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ANNUAL NATURAL ATTENUATION GROUNDWATER MONITORING REPORT YEAR 1 FOR  
OPERABLE UNIT 2 (OU 2) SITE 5 NAS CECIL FIELD FL  
9/1/1999  
TETRA TECH NUS INC

**Annual Natural Attenuation  
Groundwater Monitoring Report –  
Year 1  
for  
Operable Unit 2, Site 5**

Naval Air Station Cecil Field  
Jacksonville, Florida



**Southern Division  
Naval Facilities Engineering Command  
Contract Number N62467-94-D-0888  
Contract Task Order 0066**

September 1999

**ANNUAL NATURAL ATTENUATION  
GROUNDWATER MONITORING REPORT – YEAR 1**

**FOR**

**OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29406**

**Submitted by:  
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**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0066**

**SEPTEMBER 1999**

**PREPARED UNDER THE SUPERVISION OF:**

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CERTIFICATION OF TECHNICAL  
DATA CONFORMITY

The Contractor, Tetra Tech NUS, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-94-D-0888 are complete and accurate and comply with all requirements of this contract.

DATE: \_\_\_\_\_ September 15, 1999 \_\_\_\_\_

NAME AND TITLE OF CERTIFYING OFFICAL:                      Mark Speranza, P.E.  
Task Order Manager

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## ACRONYMS

ABB-ES	ABB Environmental Services
BEHP	bis (2-ethylhexyl) phthalate
BOD	Biochemical oxygen demand
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Chemical of concern
COD	Chemical oxygen demand
CTO	Contract Task Order
DCE	Dichloroethene
FDEP	Florida Department of Environmental Protection
HLA	Harding Lawson Associates
NAS	Naval Air Station
ORP	Oxidation-reduction potential
OU	Operable unit
RI	Remedial Investigation
SVOC	Semivolatile organic compound
TCE	Trichloroethene
TOC	Total organic carbon
T.O.C.	Top of casing
TPRH	Total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech NUS, Incorporated
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile organic compound

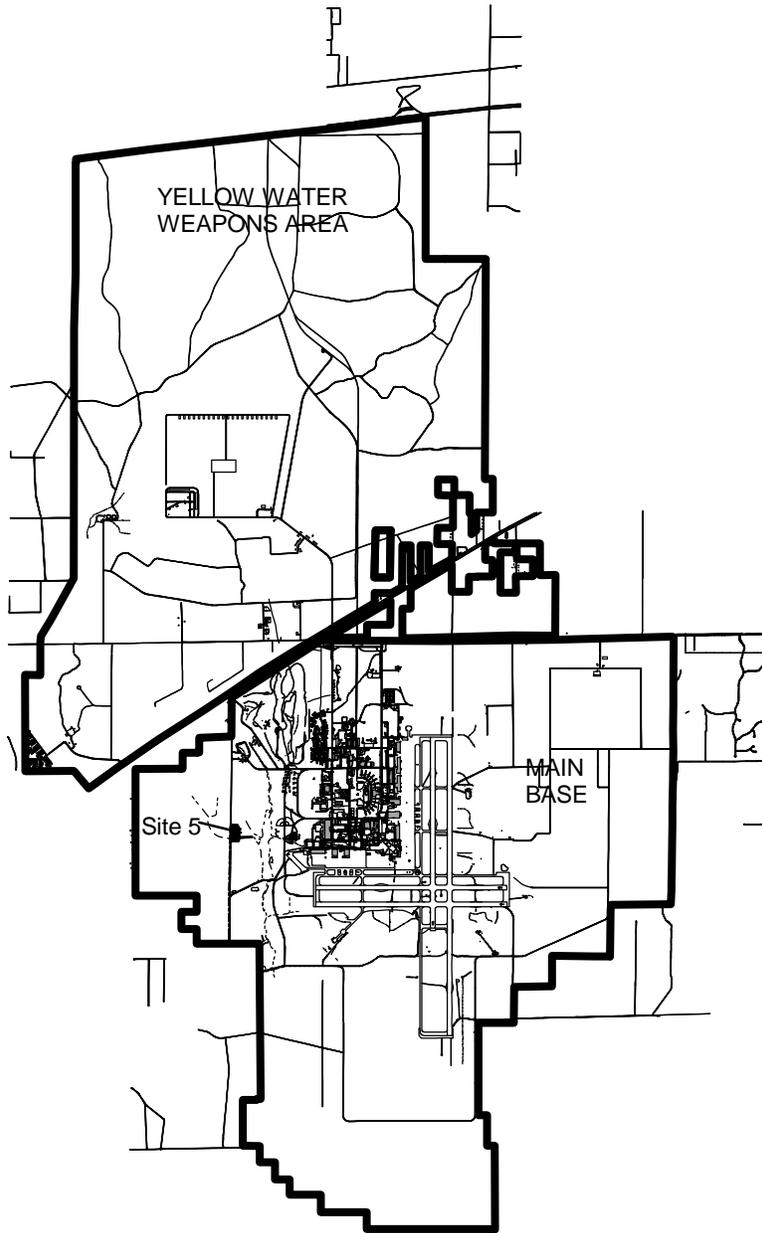
## 1.0 INTRODUCTION

This Annual Natural Attenuation Groundwater Monitoring Report – Year 1 presents a summary of the work performed during the first year of quarterly groundwater monitoring at Operable Unit (OU) 2, Site 5 at the Naval Air Station (NAS) Cecil Field, located in Jacksonville, Florida (see Figures 1-1 and 1-2). This report was prepared under Contract Task Order (CTO) 066 as part of the Comprehensive Long-Term Environmental Action Navy III (CLEAN) Contract No. N62467-94-D-0888 for the Southern Division, Naval Facilities Engineering Command. Tetra Tech NUS, Incorporated (TtNUS) collected and analyzed groundwater samples from monitoring wells for selected site chemicals of concern (COCs) and natural attenuation parameters as part of the following four monitoring events at OU 2, Site 5:

- Baseline/first quarter sampling (Year 1) – August 1998
- Second quarter (Year 1) – November/December 1998
- Third quarter (Year 1) – February 1999
- Fourth quarter (Year 1) – May 1999.

Shallow monitoring wells CEF-05-LTM-01, CEF-05-LTM-02, and CEF-05-LTM-03 were installed in August 1998 prior to the first quarter sampling event. Wells CEF-05-LTM-04 and CEF-05-LTM-05 were installed in February 1999 and sampled during the third and fourth quarter events. For the fourth quarter sampling event, a temporary well point (CEF-05-WP) was installed and sampled in the drainage ditch south of the former disposal pit to evaluate potential contaminant migration to surface water. Existing well CEF-05-7S was sampled to provide background/upgradient groundwater data. This well was sampled during the first, second, and third quarters but was dry during fourth quarter sampling.

Water-level measurements and calculated potentiometric surface elevations obtained during the four sampling events are presented on Table 1-1. A potentiometric surface elevation map for the fourth quarter sampling event is presented in Figure 1-3.



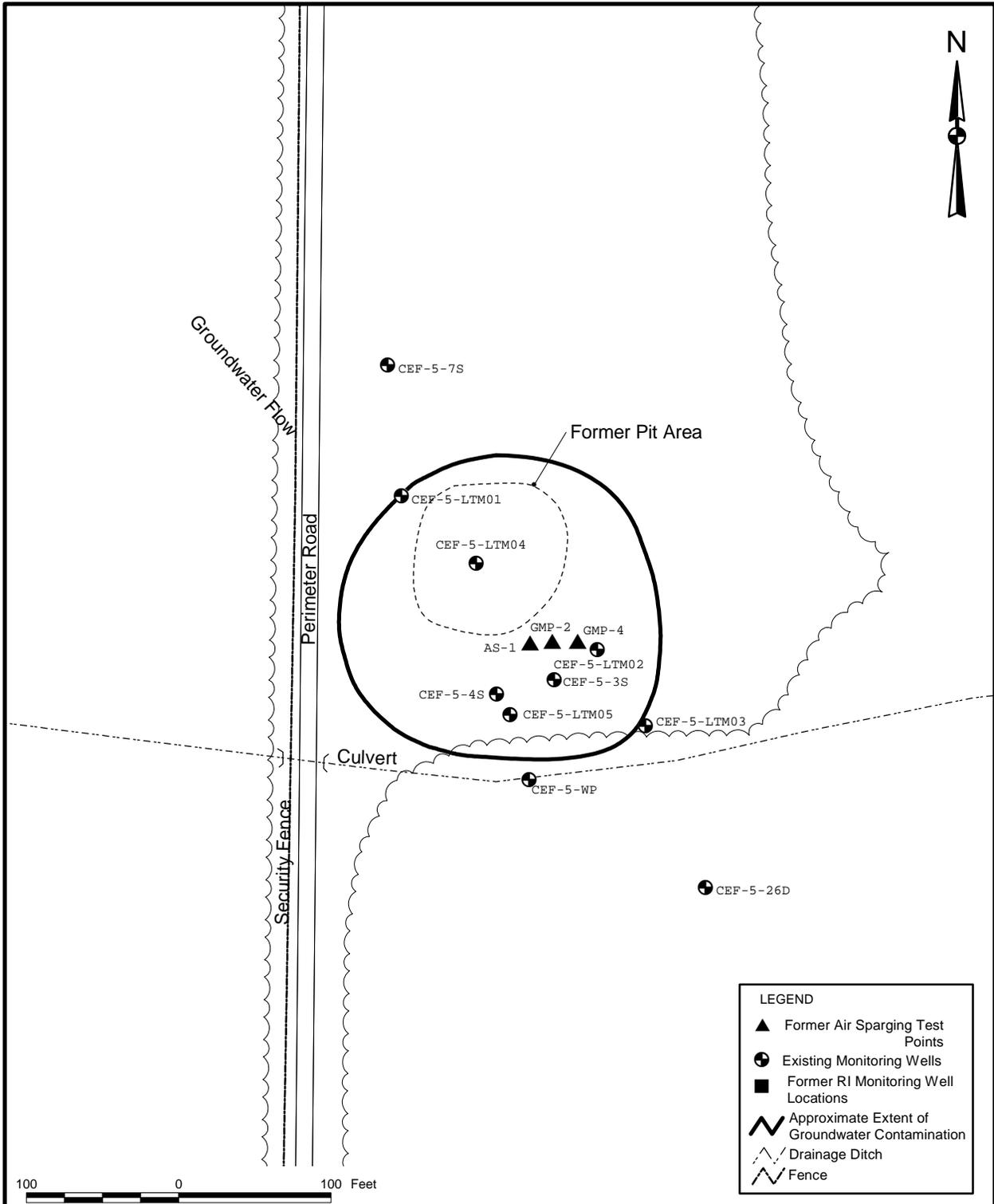
8000 0 8000 Feet

DRAWN BY <b>YLI</b>	DATE <b>1/26/99</b>
CHECKED BY <b>RD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



GENERAL LOCATION MAP  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
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DRAWING NO. <b>FIGURE 1-1</b>	REV <b>0</b>



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CHECKED BY <b>RD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



SITE LOCATION MAP  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
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DRAWING NO. <b>FIGURE 1-2</b>	REV <b>0</b>

TABLE 1-1

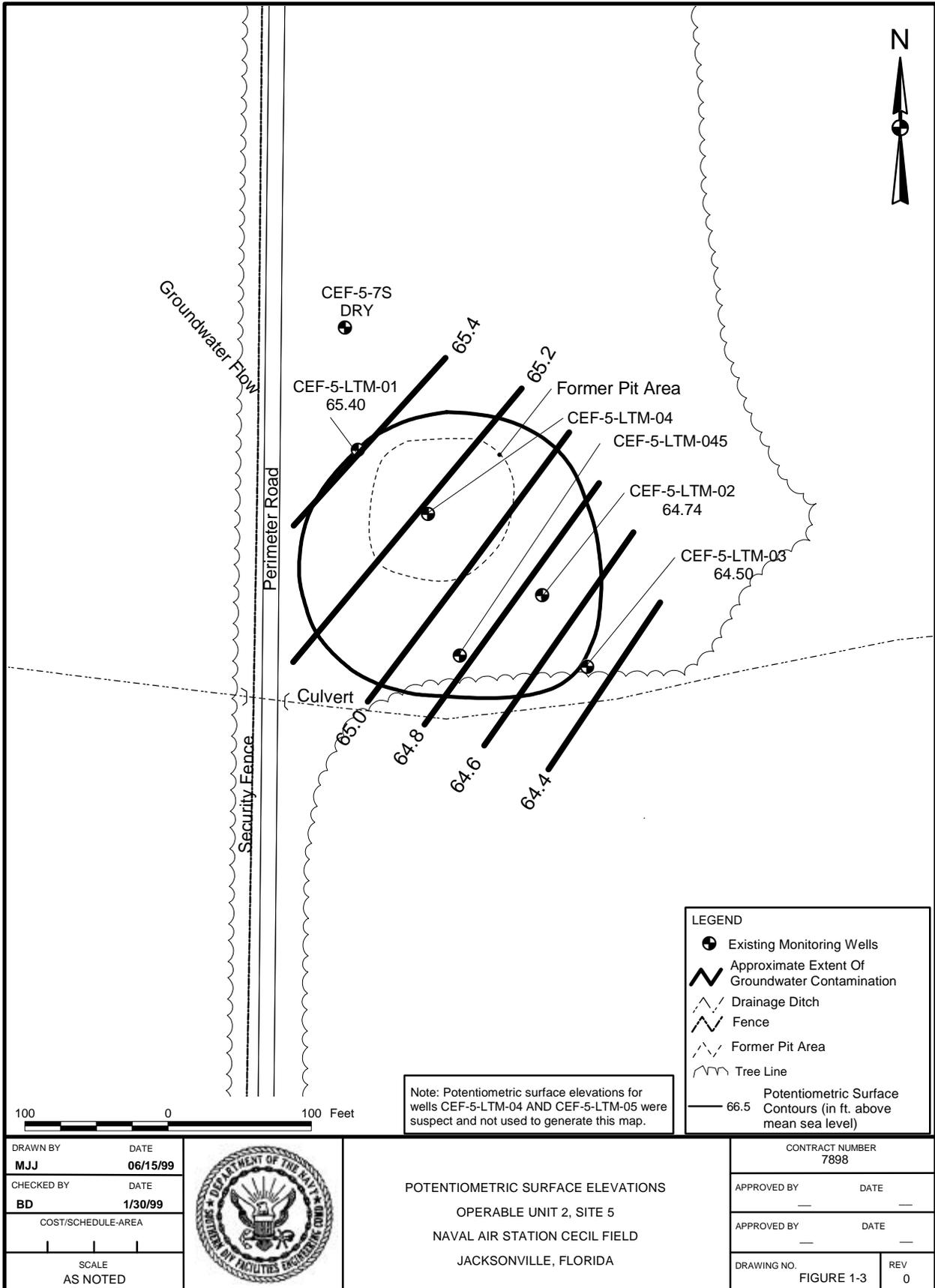
WATER-LEVEL MEASUREMENTS AND POTENTIOMETRIC SURFACE ELEVATIONS  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

Well Number	Top of Casing Elevation	Ground Surface Elevation	August 1998		November 1998		February 1999		May 1999	
			Depth to Groundwater (from T.O.C.)	Groundwater Elevation	Depth to Groundwater (from T.O.C.)	Groundwater Elevation	Depth to Groundwater (from T.O.C.)	Groundwater Elevation	Depth to Groundwater (from T.O.C.)	Groundwater Elevation
CEF-5-7S	73.90	70.70	5.94	67.96	6.50	67.40	6.30	67.60	Dry	-
CEF-5-LTM-01	73.02	69.80	5.35	67.67	5.81	67.21	5.58	67.44	7.62	65.40
CEF-5-LTM-02	71.30	68.40	4.23	67.07	4.69	66.61	4.49	66.81	6.56	64.74
CEF-5-LTM-03	69.25	66.30	3.42	65.83	3.50	65.75	3.58	65.67	4.75	64.50
CEF-5-LTM-04	71.24	68.25	-	-	-	-	5.31	65.93	7.34	63.90
CEF-5-LTM-05	69.29	66.35	-	-	-	-	3.84	65.45	5.99	63.30

T.O.C. = Top of casing.

All elevations are in feet above mean sea level.

Wells CEF-5-LTM-04 and CEF-5-LTM-05 were installed in February 1999.



100 0 100 Feet

Note: Potentiometric surface elevations for wells CEF-5-LTM-04 AND CEF-5-LTM-05 were suspect and not used to generate this map.

LEGEND	
	Existing Monitoring Wells
	Approximate Extent Of Groundwater Contamination
	Drainage Ditch
	Fence
	Former Pit Area
	Tree Line
	Potentiometric Surface Contours (in ft. above mean sea level)
	66.5

DRAWN BY <b>MJJ</b>	DATE <b>06/15/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



POTENTIOMETRIC SURFACE ELEVATIONS  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7898	
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DRAWING NO. FIGURE 1-3	REV 0

## 2.0 SITE CHEMICALS OF CONCERN

The COCs for OU 2, Site 5 that were identified during the Remedial Investigation (RI) include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, total recoverable petroleum hydrocarbons (TRPH), and metals, as listed below [ABB Environmental Services (ABB-ES), 1995]:

- Acetone
- Benzene
- Trichloroethene (TCE)
- Ethylbenzene
- Toulene
- Total xylenes
- 4-Methylphenol
- bis(2-ethylhexyl) phthalate (BEHP)
- Naphthalene
- 2,4-Dimethylphenol
- Alpha-chlordane
- Beta-HCH
- TRPH
- Antimony
- Arsenic
- Beryllium
- Cadmium
- Chromium
- Manganese
- Vanadium

### 3.0 ANALYTICAL RESULTS AND EVALUATION

The frequency of detection and ranges of positive values for COCs are presented in Table 3-1. Table 3-2 provides a summary of analytical results for OU 2, Site 5 monitoring wells. Figures 3-1, 3-2, 3-3, and 3-4 present quarterly analytical results for VOC, SVOC, TRPH, and inorganic COCs, respectively. Table 3-3 is a summary of natural attenuation indicator parameter data for the site. Figures 3-5 through 3-13 present natural attenuation data from the first year of monitoring at OU 2, Site 5. Figure 3-14 presents isopleth maps of COC and key indicator parameter data for the fourth quarterly monitoring event (May 1999). Analytical data from the fourth quarter sampling event are provided in Appendix A.

Reductions in concentrations of VOCs since the RI indicate that natural attenuation is occurring at OU 2, Site 5. Maximum detected concentrations of VOC, SVOC, pesticide, and inorganic COCs as well as TRPH have decreased significantly since the RI. In general, concentrations of COCs remained relatively consistent or decreased over the first year of groundwater monitoring at the site. In addition, COCs do not appear to be migrating beyond site boundaries or discharging into the drainage ditch south of the former disposal pit at unacceptable levels.

COCs that have not been detected in excess of groundwater target cleanup goals during the first year of monitoring include

- Acetone
- Ethylbenzene
- Toluene
- 2,4-Dimethylphenol
- Antimony
- Arsenic
- Beryllium
- Cadmium
- Chromium

BEHP was detected during third quarter sampling in CEF-05-LTM03 at 8 µg/L and CEF-05-LTM01 at 1J µg/L. The target cleanup goal for BEHP is 6 µg/L. BEHP is a common field/laboratory contaminant that is encountered on plastic materials, gloves, tubing, and plastic containers. BEHP is of minimal concern at the site due to its potential for being a field/laboratory contaminant, and its infrequent detection and low concentrations over the past four quarterly sampling events.

