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NAS CECIL FIELD, FL
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SAMPLING AND ANALYSIS OUTLINE AND REPORT FOR FACILITY 222LS BASE
REALIGNMENT AND CLOSURE ZONE C DEVELOPED NON-INDUSTRIAL AREA REVISION
1 NAS CECIL FIELD FL
11/1/1999
HARDING LAWSON ASSOCIATES

SAMPLING AND ANALYSIS OUTLINE AND REPORT

FACILITY 222LS

BASE REALIGNMENT AND CLOSURE

ZONE C, DEVELOPED NON-INDUSTRIAL AREA

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

Unit Identification Code: N60200

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Revision 1.0

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Base Realignment and Closure
Zone C, Developed Non-Industrial Area
Naval Air Station Cecil Field, Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc
BCT	Base Realignment and Closure (BRAC) cleanup team
CLP	Contract Laboratory Program
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
GCTL	groundwater cleanup target level
HI	hazard index
HQ	hazard quotient
NAS	Naval Air Station
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	sampling and analysis outline
TAL	target analyte list
TCL	target compound list
USEPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Facility 222LS is a lift station located near the southeast corner of the intersection of 6th Street and B Avenue, at Naval Air Station (NAS) Cecil Field. Wastewater is pumped from Facility 222LS to the base wastewater treatment plant.

Facility 222LS was color-coded 2/Blue in the NAS Cecil Field Environmental Baseline Survey (EBS) Report (ABB Environmental Services, Inc. [ABB-ES], 1994a) due to the presence of a 150-gallon aboveground diesel fuel storage tank for an auxiliary power unit. A Confirmatory Sampling Report (CSR) prepared for the aboveground storage tank in (ABB-ES, 1997) indicated there is no contaminated soil associated with the tank. In accordance with the 1996 revision to the BRAC Cleanup Plan Guidebook, facilities where no release or disposal of petroleum or hazardous materials has occurred should be classified as 1/White.

No known or suspected releases of petroleum or hazardous materials were observed during the EBS for Facility 222LS. However, the Base Realignment and Closure cleanup team (BCT) regards lift stations as potential pathways for wastewater contaminants to enter the groundwater, and identified a requirement for evaluation of groundwater in the vicinity of Facility 222LS. A Phase II Sampling and Analysis Outline (SAO) to assess whether or not groundwater has been contaminated by wastewater which could potentially seep from Facility 222LS was presented during the BCT meeting on January 13, 1998, and approved by the BCT. This report outlines the plan for assessment of Facility 222LS, and provides conclusions and recommendations based upon data collected during the assessment.

2.0 SAMPLING AND ANALYSIS OUTLINE

The SAO for assessment of shallow groundwater at 222LS included installation of one shallow groundwater monitoring well, and collection and analysis of one groundwater sample to be analyzed for the full Contract Laboratory Program (CLP) suite of target compound list (TCL) organics and target analyte list (TAL) inorganics. The results of the Phase II Sampling and Analysis program are discussed below.

3.0 PHASE II INVESTIGATION

One groundwater monitoring well was installed downgradient (southeast) of Facility 222LS. The well was completed at a depth of 16 feet below land surface. The groundwater flow direction in this area is likely to be southeast, based on the groundwater flow model produced for NAS Cecil Field by the U.S. Geological Survey. One groundwater sample was collected from the monitoring well. Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994b).

The groundwater sample was analyzed for the full CLP suite of TCL organics and TAL inorganics. A site plan indicating the location of the monitoring well and surface soil sample is presented on Figure 1. The soil boring log is included in Appendix A.

