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NAS CECIL FIELD, FL  
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"SECOND QUARTER THIRD YEAR GROUNDWATER MONITORING LETTER REPORT FOR  
BUILDING 81 TANKS 81 A, B AND C NAS CECIL FIELD FL"

10/17/2008

TETRA TECH NUS INC



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Project Number 112G01264

Mr. David Grabka  
Remedial Project Manager  
Technical Review/Federal Facilities  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Reference: CLEAN IV Contract Number N62467-04-D-0055  
Contract Task Order 0102

Subject: Groundwater Monitoring Report, 2<sup>nd</sup> Quarter, 3<sup>rd</sup> Year (July 2008)  
Building 81, Tanks 81 A, B, and C (3<sup>rd</sup> Quarter, 1<sup>st</sup> Year since revised NAMP)  
Naval Air Station Cecil Field  
Jacksonville, Florida

Dear Mr. Grabka:

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit this Quarterly Groundwater Monitoring Report for the referenced Contract Task Order for Building 81, Tanks 81 A, B, and C. This Groundwater Monitoring Report was prepared for Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055.

The primary objective of current activities at this site is to conduct quarterly monitoring of groundwater associated with the shallow and intermediate zones of the surficial aquifer. The sampling program is being conducted in accordance with the revised Natural Attenuation Monitoring Plan (NAMP) submitted to the Florida Department of Environmental Protection (FDEP) on November 21, 2007, based on Chapter 62-770.690, Florida Administrative Code. The parameters of the NAMP were discussed and agreed upon during the September 2007 Base Realignment and Closure Cleanup Team meeting and were implemented during this sampling event. The Natural Attenuation Monitoring Plan Approval Order (NAMP AO) was received June 27, 2008. The revised NAMP and NAMP AO are provided in Attachments A and B, respectively. This report summarizes the field operations and analytical results for the subject site for the sampling event conducted during the week of July 21, 2008. The work was performed in general accordance with FDEP Standard Operating Procedures (SOPs) under DEP-SOP-001/01.

## **FIELD OPERATIONS**

Groundwater samples were collected from existing wells CEF-081-04I, CEF-081-08SR, CEF-081-09S, CEF-081-14S, CEF-081-15S, CEF-081-16S, CEF-081-17S, CEF-081-18I, CEF-081-19I, CEF-081-21I, and CEF-081-22I on July 21 through July 23, 2008. Monitoring well locations are provided on Figure 1. The samples were placed on ice and subsequently hand-delivered under chain of custody to Columbia Analytical Services in Jacksonville, Florida, for analysis. The laboratory analyzed the samples for isopropylbenzene using United States Environmental Protection Agency Method SW-846 8260B.



Prior to obtaining groundwater samples, synoptic water levels and total well depths were measured and recorded on a site-specific groundwater measurement sheet for all wells located around former Building 81. On July 21, 2008, depth to water ranged from 3.24 feet below top of casing (btoc) (CEF-081-12S) to 7.11 feet btoc (CEF-081-21I). Depth to water measurements, top of casing elevations, and groundwater elevations are presented in Table 1. General sampling protocols were in accordance with FDEP SOPs and TtNUS SOP SA-1.1.

## RESULTS

The groundwater elevation data and flow direction for the shallow zone are shown on Figure 2. Based on the data, the inferred direction of shallow zone groundwater flow is predominantly to the north with flow components to the northeast and northwest. Groundwater elevation data and flow direction for the intermediate zone are shown on Figure 3. Based on the data, the inferred general direction of intermediate zone groundwater flow is northwest.

The only constituent of concern (COC) identified in the revised NAMP and NAMP AO is isopropylbenzene. COC concentrations reported by the laboratory for the groundwater samples collected during this sampling event were compared to the FDEP Groundwater Cleanup Target Level (GCTL) and Natural Attenuation Default Source Concentration. The data and standards are presented in Table 2, and the results are presented on Figure 4. During the July 2008 sampling event, isopropylbenzene was detected at 1.1 micrograms per liter ( $\mu\text{g/L}$ ), greater than its GCTL of 0.8  $\mu\text{g/L}$ , in CEF-081-19I. In addition, isopropylbenzene was detected greater than its GCTL at a concentration of 0.88  $\mu\text{g/L}$  in CEF-081-022I. Concentrations of isopropylbenzene decreased since the last round of sampling in wells CEF-081-04I, CEF-081-18I, and CEF-081-19I. Groundwater samples collected from CEF-081-04I and CEF-081-19I in March 2008 had isopropylbenzene concentrations of 2.7  $\mu\text{g/L}$  and 2.8  $\mu\text{g/L}$ , respectively. In all other wells, isopropylbenzene was either not detected or was detected at estimated concentrations less than the GCTL. Groundwater analytical data is provided as Attachment C.

## CONCLUSIONS

The shallow groundwater flow direction in July 2008 was consistent with previous sampling events. Intermediate zone groundwater flow was predominantly to the northwest during the July 2008 sampling event, which is consistent with the previous sampling event but inconsistent with historical groundwater flow estimates. From June 2007 to December 2007, intermediate zone groundwater flow was estimated to the northwest and southeast.

Isopropylbenzene was detected as an exceedance of its GCTL in two wells (CEF-081-19I and CEF-081-022I) in the July 2008 sampling event. Isopropylbenzene concentrations in monitoring well CEF-081-04I decreased to less than the GCTL since the previous sampling event.

The July 2008 sampling event was the fifth quarterly sampling event after the perimeter wells (CEF-081-21I and CEF-081-22I) were installed in June 2007 and the third quarterly event since the revised NAMP was submitted. The November 2007 NAMP proposed quarterly sampling for the first two years and then semi-annual sampling for three additional years. The NAMP AO identified that quarterly sampling will be conducted for one year followed by an evaluation of the data to determine if sampling will continue on a quarterly basis or whether a different sampling frequency is appropriate. The next quarterly sampling event is scheduled for mid October 2008.



If you have any questions regarding this submittal, please feel free to contact Kara Wimble at (904) 730-4669, extension 217, or via e-mail at Kara.Wimble@tetratech.com.

Sincerely,

Robert Simcik, P.E.  
Task Order Manager  
P.E. Number 61263

Kara F. Wimble  
Project Scientist

Enclosures (9)

- c: A. Sanford, NAVFAC SE (1 copy)
- S. Naik, CH2M Hill (electronic only)
- M. Perry, TtNUS (unbound)
- D. Humbert, TtNUS (letter only)
- M. Speranza, TtNUS (letter only)
- M. Jonnet, TtNUS (Cecil DMS)
- J. Logan, TtNUS
- R. Simcik, TtNUS (Bookcase File)
- J. Johnson, TtNUS (Information Repository)
- CTO 0102 Project File

#### **CERTIFICATION**

The information contained herein is based on the investigation data and information obtained from previously submitted reports. If conditions are determined to exist that differ from those described, the undersigned engineer should be notified to evaluate the effects of any additional information on the information described in this report. This Groundwater Monitoring Report, 2<sup>nd</sup> Quarter, 3<sup>rd</sup> Year (July 2008) is the third quarterly report since the revised NAMP was submitted for Building 81, Tanks 81 A, B, and C at Former Naval Air Station Cecil Field, Jacksonville, Florida, and should not be construed to apply to any other site.

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October 17, 2008  
Robert Simcik, P.E.  
P.E. License Number 61263

## TABLES

**Table 1  
Groundwater Elevation Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
 Building 81, Tanks 81 A, B, and C  
 Naval Air Station Cecil Field  
 Jacksonville, Florida  
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Monitoring Well Identification	Well Depth (feet btoc)	TOC Elevation (feet above msl)	January 11, 2002		May 23, 2002		January 7, 2003	
			Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)
CEF-80-3S	15.12	77.68	4.74	72.94	5.22	72.46	5.07	72.61
CEF-80-13S	14.90	78.17	4.96	73.21	5.48	72.69	5.51	72.66
CEF-81-2S	15.00	78.41	NM	NM	6.02	72.39	NM	NM
CEF-81-8SR	12.94	77.61	4.62	72.99	5.06	72.55	5.14	72.47
CEF-81-9S	12.74	77.72	4.73	72.99	5.19	72.53	5.16	72.56
CEF-81-10S	12.99	78.46	5.45	73.01	5.98	72.48	5.68	72.78
CEF-81-11S	12.88	78.47	5.46	73.01	5.97	72.50	5.56	72.91
CEF-81-12S	11.68	77.37	4.37	73.00	4.81	72.56	4.91	72.46
CEF-81-13S	12.14	77.91	4.92	72.99	5.36	72.55	5.27	72.64
CEF-81-14S	13.00	78.30	NI	NI	5.85	72.45	6.13	72.17
CEF-81-1I	29.25	77.73	4.77	72.96	4.77	72.96	5.65	72.08
CEF-P25-1S	12.00	77.57	NM	NM	5.17	72.40	6.00	71.57
CEF-81-2I	30.00	77.42	NI	NI	NI	NI	NI	NI
CEF-81-3I	30.00	77.78	NI	NI	NI	NI	NI	NI
CEF-81-4I	30.00	77.54	NI	NI	NI	NI	NI	NI
CEF-81-5I	30.00	77.84	NI	NI	NI	NI	NI	NI
CEF-81-1D	55.00	77.77	NI	NI	NI	NI	NI	NI
CEF-81-15S	15.00	78.03	NI	NI	NI	NI	NI	NI
CEF-81-16S	15.00	78.53	NI	NI	NI	NI	NI	NI
CEF-81-17S	15.00	78.35	NI	NI	NI	NI	NI	NI
CEF-81-18I	35.00	78.33	NI	NI	NI	NI	NI	NI
CEF-81-19I	35.00	78.15	NI	NI	NI	NI	NI	NI
CEF-81-20I	35.00	77.63	NI	NI	NI	NI	NI	NI
CEF-81-21I	35.00	78.78	NI	NI	NI	NI	NI	NI
CEF-81-22I	35.00	78.35	NI	NI	NI	NI	NI	NI

See notes at end of table.

**Table 1  
Groundwater Elevation Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
 Building 81, Tanks 81 A, B, and C  
 Naval Air Station Cecil Field  
 Jacksonville, Florida  
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Monitoring Well Identification	Well Depth (feet btoc)	TOC Elevation (feet above msl)	February 18, 2005		January 5, 2007		February 5, 2007	
			Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)
CEF-80-3S	15.12	77.68	6.61	71.07	NM	NM	NM	NM
CEF-80-13S	14.90	78.17	7.09	71.08	NM	NM	NM	NM
CEF-81-2S	15.00	78.41	7.34	71.07	9.84	68.57	NM	NM
CEF-81-8SR	12.94	77.61	6.57	71.04	8.97	68.64	8.44	69.17
CEF-81-9S	12.74	77.72	6.78	70.94	9.15	68.57	8.70	69.02
CEF-81-10S	12.99	78.46	7.52	70.94	9.83	68.63	NM	NM
CEF-81-11S	12.88	78.47	7.48	70.99	9.81	68.66	NM	NM
CEF-81-12S	11.68	77.37	6.21	71.16	9.65	67.72	6.77	70.60
CEF-81-13S	12.14	77.91	6.91	71.00	7.34	70.57	6.65	71.26
CEF-81-14S	13.00	78.30	7.41	70.89	9.79	68.51	9.44	68.86
CEF-81-1I	29.25	77.73	6.79	70.94	9.19	68.54	8.86	68.87
CEF-P25-1S	12.00	77.57	6.52	71.05	9.03	68.54	8.69	68.88
CEF-81-2I	30.00	77.42	6.54	70.88	8.94	68.48	8.62	68.80
CEF-81-3I	30.00	77.78	6.95	70.83	9.34	68.44	9.05	68.73
CEF-81-4I	30.00	77.54	6.74	70.80	9.09	68.45	8.77	68.77
CEF-81-5I	30.00	77.84	7.01	70.83	9.33	68.51	9.01	68.83
CEF-81-1D	55.00	77.77	6.83	70.94	NM	NM	8.97	68.80
CEF-81-15S	15.00	78.03	NI	NI	9.51	68.52	9.15	68.88
CEF-81-16S	15.00	78.53	NI	NI	10.05	68.48	9.73	68.80
CEF-81-17S	15.00	78.35	NI	NI	9.82	68.53	9.48	68.87
CEF-81-18I	35.00	78.33	NI	NI	9.79	68.54	9.50	68.83
CEF-81-19I	35.00	78.15	NI	NI	9.61	68.54	9.31	68.84
CEF-81-20I	35.00	77.63	NI	NI	9.09	68.54	8.77	68.86
CEF-81-21I	35.00	78.78	NI	NI	NI	NI	NI	NI
CEF-81-22I	35.00	78.35	NI	NI	NI	NI	NI	NI

See notes at end of table.