TABLE 3-1

FREQUENCY OF DETECTIONS IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA  
PAGE 1 OF 2

Parameter	Previous Investigations		First Quarter August 1998				Second Quarter November 1998			
	FREQUENCY OF DETECTION	MAXIMUM CONCENTRATION	FREQUENCY OF DETECTION	RANGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION	AVERAGE OF DETECTS	FREQUENCY OF DETECTION	RANGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION	AVERAGE OF DETECTS
<b>VOLATILE ORGANIC COMPOUNDS (µg/L)</b>										
Acetone	14 / 30	1,100	1 / 1	12	CEF-05-LTM-02	12	ND	-	-	-
Benzene	3 / 30	16	3 / 6	0.2 - 0.6	CEF-05-LTM-02	0.3	1 / 5	0.6	CEF-05-LTM-02	0.6
Ethylbenzene	9 / 30	41	3 / 6	1 - 2.8	CEF-05-LTM-02	1.6	2 / 5	1.8 - 2.7	CEF-05-LTM-02	2.2
Toluene	5 / 30	180	2 / 6	1.5 - 1.8	CEF-05-LTM-01	1.6	2 / 5	3.5 - 5.2	CEF-05-LTM-01	4.3
Trichloroethene	3 / 9	4.3	4 / 6	0.3 - 12	CEF-05-LTM-01	6.2	2 / 5	1.1 - 5.6	CEF-05-LTM-01	3.3
Xylenes, Total	8 / 30	200	3 / 6	9.2 - 14	CEF-05-LTM-02	10.9	2 / 4	13.7 - 15.2	CEF-05-LTM-01	14.5
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)</b>										
2,4-Dimethylphenol	6 / 30	110	2 / 5	1 - 10	CEF-05-LTM-02	5.5	1 / 4	6 - 8	CEF-05-LTM-02	7
4-Methylphenol	9 / 30	820 J	1 / 5	10	CEF-05-LTM-02	10	1 / 4	12 - 17	CEF-05-LTM-02	14
BEHP	9 / 30	130 J	0 / 4	-	-	-	0 / 4	-	-	-
Naphthalene	10 / 30	270	ND	-	-	-	2 / 4	15 - 32	CEF-05-LTM-02	21
<b>PESTICIDES (ug/L)</b>										
Alpha-chlordane	-	0.15	ND	-	-	-	ND	-	-	-
beta-BHC	-	0.18	ND	-	-	-	ND	-	-	-
<b>PETROLEUM HYDROCARBONS (mg/L)</b>										
TRPH	-	160	4 / 5	1.1 - 10.8	CEF-05-LTM-02	4.2	2 / 4	1.1 - 11.8	CEF-05-LTM-02	6.2
<b>INORGANICS (ug/L)</b>										
Antimony	2 / 30	29.4 J	ND	-	-	-	ND	-	-	-
Arsenic	21 / 30	79 J	ND	-	-	-	ND	-	-	-
Beryllium	4 / 30	12.5	ND	-	-	-	ND	-	-	-
Cadmium	4 / 30	5.9	ND	-	-	-	ND	-	-	-
Chromium	27 / 30	583 J	1 / 5	6.7	CEF-05-LTM-03	6.7	ND	-	-	-
Manganese	23 / 30	263	5 / 5	6.2 - 216	CEF-05-LTM-02	105.5	4 / 4	10.2 - 30.1	CEF-05-LTM-02	18.1
Vanadium	27 / 30	489	3 / 5	22.3 - 140	CEF-05-LTM-02	68.2	3 / 4	5.9 - 94.3	CEF-05-LTM-02	34.8

TABLE 3-1

FREQUENCY OF DETECTIONS IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA  
PAGE 2 OF 2

Parameter	Third Quarter February 1998				Fourth Quarter May 1998			
	FREQUENCY OF DETECTION	RANGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION	AVERAGE OF DETECTS	FREQUENCY OF DETECTION	RANGE OF DETECTIONS	LOCATION OF MAXIMUM DETECTION	AVERAGE OF DETECTS
<b>VOLATILE ORGANIC COMPOUNDS (µg/L)</b>								
Acetone	2 / 6	6.45 - 9.9	CEF-05-LTM-05	8.2	3 / 3	4.9 - 13.8	CEF-05-LTM-02	8.1
Benzene	3 / 6	0.6 - 2	CEF-05-LTM-05	1.1	2 / 6	0.75 - 0.78	CEF-05-LTM-04	0.77
Ethylbenzene	4 / 6	2.2 - 10.1	CEF-05-LTM-05	5.6	4 / 6	1.9 - 7	CEF-05-LTM-04	3.6
Toluene	4 / 6	5.3 - 28.1	CEF-05-LTM-05	12.3	4 / 6	4.2 - 20.3	CEF-05-LTM-05	10.2
Trichloroethene	4 / 6	1.35 - 33.7	CEF-05-LTM-04	13.6	4 / 6	1.4 - 14.7	CEF-05-LTM-04	7.3
Xylenes, Total	4 / 6	19.7 - 49	CEF-05-LTM-05	31.8	4 / 6	8.4 - 34.6	CEF-05-LTM-04	20.2
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)</b>								
2,4-Dimethylphenol	4 / 6	1 - 20	CEF-05-LTM-05	7.6	3 / 6	3.7 - 11.2	CEF-05-LTM-05	8.3
4-Methylphenol	3 / 6	1 - 60	CEF-05-LTM-05	24.2	2 / 6	15.5 - 26.5	CEF-05-LTM-05	21
BEHP	2 / 6	1 - 8	CEF-05-LTM-04	4.5	1 / 6	4.7	CEF-05-LTM-03	2.9
Naphthalene	4 / 6	2 - 82	CEF-05-LTM-05	35.4	4 / 6	30.5 - 58.8	CEF-05-LTM-05	42.3
<b>PESTICIDES (ug/L)</b>								
Alpha-chlordane	ND - 0.15	0.15	CEF-05-LTM-02	0.15	ND	-	-	-
beta-BHC	ND	-	-	-	ND	-	-	-
<b>PETROLEUM HYDROCARBONS (mg/L)</b>								
TRPH	4 / 6	1.08 - 13	CEF-05-LTM-05	6.1	4 / 6	1.6 - 10.2	CEF-05-LTM-02	5.9
<b>INORGANICS (ug/L)</b>								
Antimony	ND	-	-	-	ND	-	-	-
Arsenic	ND	-	-	-	1 / 6	20	CEF-05-LTM-01	20
Beryllium	ND	-	-	-	ND	-	-	-
Cadmium	ND	-	-	-	ND	-	-	-
Chromium	2 / 6	5.2 - 8.95	CEF-05-LTM-02	7.1	2 / 6	19.2 - 29.2	CEF-05-LTM-03	24.2
Manganese	6 / 6	6.2 - 29.1	CEF-05-LTM-04	16.9	5 / 6	10.2 - 29.3	CEF-05-LTM-03	18.6
Vanadium	6 / 6	1.2 - 235	CEF-05-LTM-05	55.7	4 / 6	5.8 - 122	CEF-05-LTM-05	59.6

ND = Not detected.

TRPH = Total recoverable petroleum hydrocarbons.

BEHP = bis(2-ethylhexyl) phthalate.

TABLE 3-2

SUMMARY OF CHEMICALS OF CONCERN IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA  
 PAGE 1 OF 3

PARAMETER	Ground Water Target Cleanup Goal	Surface Water Target Cleanup Goal	CEF-5-7S				CEF-05-LTM01				
			Aug-98	Nov-98	Feb-99	May-99 <sup>(1)</sup>	Aug-98		Nov-98	Feb-99	May-99
							Sample	Duplicate			
<b>VOLATILE ORGANIC COMPOUNDS (ug/L)</b>											
ACETONE	700	1,692	10 UR	10 UR	10 UR	NA	10 UR	10 UR	10 UR	10 UR	4.9 J
BENZENE	1	71.28	1 U	1 U	1 U	NA	0.2 J	0.2 J	1 U	1 U	1 U
ETHYLBENZENE	30	605	5 U	5 U	5 U	NA	1 J	1 J	1.8 J	2.2 J	2.2
TOLUENE	40	475	5 U	5 U	5 U	NA	1.8 J	1.5 J	5.2	5.5	4.2
TRICHLOROETHENE	3	80.7	3 U	3 U	3 U	NA	11	12	5.6	7.9	10.7
XYLENES, TOTAL	20	370	5 U	5 U	5 U	NA	9.6	9.2	15.2	19.7	17.6
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)</b>											
2,4-DIMETHYLPHENOL	140	261	11 U	11 U	10 U	NA	10 U	10 U	10 U	1 J	10 U
4-METHYLPHENOL	4	70	4 U	4 U	4 U	NA	4 U	4 U	4 U	4 U	4 U
BEHP	6	0.02	4 U	4 U	4 U	NA	12 U	4 U	4 U	1 J	5 U
NAPHTHALENE	20	26	6 U	6 U	6 U	NA	6 U	6 U	15	15	30.5
<b>PESTICIDES (ug/L)</b>											
ALPHA-CHLORDANE	2	0.00059	0.05 U	0.053 U	0.051 U	NA	0.052 U	0.052 U	0.052 U	0.052 U	0.1 U
BETA-BHC	0.02	0.046	0.02 U	0.021 U	0.020 U	NA	0.021 U	0.021 U	0.021 U	0.021 U	0.05 U
<b>PETROLEUM HYDROCARBONS (mg/L)</b>											
TRPH	5	5	0.5 U	0.5 U	0.5 U	NA	3.43	1.1	1.1	1.08	1.6
<b>INORGANICS (ug/L)</b>											
ANTIMONY	44.5*	4,300	5 U	5.0 U	3.8 U	NA	5 U	5 U	5.0 U	2.6 U	6.7 U
ARSENIC	50	50	10 U	5.0 U	3.6 U	NA	10 U	10 U	5.0 U	3.6 U	20
BERYLLIUM	4	0.13	3 U	3.0 U	0.10 U	NA	3 U	3 U	3.0 U	0.10 U	1.9 U
CADMIUM	6*	**	3 U	3.0 U	0.36 U	NA	3 U	3 U	3.0 U	0.30 U	0.79 U
CHROMIUM	100	-	5 U	5.0 U	1.5 U	NA	5 U	5 U	5.0 U	0.73 U	3 U
MANANESE	96.2*	-	6.2	14.1	10.9	NA	131	108	10.2	6.2	10.2
VANADIUM	49	-	22.3	6.4	7.9	NA	5 U	5 U	5.0 U	1.2	5.8

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3-4

CTO 0066

TABLE 3-2

**SUMMARY OF CHEMICALS OF CONCERN IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA  
PAGE 2 OF 3**

PARAMETER	Ground Water Target Cleanup Goal	Surface Water Target Cleanup Goal	CEF-05-LTM02						CEF-05-LTM03				
			Aug-98	Nov-98		Feb-99		May-99	Aug-98	Nov-98	Feb-99	May-99	
				Sample	Duplicate	Sample	Duplicate					Sample	Duplicate
<b>VOLATILE ORGANIC COMPOUNDS (ug)</b>													
ACETONE	700	1,692	12 J	10 UR	10 UR	6.5 J	6.4 J	13.8 J	10 UR	10 UR	10 UR	5 UR	5 UR
BENZENE	1	71.28	0.6 J	0.6 J	0.6 J	0.8 J	0.8 J	0.75 J	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	30	605	2.8 J	2.6 J	2.7 J	3.4 J	3.5 J	3.4	5 U	5 U	5 U	1 U	1 U
TOLUENE	40	475	5 U	3.5 J	3.5 J	5.4 J	5.2	5.8	5 U	5 U	5 U	1 U	1 U
TRICHLOROETHENE	3	80.7	1.8 J	1.1 J	1.1 J	1.4 J	1.3 J	1.4	3 U	3 U	3 U	1 U	1 U
XYLENES, TOTAL	20	370	14	13.7	13.9	20.3	21.4	20.1	5 U	5 U	5 U	3 U	3 U
<b>SEMIVOLATILE ORGANIC COMPOUND</b>													
2,4-DIMETHYLPHENOL	140	261	10 J	6 J	8 J	6 J	9 J	9.9 J	1 J	10 U	10 U	10 U	10 U
4-METHYLPHENOL	4	70	10	12	17	10	13 J	15.5	4 U	4 U	4 U	4 U	4 U
BEHP	6	0.02	4 U	4 U	4 U	4 U	21 U	5 U	4 U	4 U	4 U	5 U	6.9***
NAPHTHALENE	20	26	7 U	23	32***	36***	49***	52.5***	6 U	6 U	6 U	5 U	5 U
<b>PESTICIDES (ug/L)</b>													
ALPHA-CHLORDANE	2	0.00059	0.052 U	0.052 U	0.051 U	0.15***	0.14***	0.4 U	0.052 U	0.052 U	0.051 U	0.1 U	0.1 U
BETA-BHC	0.02	0.046	0.021 U	0.021 U	0.020 U	0.021 U	0.20 U	0.2 U	0.021 U	0.021 U	0.020 U	0.05 U	0.05 U
<b>PETROLEUM HYDROCARBONS (mg/L)</b>													
TRPH	5	5	10.8***	10.8***	11.8***	8.26***	8.36***	10.2***	1.47	0.5 U	0.5 U	0.5 U	0.5 U
<b>INORGANICS (ug/L)</b>													
ANTIMONY	44.5*	4,300	5 U	5.0 U	5.0 U	2.6 U	2.6 U	3.3 U	5 U	5.0 U	2.6 U	3.3 U	3.3 U
ARSENIC	50	50	10 U	5.0 U	5.0 U	3.6 U	3.6 U	2.9 U	10 U	5.0 U	3.6 U	2.7 U	2.7 U
BERYLLIUM	4	0.13	3 U	3.0 U	3.0 U	0.10 U	0.11 U	1.4 U	3 U	3.0 U	0.10 U	1.8 U	1.4 U
CADMIUM	6*	**	3 U	3.0 U	3.0 U	0.30 U	0.30 U	0.4 U	3 U	3.0 U	0.33 U	2.2 U	0.55 U
CHROMIUM	100	-	5 U	5.0 U	5.0 U	16.9	2	2.2 U	6.7	5.0 U	1.3 U	27.5	30.8
MANANESE	96.2*	-	216	28.7	30.1	22.1	20.5	16.6	66.3	18.8	20.3	30.5	28.1
VANADIUM	49	-	140	89.9	94.3	76	78.5	83	42.5	5.9	8.6	31.9	22.9

TABLE 3-2

SUMMARY OF CHEMICALS OF CONCERN IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA  
PAGE 3 OF 3

PARAMETER	Ground Water Target Cleanup Goal	Surface Water Target Cleanup Goal	CEF-05-LTM-04				CEF-05-LTM-05				CEF-05-WP-04
			Aug-98	Nov-98	Feb-99	May-99 <sup>(1)</sup>	Aug-98	Nov-98	Feb-99	May-99	May-99
<b>VOLATILE ORGANIC COMPOUNDS (ug/L)</b>											
ACETONE	700	1,892	NA	NA	10 UR	5.5 J	NA	NA	9.9 J	5 UR	5 UR
BENZENE	1	71.28	NA	NA	0.6 J	0.78 J	NA	NA	2	1 U	1 U
ETHYLBENZENE	30	605	NA	NA	6.7	7	NA	NA	10.1	1.9	1 U
TOLUENE	40	475	NA	NA	10.2	10.6	NA	NA	28.1	20.3	1 U
TRICHLOROETHENE	3	80.7	NA	NA	33.7	14.7	NA	NA	11.5	2.5	1 U
XYLENES, TOTAL	20	370	NA	NA	37.8	34.6	NA	NA	49	8.4	3 U
<b>SEMIVOLATILE ORGANIC COMPOUNDS (ug/L)</b>											
2,4-DIMETHYLPHENOL	140	261	NA	NA	2 J	3.7 J	NA	NA	20	11.2	10 U
4-METHYLPHENOL	4	70	NA	NA	1 J	4 U	NA	NA	60	26.5	4 U
BEHP	6	0.02	NA	NA	8***	5 U	NA	NA	21 U	5 U	5 U
NAPHTHALENE	20	26	NA	NA	2 J	39.3***	NA	NA	82***	58.8***	5 U
<b>PESTICIDES (ug/L)</b>											
ALPHA-CHLORDANE	2	0.00059	NA	NA	0.053 U	0.1 U	NA	NA	0.051 U	0.4 U	0.1 U
BETA-BHC	0.02	0.046	NA	NA	0.021 U	0.05 U	NA	NA	0.020 U	0.2 U	0.05 U
<b>PETROLEUM HYDROCARBONS (mg/L)</b>											
TRPH	5	5	NA	NA	2.01	1.96	NA	NA	13***	9.82***	0.5 U
<b>INORGANICS (ug/L)</b>											
ANTIMONY	44.5*	4,300	NA	NA	2.6 U	3.3 U	NA	NA	2.6 U	3.3 U	3.3 U
ARSENIC	50	50	NA	NA	3.6 U	2.7 U	NA	NA	3.6 U	2.7 U	2.7 U
BERYLLIUM	4	0.13	NA	NA	0.10 U	1.3 U	NA	NA	0.10 U	1.5 U	1.4 U
CADMIUM	6*	**	NA	NA	0.30 U	0.2 U	NA	NA	0.34 U	0.49 U	0.26 U
CHROMIUM	100	-	NA	NA	1.9 U	1.3 U	NA	NA	5.2	19.2	4 U
MANANESE	96.2*	-	NA	NA	29.1	21.4	NA	NA	13.4	15.3	5.3 U
VANADIUM	49	-	NA	NA	4.3	4 U	NA	NA	235	122	1.3 U

U = Not detected at or above method detection limit (associated value).

J = Estimated concentration.

R = Surrogate recovery noncompliance.

FDEP, Florida Administrative Code Chapter 62-777 (FDEP, 1999).

(1) Well CEF-05-7S was dry during May 1999 sampling event.

\* NAS Cecil Field Inorganic Background Data Set (HLA, 1998).

\*\* Surface water target cleanup goal dependent on hardness.

\*\*\* = Value exceeds surface water target cleanup goal.

Bolded values exceed method detection limit.

Shaded values exceed groundwater target cleanup goal.

TRPH = Total Recoverable Petroleum Hydrocarbons.

BEHP = bis(2-ethylhexyl) phthalate.



CEF-05-7S	08/98	11/98	02/99	05/99
	ND	ND	ND	ND

CEF-05-LTM-01	08/98	11/98	02/99	05/99
ACETONE	10 UR/10UR	10 UR	10 UR	4.9 J
BENZENE	0.2 J/0.2J	1 U	1 U	1 U
ETHYLBENZENE	1 J/1 J	1.8 J	2.2 J	2.2
TOLUENE	1.8 J/1.5J	5.2	5.5	4.2
TRICHLOROETHENE	11*/12*	5.60*	7.9*	10.7*
XYLENES, TOTAL	9.2/9.6	15.2	19.7	17.6

CEF-05-LTM-04	08/98	11/98	02/99	05/99
ACETONE	NA	NA	10 UR	5.5 J
BENZENE	NA	NA	0.6 J	0.78 J
ETHYLBENZENE	NA	NA	6.7	7
TOLUENE	NA	NA	10.2	10.6
TRICHLOROETHENE	NA	NA	33.7*	14.7
XYLENES, TOTAL	NA	NA	37.8*	34.6

CEF-05-LTM-05	08/98	11/98	02/99	05/99
ACETONE	NA	NA	9.9 J	5 UR
BENZENE	NA	NA	2*	1 U
ETHYLBENZENE	NA	NA	10.1	1.9
TOLUENE	NA	NA	28.1	20.3
TRICHLOROETHENE	NA	NA	11.5*	2.5
XYLENES, TOTAL	NA	NA	49*	8.4

CEF-05-LTM-02	08/98	11/98	02/99	05/99
ACETONE	12 J	10 UR/10 UR	6.5 J/6.4 J	13.8 J
BENZENE	0.6 J	0.6 J/0.6 J	0.8 J/0.8 J	0.75 J
ETHYLBENZENE	2.8 J	2.6 J/2.7 J	3.4 J/3.5 J	3.4
TOLUENE	5 U	3.5 J/3.5 J	5.4/5.2	5.8
TRICHLOROETHENE	1.8 J	1.1 J/1.1 J	1.4 J/1.3 J	1.4
XYLENES, TOTAL	14	13.7/13.9	20.3*/21.4*	20.1*

CEF-05-LTM-03	08/98	11/98	02/99	05/99
	ND	ND	ND	ND

CEF-05-WP-04	08/98	11/98	02/99	05/99
	NA	NA	NA	ND

Groundwater Flow

Perimeter Road

Security Fence

Culvert

**LEGEND**

- NA = Not Analyzed
- ND = None Detected
- J = Estimated Concentration
- U = Not Detected At Or Above Method Detection Limit (Associated Value)
- R = Surrogate Recovery Noncompliance
- \* = Detected Concentration Exceeds Target Cleanup Goal
- Duplicate Results Reported As Sample/Duplicate
- Monitoring Well
- Approximate Extent Of Groundwater Contamination
- Drainage Ditch
- Fence
- Former Pit Area

