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SAMPLING AND ANALYSIS OUTLINE AND REPORT FOR OPEN AREA BB1 BASE
REALIGNMENT AND CLOSURE NAS CECIL FIELD FL
7/1/1999
HARDING LAWSON ASSOCIATES

SAMPLING AND ANALYSIS OUTLINE AND REPORT

OPEN AREA BB1

BASE REALIGNMENT AND CLOSURE

**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

HI hazard index
HQ hazard quotient

NAS Naval Air Station

PRE Preliminary Risk Evaluation

RBC Risk-Based Concentrations

SCTL Soil Cleanup Target Levels

USEPA U.S. Environmental Protection Agency

1.0 INTRODUCTION

Open Area BB1 (BB1) is the site designation assigned to an area of undeveloped open land between the Main Base Area, and Yellow Water Weapons Area at Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. The perimeter of BB1 is formed by Normandy Boulevard to the north, 103rd Street to the south, "D" Avenue to the west, and arbitrary boundaries to the east as shown in Figure 1. Private residential parcels are located within, and along the boundaries of BB1. Privately owned light industrial parcels are also located along the south boundary of BB1. No Installation Restoration Program sites are located within BB1.

The Environmental Baseline Survey (EBS) Report (ABB Environmental Services, Inc. [ABB-ES], 1994a) documents the presence of an automobile salvage yard south of BB1, on private property. The off-site salvage yard was not identified as a potential environmental concern. Several piles of soil and construction debris were identified as potential environmental concerns during the EBS of BB1.

The EBS Report recommended a 7/Grey color classification for the debris piles, and 1/White color classification for the remainder of BB1. An additional site walkover of BB1 was conducted by Harding Lawson Associates (then ABB-ES) in 1996, confirming the observations documented in the EBS Report. No hazardous materials were visually identified within the debris. A large area of planted pines in the western part of BB1, appeared to be undersized, and stressed. Miscellaneous trash, automotive parts, two empty 55-gallon drums, and several empty abandoned vehicular fuel tanks were also noted during the site walkover. No other environmental concerns were noted during the site walkover.

2.0 SAMPLING AND ANALYSIS OUTLINE

Sampling and analysis requirements for BB1 were discussed during the BCT meeting in June, 1996. The BCT consensus on the strategy for assessment reached at this meeting, comprised collection and analysis of two surface soil samples from the area adjacent to the debris piles, and a geophysical evaluation in the area of poorly developed pine trees, to determine whether the area had been land-filled.

Analysis for the full suite of target analyte list and target compound list analytes for all samples was specified. Sample collection techniques, quality assurance objectives, quality control requirements, and sample handling and shipping procedures are outlined in the Base Realignment and Closure Project Operations Plan (ABB-ES, 1994b).

3.0 PHASE II INVESTIGATION

A geophysical survey of the area of poorly developed trees was undertaken in July, 1996. Magnetic gradients and terrain conductivity were measured at 10-foot intervals along east-west traverse lines. Traverse lines were spaced at 20-foot intervals. Geophysical contour maps produced from the survey data, do not indicate the presence of buried metal in the survey area (refer to Appendix C). One weak anomaly was observed near the northeast corner of the survey grid. Upon further examination, this anomaly was attributed to metallic surface debris.

