytes detected in groundwater at Facility 504 do not represent a hazard to human health or the environment. The color classification for Facility 504 should be changed from Gray to Light Green.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES). 1994a. *Project Operations Plan for Cecil Field and Health and Safety Plan*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (December).

ABB-ES. 1994b. *Base Realignment and Closure Environmental Baseline Survey Report, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).

ABB-ES. 1995. Minutes of September 25, 1995, conference call to discuss preliminary risk evaluations.

ABB-ES. 1996. *Sampling and Analysis Outline, Building 504, Base Realignment and Closure, Zone H, Developed Nonindustrial Area, Group V, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (June).

Florida Department of Environmental Protection (FDEP). 1994. *Groundwater Guidance Concentrations*. Bureau of Drinking Water and Groundwater Resources, Tallahassee, Florida (June).

U.S. Environmental Protection Agency (USEPA). 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. 1995. *Region IV Waste Management Division Preliminary Risk Evaluation, Ecological Risk Assessment, Supplemental Guidance to RAGS*. Region IV Bulletin No. 1 (November).

USEPA. 1996. *Region III Risk-Based Screening Table, Technical Guidance Manual*. Risk Assessment. EPA/903/R-93-001 (May).

APPENDIX A

SOIL BORING LOGS AND PRELIMINARY RISK EVALUATION TABLE

Project: N.A.S. Cecil Field		**Well ID:** CEF-504-1S	**Boring ID:**
Client: SOUTHNAVFACENGCOM	**Contractor:** Alliance Environmental Inc.		**Job No.:** 08544.94
Northing/Easting:		**Date started:** 10/18/98	**Compltd:** 10/18/98
Method: HSA	**Casing dia.:** 2 inches	**Screened int.:** 3 to 13 FT	**Protection level:** D
TOC elev.: Ft.	**Type of OVM.:** PID	**Total dpth:** 13Ft.	**Dpth to ▼** 3.0 Ft.
ABB Rep.: R. Holloway	**Well development date:**		**Site:** Bldg. 504

Depth Ft.	Laboratory Sample ID.	Sample	Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.	Well diag.
				0.0			SC	POSTHOLE	
				3.5	SILTY SAND: (SM), 100% quartz, light to dark gray, fine to very fine grained, sub-angular to sub-rounded, wet at 3.0' bls.				▼
5									
10									
15									
20									

ABB ENVIRONMENTAL SERVICES, INC.

BRAC Preliminary Risk Evaluation Table for Analytes Detected in Groundwater
Facility 504

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	Sample	Screening Values		Calculated Risk Values	
Analyte	89G00101	FDEPGGC	RBC(T)	ELCR	HQ
Inorganic Analytes					
Barium	10.2	2,000 p	2,600 n		0.0
Cobalt	1.3		2,200 n		0.0
Magnesium	419				
Potassium	638				
Sodium	2,160	160,000 p			
Thallium	3.4	2 p *	2.9 n		1.2
Vanadium	1.5	49 st	260 n		0.0
Zinc	10.4	s	11,000 n		0.0
				Sum =	1.2

Notes:
All Analytes are reported in micrograms per liter.
Sample suffixes indicate the following:
F = filtered sample, DL= laboratory diluted sample, RE laboratory re-extracted, D = field duplicate.

BRAC = Base Realignment and Closure (Act).
FDEPGGC = FDEP Groundwater Guidance Concentration, June 1994.
RBC(T) = Risk-based concentration (tap water), USEPA Region III, May 1996.
ELCR calculated excess lifetime cancer risk; ELCR = detected concentration/RBC(T) * 10E-06.
HQ = calculated hazard quotient for noncarcinogenic analytes; HQ detected concentration/RBC(T).
p = primary standard (MCL).
n = noncarcinogenic risk.
st = systemic toxicant.
* = values that exceed FDEPGGC.
s = secondary standard (related to taste, odor, color, or other non-aesthetic effects).