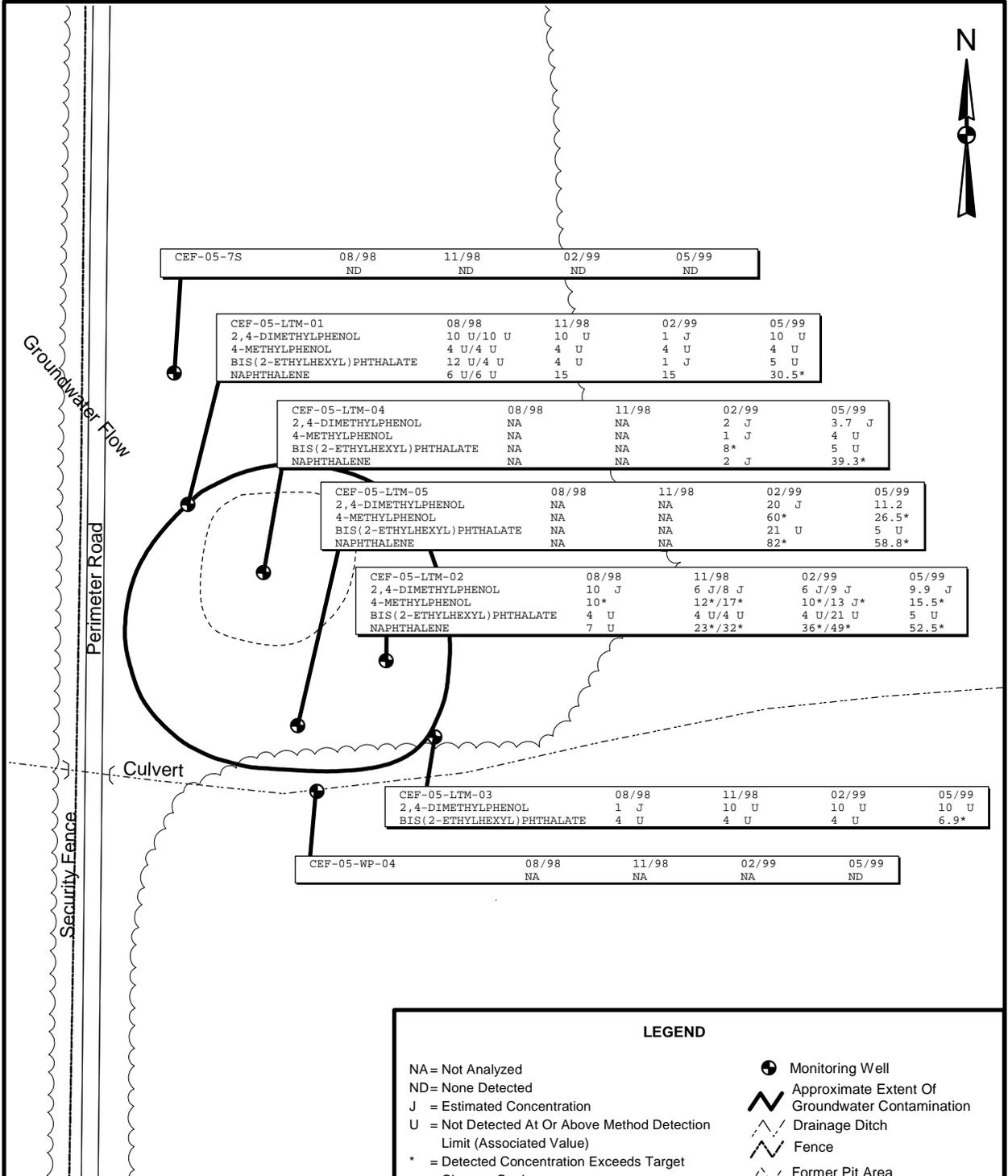


DRAWN BY	DATE
YLI	04/07/99
CHECKED BY	DATE
BD	1/30/99
COST/SCHEDULE-AREA	
SCALE AS NOTED	



VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7898	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. FIGURE 3-1	REV 0



CEF-05-7S	08/98	11/98	02/99	05/99
	ND	ND	ND	ND

CEF-05-LTM-01	08/98	11/98	02/99	05/99
2,4-DIMETHYLPHENOL	10 U/10 U	10 U	1 J	10 U
4-METHYLPHENOL	4 U/4 U	4 U	4 U	4 U
BIS(2-ETHYLHEXYL) PHTHALATE	12 U/4 U	4 U	1 J	5 U
NAPHTHALENE	6 U/6 U	15	15	30.5*

CEF-05-LTM-04	08/98	11/98	02/99	05/99
2,4-DIMETHYLPHENOL	NA	NA	2 J	3.7 J
4-METHYLPHENOL	NA	NA	1 J	4 U
BIS(2-ETHYLHEXYL) PHTHALATE	NA	NA	8*	5 U
NAPHTHALENE	NA	NA	2 J	39.3*

CEF-05-LTM-05	08/98	11/98	02/99	05/99
2,4-DIMETHYLPHENOL	NA	NA	20 J	11.2
4-METHYLPHENOL	NA	NA	60*	26.5*
BIS(2-ETHYLHEXYL) PHTHALATE	NA	NA	21 U	5 U
NAPHTHALENE	NA	NA	82*	58.8*

CEF-05-LTM-02	08/98	11/98	02/99	05/99
2,4-DIMETHYLPHENOL	10 J	6 J/8 J	6 J/9 J	9.9 J
4-METHYLPHENOL	10*	12*/17*	10*/13 J*	15.5*
BIS(2-ETHYLHEXYL) PHTHALATE	4 U	4 U/4 U	4 U/21 U	5 U
NAPHTHALENE	7 U	23*/32*	36*/49*	52.5*

CEF-05-LTM-03	08/98	11/98	02/99	05/99
2,4-DIMETHYLPHENOL	1 J	10 U	10 U	10 U
BIS(2-ETHYLHEXYL) PHTHALATE	4 U	4 U	4 U	6.9*

CEF-05-WP-04	08/98	11/98	02/99	05/99
	NA	NA	NA	ND

**LEGEND**

NA = Not Analyzed		Monitoring Well
ND = None Detected		Approximate Extent Of Groundwater Contamination
J = Estimated Concentration		Drainage Ditch
U = Not Detected At Or Above Method Detection Limit (Associated Value)		Fence
* = Detected Concentration Exceeds Target Cleanup Goal		Former Pit Area
Duplicate Results Reported As Sample/Duplicate		All Results in ug/L

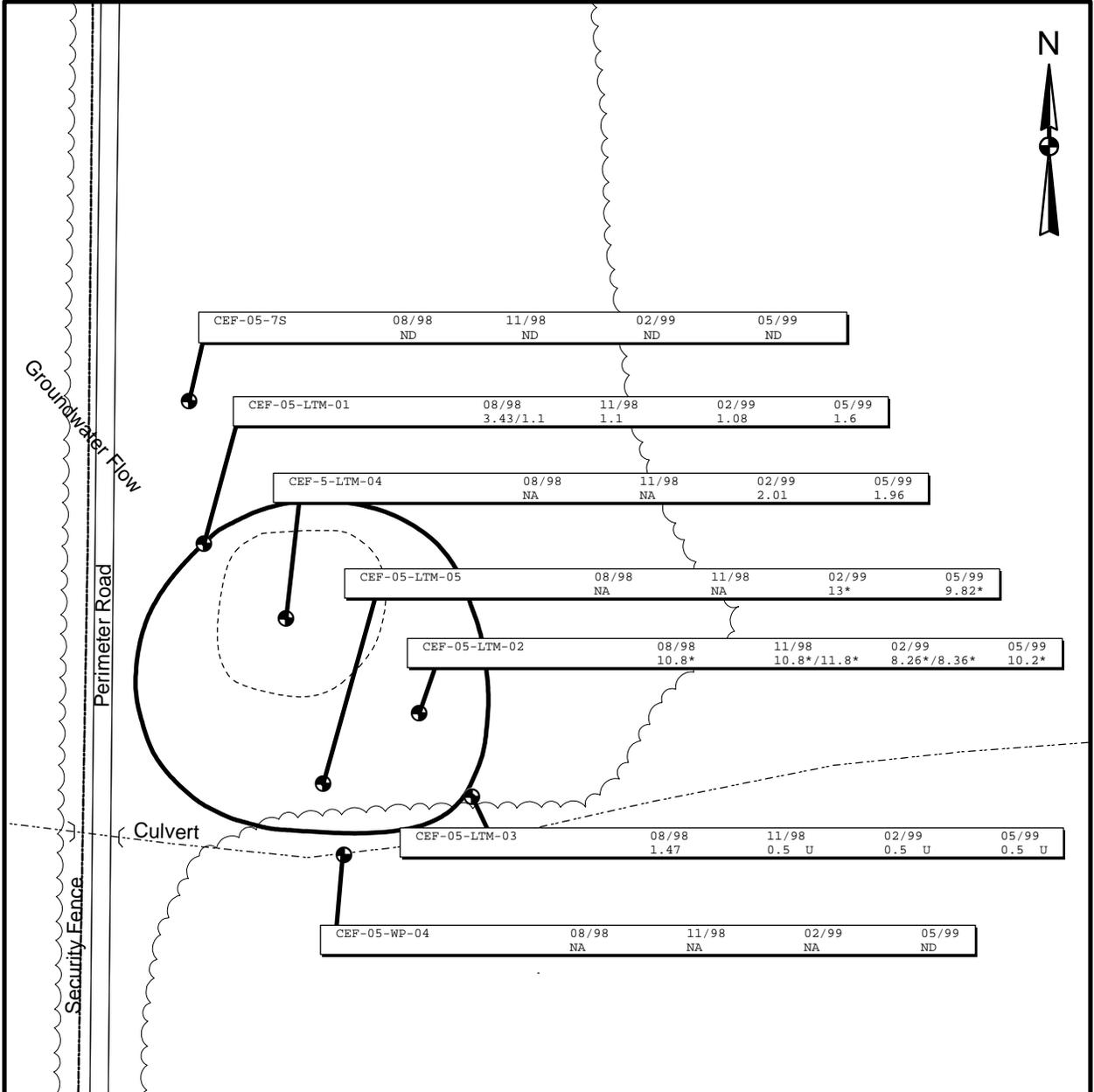


DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



SEMIVOLATILE ORGANIC COMPOUNDS  
IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. <b>FIGURE 3-2</b>	REV <b>0</b>



LEGEND	
NA = Not Analyzed	Monitoring Well
ND = None Detected	Approximate Extent Of Groundwater Contamination
J = Estimated Concentration	Drainage Ditch
U = Not Detected At Or Above Method Detection Limit (Associated Value)	Fence
* = Detected Concentration Exceeds Target Cleanup Goal	Former Pit Area
Duplicate Results Reported As Sample/Duplicate	All Results in mg/L

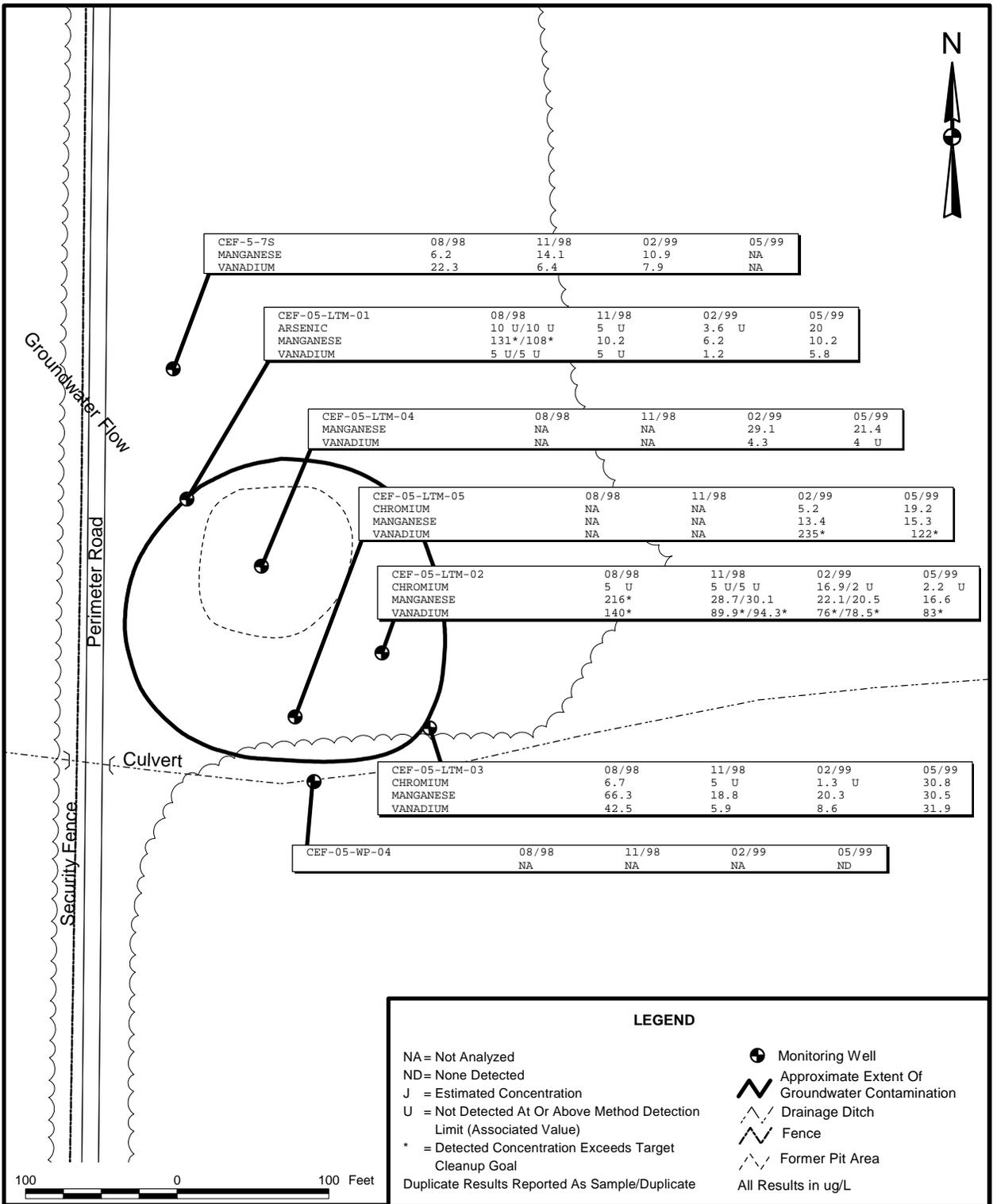


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CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



TRPH IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 3-3</b>	REV <b>0</b>



**LEGEND**

- NA = Not Analyzed
- ND = None Detected
- J = Estimated Concentration
- U = Not Detected At Or Above Method Detection Limit (Associated Value)
- \* = Detected Concentration Exceeds Target Cleanup Goal
- Duplicate Results Reported As Sample/Duplicate

- Monitoring Well
- ~ Approximate Extent Of Groundwater Contamination
- - - Drainage Ditch
- ▬ Fence
- ⊘ Former Pit Area
- All Results in ug/L



DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



INORGANICS IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. <b>FIGURE 3-4</b>	REV <b>0</b>

TABLE 3-3

SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA  
 PAGE 1 OF 3

PARAMETER	UNITS	CEF-5-7S				CEF-05-LTM-01				
		Aug-98	Nov-98	Feb-99	May-99	Aug-98		Nov-98	Feb-99	May-99
						Sample	Duplicate			
ALKALINITY	mg/L	148	157	164	NA	7.69	NT	1.0 UJ	1 U	5 U
ALKALINITY, FIELD	mg/L	119.5	298	161	NA	4.7	NT	0	0	4.9
BIOLOGICAL OXYGEN DEMAND	mg/L	3.6 J	2.0 U	2 U	NA	2320 J	NT	2.0 U	2 U	2 U
CARBON DIOXIDE	mg/L	63.2	166	140	NA	103.6	NT	229	174	261
CHEMICAL OXYGEN DEMAND	mg/L	55.6	28.6	23.8	NA	16.7	22.2	23.4	21.4	20 UJ
CHLORIDE	mg/L	13.1	35.3 J	20	NA	22.3	21.7	19.8 J	6.3	21
DISSOLVED OXYGEN	mg/L	4.84	2.13	1.41	NA	0.21	NT	0	0	0
ETHANE	ug/L	NT	6 U	5.8 U	NA	NT	NT	6 U	5.8 U	0.014 U
ETHENE	ug/L	NT	6 U	6.2 U	NA	NT	NT	6 U	6.2 U	0.06
FEROUS IRON	mg/L	0	0.01	0.03	NA	3	NT	3.37	2.87	1.73
IRON, FILTERED	ug/L	100 U	100 U	192	NA	3020	2950	3510	2990	2,780
HYDROGEN SULFIDE (H2S)	mg/L	0	0.0	0	NA	0.5	NT	0.5	2	1
SULFIDE (S-2)	mg/L	0	0.019	0.05	NA	0	NT	0.719	0.8	0.715
DISSOLVED SULFIDE	mg/L	NT	2.0 U	2 U	NA	NT	NT	2.0 U	2 U	2 U
SULFATE	mg/L	30.7	16.5 J	11	NA	5.52	4.78	13.4 J	0.51	10 U
MANGANESE, FILTERED	ug/L	6	14.6	11.7	NA	130	111	9.9	5.4	6.1
MANGANESE, FIELD	mg/L	NT	0	0.5	NA	NT	0	NT	0.2	0
METHANE	ug/L	7.6	29	58.6	NA	253	385.1	325	433.2	461
NITRATE	mg/L	0.06	0.325 J	0.39	NA	0.05 U	NT	0.1 UJ	0.1 U	0.11 U
NITRITE	mg/L	0.061	0.1 U	0.1 U	NA	0.05 U	NT	0.1 U	0.1 U	0.01 U
ORTHOPHOSPHATE	mg/L	0.02 U	0.1 UJ	0.1 U	NA	0.02 U	NT	0.1 UJ	0.1 U	0.1 U
pH	Standard units	6.73	6.12	6.84	NA	4.8	NT	4.38	4.7	4.92
ORP	mV	NT	0	55	NA	0	NT	-148.0	-115	-86.3
SPECIFIC CONDUCTIVITY	mS/cm	0.41	0.437	0.397	NA	0.118	NT	0.057	0.078	0.08
TEMPERATURE	°C	29.9	22.5	15.4	NA	27.1	NT	23.7	20.3	26.5
TOTAL ORGANIC CARBON	mg/L	NT	8.51	7.53	NA	NT	NT	3.69	4.41	4.3
TURBIDITY	NTU	0	1	0	NA	0	NT	0	0	0

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TABLE 3-3

**SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA  
PAGE 2 OF 3**

PARAMETER	CEF-05-LTM-02						CEF-05-LTM-03					
	Aug-98	Nov-98		Feb-99		May-99	Aug-98	Nov-98	Feb-99	Mar-99		
		Sample	Duplicate	Sample	Duplicate					Sample	Duplicate	
ALKALINITY	11.5	7.77	5.18	4.01	1.0	8	3.84	7.77	8	10	10	
ALKALINITY, FIELD	4.9	0	NT	0	NT	8.3	10	0	7.5	9	NA	
BIOLOGICAL OXYGEN DEMAND	3350 J	2.0 U	2.0 U	2.33	2.03	7	198 J	2.0 U	2 U	2 U	2 U	
CARBON DIOXIDE	137	208	NT	183	NT	271	58	93	54.2	34.6	NA	
CHEMICAL OXYGEN DEMAND	66.7	80.5	80.5	85.7	83.3	74.9 J	11.1	18.2	14.3	25 J	49.9 J	
CHLORIDE	6.87	12.4 J	13.2 J	3.1	3.4	8.5	7.02	12.8 J	3.5	8.5	9	
DISSOLVED OXYGEN	0.42	0	NT	0	NT	0	0.88	0	1.62	0.45	NA	
ETHANE	NT	6 U	6 U	5.8 U	5.8 U	0.15	NT	6 U	5.8 U	0.014 U	0.014 U	
ETHENE	NT	6 U	6 U	6.2 U	6.2 U	0.13	NT	6 U	6.2 U	0.014 U	0.014 U	
FERROUS IRON	4	4.70	NT	3.3	NT	3.71	1.6	0.56	0.43	1.18	NA	
IRON, FILTERED	3580	5110	5540	4160	4460	3870	1010	616	614	658	684	
HYDROGEN SULFIDE (H2S)	0.5	0.6	NT	0.7	NT	2	0.5	0.2	0.5	0.5	NA	
SULFIDE (S-2)	0	0.719	NT	0.8	NT	0.379	0	0.389	0.43	0.8	NA	
DISSOLVED SULFIDE	NT	2.0	2.0 U	2 U	2 U	2 U	NT	2.0 U	2 U	2.2	2 U	
SULFATE	7.97	3.66 J	4.47 J	3.3	3.4	10 U	0.709	1.27 J	0.73	10 U	10 U	
MANGANESE, FILTERED	211	25.7	28.5	19.8	21.6	23.7	62.6	18.0	21	17.4	32.4	
MANGANESE, FIELD	NT	0	NT	0	NT	0	NT	0.2	0	0	NA	
METHANE	2293	1552	1654	3380	2190	2080	139.4	117	363.4	66	70.9	
NITRATE	2.61 J	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.11 U	0.05	0.1 UJ	0.1 U	0.26	0.11 U	
NITRITE	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U	0.05 U	0.1 U	0.1 U	0.01 U	0.01 U	
ORTHOPHOSPHATE	0.06	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.02 U	0.1 UJ	0.1 U	0.1 U	0.1 U	
pH	4.8	5.22	NT	4.93	NT	4.86	5.27	4.98	5.6	5.33	NA	
ORP	0	0	NT	-89	NT	-90.4	0	0	-78	-136.3	NA	
SPECIFIC CONDUCTIVITY	0.072	0.04	NT	0.053	NT	0.052	0.049	0.029	0.052	0.045	NA	
TEMPERATURE	26.7	23.4	NT	20.3	NT	23	25.4	21.8	18.3	22.1	NA	
TOTAL ORGANIC CARBON	NT	19.4	18.2	22.2	24.8	14.8	NT	4.26	3.79	1.4	1.6	
TURBIDITY	0	0	NT	0	NT	0	468	11.0	0	48	NA	