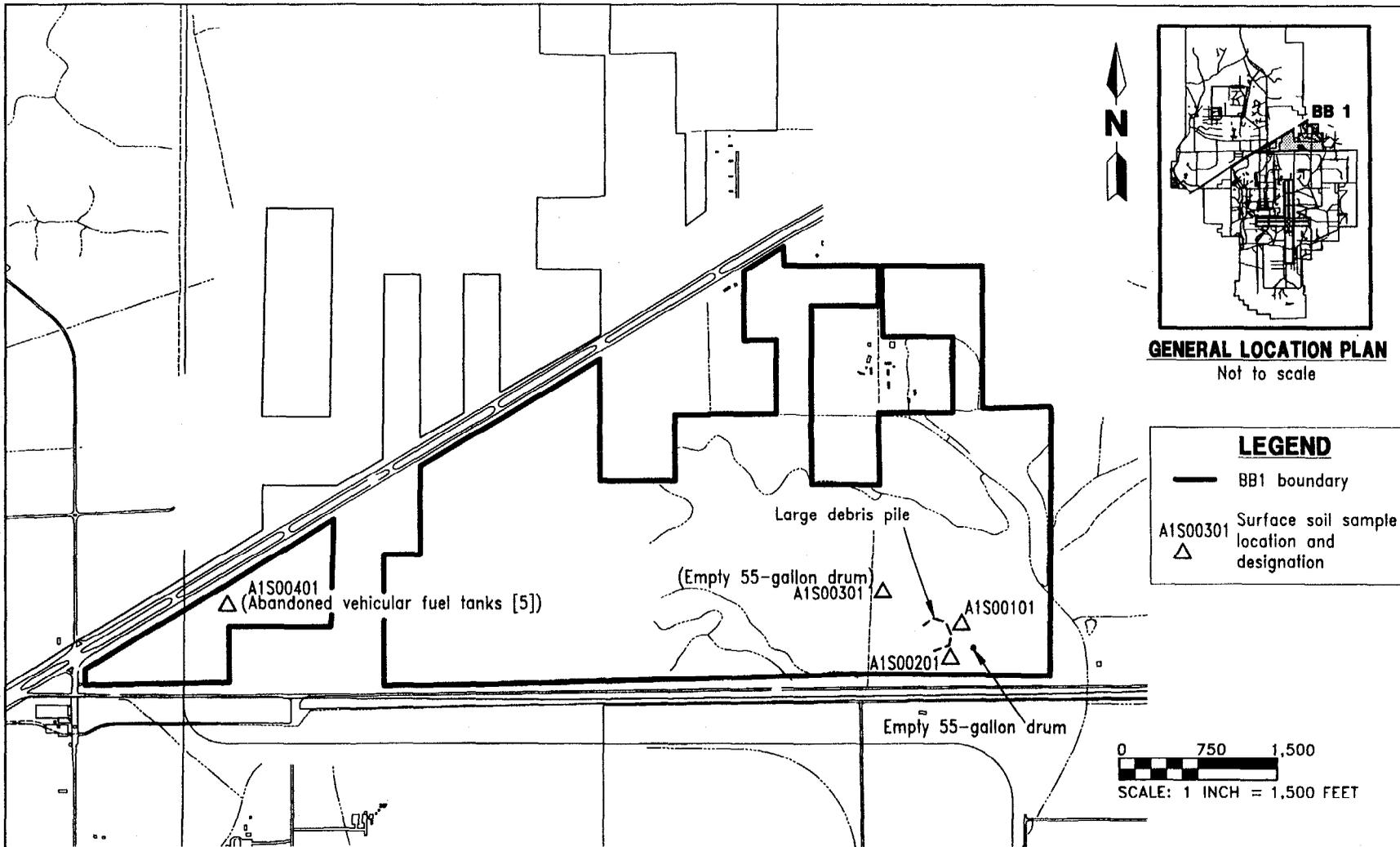


FIGURE 1
BB1 SAMPLE LOCATION PLAN



SAMPLING AND ANALYSIS
OUTLINE REPORT

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Other anomalies near the center of the northern edge of the survey grid, are attributable to the close proximity to the debris pile (refer to Appendix C).

One surface soil sample was collected from the 0 to 1-foot interval below land surface, at two separate locations downslope of the largest debris pile. In addition, the field crew collected surface soil samples in the area of abandoned fuel tanks, and adjacent to one of the empty 55-gallon drums. All four samples were analyzed for the full suite of target compound list organics and target analyte list inorganics.

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 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 Environmental Baseline Survey Report (ABB-ES, 1994b) and the Sampling and Analysis Outline (ABB-ES, 1995a).

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, 1996) 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 (HI).

Thirteen inorganic analytes, and 3 volatile organic compounds were detected in the surface soil samples collected and analyzed for BB1. A comparison between

concentrations of detected analytes in surface soil and USEPA RBCs and FDEP SCTLs is presented in Appendix A. No compounds or analytes were detected at concentrations in excess of NAS Cecil Field inorganic background data set values and SCTLs. Therefore, no HI or ELCR was calculated in association with a potential soil exposure scenario.

4.2 ECOLOGICAL PRELIMINARY RISK EVALUATION. BB1 is in a remote, and largely undeveloped planted pine area. Pathways of potential contaminant exposure 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. Pathways for soil invertebrates include direct contact and incidental ingestion of surface soil. Pathways for terrestrial plants include direct contact with surface soil. Protected species indigenous to the area, including the Gopher Tortoise, may utilize suitable habitat at BB1

A comparison between concentrations of detected analytes in surface soil, and terrestrial ecological screening criteria is presented in Appendix A. Chromium, detected at a concentration of 12 mg/kg at sample location ALS00401, was the only analyte detected at concentration in excess of NAS Cecil Field inorganic background data set values and terrestrial ecological screening criteria. The NAS Cecil Field inorganic background data set value, and the plant screening criteria for chromium are 7.5 mg/kg and 1 mg/kg, respectively. No stressed vegetation was observed at sample location ALS00401.