**Table 1  
Groundwater Elevation Data**

Groundwater Monitoring Report, 2nd Quarter, 3rd Year - July 2008  
 Building 81, Tanks 81 A, B, and C  
 Naval Air Station Cecil Field  
 Jacksonville, Florida  
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Monitoring Well Identification	Well Depth (feet btoc)	TOC Elevation (feet above msl)	June 21, 2007		September 19, 2007		December 17, 2007	
			Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)
CEF-80-3S	15.12	77.68	NM	NM	NM	NM	NM	NM
CEF-80-13S	14.90	78.17	NM	NM	NM	NM	NM	NM
CEF-81-2S	15.00	78.41	NM	NM	8.84	69.57	8.1	70.31
CEF-81-8SR	12.94	77.61	8.07	69.54	7.94	69.67	7.12	70.49
CEF-81-9S	12.74	77.72	8.35	69.37	8.15	69.57	7.34	70.38
CEF-81-10S	12.99	78.46	9.32	69.14	8.79	69.67	8.16	70.30
CEF-81-11S	12.88	78.47	NM	NM	8.79	69.68	8.14	70.33
CEF-81-12S	11.68	77.37	6.31	71.06	7.68	69.69	5.18	72.19
CEF-81-13S	12.14	77.91	8.66	69.25	6.19	71.72	5.41	72.50
CEF-81-14S	13.00	78.30	9.12	69.18	8.81	69.49	8.04	70.26
CEF-81-1I	29.25	77.73	8.58	69.15	8.23	69.50	7.52	70.21
CEF-P25-1S	12.00	77.57	NM	NM	8.05	69.52	7.31	70.26
CEF-81-2I	30.00	77.42	8.32	69.10	7.97	69.45	7.28	70.14
CEF-81-3I	30.00	77.78	NM	NM	8.40	69.38	7.64	70.14
CEF-81-4I	30.00	77.54	NM	NM	8.12	69.42	7.41	70.13
CEF-81-5I	30.00	77.84	8.73	69.11	8.37	69.47	7.67	70.17
CEF-81-1D	55.00	77.77	NM	NM	NM	NM	NM	NM
CEF-81-15S	15.00	78.03	NM	NM	8.51	69.52	7.75	70.28
CEF-81-16S	15.00	78.53	9.45	69.08	9.09	69.44	8.34	70.19
CEF-81-17S	15.00	78.35	9.20	69.15	8.87	69.48	8.1	70.25
CEF-81-18I	35.00	78.33	9.20	69.13	8.85	69.48	8.11	70.22
CEF-81-19I	35.00	78.15	9.02	69.13	8.65	69.50	7.98	70.17
CEF-81-20I	35.00	77.63	8.50	69.13	8.11	69.52	7.41	70.22
CEF-81-21I	35.00	78.78	9.73	69.05	9.40	69.38	8.65	70.13
CEF-81-22I	35.00	78.35	9.31	69.04	8.90	69.45	8.28	70.07

See notes at end of table.

**Table 1  
Groundwater Elevation Data**

Groundwater Monitoring Report, 2nd Quarter, 3rd Year - July 2008  
 Building 81, Tanks 81 A, B, and C  
 Naval Air Station Cecil Field  
 Jacksonville, Florida  
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Monitoring Well Identification	Well Depth (feet btoc)	TOC Elevation (feet above msl)	March 31, 2008		July 21, 2008	
			Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)	Depth to Water (feet btoc)	Water-Level Elevation (feet above msl)
CEF-80-3S	15.12	77.68	NM	NM	NM	NM
CEF-80-13S	14.90	78.17	NM	NM	NM	NM
CEF-81-2S	15.00	78.41	6.66	71.75	6.29	72.12
CEF-81-8SR	12.94	77.61	5.63	71.98	4.26	73.35
CEF-81-9S	12.74	77.72	5.56	72.16	4.14	73.58
CEF-81-10S	12.99	78.46	6.85	71.61	6.42	72.04
CEF-81-11S	12.88	78.47	6.83	71.64	5.36	73.11
CEF-81-12S	11.68	77.37	5.03	72.34	3.24	74.13
CEF-81-13S	12.14	77.91	5.62	72.29	3.66	74.25
CEF-81-14S	13.00	78.30	6.73	71.57	6.24	72.06
CEF-81-1I	29.25	77.73	6.18	71.55	5.76	71.97
CEF-P25-1S	12.00	77.57	5.87	71.70	5.46	72.11
CEF-81-2I	30.00	77.42	5.91	71.51	5.51	71.91
CEF-81-3I	30.00	77.78	6.35	71.43	5.93	71.85
CEF-81-4I	30.00	77.54	6.12	71.42	5.72	71.82
CEF-81-5I	30.00	77.84	6.33	71.51	5.92	71.92
CEF-81-1D	55.00	77.77	NM	NM	NM	NM
CEF-81-15S	15.00	78.03	6.42	71.61	5.96	72.07
CEF-81-16S	15.00	78.53	7.05	71.48	6.62	71.91
CEF-81-17S	15.00	78.35	6.83	71.52	6.34	72.01
CEF-81-18I	35.00	78.33	6.83	71.50	6.44	71.89
CEF-81-19I	35.00	78.15	6.67	71.48	6.29	71.86
CEF-81-20I	35.00	77.63	6.09	71.54	5.67	71.96
CEF-81-21I	35.00	78.78	7.39	71.39	7.11	71.67
CEF-81-22I	35.00	78.35	6.99	71.36	6.61	71.74

**Notes:**

TOC = Top of casing.  
 btoc = Below top of casing.  
 NM = Not measured.  
 NI = Not installed.  
 msl = Mean seal level.

**Table 2**  
**Groundwater Analytical Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida  
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Parameter	GCTL	NADSC	CEF-081-									
			01I			04I						
			02/18/05	02/05/07	06/06/07	02/18/05	09/19/07	12/17/07		04/01/08	02/18/05	07/22/08
								Sample	Duplicate			
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	0.5 U	0.3 U	0.30 U	1.5	NA	NA	NA	NA	0.5 U	NA
Isopropylbenzene	0.8	8	0.69 J	0.36 J	0.10 U	<b>1.7</b>	<b>2.3</b>	<b>1.6</b>	<b>1.5</b>	<b>2.7</b>	0.5 U	0.77 J
Toluene	40	400	0.5 U	0.2 U	0.20 U	0.50 U	NA	NA	NA	NA	0.5 U	NA
Benzene	1	10	0.5 U	0.2 U	0.20 U	0.50 U	NA	NA	NA	NA	0.5 U	NA
MTBE	20	200	NA	0.2 U	0.20 U	NA	NA	NA	NA	NA	NA	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	0.49 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	0.49 U	NA
2-Methylnaphthalene	28	280	0.49 U	0.02 U	0.02 U	NA	NA	NA	NA	NA	0.49 U	NA
Acenaphthene	20	200	0.98 U	0.24	0.02 U	1.0 U	NA	NA	NA	NA	0.98 U	NA
Fluorene	280	2800	0.98 U	0.51	0.05 U	1.1	NA	NA	NA	NA	0.98 U	NA
Naphthalene	14	140	0.98 U	0.22	0.05 U	2.2	NA	NA	NA	NA	0.98 U	NA
Phenanthrene	210	2100	0.98 U	0.02 U	0.04 U	1.0 U	NA	NA	NA	NA	0.98 U	NA
Pyrene	210	2100	0.49 U	0.02 U	0.03 U	0.50 U	NA	NA	NA	NA	0.49 U	NA

Parameter	GCTL	NADSC	CEF-081-									
			08SR					09S				
			02/05/07	06/07/07	09/20/07	12/19/07	04/01/08	07/22/08	02/18/05	02/05/07	06/08/07	09/19/07
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	0.3 U	0.20 U	NA	NA	NA	NA	0.6 J	0.3 U	0.30 U	NA
Isopropylbenzene	0.8	8	0.1 U	<b>2.1</b>	0.21 U	0.093 U	0.36 U	0.14 U	<b>2.8</b>	<b>2.29</b>	0.10 U	<b>1.3</b>
Toluene	40	400	0.2 U	0.29 J	NA	NA	NA	NA	0.5 U	0.2 U	0.25 J	NA
Benzene	1	10	0.2 U	0.20 U	NA	NA	NA	NA	0.5 U	0.2 U	0.20 U	NA
MTBE	20	200	0.2 U	0.20 U	NA	NA	NA	NA	NA	0.2 U	0.20 U	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	0.02 U	12.4	NA	NA	NA	NA	9.2	0.47	0.02 U	NA
2-Methylnaphthalene	28	280	0.02 U	4.58	NA	NA	NA	NA	5.7	0.07 J	0.02 U	NA
Acenaphthene	20	200	0.02 U	0.38	NA	NA	NA	NA	0.99 U	0.07 J	0.02 U	NA
Fluorene	280	2800	0.02 U	0.94	NA	NA	NA	NA	0.99 U	0.1	0.05 U	NA
Naphthalene	14	140	0.02 U	0.95	NA	NA	NA	NA	4.2	0.16	0.05 U	NA
Phenanthrene	210	2100	0.02 U	0.13	NA	NA	NA	NA	0.99 U	0.02 U	0.04 U	NA
Pyrene	210	2100	0.02 U	0.03 U	NA	NA	NA	NA	0.5 U	0.02 U	0.03 U	NA

**Table 2**  
**Groundwater Analytical Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida  
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Parameter	GCTL	NADSC	CEF-081-									
			09S			13S				14S		
			12/17/07	04/01/08	07/22/08	02/21/05	02/06/07	06/08/07		02/18/05	02/06/07	06/07/07
								Sample	Duplicate			
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	NA	NA	NA	0.5 U	0.3 U	0.30 U	0.30 U	0.5 U	0.3 U	0.30 U
Isopropylbenzene	0.8	8	0.67 J	0.36 U	0.14 U	0.5 U	0.1 U	0.10 U	0.10 U	<b>3.3</b>	<b>0.95 J</b>	0.21 J
Toluene	40	400	NA	NA	NA	0.5 U	0.24 J	0.20 U	0.52 J	0.5 U	0.2 U	0.22 J
Benzene	1	10	NA	NA	NA	0.5 U	0.2 U	0.20 U	0.20 U	0.5 U	0.2 U	0.20 U
MTBE	20	200	NA	NA	NA	NA	0.2 U	0.20 U	0.20 U	NA	0.2 U	0.20 U
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	NA	NA	NA	0.48 U	0.02 U	0.02 U	0.02 U	9.9	0.02 U	0.02 U
2-Methylnaphthalene	28	280	NA	NA	NA	0.48 U	0.02 U	0.02 U	0.02 U	6.2	0.02 U	0.02 U
Acenaphthene	20	200	NA	NA	NA	0.96 U	0.02 U	0.02 U	0.02 U	0.97 U	0.02 U	0.02 U
Fluorene	280	2800	NA	NA	NA	0.96 U	0.02 U	0.05 U	0.05 U	0.97 U	0.02 U	0.05 U
Naphthalene	14	140	NA	NA	NA	0.96 U	0.02 U	0.05 U	0.05 U	7.8	0.16	0.05 U
Phenanthrene	210	2100	NA	NA	NA	0.96 U	0.02 U	0.04 U	0.04 U	0.97 U	0.02 U	0.04 U
Pyrene	210	2100	NA	NA	NA	0.48 U	0.02 U	0.03 U	0.03 U	0.49 U	0.02 U	0.03 U

Parameter	GCTL	NADSC	CEF-081-									
			14S				15S					
			09/20/07	12/18/07	04/01/08	07/22/08	11/21/06	02/06/07	06/07/07	09/19/07	12/18/07	4/1/2008
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	NA	NA	NA	NA	0.3 U	0.3 U	0.30 U	NA	NA	NA
Isopropylbenzene	0.8	8	0.21 U	0.093 U	0.36 U	0.14 U	0.1 U	0.1 U	<b>1.3</b>	<b>1.0</b>	0.093 U	0.36 U
Toluene	40	400	NA	NA	NA	NA	0.2 U	0.21 J	0.33 J	NA	NA	NA
Benzene	1	10	NA	NA	NA	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA
MTBE	20	200	NA	NA	NA	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA
2-Methylnaphthalene	28	280	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA
Acenaphthene	20	200	NA	NA	NA	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA
Fluorene	280	2800	NA	NA	NA	NA	0.02 U	0.02 U	0.05 U	NA	NA	NA
Naphthalene	14	140	NA	NA	NA	NA	0.55	0.06 J	0.05 U	NA	NA	NA
Phenanthrene	210	2100	NA	NA	NA	NA	0.02 U	0.02 U	0.04 U	NA	NA	NA
Pyrene	210	2100	NA	NA	NA	NA	0.02 U	0.02 U	0.03 U	NA	NA	NA

