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NAS CECIL FIELD
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SAMPLING AND ANALYSIS REPORT FACILITY 233 AIRCRAFT WASH RACK BASE
REALIGNMENT AND CLOSURE ZONE D INDUSTRIAL AND FLIGHT LINE AREA NAS CECIL
FIELD FL
8/1/1998
HARDING LAWSON ASSOCIATES

SAMPLING AND ANALYSIS REPORT
FACILITY 233
AIRCRAFT WASHRACK
BASE REALIGNMENT AND CLOSURE
ZONE D, INDUSTRIAL AND FLIGHT LINE AREA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Unit Identification Code N60200

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Base Realignment and Closure
Zone D, Industrial and Flight Line Area
Naval Air Station Cecil Field, Jacksonville, Florida

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
EBS	environmental baseline survey
ELCR	excess lifetime cancer risk
FDEP	Florida Department of Environmental Protection
GCTL	groundwater cleanup target level
HLA	Harding Lawson Associates
HI	hazard index
HQ	hazard quotient
NAS	Naval Air Station
PRE	preliminary risk evaluation
RBC	risk-based concentration
SAO	sampling and analysis outline
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

1.0 INTRODUCTION

Harding Lawson Associates (HLA) (formerly ABB Environmental Services, Inc. [ABB-ES]), under contract to Southern Division, Naval Facilities Engineering Command, has completed the Phase II Sampling and Analysis program for Facility 233 at Naval Air Station (NAS) Cecil Field. This report summarizes the related field operations, results, conclusions, and recommendations.

Facility 233 is referred to as an aircraft washrack in the Base Realignment and Closure (BRAC) NAS Cecil Field Environmental Baseline Survey (EBS) (ABB-ES, 1994a). Facility 233 is a small, concrete block shelter located east of Hangar 14 (Figure 1). The washrack is a concrete-paved area, approximately 80-feet by 90-feet, and is sloped to drain rinse water to a catch basin (Figure 1).

Facility plans indicate that the catch basin in the washrack is currently connected to the sanitary sewage system. However, a gate valve in the washrack piping system may be used to divert runoff to the stormwater drainage system when the washrack is not in use. Facility 233 was color-coded Grey in the EBS because of the historical use of aircraft cleaning compounds and the potential for release of contaminated rinse water to the stormwater drainage system and shallow groundwater.

A sampling and analysis outline (SAO) for the assessment of groundwater in the vicinity of Facility 233 was prepared by HLA and approved by the BRAC cleanup team (ABB-ES, 1995b). Potential environmental impacts associated with releases to the stormsewer system in the vicinity of the flightline industrial area are being evaluated separately.