5.0 CONCLUSIONS AND RECOMMENDATIONS

All potential environmental concerns identified for the open area designated BB1, have been evaluated. Plant screening criteria for chromium were exceeded at one sample location. However no visible effects on the surrounding vegetation were noted. Based upon the findings of the Phase II Site Screening Investigation, the potential areas of environmental concern identified within BB1 do not contain represent a hazard to human health or the environment. The color classification for majority of the undeveloped area of BB1 should be classified 2/Light Green, to indicate that contaminants have been detected at concentrations which do not present a hazard to human health or the environment.

6.0 SELECTED 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 SOUTHNAVFACENGCOC, 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 (SOUTHNAVFACENGCOC), North Charleston, South Carolina (December).
- Florida Administrative Code. 1998. *Brownfields Cleanup Criteria Rule: Chapter 62-785*. 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. 1998. *Risk-Based Concentration Table*. Region III. Philadelphia, Pennsylvania.

APPENDIX A

PRELIMINARY RISK EVALUATION TABLES

**Preliminary Ecological Risk Evaluation Table for Analytes Detected in Surface Soil Samples
Main Base Open Area BB1, Naval Air Station Cecil Field**

Analyte	Samples				BKGRD	Screening Criteria		
	A1S00101	A1S00201	A1S00301	A1S00401		Plant Screening Value	Invertebrate Screening Value	Vertebrate Screening Value
1,1-Dichloroethane				0.0055		1000		
Methylene chloride			0.04	0.14		1000	150	6800
Trichloroethene	0.069	0.076				1000		96000
*Aluminum	2700	3600	820	320	4432.5	50		54000
Arsenic		0.7			2.0375	10	100	15
Cadmium				1.2	1.715	3	50	5.3
*Calcium	1300	13000		570	9.44			
*Chromium	5	5.5		12	7.75	1	50	14000
Iron	300	180	160	160	1486			
Lead	2.9	4.9	2.8	13	196.9	50	1190	260
Magnesium	37	110			328.65			
Manganese	1.2	2.9		1.9	21.95	500		5800
Mercury	0.029	0.04		0.048	0.16	0.3	36	3.9
Potassium	33				101.8			
*Vanadium	4	3			6.3	2		1100
Zinc	5.8			8.3	36.5	50	130	1600
TPH C8-C40	8.3		21	160				

Notes:

All detected analytes are reported (in mg/kg).

* Asterisk indicates screening criteria have been exceeded.

Screening Criteria

(refer to the Project Operations Plan, ABB-ES, 1995, Appendix A for details, acronyms and definitions)

**Preliminary Human Health Risk Evaluation Table for Analytes Detected in Surface Soil
Open Area BB1, Naval Air Station Cecil Field**

Analyte ¹	Samples				Screening Values			Calculated Risk Values ²	
	A1S00101	A1S00201	A1S00301	A1S00401	BKGRD	SCTL	RBC(R)	ELCR	HQ
1,1-Dichloroethane				5.5			7800000	n	
Methylene chloride			40	140		16000	85000	c	
Trichloroethene	69	76				4800	58000	c	
Aluminum	2700	3600	820	320	4432.5	72000	78000	n	
Arsenic		0.7			2.0375	0.8	0.43	c	
Cadmium				1.2	1.715	75	39	n	
Calcium	1300	13000		570	9.44				
Chromium	5	5.5		12	7.75	290	390	n	
Iron	300	180	160	160	1486	23000	23000	n	
Lead	2.9	4.9	2.8	13	196.9	500			
Magnesium	37	110			328.65				
Manganese	1.2	2.9		1.9	21.95	1600	1600	n	
Mercury	0.029	0.04		0.048	0.16	3.7	23	n	
Potassium	33				101.8				
Vanadium	4	3			6.3	15	550	n	
Zinc	5.8			8.3	36.5	23000	23000	n	
TPH C8-C40	8.3		21	160		350			

Notes:

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

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

Background screening criteria or SCTLs have been exceeded

GRD = 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 -- OPEN BASE AREA BB1
SURFACE SOIL -- VOLATILES -- REPORT REQUEST NO. 11091