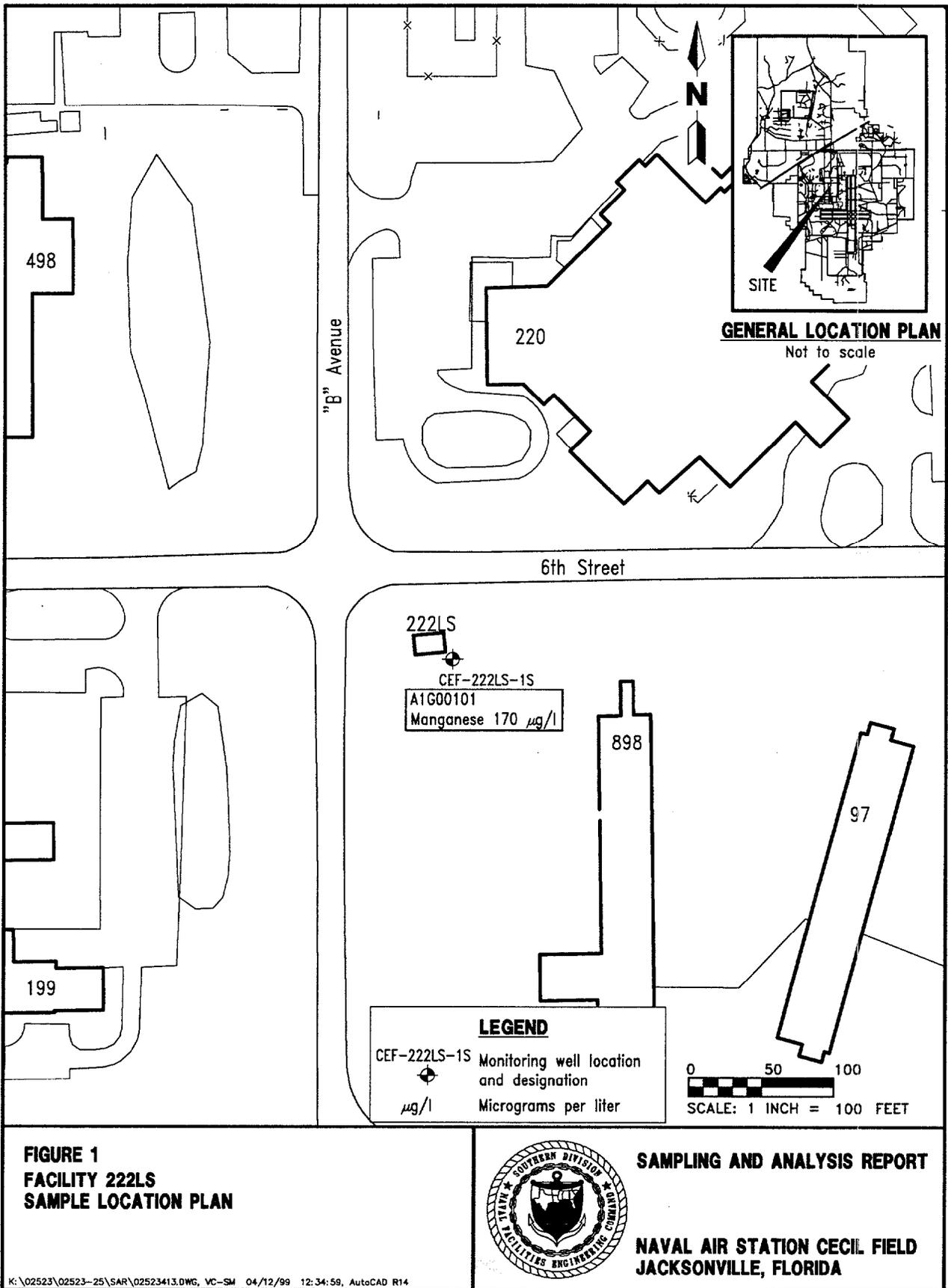
4.0 PRELIMINARY RISK EVALUATION

A preliminary risk evaluation (PRE) was conducted to assess potential risks to human and ecological receptors posed by contaminants in groundwater. 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, 1995b). Site background information and rationale for sample collection and analysis are detailed in the EBS Report (ABB-ES, 1994a).

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 PRE 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 groundwater. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs) (USEPA, 1996) and FDEP Groundwater Cleanup Target Levels (GCTLs) (Florida Department of Environmental Protection, 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 (HI).

Twelve inorganic analytes were detected in the groundwater sample collected in the study area. Aluminum and manganese were the only inorganic analytes detected at concentrations in excess of NAS Cecil Field screening criteria for inorganics and Florida GCTLs. No other inorganic analytes exceeded the screening criteria.