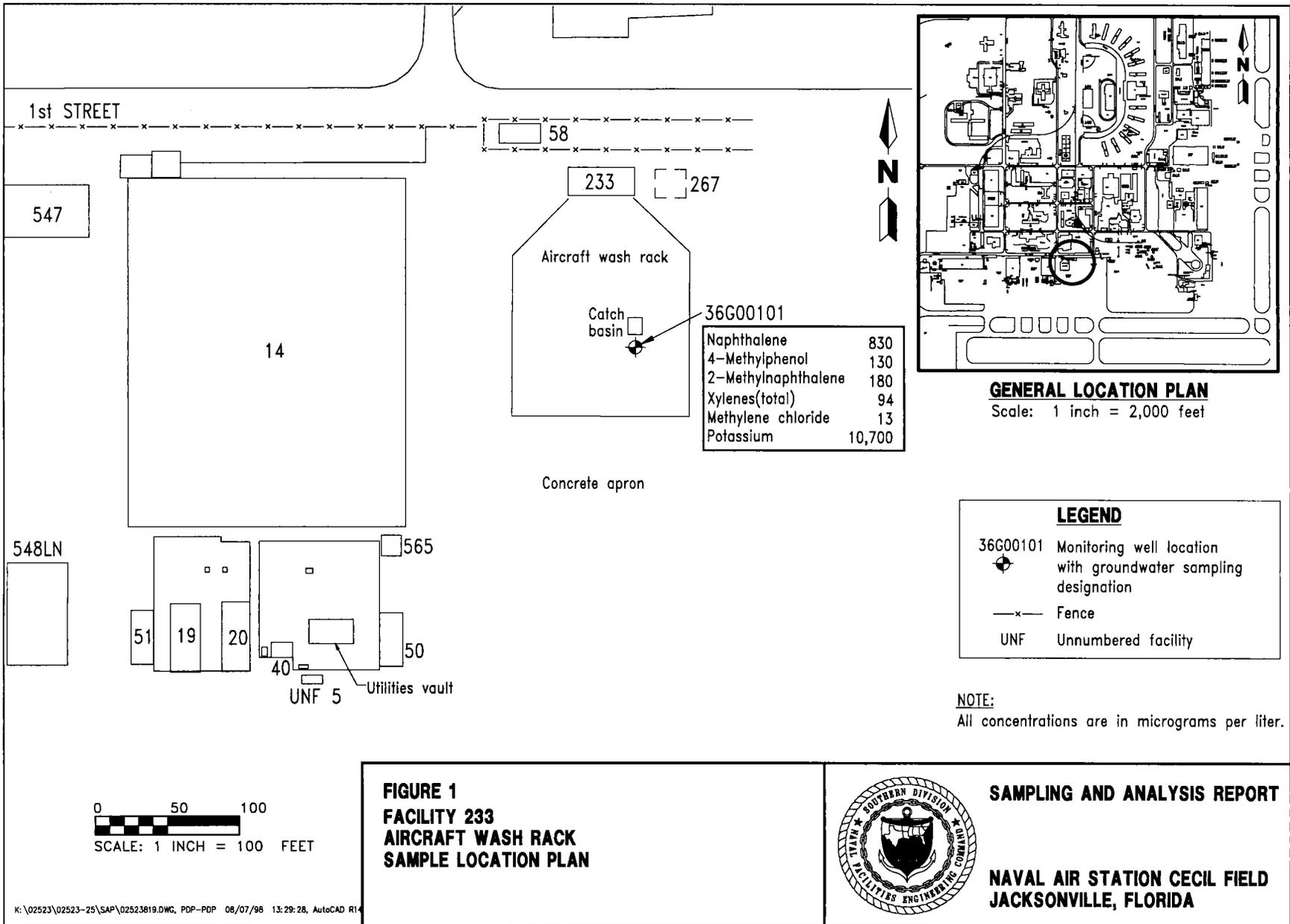
2.0 PHASE II INVESTIGATION

This 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, 1994b).

The groundwater monitoring well was installed adjacent to the catch basin at Facility 233. The groundwater flow direction in this area is likely to be south-southeast, based on the groundwater flow model produced for NAS Cecil Field by the U.S. Geological Survey (USGS) (USGS, 1998). The well was completed to a depth of 14 feet below land surface. One groundwater sample was collected and analyzed for the full Contract Laboratory Program suite of target compound list (TCL) organics and target analyte list (TAL) inorganics. A 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 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 PREs for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994), the 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, 1995a). Site background information and rationale for sample collection and analysis are detailed in the Environmental Baseline Survey Report (ABB-ES, 1994a) and the SAO (ABB-ES, 1995b).

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 was conducted for inorganic analytes detected below NAS Cecil Field screening criteria for inorganics.

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 Cleanup Target Levels (GCTLs) (FDEP, 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, five volatile organic compounds, three semivolatile organic compounds, and two pesticide compounds were detected in the groundwater sample collected in the study area. Potassium was the only inorganic analyte detected at a concentration in excess of the NAS Cecil Field screening criteria for inorganics. Potassium is a naturally occurring element in groundwater at NAS Cecil Field and is also an essential nutrient. Methylene chloride, total xylenes, 2-methylnaphthalene, 4-methylphenol, and naphthalene were detected at concentrations in excess of their respective GCTLs. A comparison among concentrations of detected analytes in groundwater, RBCs for tap water, and GCTLs is presented in Appendix A. A cumulative noncancer risk or HI of 1.4 and an ELCR of 3×10^{-6} were calculated based upon RBCs for tap water.

3.2 ECOLOGICAL PRE. Potential exposure pathways and ecological habitat associated with Facility 233 were characterized by HLA ecological risk assessors in June 1996. Facility 233 is located in a developed flightline industrial area and is surrounded by 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

One groundwater sample from the shallow surficial aquifer was collected at Facility 233 and analyzed to determine the concentrations of TCL organic and TAL inorganic compounds. Several volatile and semivolatile organic compounds were detected at concentrations in excess of FDEP GCTLs.