TABLE 3-3

SUMMARY OF NATURAL ATTENUATION PARAMETERS IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA  
 PAGE 3 OF 3

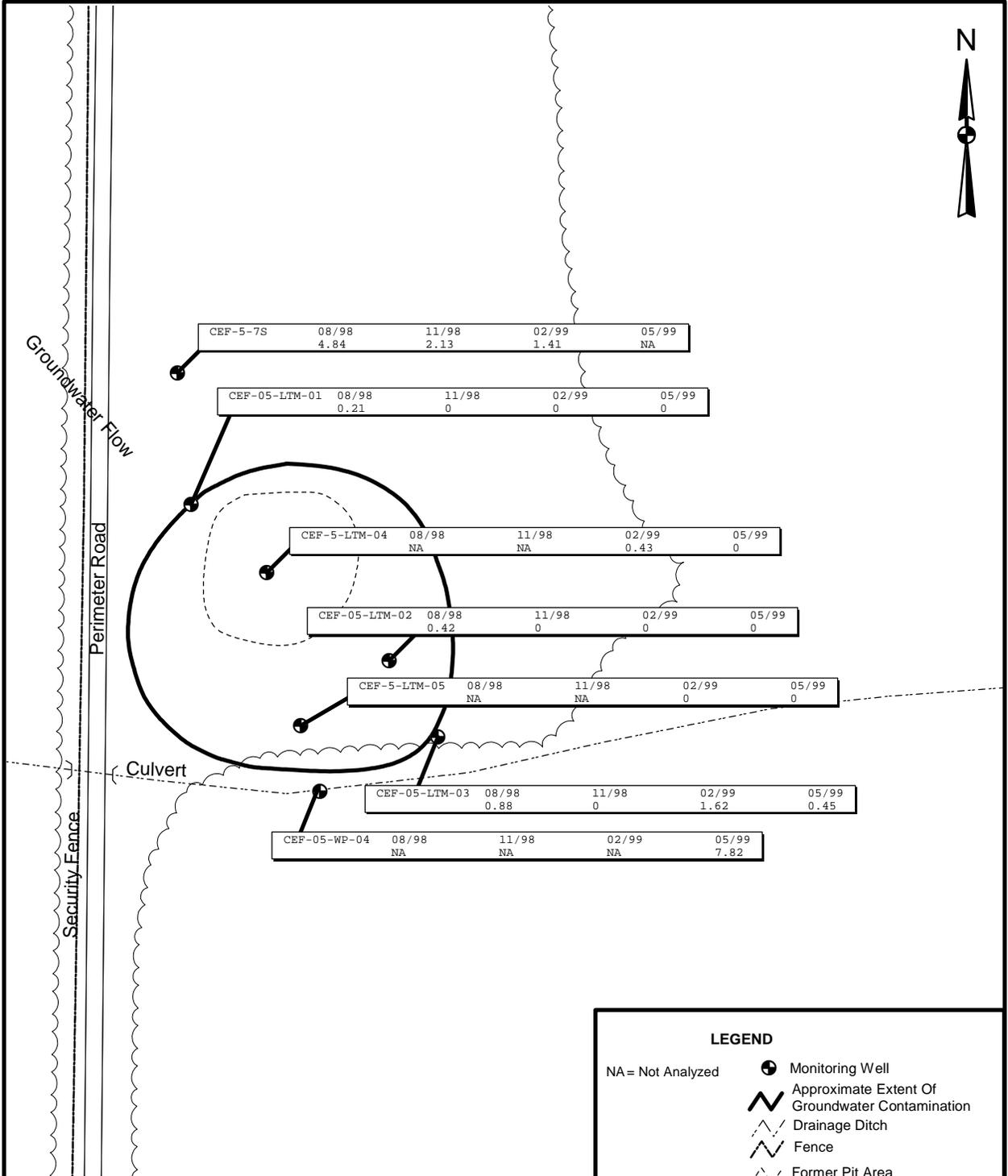
PARAMETER	UNITS	CEF-05-LTM-04				CEF-05-LTM-05				CEF-05-WP-04
		Aug-98	Nov-98	Feb-99	May-99	Aug-98	Nov-98	Feb-99	May-99	May-99
ALKALINITY	mg/L	NT	NT	58.1	47.3	NT	NT	1 U	6.5	27.4
ALKALINITY, FIELD	mg/L	NT	NT	56.8	101	NT	NT	17.3	11.1	30.4
BIOLOGICAL OXYGEN DEMAND	mg/L	NT	NT	4.03	4.4	NT	NT	2.03	11.9	2 U
CARBON DIOXIDE	mg/L	NT	NT	211	305	NT	NT	296	172	14.8
CHEMICAL OXYGEN DEMAND	mg/L	NT	NT	28.6	25 J	NT	NT	145	87.4 J	20.8 J
CHLORIDE	mg/L	NT	NT	25	29	NT	NT	12	10	10
DISSOLVED OXYGEN	mg/L	NT	NT	0.43	0	NT	NT	0	0	7.82
ETHANE	ug/L	NT	NT	5.8 U	0.07	NT	NT	5.8 U	0.09	0.014 U
ETHENE	ug/L	NT	NT	6.2 U	0.15	NT	NT	6.2 U	0.42	0.014 U
FERROUS IRON	mg/L	NT	NT	1.63	2.33	NT	NT	2.58	2.37	0
IRON, FILTERED	ug/L	NT	NT	1620	2130	NT	NT	3040	2470	231
HYDROGEN SULFIDE (H2S)	mg/L	NT	NT	0.4	2	NT	NT	0.3	0.3	0
SULFIDE (S-2)	mg/L	NT	NT	0.27	0.271	NT	NT	0.8	0.8	0.03
DISSOLVED SULFIDE	mg/L	NT	NT	2 U	2 U	NT	NT	2 U	2 U	2 U
SULFATE	mg/L	NT	NT	2	10 U	NT	NT	0.67	10 U	10 U
MANGANESE, FILTERED	ug/L	NT	NT	25.5	26.9	NT	NT	13.1	20.5	18.3
MANGANESE, FIELD	mg/L	NT	NT	0.2	0	NT	NT	0.4	0	0
METHANE	ug/L	NT	NT	1339	3010	NT	NT	6710	2920	3
NITRATE	mg/L	NT	NT	0.1 U	0.11 U	NT	NT	0.1 U	0.11 U	0.11 U
NITRITE	mg/L	NT	NT	0.1 U	0.01 U	NT	NT	0.1 U	0.01 U	0.01 U
ORTHOPHOSPHATE	mg/L	NT	NT	0.1 U	0.1 U	NT	NT	0.1 U	0.1 U	0.1 U
pH	Standard units	NT	NT	5.93	5.68	NT	NT	4.98	4.72	7.07
ORP	mV	NT	NT	-59.3	230.6	NT	NT	-16.4	-97.5	219.6
SPECIFIC CONDUCTIVITY	mS/cm	NT	NT	0.197	0.209	NT	NT	0.063	0.047	0.08
TEMPERATURE	°C	NT	NT	19.6	24.4	NT	NT	18.5	23.4	27.3
TOTAL ORGANIC CARBON	mg/L	NT	NT	5.52	8.2	NT	NT	51.8	25.9	4.2
TURBIDITY	NTU	NT	NT	182	4	NT	NT	302	28	11

NT = Not tested.

U = Not detected at or above method detection limit (associated value).

J = Estimated concentration.

ORP = Oxidation-reduction potential.



**LEGEND**

- NA = Not Analyzed
- Monitoring Well
- ~ Approximate Extent Of Groundwater Contamination
- Drainage Ditch
- Fence
- Former Pit Area

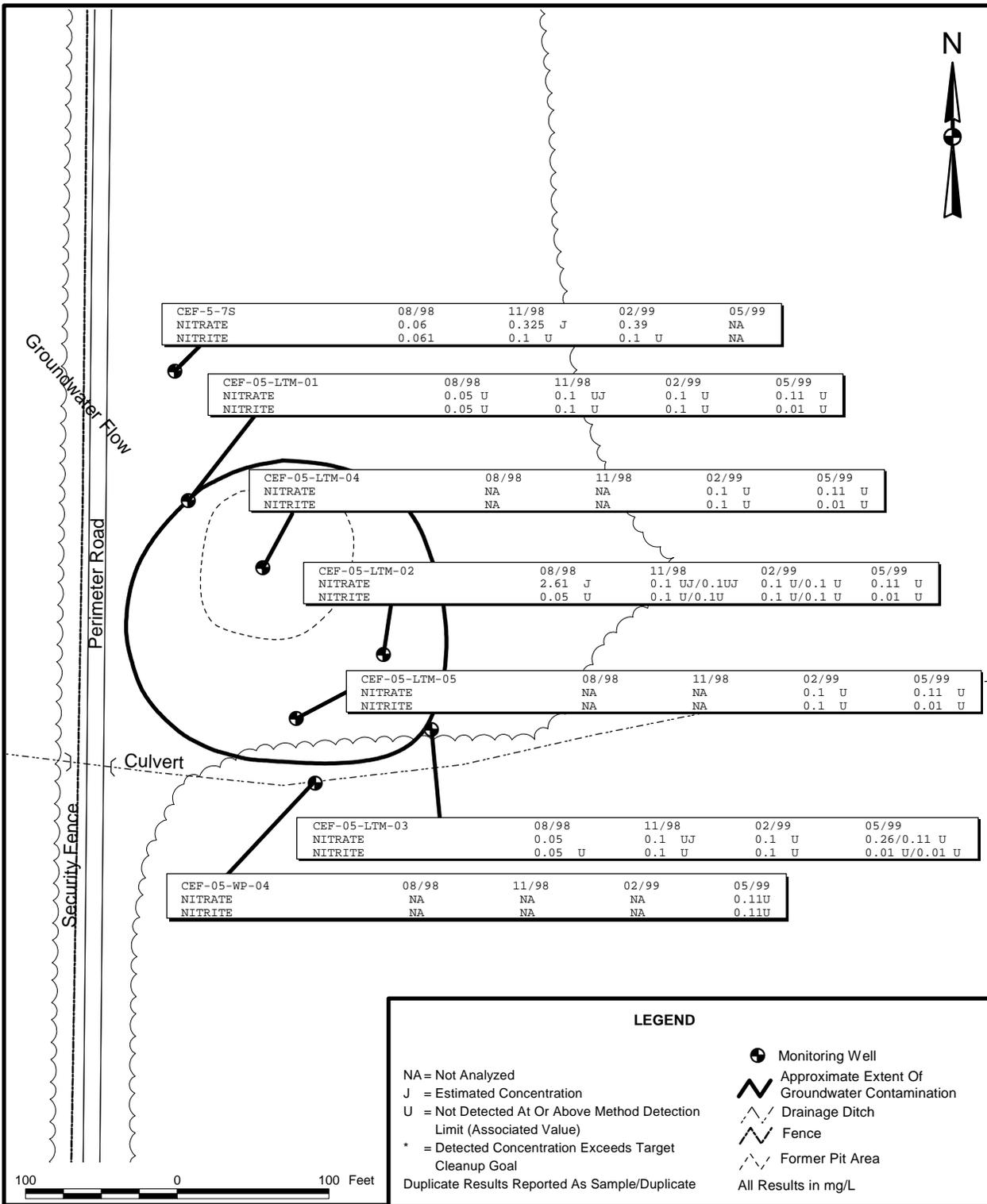
All Results in mg/L

DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



DISSOLVED OXYGEN IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. <b>FIGURE 3-5</b>	REV <b>0</b>



**LEGEND**

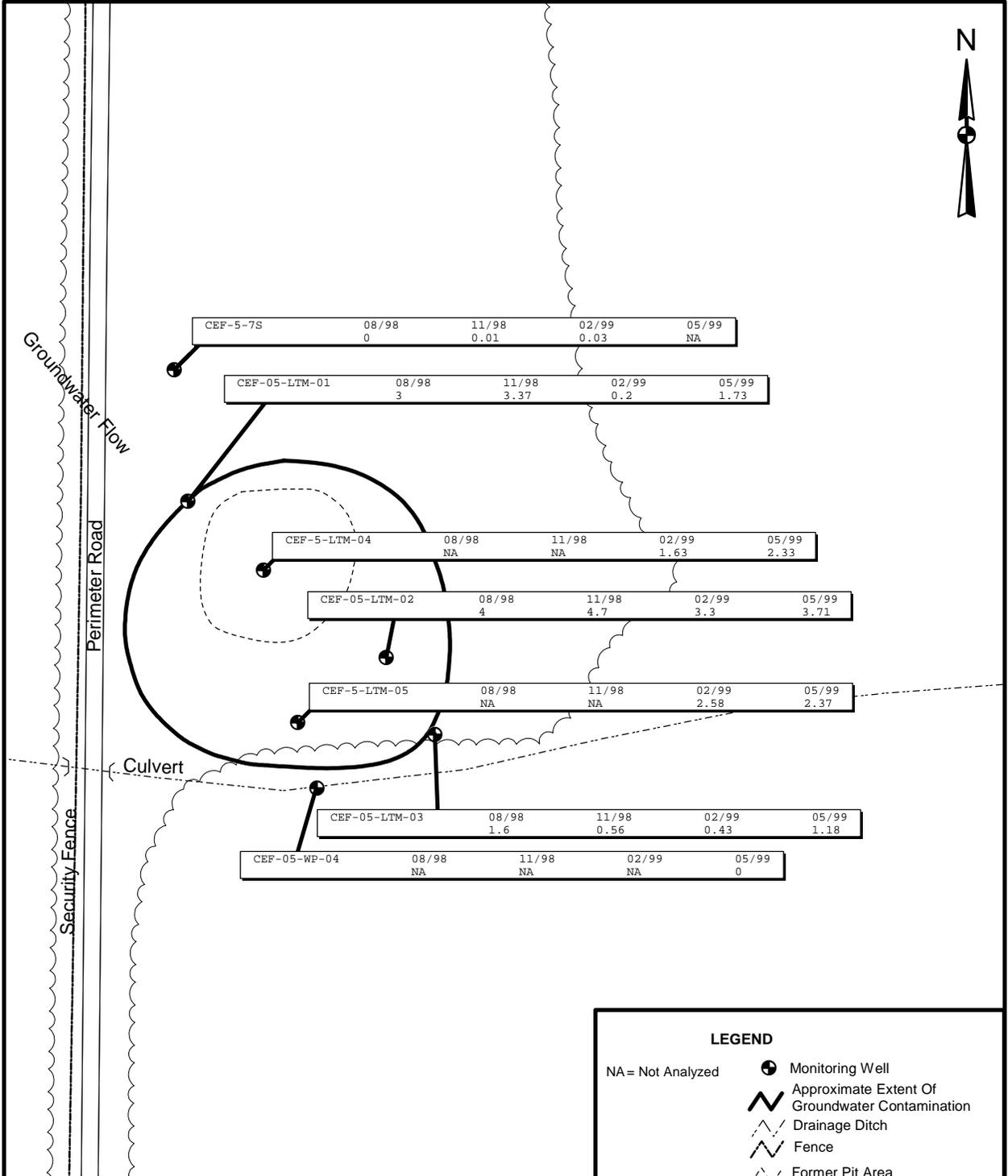
- Monitoring Well
- ~ Approximate Extent Of Groundwater Contamination
- - - Drainage Ditch
- ▬ Fence
- - - Former Pit Area
- NA = Not Analyzed
- J = Estimated Concentration
- U = Not Detected At Or Above Method Detection Limit (Associated Value)
- \* = Detected Concentration Exceeds Target Cleanup Goal
- Duplicate Results Reported As Sample/Duplicate
- All Results in mg/L

DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



**NITRATE AND NITRITE IN GROUNDWATER**  
**OPERABLE UNIT 2, SITE 5**  
**NAVAL AIR STATION CECIL FIELD**  
**JACKSONVILLE, FLORIDA**

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. <b>FIGURE 3-6</b>	REV <b>0</b>



**LEGEND**

NA = Not Analyzed

- Monitoring Well
- Approximate Extent Of Groundwater Contamination
- Drainage Ditch
- Fence
- Former Pit Area

All Results in mg/L

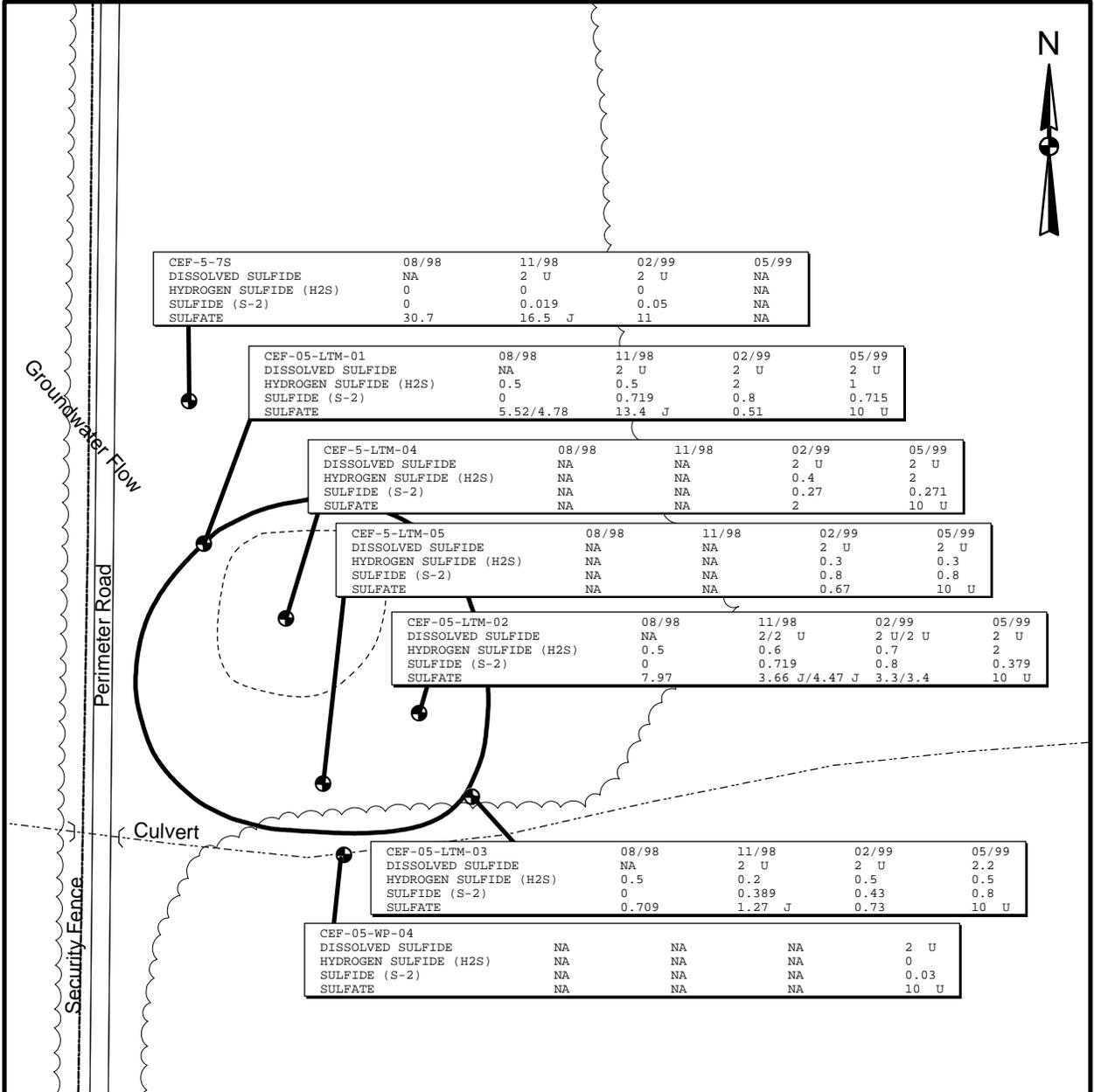


DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



FERROUS IRON IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 3-7</b>	REV <b>0</b>



**LEGEND**

- NA = Not Analyzed
- J = Estimated Concentration
- U = Not Detected At Or Above Method Detection Limit (Associated Value)
- \* = Detected Concentration Exceeds Target Cleanup Goal
- Duplicate Results Reported As Sample/Duplicate
- Monitoring Well
- ~ Approximate Extent Of Groundwater Contamination
- - - Drainage Ditch
- Fence
- - - Former Pit Area