Lab Sample Number: Site Locator Collect Date:	JR52891 BRAC A1S00101 04-FEB-99			JR52892 BRAC A1S00201 04-FEB-99			JR58651 BRAC A1S00301 13-MAR-99			JR58652 BRAC A1S00401 13-MAR-99						
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL				
EPA METHOD 8260																
Chloromethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Vinyl chloride	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Bromomethane	11 U		ug/kg	11	11 U		ug/kg	11	12 U		ug/kg	12	10 U		ug/kg	10
Chloroethane	11 U		ug/kg	11	11 U		ug/kg	11	12 U		ug/kg	12	10 U		ug/kg	10
1,1-Dichloroethene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Acetone	280 U		ug/kg	280	280 U		ug/kg	280	310 U		ug/kg	310	260 U		ug/kg	260
Carbon disulfide	280 U		ug/kg	280	280 U		ug/kg	280	310 U		ug/kg	310	260 U		ug/kg	260
Methylene chloride	28 U		ug/kg	28	28 U		ug/kg	28	40 U		ug/kg	31	140 U		ug/kg	26
trans-1,2-Dichloroethene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,1-Dichloroethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5.5 U		ug/kg	5
cis-1,2-Dichloroethene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
2-Butanone	110 U		ug/kg	110	110 U		ug/kg	110	120 U		ug/kg	120	100 U		ug/kg	100
Chloroform	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,1,1-Trichloroethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Carbon tetrachloride	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Benzene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,2-Dichloroethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Trichloroethene	69 U		ug/kg	6	76 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,2-Dichloropropane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Bromodichloromethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
cis-1,3-Dichloropropene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
4-methyl-2-pentanone	110 U		ug/kg	110	110 U		ug/kg	110	120 U		ug/kg	120	100 U		ug/kg	100
Toluene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
trans-1,3-Dichloropropene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,1,2-Trichloroethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Tetrachloroethene	17 U		ug/kg	17	17 U		ug/kg	17	19 U		ug/kg	19	16 U		ug/kg	16
2-Hexanone	110 U		ug/kg	110	110 U		ug/kg	110	120 U		ug/kg	120	100 U		ug/kg	100
Dibromochloromethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Chlorobenzene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Ethylbenzene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
m,p-Xylene	11 U		ug/kg	11	11 U		ug/kg	11	12 U		ug/kg	12	10 U		ug/kg	10
o-Xylene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Styrene	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
Bromoform	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5
1,1,2,2-Tetrachloroethane	6 U		ug/kg	6	6 U		ug/kg	6	6 U		ug/kg	6	5 U		ug/kg	5

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

NAS CECIL FIELD -- OPEN BASE AREA BB1
SURFACE SOIL -- SEMIVOLATILES -- REPORT REQUEST NO. 11092

Lab Sample Number:	JR52891	JR52892	JR58651	JR58652							
Site	BRAC	BRAC	BRAC	BRAC							
Locator	A1S00101	A1S00201	A1S00301	A1S00401							
Collect Date:	04-FEB-99	04-FEB-99	13-MAR-99	13-MAR-99							
VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL

EPA METHOD 8270

Acenaphthene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Acenaphthylene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Anthracene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzo (a) anthracene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzo (b) fluoranthene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzo (k) fluoranthene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzo (g,h,i) perylene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzo (a) pyrene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Benzylbutylphthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
bis(2-chloroethoxy) methane	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
bis(2-chloroethyl) ether	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
bis(2-chloroisopropyl) ether	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
bis(2-ethylhexyl) phthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
4-Bromophenylphenyl ether	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
2-Chloronaphthalene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Carbazole	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
4-Chlorophenyl-phenylether	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Chrysene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Dibenzo (a,h) anthracene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
1,2-Dichlorobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
1,3-Dichlorobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
1,4-Dichlorobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
3,3-Dichlorobenzidine	730 U	ug/kg	730	740 U	ug/kg	740	820 U	ug/kg	820	700 U	ug/kg	700
Diethylphthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Dimethylphthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Di-n-butylphthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Di-n-octylphthalate	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
2,4-Dinitrotoluene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
2,6-Dinitrotoluene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Fluoranthene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Fluorene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Hexachlorobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Hexachlorobutadiene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Hexachlorocyclopentadiene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Hexachloroethane	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Indeno (1,2,3-cd) pyrene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Isophorone	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
2-Methylnaphthalene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Naphthalene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Nitrobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
N-Nitrosodi-n-propylamine	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
N-Nitrosodiphenylamine	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Phenanthrene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Pyrene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
1,2,4-Trichlorobenzene	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
4-Chloroaniline	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
2-Nitroaniline	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
3-Nitroaniline	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
4-Nitroaniline	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350
Dibenzofuran	370 U	ug/kg	370	370 U	ug/kg	370	410 U	ug/kg	410	350 U	ug/kg	350

NAS CECIL FIELD -- OPEN BASE AREA BB1
 SURFACE SOIL -- SEMIVOLATILES -- REPORT REQUEST NO. 11092

Lab Sample Number:
 Site
 Locator
 Collect Date:

	JR52891			JR52892			JR58651			JR58652		
	BRAC			BRAC			BRAC			BRAC		
	A1S00101			A1S00201			A1S00301			A1S00401		
	04-FEB-99			04-FEB-99			13-MAR-99			13-MAR-99		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
4-Chloro-3-methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2-Chlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2,4-Dichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2,4-Dimethylphenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2,4-Dinitrophenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	2100	U	ug/kg	2100
4,6-dinitro-2-methylphenol	1100	U	ug/kg	1100	1100	U	ug/kg	1100	1200	U	ug/kg	1200
2-Nitrophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
4-Nitrophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
Pentachlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
Phenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2,4,6-Trichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2-Methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
3- & 4-Methylphenol (2)	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410
2,4,5-Trichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	410	U	ug/kg	410

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

NAS CECIL FIELD -- CORN BASE AREA BB1
 SURFACE SOIL -- PESTICIDES/PCBS -- REPORT REQUEST NO. 11093

Lab Sample Number:	JR52891	JR52892	JR58651	JR58652							
Site	BRAC	BRAC	BRAC	BRAC							
Locator	A1S00101	A1S00201	A1S00301	A1S00401							
Collect Date:	04-FEB-99	04-FEB-99	13-MAR-99	13-MAR-99							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

EPA METHOD 8081 (PESTICIDES)

alpha-BHC	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
gamma-BHC (Lindane)	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
beta-BHC	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Heptachlor	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
delta-BHC	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Aldrin	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Heptachlor epoxide	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Chlordane gamma	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Chlordane alpha	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endosulfan I	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
4,4-DDE	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Dieldrin	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endrin	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
4,4-DDD	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endosulfan II	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
4,4-DDT	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endrin aldehyde	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endosulfan sulfate	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Methoxychlor	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Endrin ketone	3.7 U	ug/kg	3.7	3.7 U	ug/kg	3.7	4.1 U	ug/kg	4.1	3.5 U	ug/kg	3.5
Toxaphene	73 U	ug/kg	73	74 U	ug/kg	74	82 U	ug/kg	82	69 U	ug/kg	69

EPA METHOD 8082 (PCBS)

Aroclor-1016/1242	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35
Aroclor-1221	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35
Aroclor-1232	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35
Aroclor-1248	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35
Aroclor-1254	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35
Aroclor-1260	37 U	ug/kg	37	37 U	ug/kg	37	41 U	ug/kg	41	35 U	ug/kg	35

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

NAS CECIL FIELD -- OPEN BASE AREA B81
 SURFACE SOIL -- INORGANICS -- REPORT REQUEST NO. 11094

Lab Sample Number:	JR52891	JR52892	JR58651	JR58652					
Site	BRAC	BRAC	BRAC	BRAC					
Locator	A1S00101	A1S00201	A1S00301	A1S00401					
Collect Date:	04-FEB-99	04-FEB-99	13-MAR-99	13-MAR-99					
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

TOTAL METALS

Aluminum	2700	mg/kg	22	3600	mg/kg	22	820	mg/kg	25	320	mg/kg	21
Antimony	2 U	mg/kg	2	2 U	mg/kg	2	2 U	mg/kg	2	2 U	mg/kg	2
Arsenic	.6 U	mg/kg	.6	.7 J	mg/kg	.6	.6 U	mg/kg	.6	.5 U	mg/kg	.5
Barium	22 U	mg/kg	22	22 U	mg/kg	22	25 U	mg/kg	25	21 U	mg/kg	21
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	1.2	mg/kg	1
Calcium	1300	mg/kg	28	13000	mg/kg	280	31 U	mg/kg	31	570	mg/kg	26
Chromium	5	mg/kg	1	5.5	mg/kg	1	1 U	mg/kg	1	12	mg/kg	1
Cobalt	6 U	mg/kg	6	6 U	mg/kg	6	6 U	mg/kg	6	5 U	mg/kg	5
Copper	6 U	mg/kg	6	6 U	mg/kg	6	6 U	mg/kg	6	5 U	mg/kg	5
Iron	300	mg/kg	11	180	mg/kg	11	160	mg/kg	12	160	mg/kg	10
Lead	2.9	mg/kg	1	4.9	mg/kg	1	2.8	mg/kg	1	13	mg/kg	1
Magnesium	37	mg/kg	28	110	mg/kg	28	31 U	mg/kg	31	26 U	mg/kg	26
Manganese	1.2	mg/kg	1	2.9	mg/kg	1	1 U	mg/kg	1	1.9	mg/kg	1
Mercury	.029	mg/kg	.01	.04	mg/kg	.01	.01 U	mg/kg	.01	.048	mg/kg	.01
Nickel	6 U	mg/kg	6	6 U	mg/kg	6	6 U	mg/kg	6	5 U	mg/kg	5
Potassium	33	mg/kg	28	28 U	mg/kg	28	31 U	mg/kg	31	26 U	mg/kg	26
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	28 U	mg/kg	28	28 U	mg/kg	28	31 U	mg/kg	31	26 U	mg/kg	26
Thallium	1 U	mg/kg	1	1 U	mg/kg	1	1 U	mg/kg	1	1 U	mg/kg	1
Vanadium	4	mg/kg	1	3	mg/kg	1	1 U	mg/kg	1	1 U	mg/kg	1
Zinc	5.8	mg/kg	6	6 U	mg/kg	6	6 U	mg/kg	6	8.3	mg/kg	5