An extensive groundwater contamination plume in the flightline area south and east of Hangar 14 is currently being assessed as part of a separate evaluation (ABB-ES, 1997). In addition, surface water and sediment samples have been collected from flightline industrial area outfalls to determine whether these media have been impacted by potential release of contaminants from the flightline industrial area. Unpublished laboratory data indicate groundwater contaminated with petroleum compounds and chlorinated solvents may be present throughout the east-west flightline industrial area.

It is unclear whether contaminants detected in groundwater at Facility 233 are related to the contaminant plume in the east-west flightline area. Further evaluation of the groundwater in the vicinity of Facility 233 should be undertaken within the context of the flightline groundwater evaluation. Therefore, the color classification for Facility 233 should be changed to 5/Yellow, to indicate that assessment is in progress, but that remedial action has not been completed. 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

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APPENDIX A

SOIL BORING LOG AND PRELIMINARY RISK EVALUATION TABLE

TITLE: NAS Cecil Field BRAC		LOG of WELL: CEF-233-1S	BORING NO. CEF-233-1S
CLIENT: SOUTH DIV NAV FAC ENCOM			PROJECT NO: 08520-85
CONTRACTOR: Alliance Environmental, Inc.		DATE STARTED: 12-15-95	COMPLTD: 12-15-95
METHOD: Auger	CASE SIZE: 2 in.	SCREEN INT.: 3 - 13 ft.	PROTECTION LEVEL: D
TOC ELEV.: FT.	MONITOR INST.: PID	TOT DPTH: 14.0 FT.	DPTH TO ∇ 5.0 FT.
LOGGED BY: R. Holloway	WELL DEVELOPMENT DATE: 1-3-96		SITE: 36 - 233 Washrack

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
1				2066	CONCRETE				
2					SILTY SAND (SM): 100%, dark gray to dark grayish brown, quartz, fine- to very fine-grained, subrounded to subangular, well sorted.		SM	posthole	
3			2012	posthole					
4									
5				1923				1,4,8,15	∇
6									
7				1934				14,16,18,12	
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									

**BRAC Preliminary Risk Evaluation Table for Analytes Detected in Groundwater
Building 233, Naval Air Station Cecil Field**

Analyte ¹	36G00101	Screening Values			Calculated Risk Values ²	
		BKGRD	GCTL	RBC(T)	ELCR	HI
<u>Volatle Organic Compounds</u>						
Acetone	410		700	3700 n		
Ethylbenzene	21		30	1300 n		
*Methylene chloride	13		5	4.1 c	3 E-6	
Toluene	17		40	750 n		
*Xylenes (total)	94		20	12000 n		0.01
<u>Semi-Volatile Organic Compounds</u>						
*2-Methylnaphthalene	180		20	1500 n		0.1
*4-Methylphenol	130		4	180 n		0.7
*Naphthalene	830		20	1500 n		0.6
<u>Pesticides/PCBs</u>						
4,4-DDD	0.01		0.1	0.28 c		
Heptachlor epoxide	0.001		0.2	0.0012 c		
<u>Inorganic Analytes</u>						
*Aluminum	211	13101.5	200	37000 n		
Antimony	2.2	44.5	6	15 n		
Barium	43.7	88.2	2000	2600 n		
Calcium	1180	81075				
*Iron	3800	7764.5	300	11000 n		
Magnesium	735	10005				
*Manganese	58.1	96.15	50	840 n		
*Potassium	10700	4327				
Sodium	10600	16465	160000			
Vanadium	9.7	20.15	49	260 n		
Zinc	12.8	76.75	5000	11000 n		
Cyanide	2	22	200			
<u>General Chemistry</u>						
Total petroleum hydrocarbons	2.2		5000			
				Sum =	3 E-6	1.4

Notes:

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

²ELCR and HI 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

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

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

HI = calculated Hazard Index for non-carcinogenic analytes

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

APPENDIX B
LABORATORY ANALYTICAL DATA

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- VOLATILES -- REQ.NO. 10031