**Table 2**  
**Groundwater Analytical Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida  
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Parameter	GCTL	NADSC	CEF-081-									
			15S		16S						17S	
			07/22/08	11/21/06	02/06/07	06/07/07	09/20/07	12/18/07	03/31/08	07/22/08	06/07/07	09/20/07
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	NA	0.3 U	0.3 U	0.30 U	NA	NA	NA	NA	0.30 U	NA
Isopropylbenzene	0.8	8	0.14 U	0.1 U	0.1 U	0.10 U	0.21 U	0.093 U	0.36 U	0.14 U	0.10 U	0.21 U
Toluene	40	400	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA	NA	0.20 U	NA
Benzene	1	10	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA	NA	0.20 U	NA
MTBE	20	200	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA	NA	0.20 U	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	0.02 U	NA
2-Methylnaphthalene	28	280	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	0.02 U	NA
Acenaphthene	20	200	NA	0.02 U	0.02 U	0.02 U	NA	NA	NA	NA	0.24	NA
Fluorene	280	2800	NA	0.02 U	0.02 U	0.05 U	NA	NA	NA	NA	0.43	NA
Naphthalene	14	140	NA	0.02 U	0.02 U	0.05 U	NA	NA	NA	NA	0.31	NA
Phenanthrene	210	2100	NA	0.02 U	0.02 U	0.04 U	NA	NA	NA	NA	0.04 U	NA
Pyrene	210	2100	NA	0.02 U	0.02 U	0.03 U	NA	NA	NA	NA	0.03 U	NA

Parameter	GCTL	NADSC	CEF-081-									
			17S			18I						
			12/18/07	03/31/08	07/22/08	11/22/06		02/05/07		9/20/2007	12/17/2007	4/1/2008
Sample	Duplicate	Sample	Duplicate									
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	NA	NA	NA	0.3 U	0.3 U	0.3 U	0.3 U	NA	NA	NA
Isopropylbenzene	0.8	8	0.093 U	0.36 U	0.14 U	<b>1</b>	<b>1.2</b>	<b>1.26</b>	<b>1.19</b>	<b>1.5</b>	<b>0.92 J</b>	0.54 J
Toluene	40	400	NA	NA	NA	0.5 J	0.2 U	0.23 J	0.2 U	NA	NA	NA
Benzene	1	10	NA	NA	NA	0.2 U	0.5 U	0.2 U	0.20 U	NA	NA	NA
MTBE	20	200	NA	NA	NA	0.2 U	NA	0.2 U	0.20 U	NA	NA	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	NA	NA	NA	0.09 J	0.08 J	0.02 U	0.02 U	NA	NA	NA
2-Methylnaphthalene	28	280	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA
Acenaphthene	20	200	NA	NA	NA	0.16	0.18	0.16	0.14	NA	NA	NA
Fluorene	280	2800	NA	NA	NA	0.23	0.27	0.23	0.2	NA	NA	NA
Naphthalene	14	140	NA	NA	NA	0.26	0.29	0.31	0.2	NA	NA	NA
Phenanthrene	210	2100	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA	NA
Pyrene	210	2100	NA	NA	NA	0.02 U	0.02 U	0.06 J	0.02 U	NA	NA	NA

**Table 2**  
**Groundwater Analytical Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida  
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Parameter	GCTL	NADSC	CEF-081-									
			18I		19I						20I	
			07/22/08	11/22/06	02/06/07	06/08/07	09/20/07		12/17/2007	3/31/2008	07/22/08	11/22/06
							Sample	Duplicate				
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	NA	0.7 J	1.18	1.3	NS	NA	NA	NA	NA	0.3 U
Isopropylbenzene	0.8	8	0.30 J	<b>2.8</b>	<b>5.32</b>	<b>4.2</b>	<b>2.8</b>	<b>2.8</b>	<b>3.3</b>	<b>2.8</b>	<b>1.1</b>	0.2 J
Toluene	40	400	NA	0.2 U	0.2 U	0.20 U	NA	NA	NA	NA	NA	0.3 J
Benzene	1	10	NA	0.2 U	0.20 U	0.2 U	NA	NA	NA	NA	NA	0.2 U
MTBE	20	200	NA	0.2 U	0.20 U	0.2 U	NA	NA	NA	NA	NA	0.2 U
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	NA	6.5	11.6	0.02 U	NA	NA	NA	NA	NA	0.02 U
2-Methylnaphthalene	28	280	NA	4.31	8.43	0.02 U	NA	NA	NA	NA	NA	0.02 U
Acenaphthene	20	200	NA	0.28	0.27	0.05 J	NA	NA	NA	NA	NA	0.08 J
Fluorene	280	2800	NA	0.65	0.64	0.09 J	NA	NA	NA	NA	NA	0.15
Naphthalene	14	140	NA	1.01	1.29	0.05 U	NA	NA	NA	NA	NA	0.07 J
Phenanthrene	210	2100	NA	0.1	0.09 J	0.04 U	NA	NA	NA	NA	NA	0.02 U
Pyrene	210	2100	NA	0.02 U	0.02 U	0.03 U	NA	NA	NA	NA	NA	0.02 U

Parameter	GCTL	NADSC	CEF-081-									
			20I		21I				22I			
			02/06/07	06/08/07	06/07/07	09/21/07	12/18/2007	03/31/08	07/22/08	6/7/2007	9/19/2007	12/18/2007
<b>VOCs (µg/L)</b>												
Ethylbenzene	30	300	0.3 U	0.30 U	0.30 U	NA	NA	NA	NA	0.93 J	NA	NA
Isopropylbenzene	0.8	8	0.1 U	0.10 U	0.10 U	0.21 U	0.093 U	0.36 U	0.14 U	0.52J	0.43 J	0.32 J
Toluene	40	400	0.37 J	0.20 U	0.53 J	NA	NA	NA	NA	0.43 U	NA	NA
Benzene	1	10	0.20 U	0.2 U	0.20 U	NA	NA	NA	NA	0.28 J	NA	NA
MTBE	20	200	0.20 U	0.2 U	0.20 U	NA	NA	NA	NA	1.8	NA	NA
<b>PAHs (µg/L)</b>												
1-Methylnaphthalene	28	280	0.03 U	0.02 U	0.02 U	NA	NA	NA	NA	0.02 U	NA	NA
2-Methylnaphthalene	28	280	0.03 U	0.02 U	0.02 U	NA	NA	NA	NA	0.02 U	NA	NA
Acenaphthene	20	200	0.03 U	0.08 J	0.02 U	NA	NA	NA	NA	0.23	NA	NA
Fluorene	280	2800	0.06 J	0.05 U	0.05 U	NA	NA	NA	NA	0.52	NA	NA
Naphthalene	14	140	0.03 U	0.05 J	0.05 U	NA	NA	NA	NA	0.17	NA	NA
Phenanthrene	210	2100	0.03 U	0.04 U	0.04 U	NA	NA	NA	NA	0.04 U	NA	NA
Pyrene	210	2100	0.02 U	0.03 U	0.03 U	NA	NA	NA	NA	0.03 U	NA	NA

**Table 2**  
**Groundwater Analytical Data**

Groundwater Monitoring Report, 2nd Quarter, 3<sup>rd</sup> Year - July 2008  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida  
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Parameter	GCTL	NADSC	CEF-081-221	
			3/31/2008	07/22/08
<b>VOCs (µg/L)</b>				
Ethylbenzene	30	300	NA	NA
Isopropylbenzene	0.8	8	0.58 J	<b>0.88 J</b>
Toluene	40	400	NA	NA
Benzene	1	10	NA	NA
MTBE	20	200	NA	NA
<b>PAHs (µg/L)</b>				
1-Methylnaphthalene	28	280	NA	NA
2-Methylnaphthalene	28	280	NA	NA
Acenaphthene	20	200	NA	NA
Fluorene	280	2800	NA	NA
Naphthalene	14	140	NA	NA
Phenanthrene	210	2100	NA	NA
Pyrene	210	2100	NA	NA

**Notes:**

GCTL = Groundwater Cleanup Target Level.

NADSC = Natural Attenuation Default Source Concentration.

VOCs = Volatile organic compounds.

µg/L = Micrograms per liter.

MTBE = Methyl tertiary butyl ether.

PAHs = Polynuclear aromatic hydrocarbons.

U = Not detected at detection limit shown.

J = Estimated concentration.

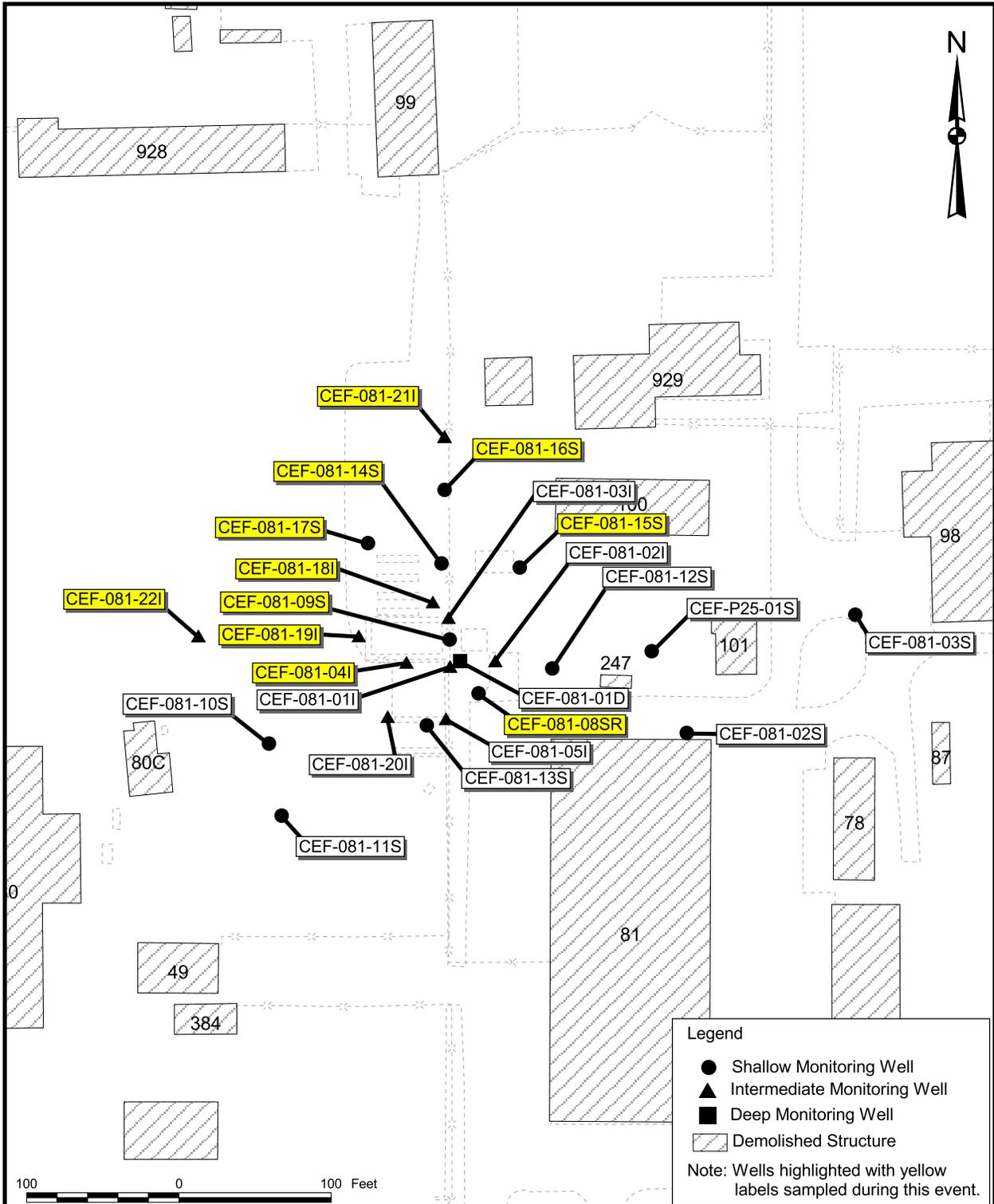
**Shading** indicates concentration greater than FDEP criterion.