**FIGURE 1
FACILITY 222LS
SAMPLE LOCATION PLAN**



SAMPLING AND ANALYSIS REPORT

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

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The groundwater monitoring well was subsequently repurged, and filtered and unfiltered groundwater samples (A1G00102 and A1G00102F) were collected and analyzed for manganese to assure that suspended solids would not influence the analysis. The manganese concentration in both samples exceeds the NAS Cecil Field screening criteria for inorganics. No organic compounds were detected in groundwater.

Concentrations of detected analytes in groundwater have been compared with RBCs for tap water and GCTLs and, where applicable, with NAS Cecil Field Inorganic Background Data Set (see Appendix A). A HI of less than 1 was calculated in association with a potential groundwater exposure scenario, based on the detected concentration of manganese.

4.2 ECOLOGICAL PRE RISK EVALUATION. Potential exposure pathways and ecological habitat associated with Facility 222LS were characterized by Harding Lawson Associates ecological risk assessors in June 1996. Facility 222LS is located within a developed area and is surrounded by maintained grass and pavement. No exposure pathway from groundwater to surface water was identified in the study area. Therefore, no further ecological risk evaluation for groundwater was conducted.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Manganese was detected in groundwater collected downgradient of Facility 222LS, at a concentration in excess of the GTCL. Based on the results of a PRE, manganese does not represent a hazard to human health or the environment at the detected concentrations. No other environmental concerns have been identified for this facility.

Based upon the findings of this evaluation, the color-code for Facility 222LS should be reclassified to 3/Light Green to indicate that inorganic analytes have been detected at concentrations which exceed background data set and SCTL values, but do not represent a hazard to human health or the environment. No remedial action or further evaluation is recommended. Appropriate site operation and management procedures should be undertaken in order to ensure that current and future site activities do not result in release of hazardous substances to the environment.

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 SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).
- ABB-ES. 1994b. *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).
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- ABB-ES. 1997. *Confirmatory Sampling Report, Tank 222LS, Base Realignment and Closure, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).
- Florida Department of Environmental Protection. 1998. *Brownfields Cleanup Criteria Rule: Chapter 62-785, Florida Administrative Code*. Tallahassee, Florida.
- Hoaglin, D.C., F. Mosteller, and J.W. Tukey. 1983. *Understanding Robust and Exploratory Data Analysis*. New York: John Wiley and Sons, Inc.
- 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. *Supplemental Guidance to RAGS*. Region IV bulletins. USEPA Region IV Waste Management Division. Atlanta, Georgia.
- USEPA. 1996. *Risk-Based Concentration Table*. Region III. Philadelphia, Pennsylvania.

APPENDIX A

SOIL BORING LOG AND PRELIMINARY RISK EVALUATION TABLE

TITLE: NAS Cecil Field, Bldg.222LS Site Assessment Report		LOG of WELL: CEF-222LS-1S	BORING NO. CEF-222LS-1S
CLIENT: SOUTHDIVNAVFACENGCOM		PROJECT NO: 02523-13	
CONTRACTOR: U.S. Probe and Drill		DATE STARTED: 01-27-99	COMPLTD: 01-27-99
METHOD: HSA	CASE SIZE: 2in.	SCREEN INT.: 1.8-11.8 FT.	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: FID	TOT DPTH: 12.5FT.	DPTH TO ∇ 5.02 FT.
LOGGED BY: H.Hooper	WELL DEVELOPMENT DATE: 02-04-99		SITE: Building 222LS

DEPTH F.T.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1			0	<> See Note		SM	posthole	
2				SILTY SAND: tan to dark brown silty fine sand.			posthole	
3			0					
4								
5			0					
6							* **	
7			0	SILTY SAND: brown silty fine sand.				
8								
9								
10			0					
11								
12				<> Soil description taken from posthole and auger * no split spoon samples taken ** OVA readings taken at borehole				
13								
14								
15								

Preliminary Human Health Risk Evaluation Table for Analytes Detected in Groundwater
Facility 222LS, Naval Air Station Cecil Field

Analyte ¹	A1G00101	A1G00102	A1G00102F	Screening Values			Calculated Risk Values ²	
				BKGRD	GCTL	RBC(T)	ELCR	HQ
Aluminum	35000			13100	200	37000 n		
Cadmium	1			6	5	18 n		
Calcium	13000			81100				
Chromium	39			18	100	180 n		
Iron	2500			7760	300	11000 n		
Lead	15			5.35	15			
Magnesium	6300			10000				
Manganese	150	180	170	96.2	50	840 n		0.2
Potassium	2100			4330				
Sodium	4000			16500	160000			
Thallium	5			13.3	2	2.9 n		
Vanadium	24			20.2	49	260 n		
							Sum=	0.2