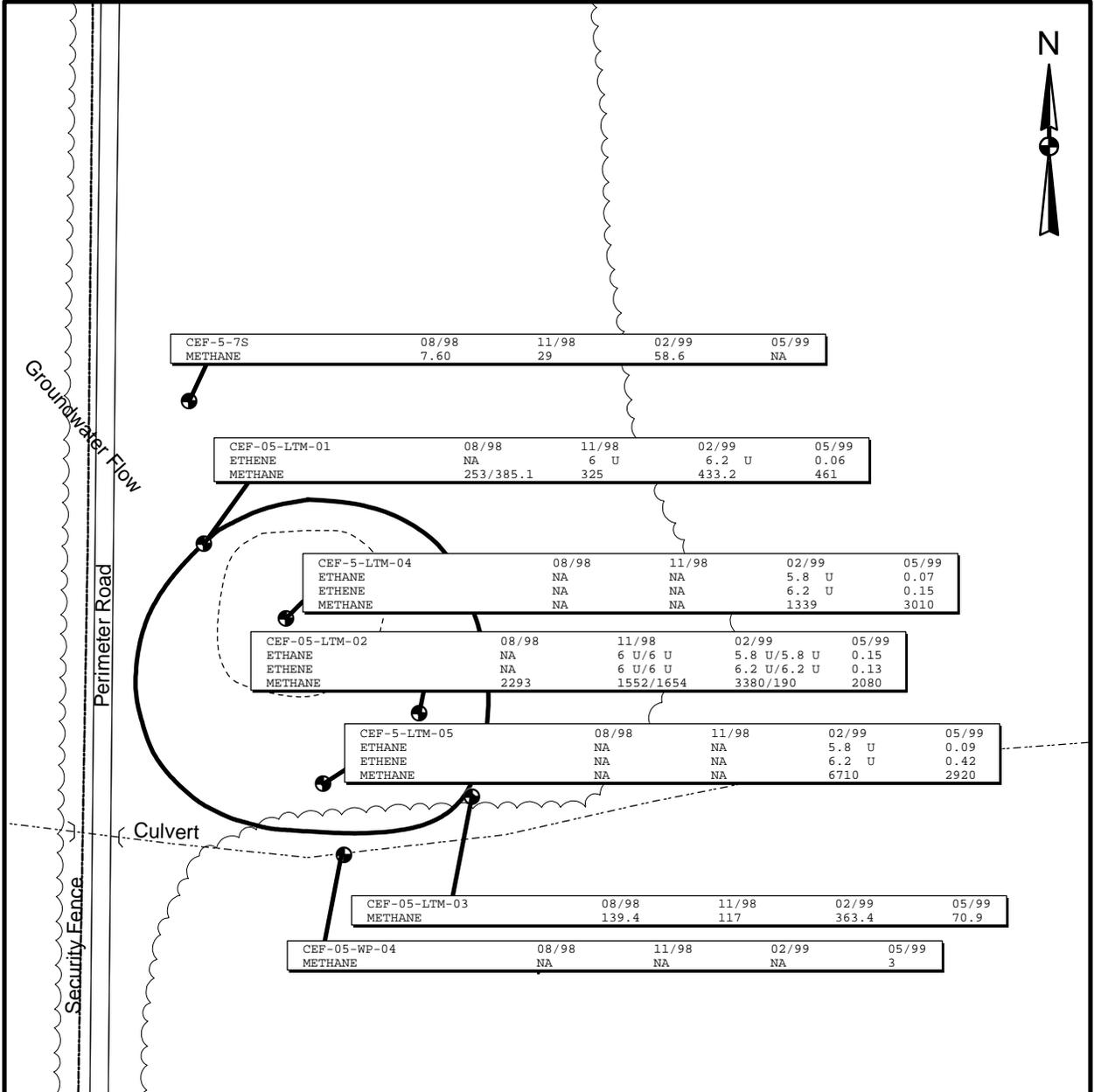
All Results in mg/L

DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



SULFATE, SULFIDE, AND HYDROGEN  
SULFIDE IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 3-8</b>	REV <b>0</b>



**LEGEND**

- NA = Not Analyzed
- J = Estimated Concentration
- U = Not Detected At Or Above Method Detection Limit (Associated Value)
- \* = Detected Concentration Exceeds Target Cleanup Goal
- Duplicate Results Reported As Sample/Duplicate
- Monitoring Well
- Approximate Extent Of Groundwater Contamination
- Drainage Ditch
- Fence
- Former Pit Area

All Results in ug/L

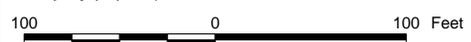
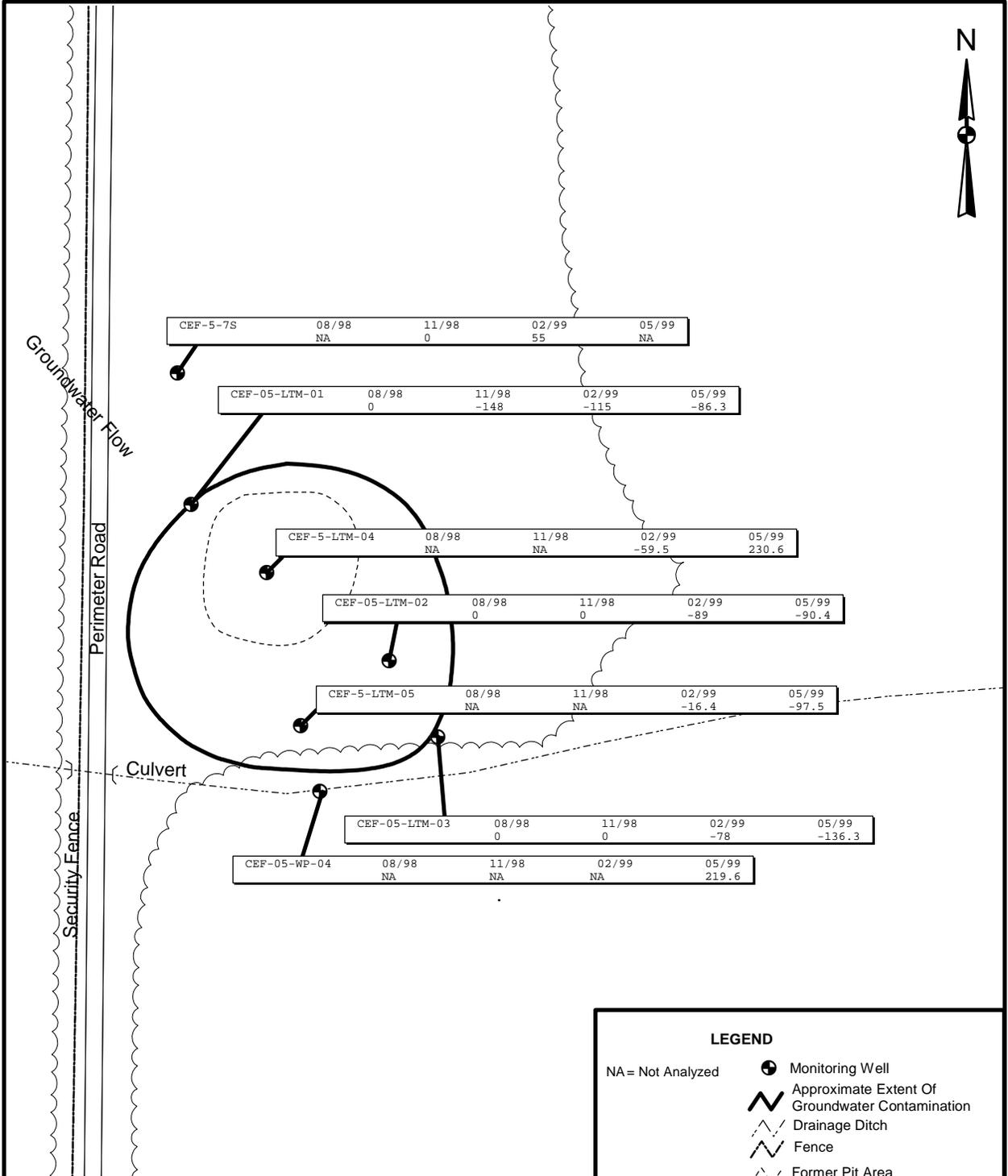


DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



METHANE, ETHANE, AND ETHENE IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 3-9</b>	REV <b>0</b>



**LEGEND**

NA = Not Analyzed

- Monitoring Well
- Approximate Extent Of Groundwater Contamination
- Drainage Ditch
- Fence
- Former Pit Area

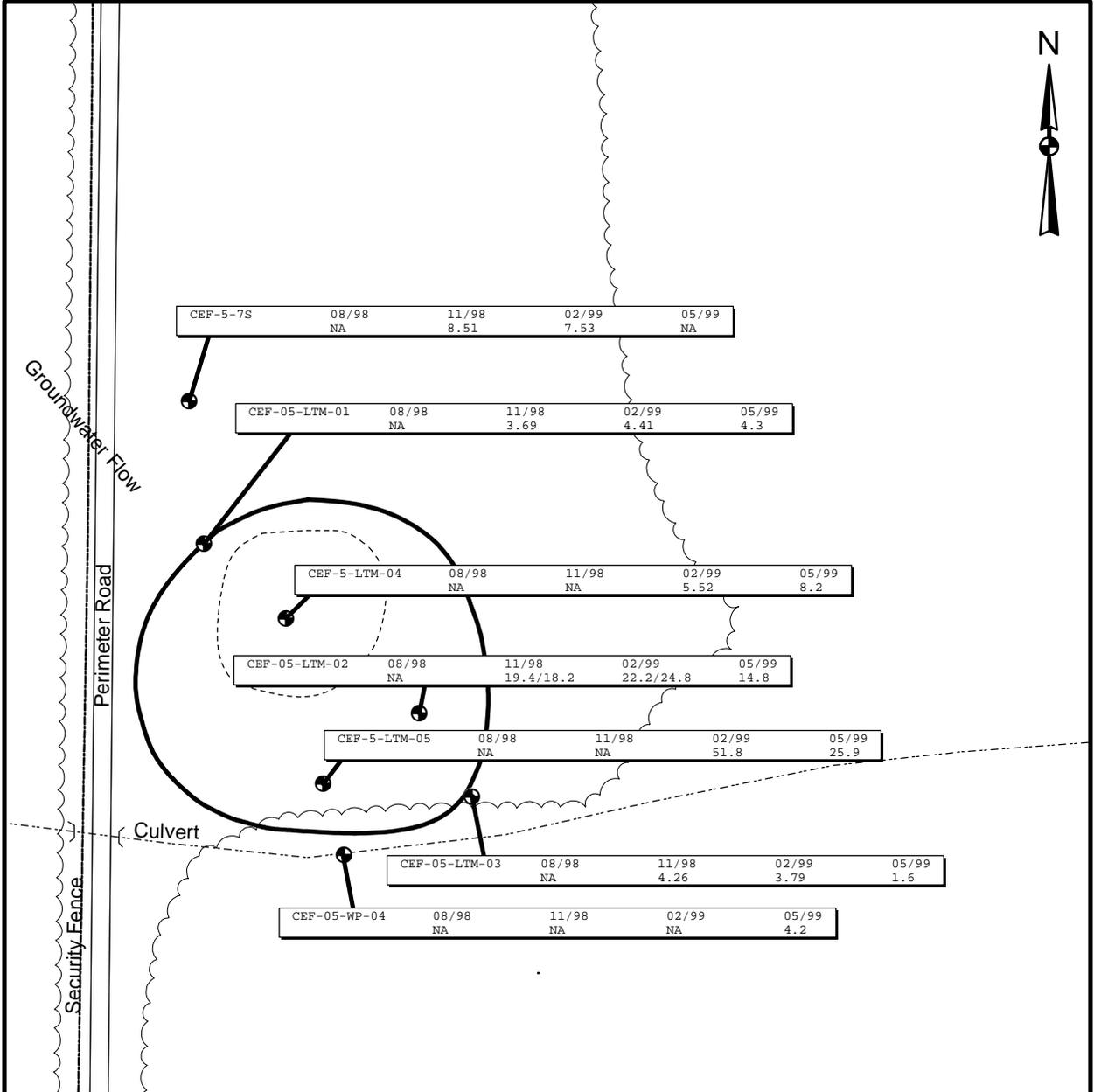
All Results in mV

DRAWN BY	DATE
YLI	04/07/99
CHECKED BY	DATE
BD	1/30/99
COST/SCHEDULE-AREA	
SCALE AS NOTED	



GROUNDWATER OXIDATION-REDUCTION POTENTIAL  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 7898	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. FIGURE 3-10	REV 0



**LEGEND**

NA = Not Analyzed	Monitoring Well
J = Estimated Concentration	Approximate Extent Of Groundwater Contamination
U = Not Detected At Or Above Method Detection Limit (Associated Value)	Drainage Ditch
* = Detected Concentration Exceeds Target Cleanup Goal	Fence
Duplicate Results Reported As Sample/Duplicate	Former Pit Area

All Results in mg/L

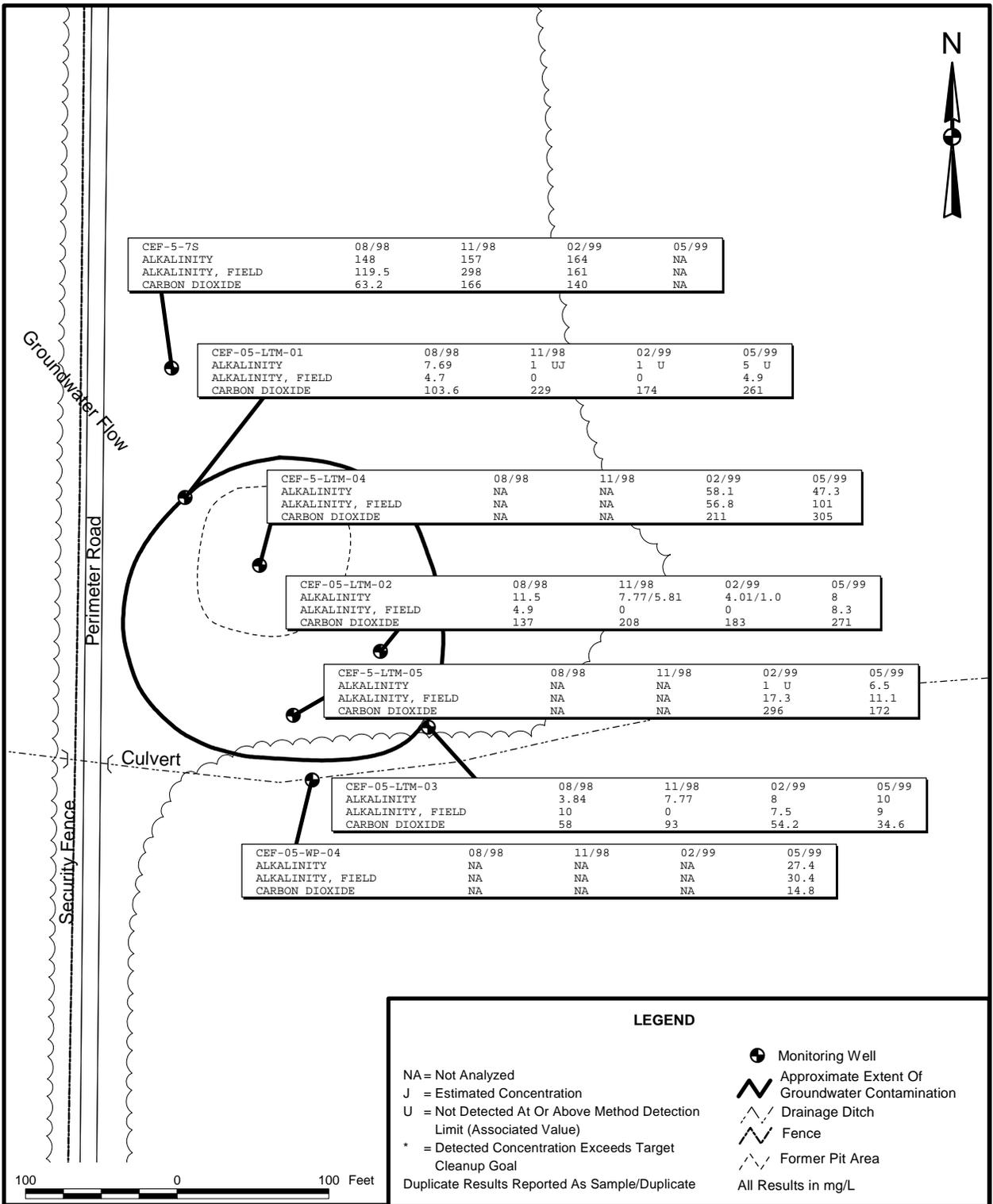


DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	



TOTAL ORGANIC CARBON IN GROUNDWATER  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. <b>FIGURE 3-11</b>	REV <b>0</b>



CEF-5-7S	08/98	11/98	02/99	05/99
ALKALINITY	148	157	164	NA
ALKALINITY, FIELD	119.5	298	161	NA
CARBON DIOXIDE	63.2	166	140	NA

CEF-05-LTM-01	08/98	11/98	02/99	05/99
ALKALINITY	7.69	1 UJ	1 U	5 U
ALKALINITY, FIELD	4.7	0	0	4.9
CARBON DIOXIDE	103.6	229	174	261

CEF-5-LTM-04	08/98	11/98	02/99	05/99
ALKALINITY	NA	NA	58.1	47.3
ALKALINITY, FIELD	NA	NA	56.8	101
CARBON DIOXIDE	NA	NA	211	305

CEF-05-LTM-02	08/98	11/98	02/99	05/99
ALKALINITY	11.5	7.77/5.81	4.01/1.0	8
ALKALINITY, FIELD	4.9	0	0	8.3
CARBON DIOXIDE	137	208	183	271

CEF-5-LTM-05	08/98	11/98	02/99	05/99
ALKALINITY	NA	NA	1 U	6.5
ALKALINITY, FIELD	NA	NA	17.3	11.1
CARBON DIOXIDE	NA	NA	296	172

CEF-05-LTM-03	08/98	11/98	02/99	05/99
ALKALINITY	3.84	7.77	8	10
ALKALINITY, FIELD	10	0	7.5	9
CARBON DIOXIDE	58	93	54.2	34.6

CEF-05-WP-04	08/98	11/98	02/99	05/99
ALKALINITY	NA	NA	NA	27.4
ALKALINITY, FIELD	NA	NA	NA	30.4
CARBON DIOXIDE	NA	NA	NA	14.8

**LEGEND**

- NA = Not Analyzed
  - J = Estimated Concentration
  - U = Not Detected At Or Above Method Detection Limit (Associated Value)
  - \* = Detected Concentration Exceeds Target Cleanup Goal
  - Duplicate Results Reported As Sample/Duplicate
  - Monitoring Well
  - Approximate Extent Of Groundwater Contamination
  - Drainage Ditch
  - Fence
  - Former Pit Area
- All Results in mg/L

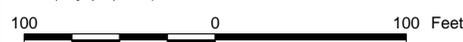
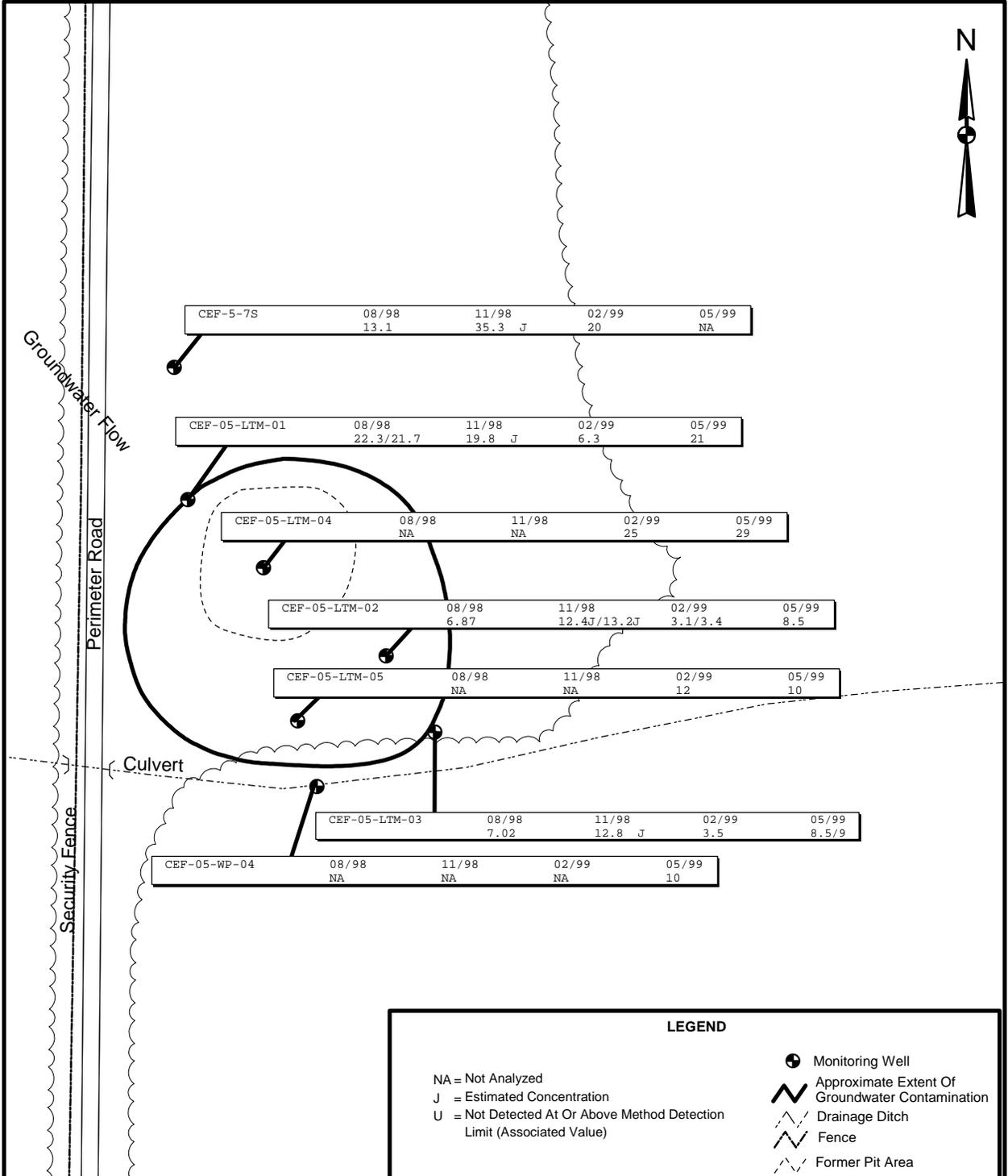