FDEP GCTLs from Chapter 62-777, Florida Administrative Code (F.A.C).

NADSCs from Chapter 62-777, F.A.C.

NA = Not analyzed.

## FIGURES

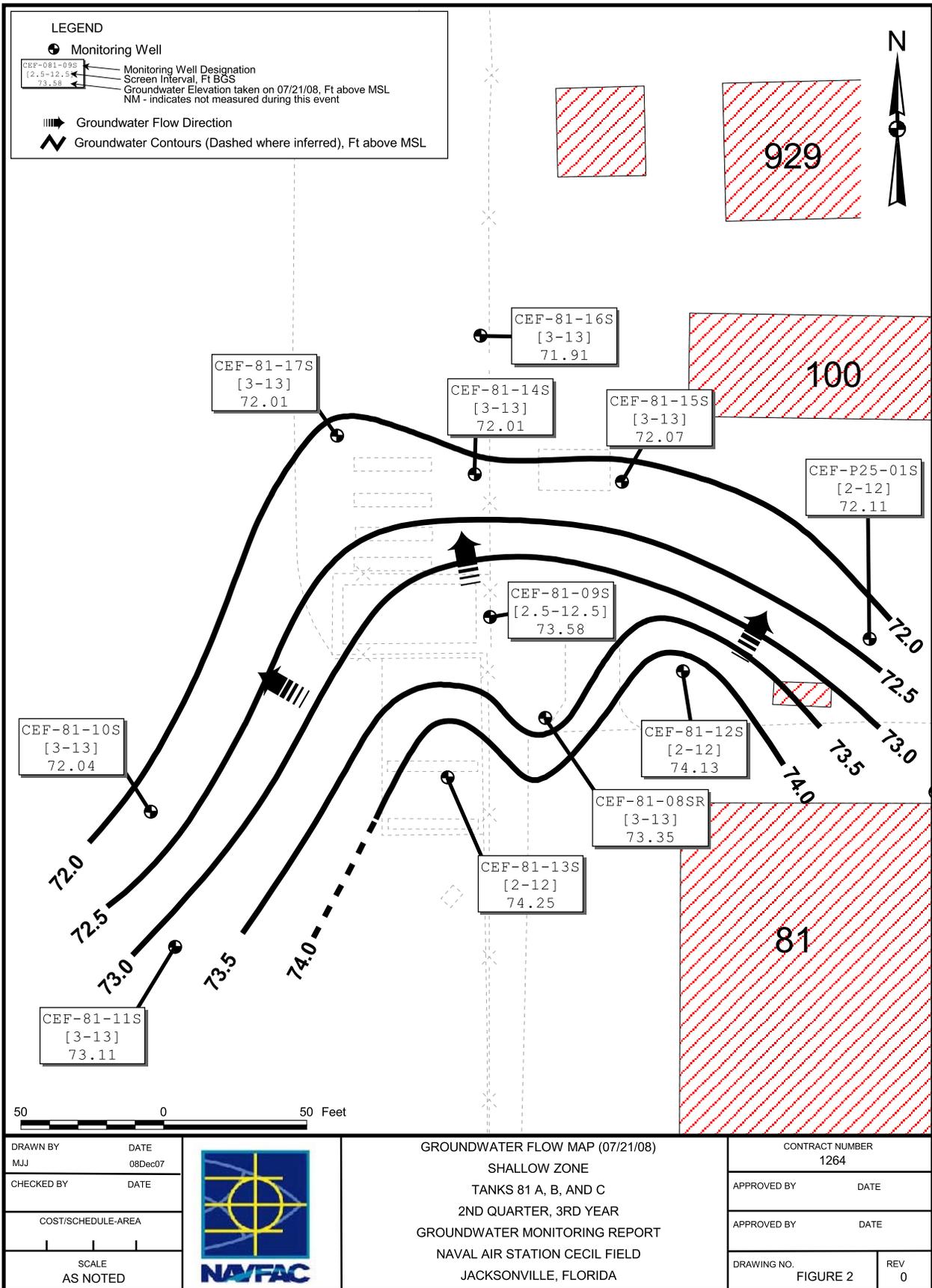


DRAWN BY MJJ	DATE 30Aug07
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



**MONITORING WELL LOCATION MAP**  
 TANKS 81 A, B, AND C  
 2ND QUARTER, 3RD YEAR  
 GROUNDWATER MONITORING REPORT  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 1264	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV 0

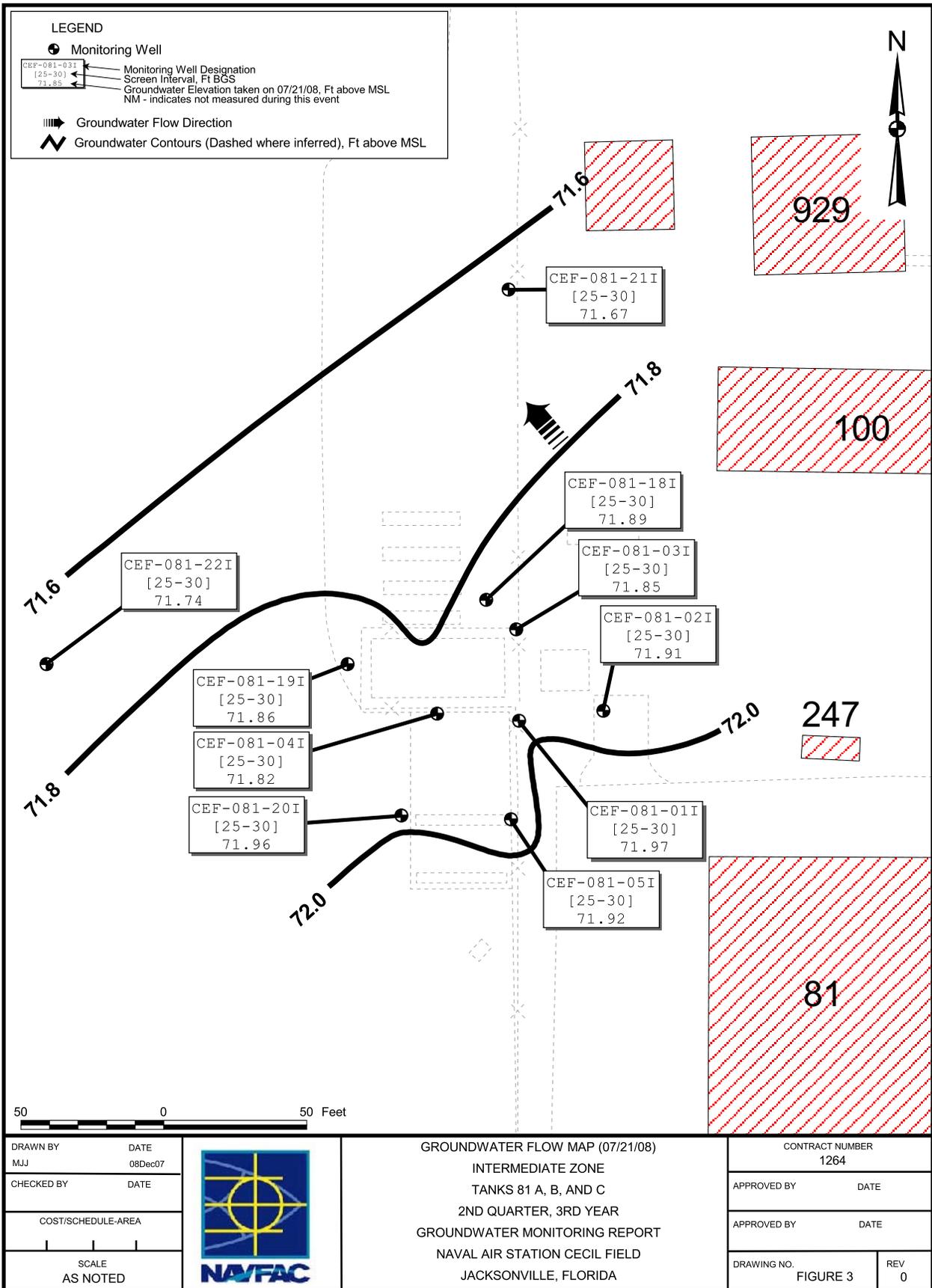


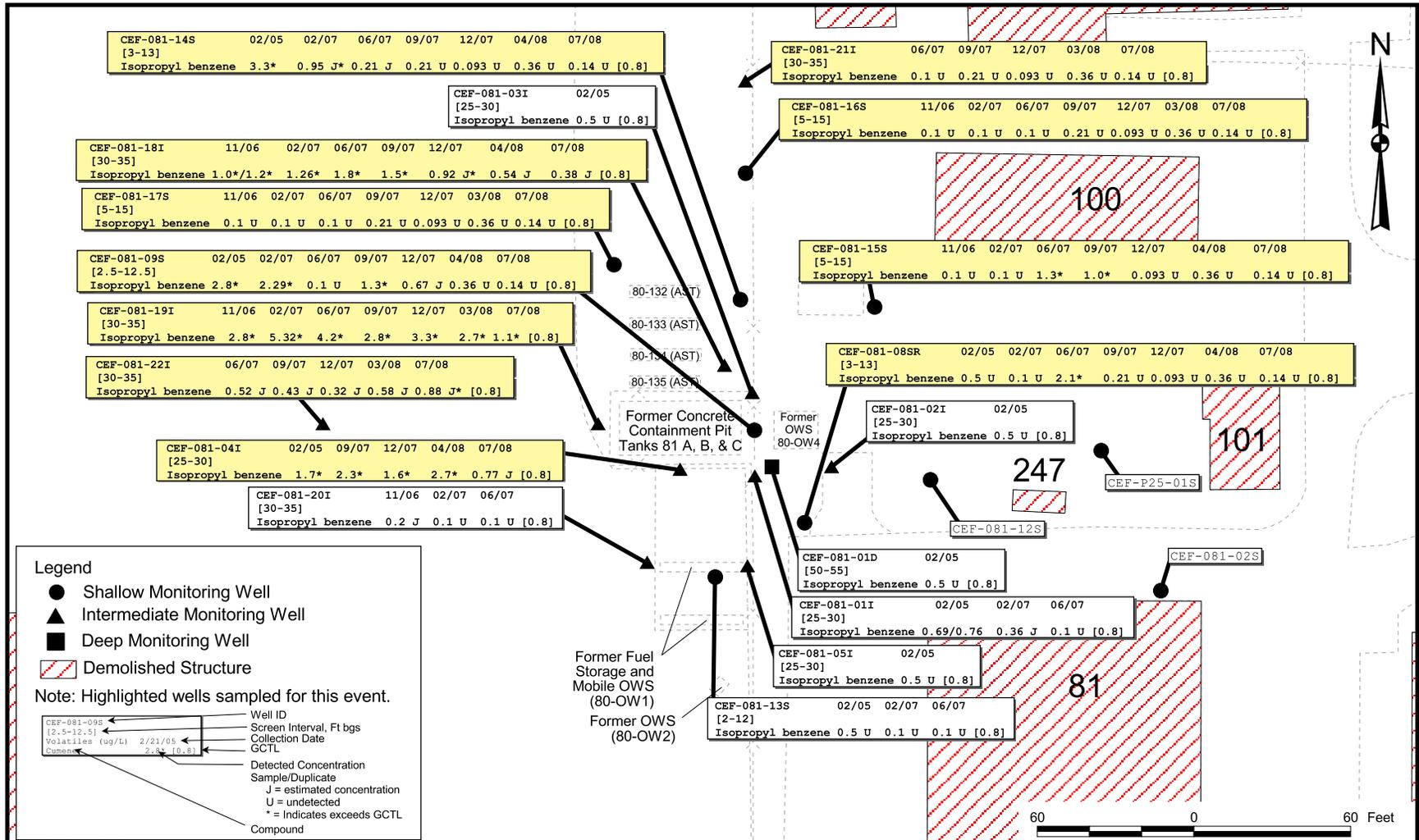
DRAWN BY MJJ	DATE 08Dec07
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



GROUNDWATER FLOW MAP (07/21/08)  
 SHALLOW ZONE  
 TANKS 81 A, B, AND C  
 2ND QUARTER, 3RD YEAR  
 GROUNDWATER MONITORING REPORT  
 NAVAL AIR STATION CECIL FIELD  
 JACKSONVILLE, FLORIDA

CONTRACT NUMBER 1264	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 2	REV 0





**Legend**

- Shallow Monitoring Well
- ▲ Intermediate Monitoring Well
- Deep Monitoring Well
- ▨ Demolished Structure

Note: Highlighted wells sampled for this event.