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

NAS CECIL FIELD -- OPEN BASE AREA BB1
 SURFACE SOIL -- TPH -- REPORT REQUEST NO. 11095

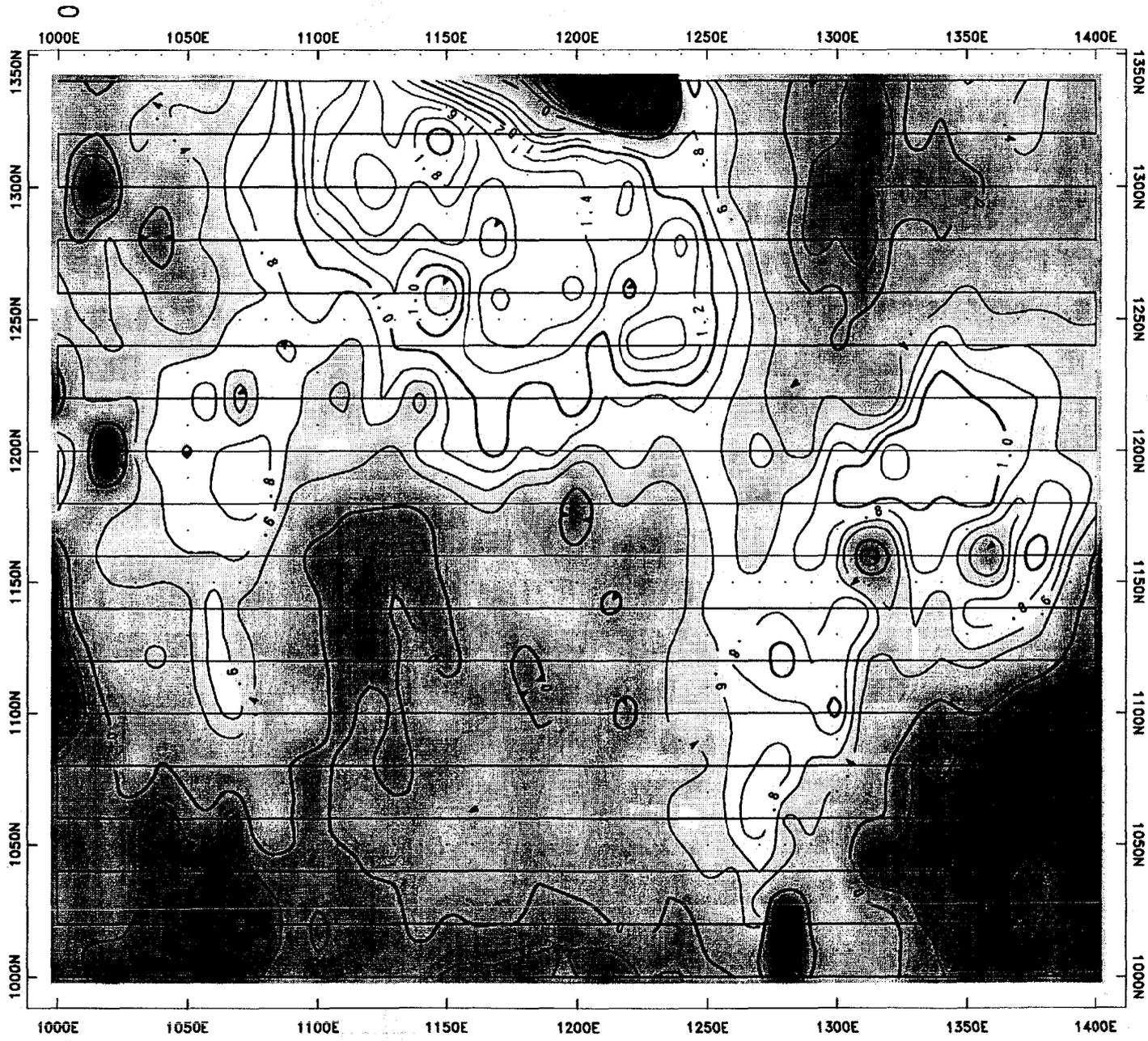
Lab Sample Number:	JR52891	JR52892	JR58651	JR58652							
Site	BRAC	BRAC	BRAC	BRAC							
Locator	A1S00101	A1S00201	A1S00301	A1S00401							
Collect Date:	04-FEB-99	04-FEB-99	13-MAR-99	13-MAR-99							
VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