Lab Sample Number: C31D0
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SQW				
Chloromethane	25 U		ug/l	25
Bromomethane	25 U		ug/l	25
Vinyl chloride	25 U		ug/l	25
Chloroethane	25 U		ug/l	25
Methylene chloride	13		ug/l	25
Acetone	410		ug/l	25
Carbon disulfide	12 U		ug/l	12
1,1-Dichloroethene	12 U		ug/l	12
1,1-Dichloroethane	12 U		ug/l	12
1,2-Dichloroethene (total)	12 U		ug/l	12
Chloroform	12 U		ug/l	12
1,2-Dichloroethane	12 U		ug/l	12
2-Butanone	25 U		ug/l	25
1,1,1-Trichloroethane	12 U		ug/l	12
Carbon tetrachloride	12 U		ug/l	12
Bromodichloromethane	12 U		ug/l	12
1,2-Dichloropropane	12 U		ug/l	12
cis-1,3-Dichloropropene	12 U		ug/l	12
Trichloroethene	12 U		ug/l	12
Dibromochloromethane	12 U		ug/l	12
1,1,2-Trichloroethane	12 U		ug/l	12
Benzene	12 U		ug/l	12
trans-1,3-Dichloropropene	12 U		ug/l	12
Bromoform	12 U		ug/l	12
4-Methyl-2-pentanone	25 U		ug/l	25
2-Hexanone	25 U		ug/l	25
Tetrachloroethene	12 U		ug/l	12
Toluene	17		ug/l	25
1,1,2,2-Tetrachloroethane	12 U		ug/l	12
Chlorobenzene	12 U		ug/l	12
Ethylbenzene	21		ug/l	25
Styrene	12 U		ug/l	12
Xylenes (total)	94		ug/l	25

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

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- SEMIVOLATILES -- REQ.NO. 10032

Lab Sample Number: C3100
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

CLP SEMIVOLATILES 90-SQW

Phenol	200 U	ug/l	200
bis(2-Chloroethyl) ether	200 U	ug/l	200
2-Chlorophenol	200 U	ug/l	200
1,3-Dichlorobenzene	200 U	ug/l	200
1,4-Dichlorobenzene	200 U	ug/l	200
1,2-Dichlorobenzene	200 U	ug/l	200
2-Methylphenol	200 U	ug/l	200
2,2-oxybis(1-Chloropropane)	200 U	ug/l	200
4-Methylphenol	130 J	ug/l	200
N-Nitroso-di-n-propylamine	200 U	ug/l	200
Hexachloroethane	200 U	ug/l	200
Nitrobenzene	200 U	ug/l	200
Isophorone	200 U	ug/l	200
2-Nitrophenol	200 U	ug/l	200
2,4-Dimethylphenol	200 U	ug/l	200
bis(2-Chloroethoxy) methane	200 U	ug/l	200
2,4-Dichlorophenol	200 U	ug/l	200
1,2,4-Trichlorobenzene	200 U	ug/l	200
Naphthalene	830	ug/l	200
4-Chloroaniline	200 U	ug/l	200
Hexachlorobutadiene	200 U	ug/l	200
4-Chloro-3-methylphenol	200 U	ug/l	200
2-Methylnaphthalene	180 J	ug/l	200
Hexachlorocyclopentadiene	200 U	ug/l	200
2,4,6-Trichlorophenol	200 U	ug/l	200
2,4,5-Trichlorophenol	500 U	ug/l	500
2-Chloronaphthalene	200 U	ug/l	200
2-Nitroaniline	500 U	ug/l	500
Dimethylphthalate	200 U	ug/l	200
Acenaphthylene	200 U	ug/l	200
2,6-Dinitrotoluene	200 U	ug/l	200
3-Nitroaniline	500 U	ug/l	500
Acenaphthene	200 U	ug/l	200
2,4-Dinitrophenol	500 U	ug/l	500
4-Nitrophenol	500 U	ug/l	500
Dibenzofuran	200 U	ug/l	200
2,4-Dinitrotoluene	200 U	ug/l	200
Diethylphthalate	200 U	ug/l	200
4-Chlorophenyl-phenylether	200 U	ug/l	200
Fluorene	200 U	ug/l	200
4-Nitroaniline	500 U	ug/l	500
4,6-Dinitro-2-methylphenol	500 U	ug/l	500
N-Nitrosodiphenylamine	200 U	ug/l	200
4-Bromophenyl-phenylether	200 U	ug/l	200
Hexachlorobenzene	200 U	ug/l	200
Pentachlorophenol	500 U	ug/l	500
Phenanthrene	200 U	ug/l	200
Anthracene	200 U	ug/l	200
Carbazole	200 U	ug/l	200
Di-n-butylphthalate	200 U	ug/l	200