CEF-081-09S	← Well ID
[2.5-12.5]	← Screen Interval, Ft bgs
Volatiles (ug/L) 2/21/05	← Collection Date
2.3* [0.8]	← GCTL
←	← Detected Concentration
←	← Sample/Duplicate
←	← J = estimated concentration
←	← U = undetected
←	← * = Indicates exceeds GCTL
←	← Compound

MJJ	DATE	07Feb08
CHECKED BY	DATE	
COST/SCHEDULE-AREA		
SCALE		
AS NOTED		



ANALYTICAL RESULTS  
TANKS 81 A, B, AND C  
2ND QUARTER, 3RD YEAR  
GROUNDWATER MONITORING REPORT  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

DRAWN BY	CONTRACT NUMBER	1264
APPROVED BY	DATE	
APPROVED BY	DATE	
DRAWING NO.	FIGURE 4	REV 0

**ATTACHMENT A**

**REVISED NATURAL ATTENUATION MONITORING PLAN (NAMP)  
NOVEMBER 21, 2007**



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Document Tracking Number 07JAX0135

November 21, 2007

Project Number 112G00746

Mr. David Grabka  
Florida Department of Environmental Protection  
Twin Towers Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Reference: CLEAN IV Contract Number N62467-04-D-0055  
Contract Task Order Number 0076

Subject: Natural Attenuation Monitoring Plan  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Florida

Dear Mr. Grabka:

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit this Natural Attenuation Monitoring Plan (NAMP) for Building 81, Tanks 81 A, B, and C. This document was prepared for the United States Department of the Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62467-04-D-0055, Contract Task Order 0076.

**INTRODUCTION**

This Natural Attenuation Monitoring Plan (NAMP) addresses the proposed groundwater monitoring activities for Tanks 81 A, B, and C at Former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. This NAMP was drafted to set and meet the milestone objectives in accordance with Chapter 62-770.690, Florida Administrative Code (FAC) and ultimately to meet the applicable No Further Action criteria of Rule 62-770.680, FAC at Tanks 81 A, B, and C.

**PURPOSE**

This monitoring plan for Tanks 81 A, B, and C is an integral component of the remedial action taken at this site under the Navy's Base Realignment and Closure (BRAC) Program at Former NAS Cecil Field. It is also the purpose of this plan to establish a reasonable exit strategy that will define when a satisfactory level of clean up has been achieved. The following sections describe the site background, objective of the monitoring plan, the specific monitoring plan components, and the exit strategy.

**SITE BACKGROUND**

The majority of NAS Cecil Field is located in southwestern Duval County, and the southernmost portion is located in Clay County. The base was operated by the Navy from approximately 1943 to 1999. Building 81, Tanks 81 A, B, and C were located in the Main Base area of NAS Cecil Field west of the Alpha runway at NAS Cecil Field. Figure 1 provides a location map for the site.

Former Tanks 81 A, B, and C consisted of three aboveground storage tanks (ASTs) located northwest of Building 81. No structures are currently located on the site. The location of the former Tanks 81 A, B,

and C is a relatively flat area with a mix of an asphalt parking lot and a grassy vacant lot. A topographic map of the area surrounding the site is presented in Figure 2.

According to the Environmental Baseline Survey for NAS Cecil Field, this site was on the eastern edge of an area called the Transportation and Fuel Management (TFM) compound (TtNUS, 2002). The TFM compound consisted of seven buildings (Buildings 49, 80, 80C, 178, 180, 384, and 584). Figure 3 shows the location of three of those buildings to the southwest of the site. Automotive maintenance for the base was managed from the TFM compound. Immediately east of the TFM compound, a series of buildings existed that housed the operations of a Navy subcontractor hired to handle plumbing, carpentry, general painting, and welding, electrical and light machine work related to general maintenance on base. This area was known as the Public Works Maintenance Area (PWMA). The central building of the PWMA was Building 81. Support buildings to the north and east of Building 81, shown on Figure 3, included Buildings 78, 98, 100, 101, 201, 247 and 929. Although the site's identification (Building 81, Tanks 81 A, B, and C) indicates a relationship to the PWMA, this information appears to establish a closer relationship between this site and the TFM compound.

Tanks 81 A, B, and C were contained in a secondary concrete containment pit that was approximately 2 feet deep. There is limited available information about the construction or possible contents of the three ASTs kept in this pit. (TtNUS, 2002).

TtNUS personnel conducted a Site Assessment and prepared a Site Assessment Report (SAR) for Building 81, Tanks 81 A, B, and C on July 18, 2002. The conclusions and recommendations from the SAR were as follows:

- Soil contamination was adequately addressed and removed by previous source removal actions.
- Groundwater contamination was delineated to the water table.
- There was no free product and contamination did not appear to extend deeper than the water table.
- Monitoring of contaminated groundwater in five water table wells (CEF-81-8SR, CEF-81-9S, CEF-81-12S, CEF-81-13S, and CEF-81-14S) for the four constituents of concern (COCs) [isopropylbenzene, naphthalene, 1,2,4-trimethylbenzene (TMB), and 1,3,5-TMB] for 5 years is recommended.
- Institutional controls were recommended to prevent use of groundwater as a potable water source.

The Florida Department of Environmental Protection (FDEP) generally accepted the recommendations from the SAR in the Monitoring Only Plan Approval Order dated October 1, 2002, with the exception of altering the recommended monitoring well list. The monitoring well list specified in the order was as follows: CEF-81-08SR, CEF-81-13S, CEF-81-14S, and CEF-81-011.

The first quarterly monitoring event, conducted in January 2003, indicated that concentrations of COCs in intermediate well CEF-81-011 exceeded GCTLs. The associated report (TtNUS, 2003) recommended that the monitoring program be discontinued and that a supplemental site assessment be conducted. The FDEP approved the recommendation for a supplemental investigation in a letter dated February 5, 2004.

In response to these exceedances of COCs in CEF-81-011 during quarterly monitoring events in 2003, FDEP approved TtNUS's recommendation for a supplemental investigation on February 5, 2004. Additional monitoring wells were installed at the site for analysis as part of the supplemental site assessment. Four intermediate monitoring wells (CEF-81-02I, CEF-81-03I, CEF-81-04I, and CEF-81-05I) and one deep monitoring well (CEF-81-01D) were installed and developed in February 2005. The newly installed wells along with the original five Monitoring Only Plan wells were sampled for the COCs during the February 2005 groundwater sampling event.

The Supplemental Site Assessment Letter Report dated August 3, 2005, indicated that isopropyl benzene was migrating downgradient in the shallow and intermediate zones of the surficial aquifer; however, the deep zone had been delineated. FDEP approved an additional recommendation to further delineate the shallow and intermediate zones of the surficial aquifer in December 2005. In response, three shallow monitoring wells (CEF-081-15S, CEF-081-16S, and CEF-081-17S) and three intermediate monitoring wells (CEF-081-18I, CEF-081-19I, and CEF-081-20I) were installed and sampled in November 2006.

The laboratory analytical results from the November 2006 sampling event indicate that concentrations of isopropyl benzene in groundwater exceeded its GCTL in monitoring wells CEF-81-18I and CEF-18-19I. No GCTLs were exceeded for the other four newly installed wells (CEF-81-15S, CEF-81-16S, CEF-81-17S, and CEF-81-20I) during this sampling event (TtNUS, 2007).

The laboratory analytical results from the February 2007 sampling events indicate that concentrations of isopropyl benzene in groundwater exceed the GCTL in monitoring wells CEF-81-09S, CEF-81-14S, CEF-81-18I, and CEF-81-19I. No other COCs exceeded their respective GCTLs.

During the May 2007 BRAC Team (BCT) meeting, the installation of additional wells to further delineate contamination in the intermediate zone of the aquifer was discussed and the BCT agreed that adding two intermediate wells was the best course of action, and that the shallow zone was delineated.

In June 2007, two additional wells, CEF-081-21I and CEF-081-22I, were installed, developed, and sampled. The laboratory analytical results from the June 2007 sampling events indicated that concentrations of isopropyl benzene in groundwater exceeded the GCTL in monitoring wells CEF-81-08SR, CEF-81-15S, CEF-81-18I, and CEF-81-19I. The isopropyl benzene concentrations have decreased to below the GCTLs since the last sampling event (February 2007) in monitoring wells CEF-081-09S and CEF-081-14S. However, isopropyl benzene was first detected in monitoring wells CEF-081-08SR and CEF-081-15S during this June 2007 sampling event. No other COCs exceeded their respective GCTLs. Analytical results for the June 2007 sampling event are presented on Figure 4.

Based on the results of the June 2007 groundwater sampling event, TtNUS recommends that a revised NAMP be prepared and implemented for the site. Chapter 62-770.690(7)(a), FAC requires a minimum of two wells for the NAMP to monitor the area of maximum concentration of contaminants and the downgradient edge of the plume. TtNUS also recommended that quarterly sampling continue.

## **OBJECTIVES**

The objective of this NAMP is to ensure that UST requirements are acceptable to meet the goals of protecting human health and the environment by satisfying the following objectives:

- Assure the public, the regulators, and the scientific community that the selected monitoring plan is working as expected and continues to be protective of human health and the environment.
- Collect sufficient groundwater quality data to enable reliable assessment of data trends and projections of time to reach remedial goals defined by the milestones and FDEP GCTLs for groundwater.
- Make timely decisions for the need to implement contingent actions and/or modify the NAMP.
- Assess the progress for the cleanup against the exit strategy.

## **NAMP COMPONENTS AND SUMMARY**

This NAMP provides groundwater sample collection and analysis methodology for the monitoring effort at Tanks 81 A, B, and C. The following sections provide the components of the plan for Tanks 81 A, B, and C.

**Components of the Plan – TANKS 81 A, B, AND C**

Groundwater will be monitored for the COC isopropyl benzene to assess the effectiveness of natural attenuation as a treatment for the surficial aquifer at Tanks 81 A, B, and C. Six shallow monitoring wells and five intermediate monitoring wells located throughout the groundwater plume at Tanks 81 A, B, and C will be sampled to monitor groundwater plume size, chemical concentrations, and movement of the plume. The monitoring program will begin with quarterly sampling for years one and two and semi-annual sampling in years three, four, and five. Groundwater monitoring will continue until the FDEP GCTL is attained or unless, during an annual review, site conditions suggest that a different cleanup method should be considered. Figure 5 presents the location of the groundwater monitoring wells that will be sampled as part of this monitoring plan.

**Groundwater Measurements and Sampling**

During each sampling event, synoptic groundwater level measurements will be obtained from each monitoring well at the site. Because the aquifer is very flat, groundwater levels will be collected from all of the wells in the vicinity of the plume as listed below:

Shallow Aquifer

- CEF-P25-01S
- CEF-081-02S
- CEF-081-08SR
- CEF-081-09S
- CEF-081-10S
- CEF-081-11S
- CEF-081-12S
- CEF-081-13S
- CEF-081-14S
- CEF-081-15S
- CEF-081-16S
- CEF-081-17S

Intermediate Aquifer

- CEF-081-01I
- CEF-081-02I
- CEF-081-03I
- CEF-081-04I
- CEF-081-05I
- CEF-081-18I
- CEF-081-19I
- CEF-081-20I
- CEF-081-21I
- CEF-081-22I

Measurements will be collected with a water interface probe (or equivalent) using the marked location on the top of the well casing as the reference point. Groundwater level measurements will be recorded to the nearest 0.01 foot.

Groundwater samples will be obtained from 11 monitoring wells during each sampling event and submitted for fixed-base laboratory analysis (Figure 5). The following wells will be sampled and analyzed for isopropyl benzene only:

- CEF-081-04I
- CEF-081-17S
- CEF-081-08SR
- CEF-081-09S
- CEF-081-14S
- CEF-081-15S
- CEF-081-16S
- CEF-081-18I
- CEF-081-19I
- CEF-081-21I
- CEF-081-22I

Teflon® and surgical-grade silicon tubing will be used for sample collection. Groundwater samples will be collected using the “straw” method for volatile organic compounds (VOCs) and will be discharged into the appropriate sample bottles for analysis. Samples requiring preservation will be collected in pre-preserved bottles provided by the laboratory.