DRAWN BY	DATE
YLI	04/07/99
CHECKED BY	DATE
BD	1/30/99
COST/SCHEDULE-AREA	
SCALE AS NOTED	



CARBON DIOXIDE AND ALKALINITY IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
7898	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO.	REV
FIGURE 3-12	0



**LEGEND**

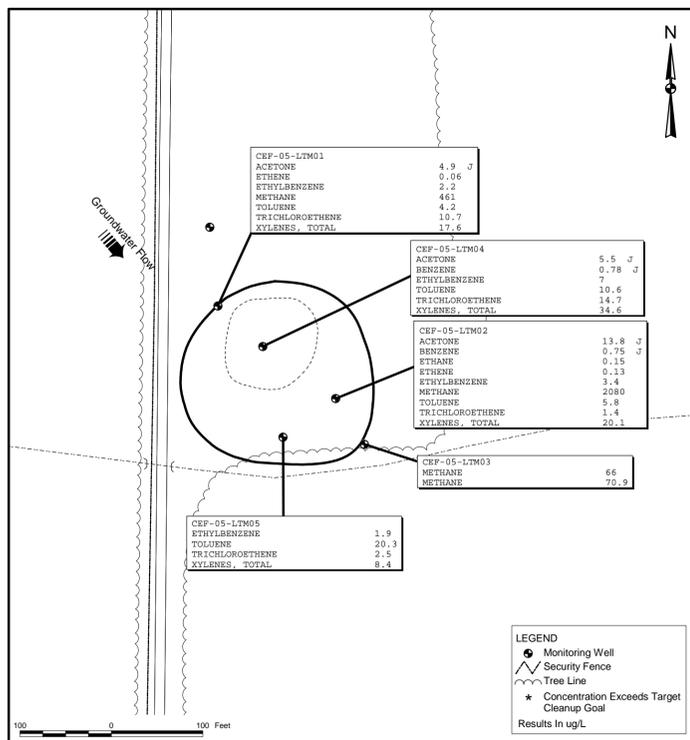
NA = Not Analyzed	Monitoring Well
J = Estimated Concentration	Approximate Extent Of Groundwater Contamination
U = Not Detected At Or Above Method Detection Limit (Associated Value)	Drainage Ditch
	Fence
	Former Pit Area
Duplicate Results Reported As Sample/Duplicate	All Results in mg/L

DRAWN BY <b>YLI</b>	DATE <b>04/07/99</b>
CHECKED BY <b>BD</b>	DATE <b>1/30/99</b>
COST/SCHEDULE-AREA	
SCALE AS NOTED	

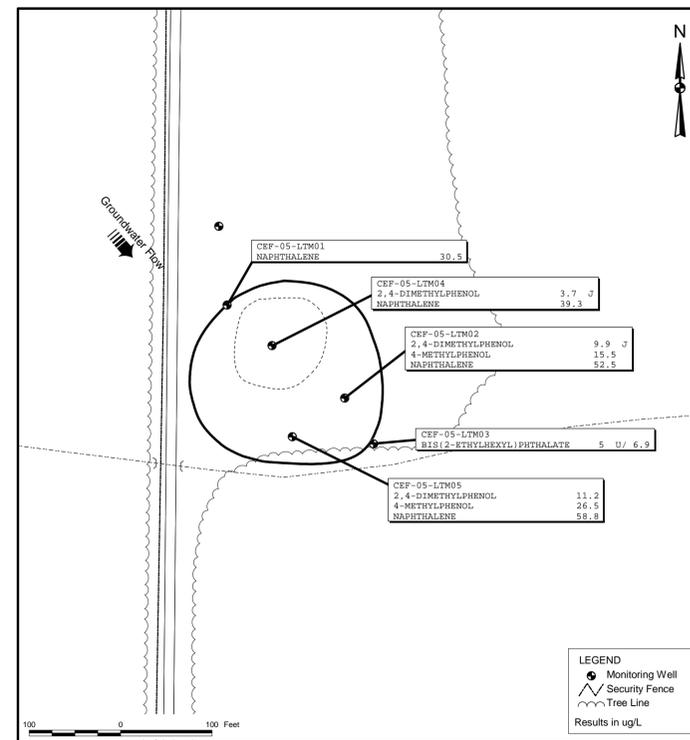


CHLORIDE IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

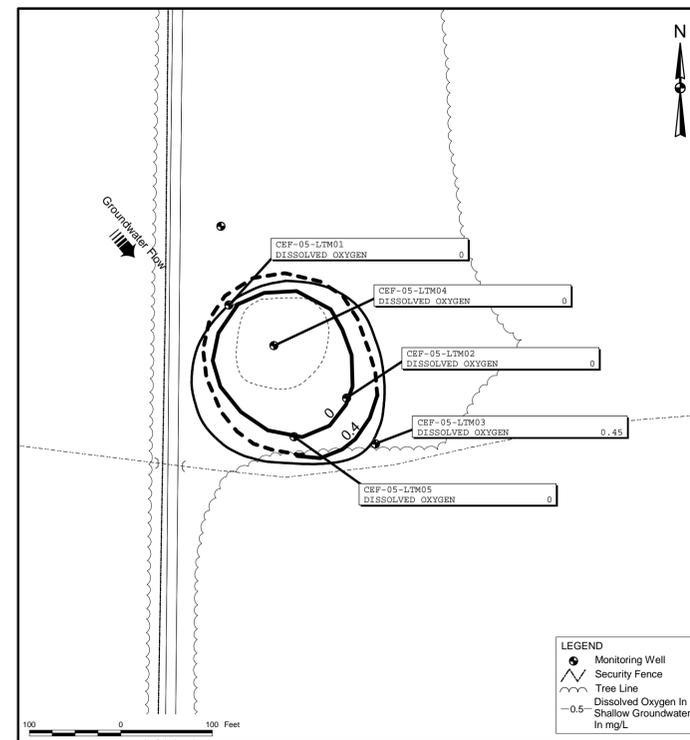
CONTRACT NUMBER <b>7898</b>	
APPROVED BY	DATE
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APPROVED BY	DATE
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DRAWING NO. <b>FIGURE 3-13</b>	REV <b>0</b>



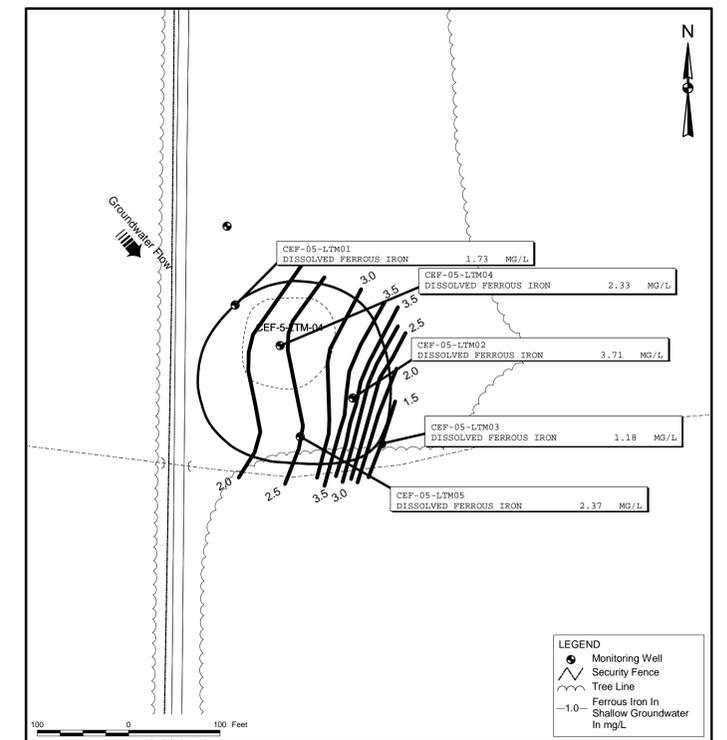
**VOLATILE ORGANIC COMPOUNDS**



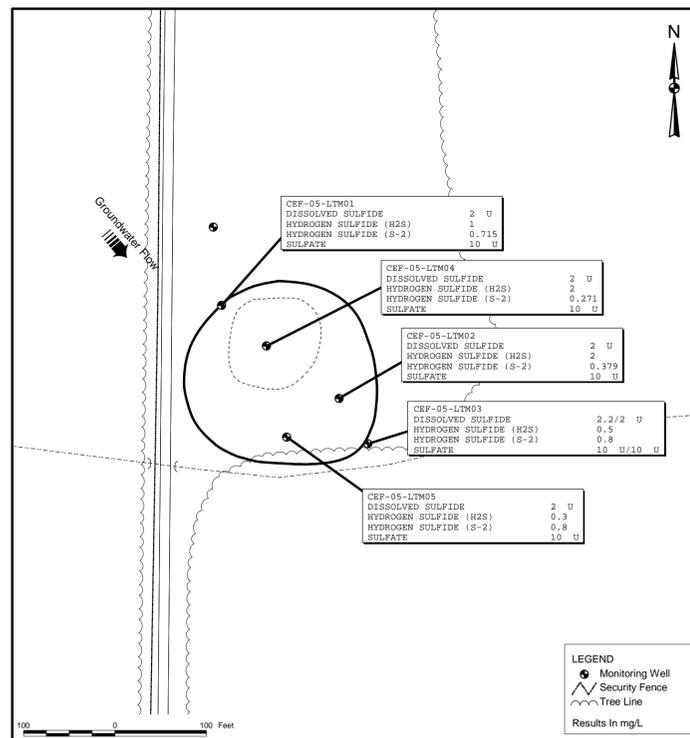
**SEMIVOLATILE ORGANIC COMPOUNDS**



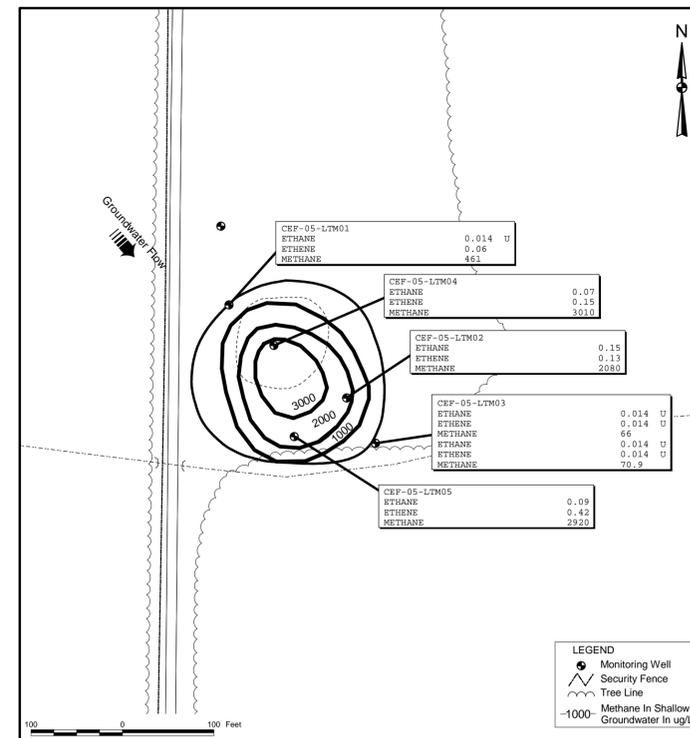
**DISSOLVED OXYGEN**



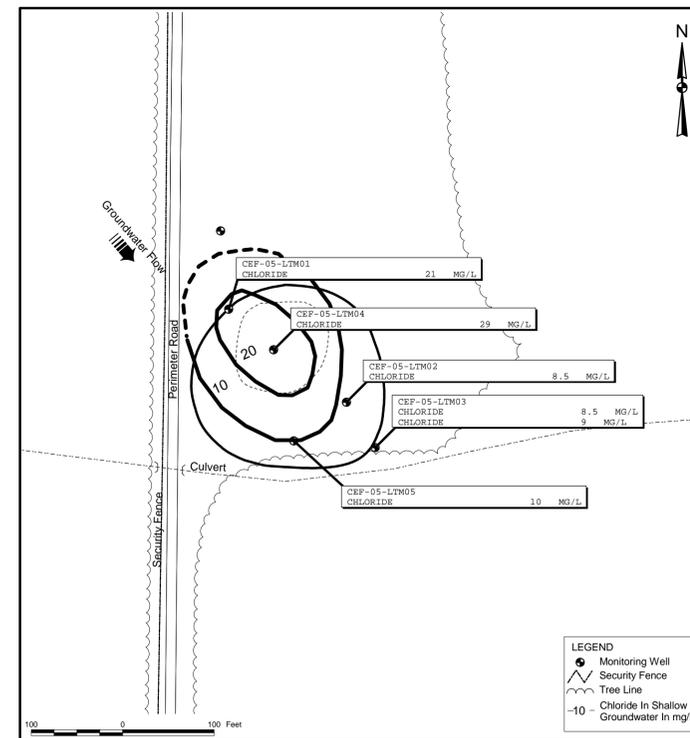
**FERROUS IRON**



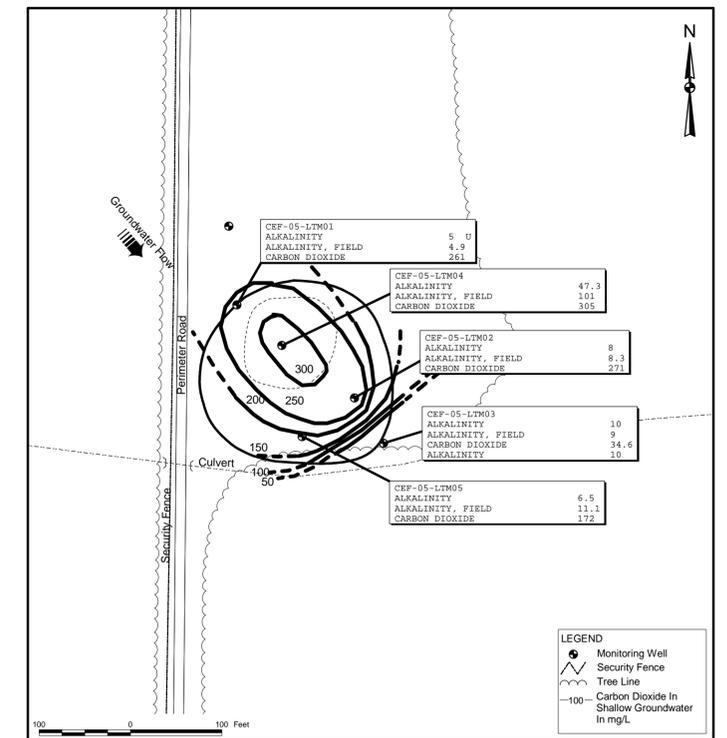
**SULFATE, SULFIDE, AND HYDROGEN SULFIDE**



**METHANE**

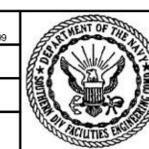


**CHLORIDE**



**CARBON DIOXIDE AND ALKALINITY**

DRAWN BY: MJJ  
 CHECKED BY: [blank]  
 DATE: 15 June 99  
 SCALE: AS NOTED



ISOPLETH MAPS OF CHEMICALS OF CONCERN  
 AND SELECTED NATURAL ATTENUATION PARAMETERS  
 IN GROUNDWATER  
 OPERABLE UNIT 2, SITE 5  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NO. 7898  
 OWNER NO. [blank]  
 APPROVED BY: [blank] DATE: [blank]  
 DRAWING NO. FIGURE 3-14  
 REV. 0

Beta-BHC has not been detected during the four quarterly sampling events. Alpha-chlordane was detected at 0.15 µg/L in well CEF-05-LTM02 during third quarter sampling. This concentration is below the groundwater target cleanup goal of 2 µg/L.

Site data suggest that destructive and non-destructive natural attenuation mechanisms are occurring at the site. Geochemical data indicate that anaerobic biodegradation of petroleum-related and chlorinated compounds is taking place via iron reduction, sulfate reduction, and methanogenesis in the area of the plume. Natural and anthropogenic carbon sources may be utilized as the primary substrate for microbial growth at the site. Total organic carbon (TOC) concentrations in the upgradient well are less than 20 mg/L, and total concentrations of benzene, ethylbenzene, toluene, and xylenes (BTEX) at the site are less than 100 µg/L, indicating a limited but sufficient amount of carbon to be used as an energy source. In addition, biodegradation of petroleum-related compounds is less efficient under the anaerobic conditions present at the site, resulting in a relatively slow rate of biodegradation of these compounds. Because of these limitations to natural attenuation by biodegradation, non-destructive mechanisms such as advection, dispersion, sorption, and volatilization also may be important in reducing contaminant concentrations at the site.

Natural attenuation data from third quarter sampling were evaluated quantitatively using a preliminary screening matrix to derive an interpretative score [United States Environmental Protection Agency (U.S. EPA), 1997]. The screening matrix was used to evaluate the source area and the downgradient plume with respect to anaerobic biodegradation of chlorinated solvents. Data from source wells and wells downgradient of the source area were compared to data from the background/upgradient well (CEF-05-7S). Data from the fourth quarter were not used in the screening matrix because CEF-05-7S was dry during this event and background data were not available for comparison. For the wells within the source area, the screening matrix score was 12, indicating “limited evidence” for biodegradation of chlorinated compounds in this area (see Table 3-4). For wells downgradient of the source area, a score of 14 was calculated, also indicating “limited evidence” of chlorinated solvent biodegradation in this area (see Table 3-5).

The results of the groundwater sampling and analysis of the sample from well CEF-05-26D for the first and second quarter sampling events are summarized in Table 3-6. None of the TCL VOC (including tetrachloroethene [PCE]) compounds were detected in the second quarter groundwater sampling event.

TABLE 3-4

**PRELIMINARY SCREENING PARAMETERS & WEIGHTING FOR ANAEROBIC BIODEGRADATION PROCESSES  
WELL IN THE SOURCE AREA\*  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

Analyte	Units	Threshold Concentration	OU 7, Site 16 Concentration	Available Points	Site Points	Interpretation
Oxygen	mg/L	<0.5	0.43	3	3	Tolerated; suppresses reductive dechlorination at higher concentrations
	mg/L	>5 >1(a)		-3		Not tolerated; however, vinyl chloride may be oxidized aerobically
Nitrate	mg/L	<1	ND	2	0	At higher concentrations may compete with reductive pathway
Ferrous Iron (Fe <sup>2+</sup> )	mg/L	>1	1.63	3	3	Reductive pathway possible; vinyl chloride may be oxidized under Fe (III) reducing conditions
Sulfate	mg/L	<20	2	2	2	At higher concentrations may compete with reductive pathway
Sulfide	mg/L	>1	0.27	3	0	Reductive pathway possible
Methane	mg/L	<0.5	1.339	0	3	Vinyl chloride oxidizes
	mg/L	>0.5		3		Ultimate reductive daughter product, vinyl chloride accumulates
ORP (Eh)	mV	<50	-59.3	1	1	Reductive pathway possible
	mV	<-100		2		Reductive pathway likely
pH	unitless	5<pH<9	5.93	0	0	Optimal range for reductive pathway
	unitless	5>pH>9		-2		Outside optimal range for reductive pathway
TOC (total organic carbon) in BG	mg/L	>20	7.53	2	0	Carbon and energy source; drives dechlorination; can be natural or anthropogenic
Temperature	deg-C	>20	19.6	1	0	At T> 20°C, biochemical process is accelerated
Carbon Dioxide	mg/L	>2x BG (BG=140)	211	1	0	Ultimate oxidative daughter product
Alkalinity	mg/L	>2x BG (BG=164)	58.1	1	0	Results from interaction of carbon dioxide with aquifer minerals
Chloride	mg/L	>2x BG (BG=20)	25	2	0	Daughter product of organic chlorine
Hydrogen	nM	>1	NA	3	-	Reductive pathway possible; vinyl chloride may accumulate
	nM	<1		0		Vinyl chloride oxidized
Volatile Fatty Acids	mg/L	>0.1	NA	2	-	Carbon and energy source; drives dechlorination
BTEX	µg/L	>100	89	2	0	Carbon and energy source; drives dechlorination
Tetrachloroethene	µg/L	-	NA	-	-	Material released
Trichloroethene	µg/L	-	33.7	0	0	Material released
	µg/L	-		2 (b)		Daughter product of tetrachloroethene
Dichloroethene	µg/L	-	NA	0	-	Material released
	µg/L	-		2 (b)		cis-1,2-dichloroethene is greater than 80% of
Vinyl Chloride	µg/L	-	NA	0	-	Material released
	µg/L	-		2 (b)		Daughter product of dichloroethenes
1,1,1-Trichloroethane	µg/L	-	NA	-	-	Material released
Dichloroethane	µg/L	-	NA	-	-	Daughter product of 1,1,1-trichloroethane under reducing conditions
Carbon Tetrachloride	µg/L	-	NA	0	-	Material released
Chloroethane	µg/L	-	NA	2	-	Daughter product of DCA or VC under reducing conditions
Ethene/Ethane	mg/L	>0.01	ND	2	0	Daughter product of vinyl chloride/ethene
	mg/L	>0.1		3		Daughter product of vinyl chloride/ethene
Chloroform	µg/L	-	NA	0	-	Material released
	µg/L	-		2		Daughter product of carbon tetrachloride
Dichloromethane	µg/L	-	NA	0	-	Material released
	µg/L	-		2		Daughter product of chloroform
<b>Total Score</b>				<b>36</b>	<b>12</b>	<b>LIMITED EVIDENCE OF BIODEGRADATION</b>

Reference: Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater - EPA/600/R-98/128

\* - Well evaluated is CEF-05-LTM-04

Background monitoring well is CEF-05-7S

(a) - Draft EPA Region 4 Suggested Practices for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents

(b) - Points awarded only if it can be shown that the compound is a daughter product.