FLA PRO												
TPH C8-C40	8.3	mg/kg	7.3	7.4 U	mg/kg	7.4	21	mg/kg	8.2	160	mg/kg	6.9

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

APPENDIX C

GEOPHYSICAL CONTOUR MAPS



CONTOUR INTERVAL: 0.2/1.0 MMHOS/METER

SOUTHERN DIVISION

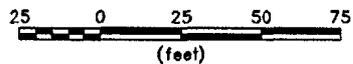
QUADRATURE CONTOURS

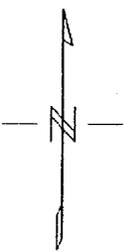
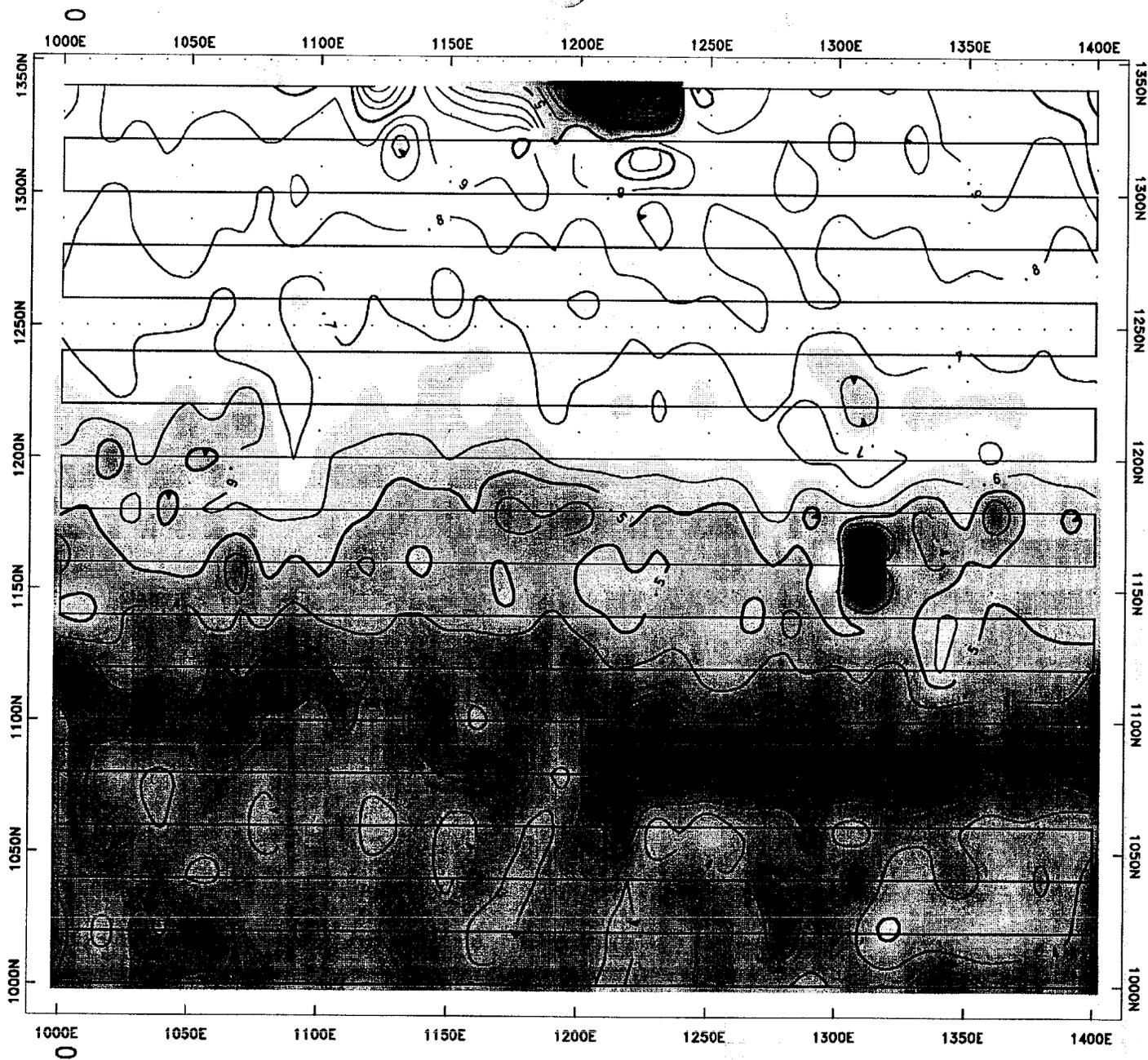
NAS, CECIL FIELD

BB1

ABB ENVIRONMENTAL SERVICES, INC.