Procedures will be in accordance with TtNUS SOPs and FDEP SOPs. Since the site is in Florida, the FDEP SOPs will take precedence if there is a conflict between the two guidance documents unless otherwise directed.

### **Monitoring Parameters**

During this monitoring period, data evaluation will be conducted after each sampling event. The results of the data evaluation will be used to make recommendations for continued monitoring and/or modifications in approach or methodology to ensure adequate and appropriate data collection to achieve the purposes of this NAMP. In anticipation of natural attenuation in 5 years, recommended milestone objectives for annual evaluation of remediation progress will also be provided in accordance with Chapter 62-770.690(7)(g), FAC.

The recommended COC for this NAMP is isopropyl benzene and is the only parameter to be analyzed for groundwater samples collected at Tanks 81 A, B, and C under United States Environmental Protection Agency Method SW-846 8620B (VOCs). In addition to regular calibration of field equipment and appropriate documentation, quality control samples will be collected during the field monitoring activities.

During sampling activities, one trip blank, consisting of one vial, shall be placed in each cooler that contains environmental samples destined for VOC analysis. One field duplicate will also be collected during each sampling event.

In anticipation of natural attenuation in 5 years for the extent of the plume, the following recommended milestone objectives for annual evaluation of remediation progress is provided in accordance with Chapter 62-770.690(7)(g), FAC:

<b>Timeline</b>	<b>Isopropyl benzene</b>
End of Year 1	4 micrograms per liter (µg/L)
End of Year 2	3 µg/L
End of Year 3	2 µg/L
End of Year 4	0.8 µg/L
End of Year 5	<0.8 µg/L

### **DATA ASSESSMENT AND REPORTING**

The recommended frequency of monitoring events will be quarterly for the first 2 years and semi-annually for the last 3 years. Upon completion of each monitoring event, plume concentrations will be documented in a groundwater monitoring report. Monitoring reports will be prepared and submitted to NAVFAC SE and the FDEP. The monitoring report will contain the following information:

- Introduction describing site location and brief discussion of site history.
- Description of groundwater activities.
- Groundwater analytical results.
- Groundwater flow conditions.
- Any other pertinent data or site changes that might affect analytical results.
- Recommendations that would assist in reaching milestones of this NAMP.

## EXIT STRATEGIES

### Natural Attenuation Exit Strategy

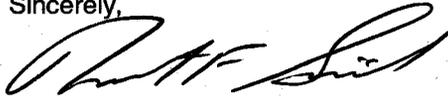
Natural attenuation monitoring is required to measure the progress of achieving the milestones at Tanks 81 A, B, and C. To prevent overly long periods of monitoring that are not cost-effectively remediating the site, various exit strategy components are included in this section. The following components of the Tanks 81 A, B, and C exit strategy should be considered during the natural attenuation monitoring program.

- **Achievement of GCTLs and Milestones:** This exit point is clear and will lead to discontinuing of the monitoring program. Once the concentration of the COC (isopropyl benzene) is less than its GCTL in all wells being monitored for two successive sampling events, then monitoring will cease and the site will be closed.
- **No Continued Reduction in COC:** An evaluation of the progress of natural attenuation at Tanks 81 A, B, and C will be performed after each natural attenuation event to evaluate potential natural attenuation pathways and to identify direct evidence of COC degradation. If at any time the Navy deems the process ineffective, they may opt to change the remediation strategy to a more active technology. The concentrations in the wells should be compared to the milestones regularly. If at any point progress toward the milestones is not being achieved, the Navy may consider exiting the natural attenuation process and opting for an active remediation alternative.

In addition to the exit from the natural attenuation program, individual wells may be removed from the program if the Navy, with agreement from FDEP, decides that continued monitoring no longer provides pertinent information. The party that is performing the sampling and reporting will provide recommendations regarding the sampling program.

Please provide any comments or direct any questions to Kara Wimble at 904-730-4669, extension 214, or myself at 412-921-8163.

Sincerely,



Robert F. Simcik, P.E.  
Task Order Manager

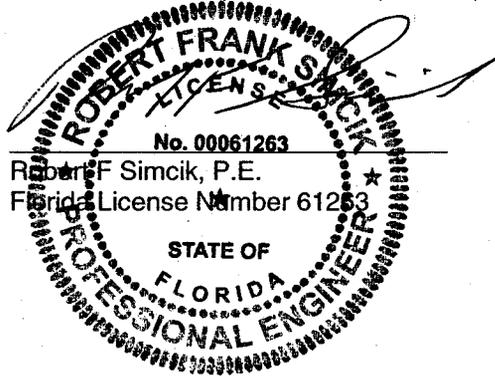
RS/kw

Enclosure

- c:
- Barbara Nwokike (1 copy)
  - Mike Hail, CH2M Hill (electronic only)
  - Rob Simcik, TtNUS (Bookcase File)
  - Mark Speranza, TtNUS (cover letter only)
  - Mark Jonnet, TtNUS (Cecil DMS)
  - Mark Perry, TtNUS (unbound)
  - Debra Humbert, TtNUS (cover letter only)
  - Project File CTO 0076 (1 copy)

**CERTIFICATION**

The information contained in this report is based on the investigation and associated information detailed in the text, appended to this report, and supporting documents referenced in this report. If conditions are determined to exist that differ from those described, the undersigned professional engineer should be notified to evaluate the effects of any additional information on the information described in this report. This Natural Attenuation Monitoring Plan was developed for Tanks 81 A, B, and C at Naval Air Station Cecil Field, Jacksonville, Florida, and should not be construed to apply to any other site.

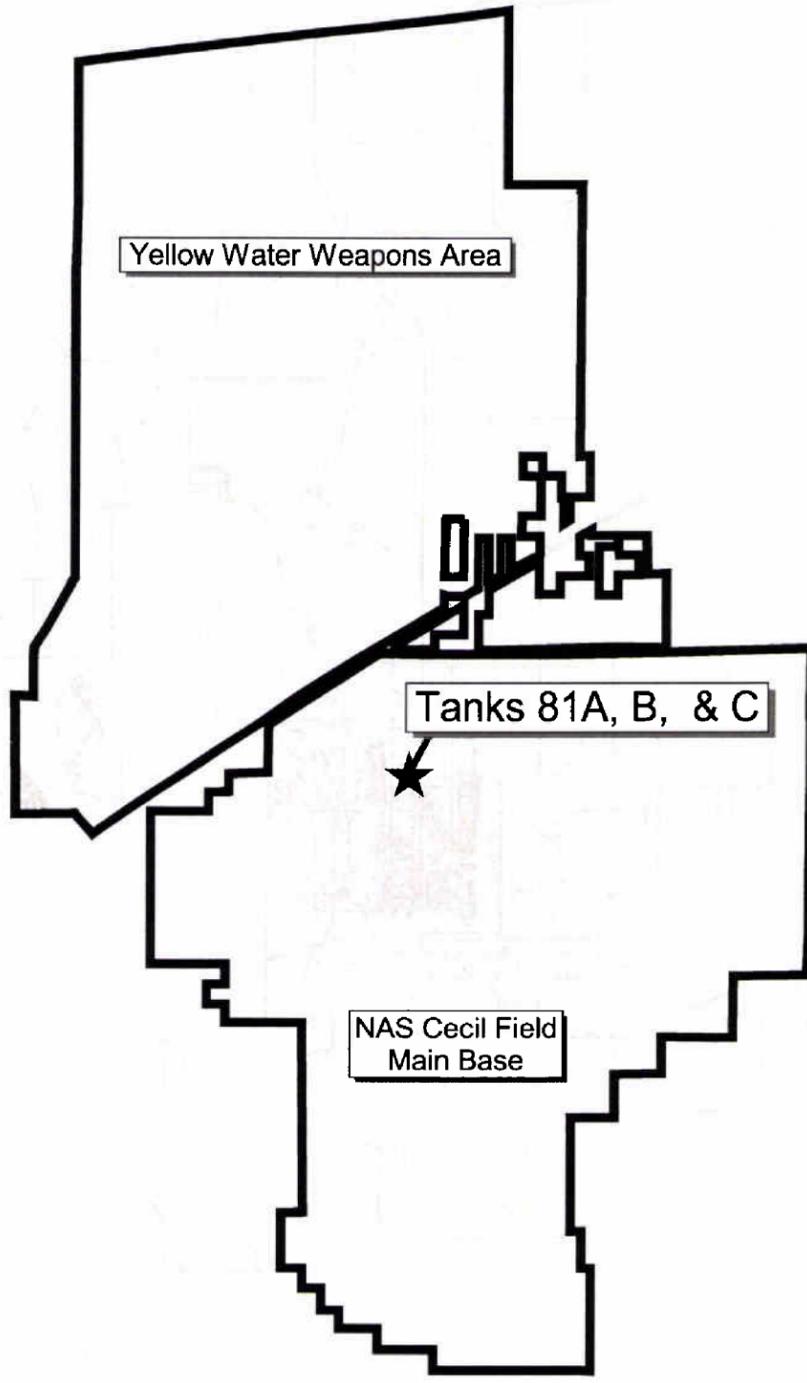


Robert F Simcik, P.E.  
Florida License Number 61263

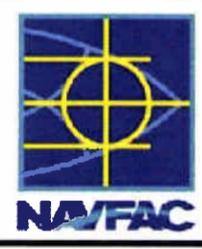
11/21/07

Date

**FIGURES**

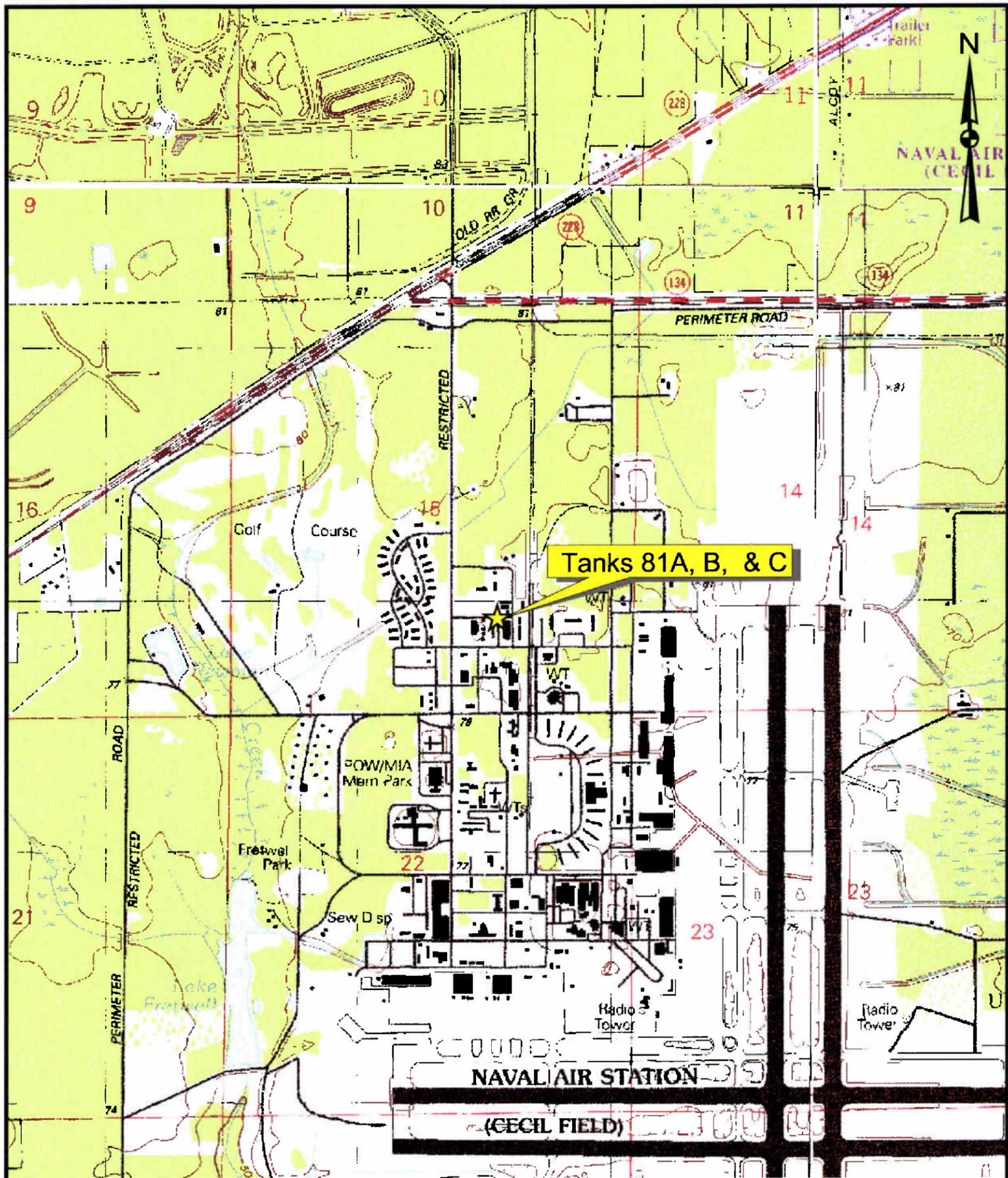


DRAWN BY MJJ	DATE 30Aug07
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COST/SCHEDULE AREA	
SCALE AS NOTED	



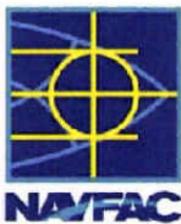
GENERAL LOCATION MAP  
TANKS 81A, B, & C  
NATURAL ATTENUATION MONITORING PLAN  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 0746	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 1	REV 0



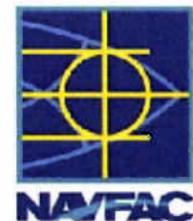
2000 0 2000 Feet

Source: USGS Fiftone Florida 7.5-Minute Topographic Quadrangle, 1993.