NA = Not analyzed

ND = Not detected

NOTE: Third quarter data were used because the background well was dry during fourth quarter sampling.

TABLE 3-5

**PRELIMINARY SCREENING PARAMETERS & WEIGHTING FOR ANAEROBIC BIODEGRADATION PROCESSES**  
**WELLS DOWNGRADIENT OF THE SOURCE AREA\***  
**OPERABLE UNIT 2, SITE 5**  
**NAVAL AIR STATION CECIL FIELD**  
**JACKSONVILLE, FLORIDA**

Analyte	Units	Threshold Concentration	OU 7, Site 16 Concentration	Available Points	Site Points	Interpretation
Oxygen	mg/L	<0.5	0 - 1.62	3	3	Tolerated; suppresses reductive dechlorination at higher concentrations
	mg/L	>5 >1(a)		-3		Not tolerated; however, vinyl chloride may be oxidized aerobically
Nitrate	mg/L	<1	ND	2	0	At higher concentrations may compete with reductive pathway
Ferrous Iron (Fe <sup>2+</sup> )	mg/L	>1	0.43 - 3.3	3	3	Reductive pathway possible; vinyl chloride may be oxidized under Fe (III) reducing conditions
Sulfate	mg/L	<20	0.67 - 3.3	2	2	At higher concentrations may compete with reductive pathway
Sulfide	mg/L	>1	0.43 - 0.8	3	0	Reductive pathway possible
Methane	mg/L	<0.5	0.363 - 6.71	0	3	Vinyl chloride oxidizes
	mg/L	>0.5		3		Ultimate reductive daughter product, vinyl chloride accumulates
ORP (Eh)	mV	<50	-89 - -16.4	1	1	Reductive pathway possible
	mV	<-100		2		Reductive pathway likely
pH	unitless	5<pH<9	4.98 - 5.33	0	0	Optimal range for reductive pathway
	unitless	5>pH>9		-2		Outside optimal range for reductive pathway
TOC (total organic carbon) in BG	mg/L	>20	7.53	2	0	Carbon and energy source; drives dechlorination; can be natural or anthropogenic
Temperature	deg-C	>20	18.5 - 22.1	1	1	At T > 20°C, biochemical process is accelerated
Carbon Dioxide	mg/L	>2x BG (BG=140)	54.2 - 296	1	1	Ultimate oxidative daughter product
Alkalinity	mg/L	>2x BG (BG=164)	ND - 8	1	0	Results from interaction of carbon dioxide with aquifer minerals
Chloride	mg/L	>2x BG (BG=20)	3.1 - 12	2	0	Daughter product of organic chlorine
Hydrogen	nM	>1	NA	3	-	Reductive pathway possible; vinyl chloride may accumulate
	nM	<1		0		Vinyl chloride oxidized
Volatile Fatty Acids	mg/L	>0.1	NA	2	-	Carbon and energy source; drives dechlorination
BTEX	µg/L	>100	ND - 89.2	2	0	Carbon and energy source; drives dechlorination
Tetrachloroethene	µg/L	-	NA	-	-	Material released
Trichloroethene	µg/L	-	1.4 - 11.5	0	0	Material released
	µg/L	-		2 (b)		Daughter product of tetrachloroethene
Dichloroethene	µg/L	-	NA	0	-	Material released
	µg/L	-		2 (b)		cis-1,2-dichloroethene is greater than 80% of
Vinyl Chloride	µg/L	-	NA	0	-	Material released
	µg/L	-		2 (b)		Daughter product of dichloroethenes
1,1,1-Trichloroethane	µg/L	-	NA	-	-	Material released
Dichloroethane	µg/L	-	NA	-	-	Daughter product of 1,1,1-trichloroethane under reducing conditions
Carbon Tetrachloride	µg/L	-	NA	0	-	Material released
Chloroethane	µg/L	-	NA	2	-	Daughter product of DCA or VC under reducing conditions
Ethene/Ethane	mg/L	>0.01	ND	2	0	Daughter product of vinyl chloride/ethene
	mg/L	>0.1		3		Daughter product of vinyl chloride/ethene
Chloroform	µg/L	-	NA	0	-	Material released
	µg/L	-		2		Daughter product of carbon tetrachloride
Dichloromethane	µg/L	-	NA	0	-	Material released
	µg/L	-		2		Daughter product of chloroform
<b>Total Score</b>				<b>36</b>	<b>14</b>	<b>LIMITED EVIDENCE OF BIODEGRADATION</b>

Reference: Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater - EPA/600/R-98/128

\* - Wells evaluated include CEF-05-LTM-02, CEF-05-LTM-03, CEF-05-LTM-05

Background monitoring well is CEF-05-7S

(a) - Draft EPA Region 4 Suggested Practices for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents

(b) - Points awarded only if it can be shown that the compound is a daughter product.

NA = Not analyzed

ND = Not detected

NOTE: Third quarter data were used because the background well was dry during fourth quarter sampling.

TABLE 3-6

**SUMMARY OF CHEMICALS OF CONCERN IN GROUNDWATER  
MONITORING WELL CEF-05-26D  
OPERABLE UNIT 2, SITE 5  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

PARAMETER	CEF-05-26D	
	Aug-98	Nov-98
<b>VOLATILES (ug/L)</b>		
1,1,1-TRICHLOROETHANE	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	0.2 UJ	1 U
1,1,2-TRICHLOROETHANE	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U
1,2-DICHLOROETHENE (TOTAL)	1 U	NT
1,2-DICHLOROPROPANE	1 U	1 U
2-BUTANONE	1 UR	5 U
2-HEXANONE	1 U	5 U
4-METHYL-2-PENTANONE	1 U	5 UR
ACETONE	1 UR	5 U
BENZENE	1 U	1 U
BROMODICHLOROMETHANE	0.6 U	1 U
BROMOFORM	1 U	1 U
BROMOMETHANE	1 U	1 U
CARBON DISULFIDE	1 UJ	1 U
CARBON TETRACHLORIDE	1 U	1 U
CHLOROBENZENE	1 U	1 U
CHLOROETHANE	1 U	1 U
CHLOROFORM	1 U	1 U
CHLOROMETHANE	1 U	1 U
CIS-1,2-DICHLOROETHENE	NT	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U
ETHYLBENZENE	1 U	1 U
M+P-XYLENES	NT	1 U
METHYL TERT-BUTYL ETHER	1 U	NT
METHYLENE CHLORIDE	0.5 U	1 U
O-XYLENE	NT	1 U
STYRENE	1 U	1 U
TETRACHLOROETHENE	1 U	1 U
TOLUENE	1 U	1 U
TRANS-1,2-DICHLOROETHENE	NT	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U
TRICHLOROETHENE	0.3 J	1 U
VINYL CHLORIDE	1 U	1 U
XYLENES, TOTAL	1 U	NT

## 4.0 RECOMMENDATIONS

The natural attenuation remedial action at OU2, Site 5 is currently operational and functional. Based on an evaluation of data collected during the first year of quarterly groundwater monitoring, the following recommendations are proposed:

1. **Decrease the sampling frequency** from quarterly **to semi-annually**, with modifications as outlined below. TtNUS will continue to review semi-annual sampling data to optimize the monitoring program.
2. **Discontinue analysis of the following natural attenuation parameters:** alkalinity (field and laboratory), biochemical oxygen demand (BOD), chemical oxygen demand (COD), chloride, dissolved sulfide, ethene/ethane, field manganese, nitrate, nitrite, orthophosphate, TOC, dissolved iron, and dissolved manganese. These parameters have not yielded useful data during the previous monitoring events and are no longer deemed necessary to evaluate natural attenuation processes at the site. Reintroduction of these analyses may be considered if site conditions change.
3. **Discontinue analysis of the following COCs:** acetone, ethylbenzene, toluene, 2,4-dimethylphenol, BEHP, alpha-chlordane, beta-BHC, antimony, arsenic, beryllium, cadmium, chromium, and manganese. With the exception of BEHP, pesticide COCs, and manganese, these parameters were not detected in excess of groundwater target cleanup goals during the first four quarterly monitoring events.

BEHP was detected once in two wells during separate sampling events at concentrations in excess of its groundwater target cleanup goal. The BEHP concentrations have decreased significantly since the RI and its detection has been infrequent and at low concentrations (less than 8 µg/L) over the past four quarterly sampling events. BEHP is also a common field and laboratory contaminant and is not very soluble in water. BEHP is of minimal concern at the site.

One pesticide, alpha-chlordane, was detected during one sampling event in one well at a concentration less than its groundwater target cleanup goal. Manganese was detected at concentrations greater than its groundwater target cleanup goal in the August 1998 sampling event in wells CEF-05-LTM-01 and CEF-05-LTM-02; however, manganese concentrations in these wells for the three subsequent quarterly sampling events decreased substantially, to levels less than the groundwater target cleanup goal.

4. **Discontinue sampling of CEF-05-7S.** TtNUS has evaluated the monitoring network to determine the wells that will continue to be sampled in order to optimize the sampling program. This well was sampled to provide upgradient/background data for evaluation of natural attenuation processes. Unless conditions change, data from this well are not considered necessary.
5. **Collect biogenic gas samples for fixed-based laboratory analysis of hydrogen, carbon dioxide, nitrogen, methane, ethane, ethene, and dissolved oxygen during the first semi-annual-year 2 groundwater sampling event (August 1999) only.**
6. **Begin analysis for TCE biodegradation daughter products including 1,1-dichloroethene (DCE), cis- and trans- 1,2-DCE, and vinyl chloride.** These data will be used to further evaluate TCE dechlorination processes at the site.
7. Monitoring well CEF-05-26D was sampled for VOC because of a previous detection of PCE. Groundwater analytical results from well CEF-05-26D indicated that PCE was not detected at this location. **It is recommended that sampling and analysis of monitoring well CEF-05-26D be discontinued since PCE has not been detected during the first and second quarterly sampling events.**

## REFERENCES

ABB Environmental Services (ABB-ES), 1995. Remedial Investigation, Operable Unit 2, NAS Cecil Field, Jacksonville, Florida. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina, May.

Chapelle, Frank, 1996. Protocol for Assessing the Natural Attenuation of Chlorinated Ethenes in Ground-Water Systems. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, North Charleston, South Carolina, July.

Harding Lawson Associates (HLA), 1998a. Site 5 Groundwater Remedial Design, NAS Cecil Field, Jacksonville, Florida. Prepared for Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, May.

HLA, 1998b. Inorganic Background Data Set.

HLA, 1997. Site 5 Air Sparging Pilot Test, NAS Cecil Field, Jacksonville, Florida. Prepared for Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, November.

Tetra Tech NUS, Incorporated (TtNUS), 1999a. Third Quarter Natural Attenuation Groundwater Monitoring Report for Operable Unit 2, Site 5, Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, May.

TtNUS, 1999b. Second Quarter Natural Attenuation Groundwater Monitoring Report for Operable Unit 2, Site 5, Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, February.

TtNUS, 1999c. Work Plan Addendum for Long-Term Groundwater Monitoring at Sites 3,5,8 and 11. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, January.

TtNUS, 1998a. Final Initial Natural Attenuation Sampling Work Plan for Operable Unit 2, Site 5, Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, July.

TtNUS, 1998b. Initial (First Quarter) Groundwater Monitoring Report for Operable Unit 2, Site 5, Naval Air Station Cecil Field, Jacksonville, Florida. Prepared for the Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, October.

United States Environmental Protection Agency (U.S. EPA), 1996. Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May.

U.S. EPA, 1997. Draft Region 4 Suggested Practices for Evaluation of a Site for Natural Attenuation (Biological Degradation) of Chlorinated Solvents, U.S. EPA Region 4, Athens, Georgia, Version 3.0, November.

U.S. EPA, 1998. Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128, September.

Wiedemeier, T. H., and F. H. Chapelle, 1998. Technical Guidelines for Evaluating Monitored Natural Attenuation of Petroleum Hydrocarbons and Chlorinated Solvents in Ground Water at Naval and Marine Corps Facilities. Prepared for the Southwest Division Naval Facilities Engineering Command and Southern Division Naval Facilities Engineering Command Engineering Field Activity, September.

**APPENDIX A**

**ANALYTICAL LABORATORY RESULTS**



MEMO TO: MR. M. SPERANZA  
DATE: JUNE 8, 1999 – PAGE 2

**SEMIVOLATILE FRACTION**

All quality control parameters were met for this fraction.

**PESTICIDE FRACTION**

It should be noted the detection limit, 0.05, of beta-BHC exceeded the Florida groundwater limit of 0.02.

Samples CEF-05-LTM02-04 and CEF-05-LTM05-04 reported elevated detection limits due to a four-fold dilution. The reporting limits of both samples exceeded the groundwater limits for both compounds.

The laboratory reported gamma-Chlordane on the Form Is, however, the laboratory specification required the analysis of alpha-Chlordane. The laboratory was notified and in return, amended the associated Form Is.

**TPH FRACTION**

It should be noted in samples CEF-05-LTM02-04 and CEF-05-LTM05-04 elevated detection limits were reported due to a five-fold dilution.

It should be noted the laboratory reported the units in milligram per liter, however, according to the laboratory specifications the units were to be reported in microgram per liter. The reviewer amended the electronic data to be reported as micrograms per liter.

**GAS FRACTION**

It should be noted the laboratory failed to provide a Form I for sample CEF-05-LTM01-04. The laboratory was notified and in return provided the Form I for the associated sample.

**ADDITIONAL COMMENTS**

Positive results reported at concentrations below the Contract Required Quantitation Limits (CRQL) were qualified as estimated (J).

**EXECUTIVE SUMMARY**

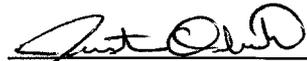
**Laboratory performance:** The initial and continuing calibration RRFs were below the 0.05 quality control limits for acetone. Methane was detected as blank contaminant.

**Other Factors Affecting Data Quality:** Several of the samples were analyzed at a dilution in the TPH fraction. Several pesticide compounds exceeded the Florida groundwater reporting limits.

MEMO TO: MR. M. SPERANZA  
DATE: JUNE 8, 1999 - PAGE 3

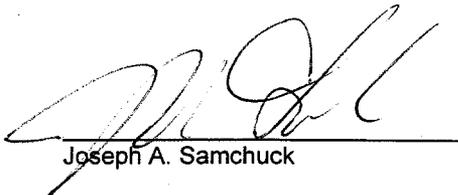
The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1994), and the NFESC guidelines "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



Justin Orbich

Chemist/Data Validator  
Tetra Tech, NUS



Joseph A. Samchuck

Data Validation Quality Assurance Officer  
Tetra Tech, NUS

Attachments:

1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008876.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

### VOA TCL List

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	ND	5.0	ug/l	
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	ND	1.0	ug/l	
1330-20-7	Xylene (total)	ND	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%		80-116%
17060-07-0	1,2-Dichloroethane-D4	107%		74-120%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	99%		86-115%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008870.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

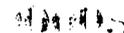
### VOA TCL List

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	4.9	5.0	ug/l	J
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	2.2	1.0	ug/l	
108-88-3	Toluene	4.2	1.0	ug/l	
79-01-6	Trichloroethylene	10.7	1.0	ug/l	
1330-20-7	Xylene (total)	17.6	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		80-116%
17060-07-0	1,2-Dichloroethane-D4	102%		74-120%
2037-26-5	Toluene-D8	100%		80-120%
460-00-4	4-Bromofluorobenzene	100%		86-115%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound





<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008887.D	1	05/20/99	CJP	n/a	n/a	VG242
Run #2							

**VOA TCL List**

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	13.8	5.0	ug/l	
71-43-2	Benzene	0.75	1.0	ug/l	J
100-41-4	Ethylbenzene	3.4	1.0	ug/l	
108-88-3	Toluene	5.8	1.0	ug/l	
79-01-6	Trichloroethylene	1.4	1.0	ug/l	
1330-20-7	Xylene (total)	20.1	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	92%		80-116%
17060-07-0	1,2-Dichloroethane-D4	93%		74-120%
2037-26-5	Toluene-D8	100%		80-120%
460-00-4	4-Bromofluorobenzene	94%		86-115%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008872.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

**VOA TCL List**

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	ND	5.0	ug/l	
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	ND	1.0	ug/l	
1330-20-7	Xylene (total)	ND	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		80-116%
17060-07-0	1,2-Dichloroethane-D4	97%		74-120%
2037-26-5	Toluene-D8	101%		80-120%
460-00-4	4-Bromofluorobenzene	99%		86-115%

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound



## Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04		<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4		<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B		
<b>Project:</b> NAS Cecil Field-Site 5		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008873.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

**VOA TCL List**

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	5.5	5.0	ug/l	
71-43-2	Benzene	0.78	1.0	ug/l	J
100-41-4	Ethylbenzene	7.0	1.0	ug/l	
108-88-3	Toluene	10.6	1.0	ug/l	
79-01-6	Trichloroethylene	14.7	1.0	ug/l	
1330-20-7	Xylene (total)	34.6	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%		80-116%
17060-07-0	1,2-Dichloroethane-D4	97%		74-120%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	98%		86-115%

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<p>ND = Not detected</p> <p>RDL = Reported Detection Limit</p> <p>E = Indicates value exceeds calibration range</p>	<p>J = Indicates an estimated value</p> <p>B = Indicates analyte found in associated method blank</p> <p>N = Indicates presumptive evidence of a compound</p>
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# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008874.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

### VOA TCL List

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	ND	5.0	ug/l	
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	1.9	1.0	ug/l	
108-88-3	Toluene	20.3	1.0	ug/l	
79-01-6	Trichloroethylene	2.5	1.0	ug/l	
1330-20-7	Xylene (total)	8.4	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	94%		80-116%
17060-07-0	1,2-Dichloroethane-D4	99%		74-120%
2037-26-5	Toluene-D8	100%		80-120%
460-00-4	4-Bromofluorobenzene	97%		86-115%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8260B	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0008875.D	1	05/17/99	CJP	n/a	n/a	VG242
Run #2							

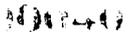
**VOA TCL List**

CAS No.	Compound	Result	RDL	Units	Q
67-64-1	Acetone	ND	5.0	ug/l	
71-43-2	Benzene	ND	1.0	ug/l	
100-41-4	Ethylbenzene	ND	1.0	ug/l	
108-88-3	Toluene	ND	1.0	ug/l	
79-01-6	Trichloroethylene	ND	1.0	ug/l	
1330-20-7	Xylene (total)	ND	3.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%		80-116%
17060-07-0	1,2-Dichloroethane-D4	110%		74-120%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	100%		86-115%

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound





# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001776.D	1	05/15/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	ND	10	ug/l	
	3&4-Methylphenol	ND	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	6.9	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		21-100%
4165-62-2	Phenol-d5	27%		10-94%
118-79-6	2,4,6-Tribromophenol	85%		10-123%
4165-60-0	Nitrobenzene-d5	73%		35-114%
321-60-8	2-Fluorobiphenyl	78%		43-116%
1718-51-0	Terphenyl-d14	97%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001770.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	ND	10	ug/l	
	3&4-Methylphenol	ND	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	30.5	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	46%		21-100%
4165-62-2	Phenol-d5	28%		10-94%
118-79-6	2,4,6-Tribromophenol	107%		10-123%
4165-60-0	Nitrobenzene-d5	85%		35-114%
321-60-8	2-Fluorobiphenyl	88%		43-116%
1718-51-0	Terphenyl-d14	104%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001771.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	9.9	10	ug/l	J
	3&4-Methylphenol	15.5	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	52.5	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	48%		21-100%
4165-62-2	Phenol-d5	29%		10-94%
118-79-6	2,4,6-Tribromophenol	112%		10-123%
4165-60-0	Nitrobenzene-d5	86%		35-114%
321-60-8	2-Fluorobiphenyl	91%		43-116%
1718-51-0	Terphenyl-d14	102%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

Client Sample ID: CEF-05-LTM03-04  
Lab Sample ID: F4127-3  
Matrix: AQ - Ground Water  
Method: SW846 3510C/8270C  
Project: NAS Cecil Field-Site 5