Notes:

¹ All detected analytes are reported. Concentrations and screening values are expressed in ug/l

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

* = Background screening criteria or GWCTLs have been exceeded

BKGRD = NAS Cecil Field Inorganic Background Data Set

GCTL = Groundwater Cleanup Target Levels, FDEP, Chapter 62-785, Florida Administrative Code

RBC(T) = Risk-based Concentration (Tap Water), USEPA Region III, April 1998

n = non-carcinogenic risk

c = carcinogenic risk

ELCR = calculated excess lifetime cancer risk, based on RBC(T) values.

(ELCR = maximum detected concentration/RBC(T) * 1E-06)

HQ = calculated Hazard Quotient for non-carcinogenic analytes

(HQ = maximum detected concentration/RBC(T))

APPENDIX B

LABORATORY ANALYTICAL DATA

NAS CECIL FIELD -- FACILITY 222LS
 GROUNDWATER -- VOLATILES -- REQUEST NO. 10923

Lab Sample Number: JR52895
 Site: BRAC
 Locator: A1G00101
 Collect Date: 04-FEB-99

VALUE QUAL UNITS DL

BRAC VOLATILES

1,1,1-Trichloroethane	1 U	ug/l	1
1,1,2,2-Tetrachloroethane	1 U	ug/l	1
1,1,2-Trichloroethane	1 U	ug/l	1
1,1-Dichloroethane	1 U	ug/l	1
1,1-Dichloroethene	1 U	ug/l	1
1,2-Dichloroethane	1 U	ug/l	1
1,2-Dichloropropane	1 U	ug/l	1
Benzene	1 U	ug/l	1
Bromodichloromethane	1 U	ug/l	1
Bromoform	1 U	ug/l	1
Bromomethane	2 U	ug/l	2
Carbon tetrachloride	1 U	ug/l	1
Chlorobenzene	1 U	ug/l	1
Chloroethane	2 U	ug/l	2
Chloroform	1 U	ug/l	1
Chloromethane	1 U	ug/l	1
Dibromochloromethane	1 U	ug/l	1
Ethyl benzene	1 U	ug/l	1
Methylene chloride	5 U	ug/l	5
Tetrachloroethene	3 U	ug/l	3
Toluene	1 U	ug/l	1
Trichloroethene	1 U	ug/l	1
Vinyl chloride	1 U	ug/l	1
cis-1,3-Dichloropropene	1 U	ug/l	1
m,p-Xylene	2 U	ug/l	2
o-Xylene	1 U	ug/l	1
trans-1,2-Dichloroethene	1 U	ug/l	1
trans-1,3-Dichloropropene	1 U	ug/l	1

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

NAS CECIL FIELD -- FACILITY 222LS
GROUNDWATER -- SEMIVOLATILES -- REQUEST NO. 10924

Lab Sample Number: JR52895
Site: BRAC
Locator: A1G00101
Collect Date: 04-FEB-99

VALUE QUAL UNITS DL

BRAC SEMIVOLATILES

	VALUE	QUAL	UNITS	DL
Phenol	10	U	ug/l	10
bis(2-Chloroethyl)ether	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10
Isophorone	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10
Naphthalene	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10
2-Chloronaphthalene	10	U	ug/l	10
Dimethylphthalate	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10
2,4-Dinitrophenol	50	U	ug/l	50
3- & 4-Methylphenol (2)	10	U	ug/l	10
4-Nitrophenol	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10
Fluorene	10	U	ug/l	10
4,6-Dinitro-2-methylphenol	30	U	ug/l	30
4-Bromophenyl-phenylether	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10
Pentachlorophenol	10	U	ug/l	10
Phenanthrene	10	U	ug/l	10
Pyrene	10	U	ug/l	10
Anthracene	10	U	ug/l	10
Acenaphthene	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10
3,3-Dichlorobenzidine	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10
Carbazole	10	U	ug/l	10
Chrysene	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10