DRAWN BY MJJ	DATE 30Aug07		TOPOGRAPHIC MAP TANKS 81A, B, & C NATURAL ATTENUATION MONITORING PLAN NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0746
CHECKED BY	DATE		APPROVED BY	DATE
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2	REV 0

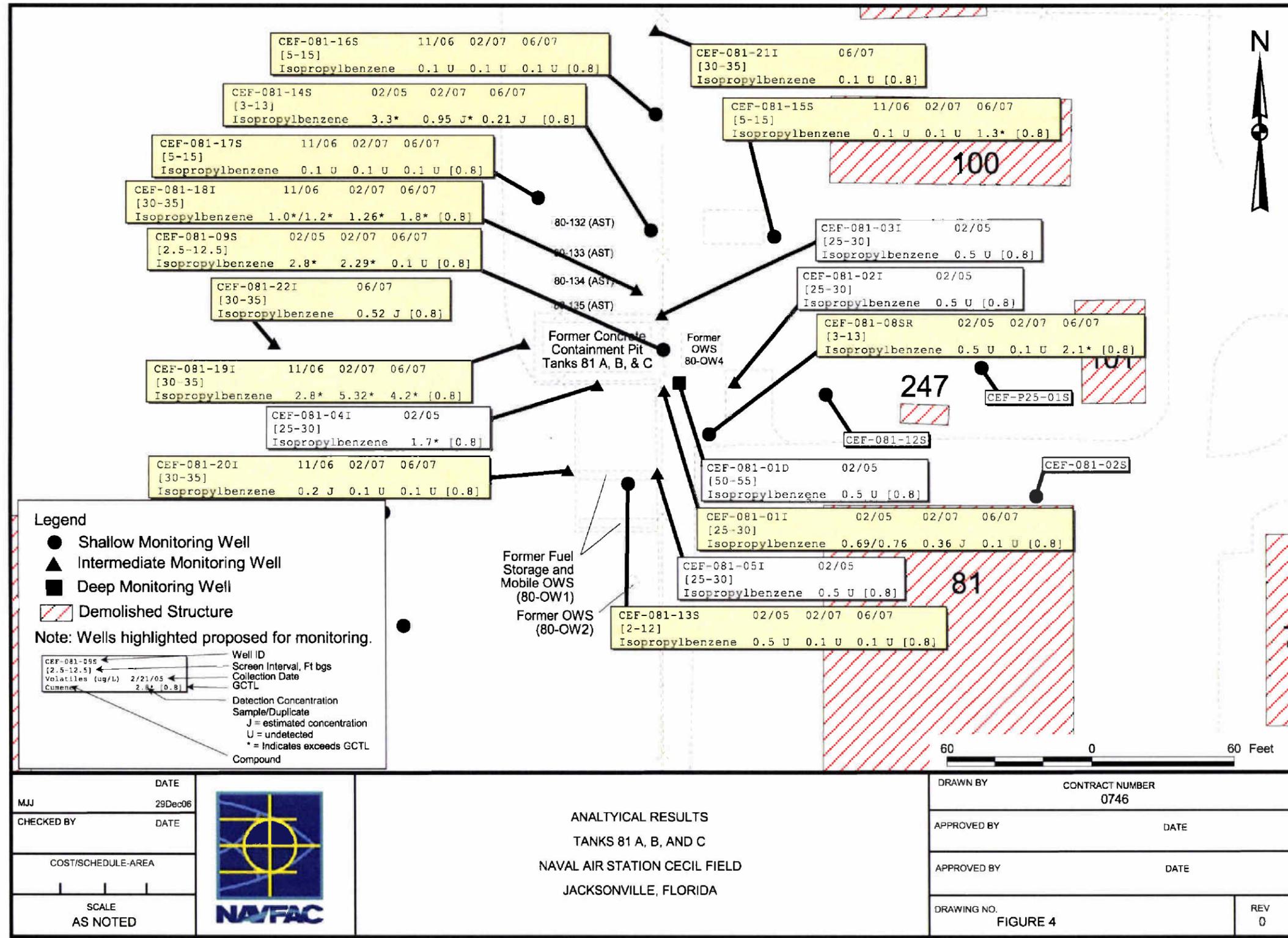


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MJj	30Aug07
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	

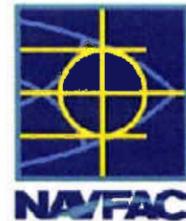


LAND USE MAP  
TANKS 81A, B, & C  
NATURAL ATTENUATION MONITORING PLAN  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

CONTRACT NUMBER 0746	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 3	REV 0

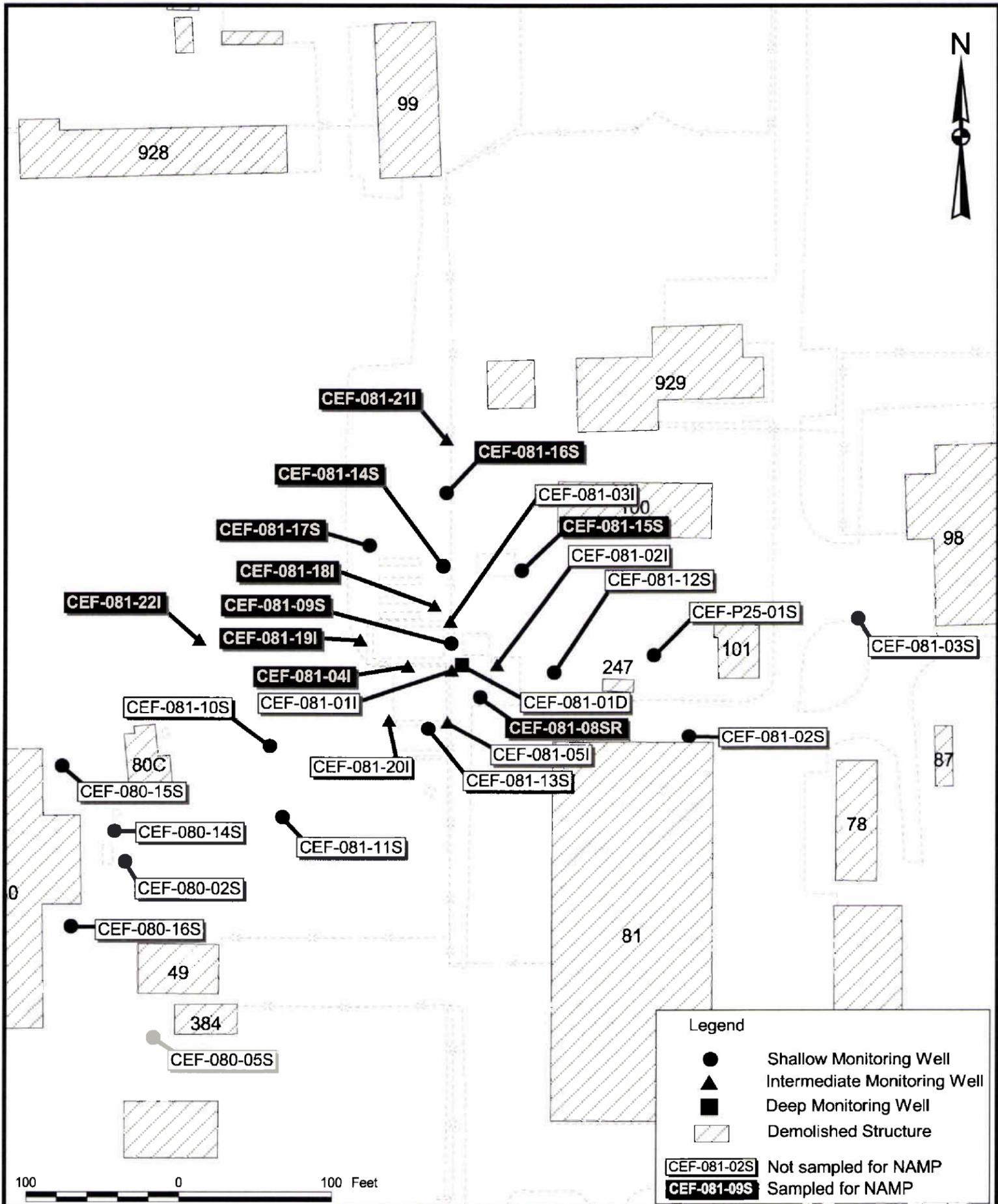


MJJ	DATE	29Dec06
CHECKED BY	DATE	
COST/SCHEDULE-AREA		
SCALE	AS NOTED	

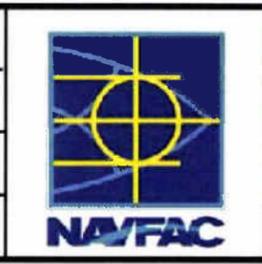


ANALYTICAL RESULTS  
TANKS 81 A, B, AND C  
NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA

DRAWN BY	CONTRACT NUMBER	0746
APPROVED BY	DATE	
APPROVED BY	DATE	
DRAWING NO.	FIGURE 4	REV 0



DRAWN BY MJJ	DATE 30Aug07
CHECKED BY	DATE
COST/SCHEDULE-AREA	
SCALE AS NOTED	



**MONITORING WELL LOCATION MAP**  
**TANKS 81A, B, & C**  
**NATURAL ATTENUATION MONITORING PLAN**  
**NAVAL AIR STATION CECIL FIELD**  
**JACKSONVILLE, FLORIDA**

CONTRACT NUMBER 0746	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5	REV 0

P:\GIS\NAS\_CecilField\Tank 81abc\_20070830.apr 30Aug07 MJJ Layout12

**ATTACHMENT B**

**NATURAL ATTENUATION MONITORING PLAN APPROVAL ORDER (NAMPAO)  
JUNE 27, 2008**



# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blairstone Road  
Tallahassee, Florida 32399-2400

Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

June 27, 2008

BRAC PMO SE  
Attn: Mr. Jim Ferro  
4130 Faber Place Drive  
Suite 202  
North Charleston, SC 29405

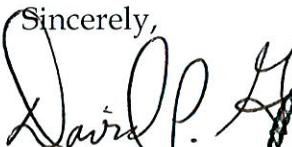
RE: Natural Attenuation Monitoring Plan, Building 81, Tanks 81 A, B, and C, Naval Air Station Cecil Field, Jacksonville, Florida

Dear Mrs. Nwokike:

I have completed my review of the Site Assessment Report Addendum and Natural Attenuation Monitoring Plan, Building 81, Tanks 81 A, B, and C, Naval Air Station Cecil Field, dated May 4, 2007 and November 21, 2007, respectively (received May 8, 2007 and November 26, 2007, respectively), prepared and submitted by Tetra Tech NUS, Inc. Based upon my review, the enclosed Natural Attenuation Monitoring Plan Approval Order (NAMPAO) was signed by Mr. Doug Jones, Chief, Bureau of Waste Cleanup.

If you have any concerns regarding this letter, please contact me at (850) 245-8997.