Date Sampled: 05/11/99  
Date Received: 05/12/99  
Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001772.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	ND	10	ug/l	
	3&4-Methylphenol	ND	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	41%		21-100%
4165-62-2	Phenol-d5	25%		10-94%
118-79-6	2,4,6-Tribromophenol	96%		10-123%
4165-60-0	Nitrobenzene-d5	88%		35-114%
321-60-8	2-Fluorobiphenyl	92%		43-116%
1718-51-0	Terphenyl-d14	106%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001773.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	3.7	10	ug/l	J
	3&4-Methylphenol	ND	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	39.3	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	46%		21-100%
4165-62-2	Phenol-d5	27%		10-94%
118-79-6	2,4,6-Tribromophenol	105%		10-123%
4165-60-0	Nitrobenzene-d5	90%		35-114%
321-60-8	2-Fluorobiphenyl	92%		43-116%
1718-51-0	Terphenyl-d14	106%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001774.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	11.2	10	ug/l	
	3&4-Methylphenol	26.5	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	58.8	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	46%		21-100%
4165-62-2	Phenol-d5	29%		10-94%
118-79-6	2,4,6-Tribromophenol	100%		10-123%
4165-60-0	Nitrobenzene-d5	91%		35-114%
321-60-8	2-Fluorobiphenyl	93%		43-116%
1718-51-0	Terphenyl-d14	97%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8270C	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	L001775.D	1	05/14/99	ME	05/14/99	OP803	SL109
Run #2							

### ABN TCL List

CAS No.	Compound	Result	RDL	Units	Q
105-67-9	2,4-Dimethylphenol	ND	10	ug/l	
	3&4-Methylphenol	ND	4.0	ug/l	
117-81-7	bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l	
91-20-3	Naphthalene	ND	5.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
367-12-4	2-Fluorophenol	40%		21-100%
4165-62-2	Phenol-d5	25%		10-94%
118-79-6	2,4,6-Tribromophenol	91%		10-123%
4165-60-0	Nitrobenzene-d5	74%		35-114%
321-60-8	2-Fluorobiphenyl	76%		43-116%
1718-51-0	Terphenyl-d14	97%		33-141%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

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## Report of Analysis

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<b>Client Sample ID:</b>	CEF-05-DUP1-04	<b>Date Sampled:</b>	05/11/99
<b>Lab Sample ID:</b>	F4127-7	<b>Date Received:</b>	05/12/99
<b>Matrix:</b>	AQ - Ground Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	SW846 3510C/8081A		
<b>Project:</b>	NAS Cecil Field-Site 5		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN03564.D	1	05/17/99	SKW	05/17/99	OP807	GMN148
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.10</del>	<del>ug/l</del>	<del></del>

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CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	86%		30-160%
2051-24-3	Decachlorobiphenyl	39%		30-160%

ND = Not detected

RDL = Reported Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b> CEF-05-LTM01-04		<b>Date Sampled:</b> 05/11/99	
<b>Lab Sample ID:</b> F4127-1		<b>Date Received:</b> 05/12/99	
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a	
<b>Method:</b> SW846 3510C/8081A			
<b>Project:</b> NAS Cecil Field-Site 5			

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN03556.D	1	05/17/99	SKW	05/17/99	OP807	GMN148
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.10</del>	<del>ug/l</del>	

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CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	63%		30-160%
2051-24-3	Decachlorobiphenyl	72%		30-160%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

Page 1 of 1

Client Sample ID: CEF-05-LTM02-04  
 Lab Sample ID: F4127-2  
 Matrix: AQ - Ground Water  
 Method: SW846 3510C/8081A  
 Project: NAS Cecil Field-Site 5

Date Sampled: 05/11/99  
 Date Received: 05/12/99  
 Percent Solids: n/a

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	MN03577.D	4	05/19/99	SKW	05/17/99	OP807	GMN149
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.20	ug/l	
5103-71-9	alpha-Chlordane	ND	0.40	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.40</del>	<del>ug/l</del>	

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CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	68%		30-160%
2051-24-3	Decachlorobiphenyl	129%		30-160%

(a) Dilution required due to matrix interference.

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

## Report of Analysis

Page 1 of 1

<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 3510C/8081A	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN03560.D	1	05/17/99	SKW	05/17/99	OP807	GMN148
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.10</del>	<del>ug/l</del>	<del></del>

*DO 6-8-99*

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	79%		30-160%
2051-24-3	Decachlorobiphenyl	43%		30-160%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

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<b>Client Sample ID:</b>	CEF-05-LTM04-04	<b>Date Sampled:</b>	05/11/99
<b>Lab Sample ID:</b>	F4127-4	<b>Date Received:</b>	05/12/99
<b>Matrix:</b>	AQ - Ground Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	SW846 3510C/8081A		
<b>Project:</b>	NAS Cecil Field-Site 5		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN03561.D	1	05/17/99	SKW	05/17/99	OP807	GMN148
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.10</del>	<del>ug/l</del>	

DO 6-8-99

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	64%		30-160%
2051-24-3	Decachlorobiphenyl	57%		30-160%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

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<b>Client Sample ID:</b>	CEF-05-LTM05-04	<b>Date Sampled:</b>	05/11/99
<b>Lab Sample ID:</b>	F4127-5	<b>Date Received:</b>	05/12/99
<b>Matrix:</b>	AQ - Ground Water	<b>Percent Solids:</b>	n/a
<b>Method:</b>	SW846 3510C/8081A		
<b>Project:</b>	NAS Cecil Field-Site 5		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 <sup>a</sup>	MN03578.D	4	05/19/99	SKW	05/17/99	OP807	GMN149
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.20	ug/l	
5103-71-9	alpha-Chlordane	ND	0.40	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.40</del>	<del>ug/l</del>	<del></del> <i>DO 6-8-99</i>

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	62%		30-160%
2051-24-3	Decachlorobiphenyl	98%		30-160%

(a) Dilution required due to matrix interference.

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

## Report of Analysis

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<b>Client Sample ID:</b> CEF-05-WP-04	
<b>Lab Sample ID:</b> F4127-6	<b>Date Sampled:</b> 05/11/99
<b>Matrix:</b> AQ - Ground Water	<b>Date Received:</b> 05/12/99
<b>Method:</b> SW846 3510C/8081A	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	MN03563.D	1	05/17/99	SKW	05/17/99	OP807	GMN148
Run #2							

## Pesticide TCL List

CAS No.	Compound	Result	RDL	Units	Q
319-85-7	beta-BHC	ND	0.050	ug/l	
5103-71-9	alpha-Chlordane	ND	0.10	ug/l	
<del>5103-74-2</del>	<del>gamma-Chlordane</del>	<del>ND</del>	<del>0.10</del>	<del>ug/l</del>	<del></del>

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CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
877-09-8	Tetrachloro-m-xylene	84%		30-160%
2051-24-3	Decachlorobiphenyl	57%		30-160%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03959.D	1	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	91%		40-140%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03950.D	1	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	1.60	0.50	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	91%		40-140%	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03953.D	5	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	10.2	2.5	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	89%		40-140%

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03954.D	1	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	87%		40-140%	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03956.D	1	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	1.96	0.50	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	89%		40-140%	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03957.D	5	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	9.82	2.5	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	110%		40-140%	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

00035



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> FLORIDA-PRO	
<b>Project:</b> NAS Cecil Field-Site 5	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	OP03958.D	1	05/18/99	SKW	05/17/99	OP805	GOP190
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
	TPH (C8-C40)	ND	0.50	mg/l	
CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits	
84-15-1	o-Terphenyl	93%		40-140%	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04		<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7		<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8015		
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	II11661.D	1	05/18/99	WDS	n/a	n/a	GII654
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	70.9	0.070	ug/l	
74-84-0	Ethane	ND	0.014	ug/l	
74-85-1	Ethene	ND	0.014	ug/l	

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

00325

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8015	
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	II11653.D	1	05/18/99	WDS	n/a	n/a	GII654
Run #2	II11654.D	50	05/18/99	WDS	n/a	n/a	GII654

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	2080 <sup>a</sup>	3.5	ug/l	
74-84-0	Ethane	0.15	0.014	ug/l	
74-85-1	Ethene	0.13	0.014	ug/l	

(a) Result is from Run# 2

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

100.000

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM03-04	
<b>Lab Sample ID:</b> F4127-3	<b>Date Sampled:</b> 05/11/99
<b>Matrix:</b> AQ - Ground Water	<b>Date Received:</b> 05/12/99
<b>Method:</b> SW846 8015	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	II11655.D	1	05/18/99	WDS	n/a	n/a	GII654
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	66.0	0.070	ug/l	
74-84-0	Ethane	ND	0.014	ug/l	
74-85-1	Ethene	ND	0.014	ug/l	

ND = Not detected  
RDL = Reported Detection Limit  
E = Indicates value exceeds calibration range

J = Indicates an estimated value  
B = Indicates analyte found in associated method blank  
N = Indicates presumptive evidence of a compound

00307

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04		<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4		<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8015		
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	II11656.D	1	05/18/99	WDS	n/a	n/a	GII654
Run #2	II11657.D	50	05/18/99	WDS	n/a	n/a	GII654

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	3010 <sup>a</sup>	3.5	ug/l	
74-84-0	Ethane	0.070	0.014	ug/l	
74-85-1	Ethene	0.15	0.014	ug/l	

(a) Result is from Run# 2

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

00311

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04		<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5		<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water		<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8015		
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8		

Run #	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	II11658.D	1	05/18/99	WDS	n/a	n/a	GII654
Run #2	II11659.D	50	05/18/99	WDS	n/a	n/a	GII654

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	2920 <sup>a</sup>	3.5	ug/l	
74-84-0	Ethane	0.090	0.014	ug/l	
74-85-1	Ethene	0.42	0.014	ug/l	

(a) Result is from Run# 2

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

00318

# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Method:</b> SW846 8015	
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

Run #1	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #2	II11660.D	1	05/18/99	WDS	n/a	n/a	GII654

CAS No.	Compound	Result	RDL	Units	Q
74-82-8	Methane	3.0	0.070	ug/l	
74-84-0	Ethane	ND	0.014	ug/l	
74-85-1	Ethene	ND	0.014	ug/l	

ND = Not detected  
 RDL = Reported Detection Limit  
 E = Indicates value exceeds calibration range

J = Indicates an estimated value  
 B = Indicates analyte found in associated method blank  
 N = Indicates presumptive evidence of a compound

00325



Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-06-9-037

TO: **M. SPERANZA** DATE: **JUNE 4, 1999**  
FROM: **GRETCHEN PHIPPS** COPIES: **DV FILE**  
SUBJECT: **DATA VALIDATION – SELECT METALS, DISSOLVED IRON AND MANGANESE, MISCELLANEOUS PARAMETERS CTO 066 - NAS CECIL FIELD SDG – F4127**

SAMPLES: 14/Aqueous/

CEF-05-DUP1-04	CEF-05-DUP1-04-F	CEF-05-LTM01-04
CEF-05-LTM01-04-F	CEF-05-LTM02-04	CEF-05-LTM02-04-F
CEF-05-LTM03-04	CEF-05-LTM03-04-F	CEF-05-LTM04-04
CEF-05-LTM04-04-F	CEF-05-LTM05-04	CEF-05-LTM05-04-F
CEF-05-WP-04	CEF-05-WP-04-F	

#### Overview

The sample set for CTO 066, NAS Cecil Field, SDG F4127, consists of fourteen (14) aqueous environmental samples. Two field duplicate pairs (CEF-05-LTM03-04 / CEF-05-DUP1-04 and CEF-05-LTM03-04-F / CEF-05-DUP1-04-F) were included within this SDG.

The samples, with exception to those designated –F, were analyzed for select metals, alkalinity, biological oxygen demand (BOD), chemical oxygen demand (COD), chloride, dissolved sulfide, nitrate, nitrite, orthophosphate, sulfate and total organic carbon (TOC). Those samples designated –F were analyzed for dissolved iron and manganese. The samples were collected by Tetra Tech NUS on May 11, 1999 and analyzed by Accutest Laboratories under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control criteria. Metals analyses were conducted using SW-846 method 6010B. Alkalinity analyses were conducted using EPA method 310.1. BOD analyses were conducted using EPA method 405.1. COD analyses were conducted using EPA method 410.1. Chloride analyses were conducted using EPA method 325.3. Dissolved sulfide analyses were conducted using EPA method 376.1. Nitrate and nitrite analyses were conducted using Standard Method 18 4500. Orthophosphate analyses were conducted using EPA method 365.2. Sulfate analyses were conducted using EPA method 375.4. TOC analyses were conducted using EPA method 415.1.

The data was evaluated based on the following parameters:

- \* • Data Completeness
- \* • Holding Times
- \* • Calibration Verifications
- Laboratory Blank Analyses
- Field Duplicate Imprecision

\* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

Affected samples: All

<u>Analyte</u>	<u>Maximum Concentration</u>	<u>Action Level(aqueous)</u>
Antimony	4.2µg/L	21.0µg/L
Arsenic	3.9µg/L	19.5µg/L
Beryllium	1.7µg/L	8.5µg/L
Cadmium	0.81µg/L	4.05µg/L
Chromium <sup>(1)</sup>	2.5µg/L	12.5µg/L
Iron	24.7µg/L	123.5µg/L
Manganese <sup>(1)</sup>	1.1µg/L	5.5µg/L
Vanadium	0.99µg/L	4.95µg/L

<sup>(1)</sup> Maximum concentration found in aqueous preparation blank.

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination. Sample aliquot and dilution factors were taken into consideration when determining blank contamination. Positive results < the action level for antimony, arsenic, beryllium, cadmium, chromium, manganese and vanadium were qualified as, "U", as a result of blank contamination. No action was taken for the remaining analytes since either the results were greater than the action level or were nondetects.

Field Duplicate Imprecision

Field duplicate imprecision (>35%) was noted for COD. The positive results reported for COD were qualified as estimated, "J".

Notes

The BOD result for sample CEF-05-LTM03-04 was not entered correctly on the Form 1 or the EDD. The laboratory was notified and provided the correct information.

Executive Summary

**Laboratory Performance:** Several analytes were present in the laboratory method / preparation blanks.

**Other Factors Affecting Data Quality:** Field duplicate imprecision (>35%) was noted for COD.

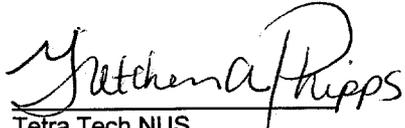
MEMO TO: M. SPERANZA - PAGE 3  
DATE: JUNE 4, 1999

PITT-06-9-037

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitled "Navy Installation Restoration Laboratory Quality Assurance Guide." (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

  
Tetra Tech NUS  
Gretchen A. Phipps

  
Tetra Tech NUS  
Joseph A. Samchuck  
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.7 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.4 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.55 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	30.8	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	28.1	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	22.9 B	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	684	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	32.4	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	6.7	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	20.0	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.9 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.79 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	3.0 B	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	10.2 B	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	5.8 B	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit

000009



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	2780	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	6.1 B	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



## Report of Analysis

Page 1 of 1

**Client Sample ID:** CEF-05-LTM02-04  
**Lab Sample ID:** F4127-2  
**Matrix:** AQ - Ground Water  
**Project:** NAS Cecil Field-Site 5

**Date Sampled:** 05/11/99  
**Date Received:** 05/12/99  
**Percent Solids:** n/a

### Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.9 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.4 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.40 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	2.2 B	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	16.6	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	83.0	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	3870	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	23.7	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

Client Sample ID: CEF-05-LTM03-04  
Lab Sample ID: F4127-3  
Matrix: AQ - Ground Water  
Project: NAS Cecil Field-Site 5

Date Sampled: 05/11/99  
Date Received: 05/12/99  
Percent Solids: n/a

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.7 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.8 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	2.2 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	27.5	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	30.5	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	31.9 B	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	658	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	17.4	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.7 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.3 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.20 U	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	1.3 B	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	21.4	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	4.0 B	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



**ACCUTEST.**

### Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

#### Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	2130	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	26.9	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit

00060



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.7 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.5 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.49 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	19.2	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	15.3	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	122	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	2470	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	20.5	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

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RDL = Reported Detection Limit

00062



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Antimony	3.3 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Arsenic	2.7 U	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Beryllium	1.4 B	5.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Cadmium	0.26 B	4.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Chromium	4.0 B	10.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	5.3 B	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Vanadium	1.3 B	50.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed By	Method
Iron	231	100	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A
Manganese	18.3	15.0	ug/l	1	05/14/99	05/14/99 JK	SW846 6010A

RDL = Reported Detection Limit

00064



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	10	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	<2.0	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	49.9	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	9.0	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/06/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

### General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	1.6	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

RDL = Reported Detection Limit

00053



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-DUP1-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-7A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit



# Report of Analysis

**Client Sample ID:** CEF-05-LTM01-04  
**Lab Sample ID:** F4127-1  
**Matrix:** AQ - Ground Water  
**Project:** NAS Cecil Field-Site 5

**Date Sampled:** 05/11/99  
**Date Received:** 05/12/99  
**Percent Solids:** n/a

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	<5.0	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	<2.0	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	<20	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	21.0	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/13/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit

00010



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	4.3	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM01-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-1A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit



# Report of Analysis

Client Sample ID: CEF-05-LTM02-04  
Lab Sample ID: F4127-2  
Matrix: AQ - Ground Water  
Project: NAS Cecil Field-Site 5

Date Sampled: 05/11/99  
Date Received: 05/12/99  
Percent Solids: n/a

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	8.0	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	7.0	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	74.9	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	8.5	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/13/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	14.8	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

RDL = Reported Detection Limit

00018



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM02-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-2A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

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RDL = Reported Detection Limit



## Report of Analysis

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Client Sample ID: CEF-05-LTM03-04	Date Sampled: 05/11/99
Lab Sample ID: F4127-3	Date Received: 05/12/99
Matrix: AQ - Ground Water	Percent Solids: n/a
Project: NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	10	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	<2.0	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	25.0	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	8.5	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	0.26	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	0.26	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/13/99 LR	EPA 375.4
Total Organic Carbon	1.4	1.0	mg/l	1	05/21/99 ANJ	EPA415.1/SW8469060M

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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RDL = Reported Detection Limit



<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

**General Chemistry**

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	1.4	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

**RDL = Reported Detection Limit**

00025



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM03-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-3A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	2.2	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	47.3	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	4.4	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	25.0	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	29.0	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/13/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	3.2	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

RDL = Reported Detection Limit

00032



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM04-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-4A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	6.5	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	11.9	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	87.4	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	10.0	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/06/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

### General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon <sup>a</sup>	25.9	2.0	mg/l	2	05/25/99 JS	EPA415.1/SW8469060M

(a) Multiple analysis indicates possible matrix interference.

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-LTM05-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-5A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit

00063



## Report of Analysis

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**Client Sample ID:** CEF-05-WP-04  
**Lab Sample ID:** F4127-6  
**Matrix:** AQ - Ground Water  
**Project:** NAS Cecil Field-Site 5

**Date Sampled:** 05/11/99  
**Date Received:** 05/12/99  
**Percent Solids:** n/a

### General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Alkalinity, Total	27.4	5.0	mg/l	1	05/13/99 EP	EPA 310.1
BOD, 5 Day	<2.0	2.0	mg/l	1	05/17/99 EP	EPA 405.1
Chemical Oxygen Demand	20.8	20	mg/l	1	05/18/99 LR	EPA 410.1
Chloride	10.0	1.0	mg/l	1	05/17/99 EP	EPA 325.3
Nitrogen, Nitrate <sup>a</sup>	<0.11	0.11	mg/l	1	05/17/99 LR	SM18 4500NO3E/NO2B
Nitrogen, Nitrate + Nitrite	<0.10	0.10	mg/l	1	05/17/99 LR	SM18 4500NO3E
Nitrogen, Nitrite	<0.010	0.010	mg/l	1	05/12/99 LR	SM18 4500NO2B
Phosphate, Ortho	<0.10	0.10	mg/l	1	05/13/99 EP	EPA 365.2
Sulfate	<10	10	mg/l	1	05/06/99 LR	EPA 375.4

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

RDL = Reported Detection Limit



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Ground Water	<b>Percent Solids:</b> n/a
<b>Project:</b> TETRPAPT: NAS Cecil Field-Site 8	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Total Organic Carbon	4.2	1.0	mg/l	1	05/21/99 JS	EPA415.1/SW8469060M

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RDL = Reported Detection Limit

00046



# Report of Analysis

<b>Client Sample ID:</b> CEF-05-WP-04	<b>Date Sampled:</b> 05/11/99
<b>Lab Sample ID:</b> F4127-6A	<b>Date Received:</b> 05/12/99
<b>Matrix:</b> AQ - Groundwater Filtered	<b>Percent Solids:</b> n/a
<b>Project:</b> NAS Cecil Field-Site 5	

## General Chemistry

Analyte	Result	RDL	Units	DF	Analyzed By	Method
Hydrogen Sulfide	<2.0	2.0	mg/l	1	05/14/99 EP	SM18 4500/EPA 376.1

RDL = Reported Detection Limit