NAS CECIL FIELD -- FACILITY 222LS
GROUNDWATER -- SEMIVOLATILES -- REQUEST NO. 10924

Lab Sample Number: JR52895
Site: BRAC
Locator: A1G00101
Collect Date: 04-FEB-99

VALUE QUAL UNITS DL

Indeno (1,2,3-cd) pyrene	10 U	ug/l	10
Dibenzo (a,h) anthracene	10 U	ug/l	10
Benzo (g,h,i) perylene	10 U	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10
4-Chloroaniline	10 U	ug/l	10
2-Nitroaniline	10 U	ug/l	10
3-Nitroaniline	10 U	ug/l	10
4-Nitroaniline	10 U	ug/l	10

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

NAS CECIL FIELD -- FACILITY 222LS
GROUNDWATER -- PESTICIDES & PCBs -- REQUEST NO. 10925

Lab Sample Number: JR52895
Site: BRAC
Locator: A1G00101
Collect Date: 04-FEB-99

VALUE QUAL UNITS DL

BRAC PESTICIDES/PCBS

alpha-BHC	.05 U	ug/l	.05
beta-BHC	.05 U	ug/l	.05
gamma-BHC (Lindane)	.05 U	ug/l	.05
Heptachlor	.05 U	ug/l	.05
Aldrin	.05 U	ug/l	.05
Heptachlor epoxide	.05 U	ug/l	.05
Endosulfan I	.05 U	ug/l	.05
Dieldrin	.05 U	ug/l	.05
4,4-DDE	.05 U	ug/l	.05
Endrin	.05 U	ug/l	.05
Endosulfan II	.05 U	ug/l	.05
4,4-DDD	.05 U	ug/l	.05
Endosulfan sulfate	.09 U	ug/l	.09
4,4-DDT	.05 U	ug/l	.05
Methoxychlor	.05 U	ug/l	.05
Endrin ketone	.05 U	ug/l	.05
Endrin aldehyde	.05 U	ug/l	.05
alpha-Chlordane	.05 U	ug/l	.05
gamma-Chlordane	.05 U	ug/l	.05
Toxaphene	2 U	ug/l	2
Aroclor-1221	1 U	ug/l	1
Aroclor-1232	1 U	ug/l	1
Aroclor-1248	1 U	ug/l	1
Aroclor-1254	1 U	ug/l	1
Aroclor-1260	1 U	ug/l	1
Aroclor-1016/1242	1 U	ug/l	1

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

NAS CECIL FIELD -- FACILITY 222LS
 GROUNDWATER -- INORGANICS -- REQUEST NO. 10926

Lab Sample Number: JR52895
 Site: BRAC
 Locator: A1G00101
 Collect Date: 04-FEB-99

VALUE QUAL UNITS DL

CLP METALS AND CYANIDE

Aluminum	35	mg/l	.05
Antimony	.012 U	mg/l	.012
Arsenic	.01 U	mg/l	.01
Barium	.1 U	mg/l	.1
Beryllium	.001 U	mg/l	.001
Cadmium	.001 J	mg/l	.001
Calcium	13	mg/l	.5
Chromium	.039	mg/l	.01
Cobalt	.05 U	mg/l	.05
Copper	.05 U	mg/l	.05
Iron	2.5	mg/l	.05
Lead	.015	mg/l	.005
Magnesium	6.3	mg/l	.5
Manganese	.15	mg/l	.01
Mercury	.0002 U	mg/l	.0002
Nickel	.01 U	mg/l	.01
Potassium	2.1	mg/l	.5
Selenium	.01 U	mg/l	.01
Silver	.01 U	mg/l	.01
Sodium	4	mg/l	.5
Thallium	.005 J	mg/l	.004
Vanadium	.024	mg/l	.01
Zinc	.1 U	mg/l	.1
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 222LS
 GROUNDWATER -- MANGANESE -- REQUEST NO. 10927

Lab Sample Number:	JR58661		JR58662		
Site	BRAC		BRAC		
Locator	A1G00102		A1G00102F		
Collect Date:	13-MAR-99		13-MAR-99		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS
			DL		DL

Manganese

.18	mg/l	.01	.17	mg/l	.01
-----	------	-----	-----	------	-----

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