Sincerely,

  
David P. Grabka, P.G.  
Remedial Project Manager



20 June 2008  
Date

CC: Doyle Brittain, USEPA, Atlanta  
John Flowe, City of Jacksonville  
Mark Speranza, TtNUS, Pittsburgh  
Mike Halil, CH2M Hill, Jacksonville  
Mike Fitzsimmons, FDEP, Northeast District  
Mark Peterson, TtNUS, Jacksonville

JJC/ESN ESN



# Florida Department of Environmental Protection

Bob Martinez Center  
2600 Blairstone Road  
Tallahassee, Florida 32399-2400

Charlie Crist  
Governor

Jeff Kottkamp  
Lt. Governor

Michael W. Sole  
Secretary

June 27, 2008

## **CERTIFIED MAIL** **RETURN RECEIPT REQUESTED**

Mr. Jim Ferro  
BRAC Program Management Office Southeast  
4130 Faber Place Drive  
Suite 202  
North Charleston, South Carolina 29405

Subject: Natural Attenuation Monitoring Plan Approval Order  
Building 81, Tanks 81 A, B, and C  
Naval Air Station Cecil Field  
Jacksonville, Duval County

Dear Mr. Ferro:

The Bureau of Waste Cleanup has reviewed the Site Assessment Report Addendum and the Natural Attenuation Monitoring Plan, dated May 4, 2007 and November 21, 2007, respectively, (received May 8, 2007 and November 26, 2007, respectively), prepared and submitted by Tetra Tech NUS, Inc., for the petroleum product discharge discovered at this site. Pursuant to Paragraph 62-770.690(5)(a), Florida Administrative Code (F.A.C.), the Florida Department of Environmental Protection (Department) approves the Natural Attenuation Monitoring Plan. Pursuant to Rule 62-770.690(8), F.A.C., you are required to complete the monitoring program outlined below. The first sampling event must be performed within 60 days of the installation of replacement monitoring well CEF-502-1SR following the excavation of contaminated soil proposed in the May 25, 2007 Dig and Haul Package for Building 502, Tank 502; or as otherwise approved in a Site Management Plan. Water-level measurements must be made immediately prior to each sampling event. The analytical results (laboratory report), chain of custody record form, cumulative summary tables as required by Subparagraph 62-770.600(8)(a)25., F.A.C. (updated as applicable), site map(s) that illustrate the most recent analytical results, and the water-level elevation information (cumulative summary table and most recent flow interpretation map), must be submitted to the Department within 60 days of sample collection.

The monitoring wells to be sampled, the sampling parameters, and the sampling frequency are as follows:

<u>Monitoring Wells</u>	<u>Contaminants of Concern</u>	<u>Frequency</u>	<u>Duration</u>
CEF-081-04I, 17S, 08SR, 09S, 14S, 15S, 16S, 18I, 19I, 21I, and 22I	Cumene (isopropylbenzene)	Quarterly	One year

"More Protection, Less Process"

Printed on recycled paper.

The approved Remedial Action by Natural Attenuation monitoring period is five years. The sampling frequency will be evaluated following the submittal of the first annual report to determine whether to continue quarterly or whether a different sampling frequency may be appropriate.

If concentrations of contaminants of concern in any of the designated wells increase above the action levels listed below, the well or wells must be resampled no later than 30 days after the initial positive results are known. If the results of the resampling confirm the initial sampling results, then the monitoring report referenced in Paragraph 62-770.690(8)(d), F.A.C., must be signed and sealed by an appropriate registered professional pursuant to Rule 62-770.490, F.A.C., and must include a proposal as described in Paragraph 62-770.690(8)(e), F.A.C.

Contaminated wells:

CEF-081-09S, 19I, 08SR, 04I, 15S, 18I: 8 µg/L cumene (isopropylbenzene).

Perimeter wells (temporary points of compliance):

CEF-081-21I, 16S, 14S, 17S, 22I: .8 µg/L cumene (isopropylbenzene).

If the applicable No Further Action criteria of Rule 62-770.680, F.A.C., are met for two consecutive sampling events, a Site Rehabilitation Completion Report with a No Further Action Proposal, that summarizes the monitoring program and contains documentation to support the opinion that the cleanup objectives have been achieved, must be submitted as required in Subsection 62-770.690(10), F.A.C. If the applicable No Further Action criteria of Rule 62-770.680, F.A.C., are not met following five years of monitoring, then the monitoring report must include a proposal as described in Subsection 62-770.690(8)(f), F.A.C.

Legal Issues

The Department's Order shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, Florida Statutes (F.S.), within 21 days of receipt of this Order. The procedures for petitioning for an administrative hearing are set forth below.

Persons affected by this Order have the following options:

- (A) If you choose to accept the Department's decision regarding the Second Quarter 2006 Operations and Maintenance Status Report, you do not have to do anything. This Order is final and effective as of the date on the top of the first page of this Order.
- (B) If you choose to challenge the decision, you may do the following:
  - (1) File a request for an extension of time to file a petition for an administrative hearing with the Department's Agency Clerk in the Office of General Counsel within 21 days of receipt of this Order; such a request should be made if you wish to meet with the Department in an attempt to informally resolve any disputes without first filing a petition for an administrative hearing; or

- (2) File a petition for an administrative hearing with the Department's Agency Clerk in the Office of General Counsel within 21 days of receipt of this Order.

Please be advised that mediation of this decision pursuant to Section 120.573, F.S., is not available.

#### How to Request an Extension of Time to File a Petition for an Administrative Hearing

For good cause shown, pursuant to Subsection 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for an administrative hearing. Such a request must be filed (received) by the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from BRAC Program Management Office Southeast, shall mail a copy of the request to BRAC Program Management Office Southeast at the time of filing. Timely filing a request for an extension of time tolls the time period within which a petition for an administrative hearing must be made.

#### How to File a Petition for an Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative hearing under Sections 120.569 and 120.57, F.S. The petition must contain the information set forth below and must be filed (received) by the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from BRAC Program Management Office Southeast, shall mail a copy of the petition to BRAC Program Management Office Southeast at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Subsection 120.569(2), F.S. and Rule 28-106.201, F.A.C., a petition for an administrative hearing shall contain the following information:

- (a) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any; the facility owner's name and address, if different from the petitioner; the FDEP facility number, and the name and address of the facility;
- (b) A statement of when and how each petitioner received notice of the Department's action or proposed action;
- (c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;
- (d) A statement of the disputed issues of material fact, or a statement that there are no disputed facts;
- (e) A statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;
- (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's action or proposed action; and
- (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

Mr. Jim Ferro  
June 27, 2008  
Page Four

This Order is final and effective as of the date on the top of the first page of this Order. Timely filing a petition for an administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or an Order Responding to Supplemental Information provided to the Department pursuant to meetings with the Department.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the Department's Agency Clerk in the Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days after this Order is filed with the Department's clerk (see below).

Questions

Any questions regarding the Department's review of your Second Quarter 2006 Operations and Maintenance Status Report should be directed to David Grabka at (850) 245-8997. Questions regarding legal issues should be referred to the Department's Office of General Counsel at (850) 245-2242. Contact with any of the above does not constitute a petition for administrative hearing or request for an extension of time to file a petition for administrative hearing.

Sincerely,



Douglas A. Jones, Chief  
Bureau of Waste Cleanup  
Division of Waste Management

DAJ/dpg

cc: David Grabka, DEP – BWC  
File

FILING AND ACKNOWLEDGMENT  
FILED, on this date, pursuant to  
§120.52 Florida Statutes, with the  
designated Department Clerk, receipt  
of which is hereby acknowledged.



Clerk  
(or Deputy Clerk)



Date

**ATTACHMENT C**  
**GROUNDWATER ANALYTICAL REPORT**  
**JULY 2008**

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-15S-2008-072308  
**Lab Code:** J0803603-001  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/30/08	07/30/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	98	71-122	07/30/08	Acceptable
4-Bromofluorobenzene	99	75-120	07/30/08	Acceptable
Dibromofluoromethane	97	82-116	07/30/08	Acceptable
Toluene-d8	100	88-117	07/30/08	Acceptable

**Comments:** \_\_\_\_\_

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

Volatile Organic Compounds by GC/MS

**Sample Name:** CEF-081-08SR-2008-072208  
**Lab Code:** J0803603-002  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/30/08	07/30/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	97	71-122	07/30/08	Acceptable
4-Bromofluorobenzene	101	75-120	07/30/08	Acceptable
Dibromofluoromethane	99	82-116	07/30/08	Acceptable
Toluene-d8	102	88-117	07/30/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-221-2008-072208  
**Lab Code:** J0803603-003  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	0.88 I	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	98	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	101	75-120	07/31/08	Acceptable
Dibromofluoromethane	100	82-116	07/31/08	Acceptable
Toluene-d8	102	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-041-2008-072208  
**Lab Code:** J0803603-004  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	0.77 I	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	100	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	98	75-120	07/31/08	Acceptable
Dibromofluoromethane	102	82-116	07/31/08	Acceptable
Toluene-d8	105	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-17S-2008-072208  
**Lab Code:** J0803603-005  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	97	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	100	75-120	07/31/08	Acceptable
Dibromofluoromethane	98	82-116	07/31/08	Acceptable
Toluene-d8	100	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-14S-2008-072308  
**Lab Code:** J0803603-006  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	104	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	102	75-120	07/31/08	Acceptable
Dibromofluoromethane	100	82-116	07/31/08	Acceptable
Toluene-d8	99	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-DUP-01-2008-072308  
**Lab Code:** J0803603-007  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	99	75-120	07/31/08	Acceptable
Dibromofluoromethane	103	82-116	07/31/08	Acceptable
Toluene-d8	105	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** Trip Blank 01  
**Lab Code:** J0803603-008  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	99	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	97	75-120	07/31/08	Acceptable
Dibromofluoromethane	98	82-116	07/31/08	Acceptable
Toluene-d8	98	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-191-2008-072208  
**Lab Code:** J0803603-009  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	1.1	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	99	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	98	75-120	07/31/08	Acceptable
Dibromofluoromethane	101	82-116	07/31/08	Acceptable
Toluene-d8	103	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/21/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-09S-2008-072108  
**Lab Code:** J0803603-010  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	103	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	99	75-120	07/31/08	Acceptable
Dibromofluoromethane	99	82-116	07/31/08	Acceptable
Toluene-d8	103	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** Trip Blank 02  
**Lab Code:** J0803603-011  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	102	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	97	75-120	07/31/08	Acceptable
Dibromofluoromethane	97	82-116	07/31/08	Acceptable
Toluene-d8	101	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-211-2008-072308  
**Lab Code:** J0803603-012  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	98	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	100	75-120	07/31/08	Acceptable
Dibromofluoromethane	94	82-116	07/31/08	Acceptable
Toluene-d8	108	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/22/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-18I-2008-072208  
**Lab Code:** J0803603-013  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	0.38	I	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	100	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	101	75-120	07/31/08	Acceptable
Dibromofluoromethane	99	82-116	07/31/08	Acceptable
Toluene-d8	100	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** 07/23/2008  
**Date Received:** 07/24/2008

**Volatile Organic Compounds by GC/MS**

**Sample Name:** CEF-081-16S-2008-072308  
**Lab Code:** J0803603-014  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/31/08	07/31/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	95	71-122	07/31/08	Acceptable
4-Bromofluorobenzene	98	75-120	07/31/08	Acceptable
Dibromofluoromethane	97	82-116	07/31/08	Acceptable
Toluene-d8	99	88-117	07/31/08	Acceptable

**Comments:** \_\_\_\_\_

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Results

**Client:** Tetra Tech NUS, Inc.  
**Project:** Cecil - 81ABC/112GO1264  
**Sample Matrix:** Water

**Service Request:** J0803603  
**Date Collected:** NA  
**Date Received:** NA

**Volatile Organic Compounds by GC/MS**

**Sample Name:** Method Blank  
**Lab Code:** JWG0802815-4  
**Extraction Method:** EPA 5030B  
**Analysis Method:** 8260B

**Units:** ug/L  
**Basis:** NA  
**Level:** Low

Analyte Name	Result Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Isopropylbenzene	ND U	1.0	0.14	1	07/30/08	07/30/08	JWG0802815	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
1,2-Dichloroethane-d4	101	71-122	07/30/08	Acceptable
4-Bromofluorobenzene	103	75-120	07/30/08	Acceptable
Dibromofluoromethane	98	82-116	07/30/08	Acceptable
Toluene-d8	96	88-117	07/30/08	Acceptable

**Comments:** \_\_\_\_\_