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- SEMIVOLATILES -- REQ.NO. 10032

Lab Sample Number: C31D0
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

	VALUE	QUAL	UNITS	DL
Fluoranthene	200	U	ug/l	200
Pyrene	200	U	ug/l	200
Butylbenzylphthalate	200	U	ug/l	200
3,3-Dichlorobenzidine	200	U	ug/l	200
Benzo (a) anthracene	200	U	ug/l	200
Chrysene	200	U	ug/l	200
bis(2-Ethylhexyl) phthalate	200	U	ug/l	200
Di-n-octylphthalate	200	U	ug/l	200
Benzo (b) fluoranthene	200	U	ug/l	200
Benzo (k) fluoranthene	200	U	ug/l	200
Benzo (a) pyrene	200	U	ug/l	200
Indeno (1,2,3-cd) pyrene	200	U	ug/l	200
Dibenzo (a,h) anthracene	200	U	ug/l	200
Benzo (g,h,i) perylene	200	U	ug/l	200

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

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- PESTICIDES & PCBs -- REQ.NO. 10033

Lab Sample Number: C31D0
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

CLP PESTICIDES/PCBS 90-SOW

alpha-BHC	.05 U	ug/l	.05
beta-BHC	.05 U	ug/l	.05
delta-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	.001 J	ug/l	.05
Endosulfan I	.05 U	ug/l	.05
Dieldrin	.1 U	ug/l	.1
4,4-DDE	.1 U	ug/l	.1
Endrin	.1 U	ug/l	.1
Endosulfan II	.1 U	ug/l	.1
4,4-DDD	.01 J	ug/l	.1
Endosulfan sulfate	.1 U	ug/l	.1
4,4-DDT	.1 U	ug/l	.1
Methoxychlor	.5 U	ug/l	.5
Endrin ketone	.1 U	ug/l	.1
Endrin aldehyde	.1 U	ug/l	.1
alpha-Chlordane	.05 U	ug/l	.05
gamma-Chlordane	.05 U	ug/l	.05
Toxaphene	5 U	ug/l	5
Aroclor-1016	1 U	ug/l	1
Aroclor-1221	2 U	ug/l	2
Aroclor-1232	1 U	ug/l	1
Aroclor-1242	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

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

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- INORGANICS -- REQ.NO. 10034

Lab Sample Number: C31D0
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

CLP METALS AND CYANIDE

Aluminum	211	N	ug/l	40
Antimony	2.2	J	ug/l	12
Arsenic	3	U	ug/l	2
Barium	43.7	J	ug/l	40
Beryllium	1	U	ug/l	1
Cadmium	1	U	ug/l	1
Calcium	1180	J	ug/l	1000
Chromium	2	U	ug/l	2
Cobalt	2	U	ug/l	10
Copper	2	U	ug/l	5
Iron	3800	N	ug/l	20
Lead	2	U	ug/l	.6
Magnesium	735	J	ug/l	1000
Manganese	58.1		ug/l	3
Mercury	.2	U	ug/l	.1
Nickel	2	U	ug/l	8
Potassium	10700		ug/l	1000
Selenium	3	U	ug/l	1
Silver	1	U	ug/l	2
Sodium	10600		ug/l	1000
Thallium	4	U	ug/l	2
Vanadium	9.7	J	ug/l	10
Zinc	12.8	JN	ug/l	4
Cyanide	2	UN	ug/l	.5

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

NAS CECIL FIELD -- FACILITY 233
GROUNDWATER -- TRPH -- REQ.NO. 10035

Lab Sample Number: A6B1601240
Site: CECILBRAC2
Locator: 36G00101
Collect Date: 15-FEB-96

VALUE QUAL UNITS DL

TPH			
Total petroleum hydrocarbons	2.2	mg/l	.5

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