Scale 1:720





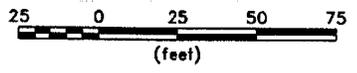
CONTOUR INTERVAL: 0.1/0.5 (UNITLESS)

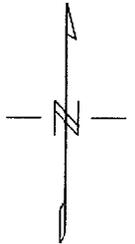
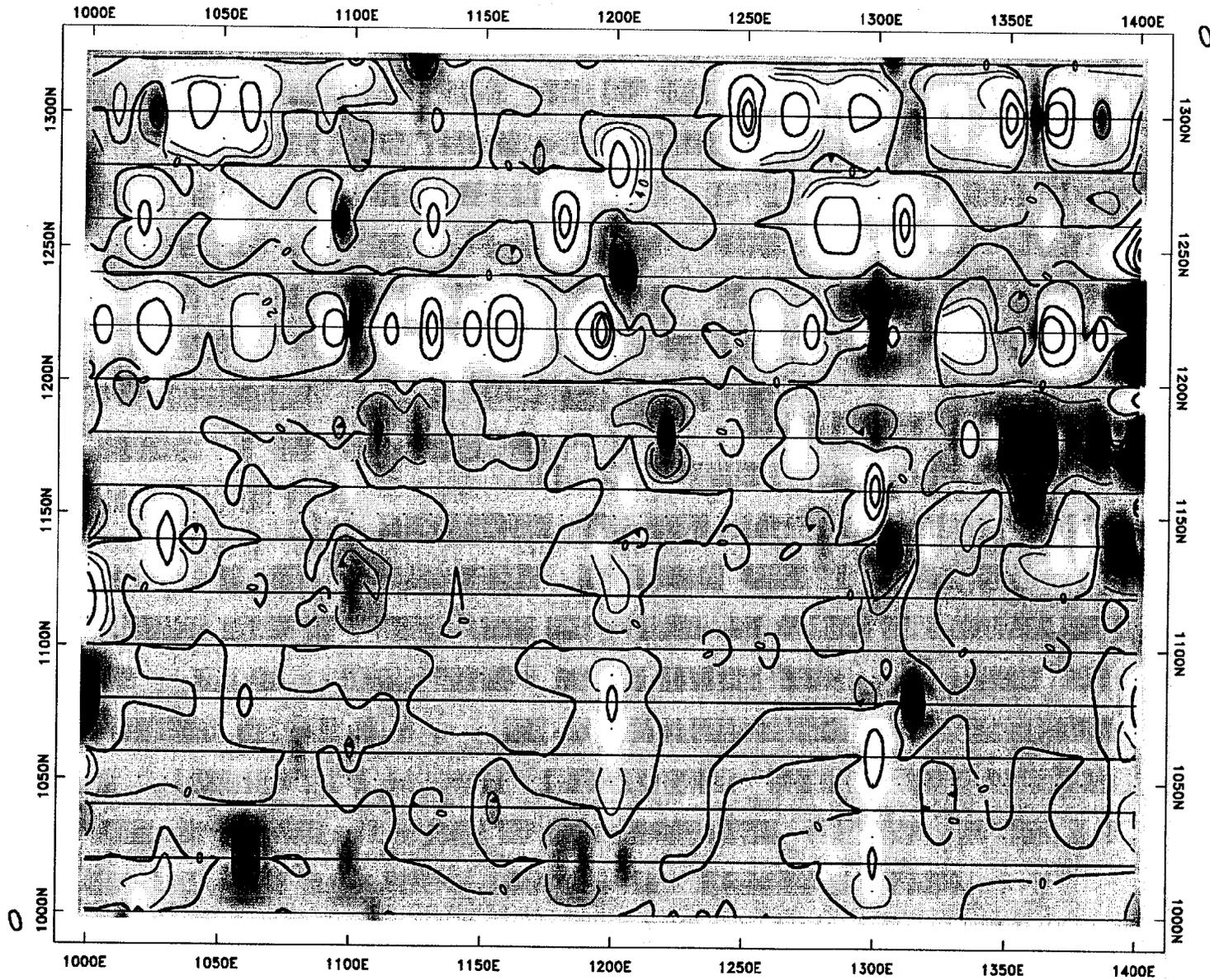
SOUTHERN DIVISION

INPHASE CONTOURS
 NAS, CECIL FIELD
 BB1

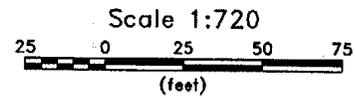
ABB ENVIRONMENTAL SERVICES, INC.

Scale 1:720





CONTOUR INTERVAL: 20/100 GAMMAS/METER



SOUTHERN DIVISION
VERTICAL GRADIENT CONTOURS NAS, CECIL FIELD BB1
ABB ENVIRONMENTAL SERVICES, INC.