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NAS PENSACOLA
5090.3a

LETTER REPORT ON TREATABILITY STUDY FOR SECOND QUARTER POST INJECTION GROUNDWATER MONITORING AT UNDERGROUND STORAGE TANK 14 NAS PENSACOLA FL

2/13/2004

TETRA TECH

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February 13, 2004

Project Number N0020

Commander
Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Byas Glover (ES24)
2155 Eagle Drive
North Charleston, South Carolina 29406
(PLA: NAVFAC EFD SOUTH CHARLESTON SC)
UIC: 62467

Reference: CLEAN Contract Number N62467-94-D-0888
Contract Task Order Number 0198

Subject: Treatability Study Second Quarter Post-Injection Groundwater Monitoring Report
Underground Storage Tank (UST) Site 14
Naval Air Station (NAS) Pensacola
Pensacola, Florida

Dear Mr. Glover:

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit the Treatability Study Second Quarter Post-injection Groundwater Monitoring Letter Report for the referenced Contract Task Order (CTO). This report was prepared for the United States Navy (Navy) Southern Division, Naval Facilities Engineering Command for the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract Number N62467-94-D-0888. This letter report provides the results of the second quarter groundwater sampling event conducted in December 2003 for UST Site 14 and summarizes the treatability study results to date.

Site Summary

NAS Pensacola is located on a peninsula in southern Escambia County, immediately southwest of the city of Pensacola. This peninsula is bounded to the north by the Bayou Grande, to the east by Pensacola Bay, and to the south by the Gulf of Mexico. UST Site 14 includes the fenced area surrounding the locations of USTs 681 and 682. USTs 681 and 682 are located at the former NAS Pensacola petroleum storage facility, which is located south of Farrar Street (Figure 1). The land surface within the petroleum facility slopes toward the south and is covered with grass and several mature trees. The area surrounding the former USTs is fenced and contains the pump house buildings for the UST system, another small building, and a shed as shown in Figure 2. The nearest surface water body to the UST system is Bayou Grande located approximately 3,500 feet (ft) to the northeast. A wetland area is located approximately 600 ft southwest of the site. The wetland contains a creek, which flows intermittently into Bayou Grande.

The site is currently inactive and the two USTs were taken out of service and closed in place in April 1995. The tanks had been installed in December 1943 and each had a storage capacity of approximately 1.1 million gallons. At the time the UST system was closed the tanks were used to store diesel fuel marine (DFM). Historically the USTs had been used to store a variety of vehicle fuels.

A Site Assessment Report (SAR) was completed for the site in January 2000, followed by three SAR Addendums (SARAs) completed in January 2001, October 2001, and April 2002. The final recommendation of Natural Attenuation (NA) Monitoring was accepted by the Florida Department of Environmental Protection (FDEP). Quarterly NA monitoring of the site was initiated with field events completed in August 2002 and November 2002. Letter reports documenting the first and second groundwater monitoring events were presented December 13, 2002 and February 18, 2003, respectively. Elevated concentrations of 1-methylnaphthalene and 2-methylnaphthalene were reported in perimeter monitoring well MW-2S at levels exceeding the FDEP site specific action levels and groundwater cleanup target levels (GCTLs). Naphthalene was also detected in monitoring well MW-2S at a concentration exceeding the FDEP GCTL. The locations of site features and monitoring wells are shown on Figure 2. Based on these results, it was concluded that NA alone was not effective in reducing site contaminant concentrations. Therefore, TtNUS recommended the completion of a treatability study for ORC® enhanced biodegradation at UST Site 14.

Enhanced NA Treatability Study

The following activities are scoped for the treatability study at UST Site 14:

- The baseline groundwater monitoring event
- The ORC® injection event
- Four quarters of post-injection groundwater monitoring

The baseline groundwater monitoring event was conducted June 23, 2003 and the ORC® injection event was conducted from July 8 to July 10, 2003. The locations of the ORC® injection points are shown on Figure 3. Details of the various treatability study tasks are provided in the "Enhanced NA Treatability Study Work Plan for UST Site 14, Naval Air Station Pensacola" submitted by TtNUS on May 6, 2003. The Baseline Monitoring Report, the Quarterly Post-Injection Performance Monitoring Letter Reports and the Treatability Study Evaluation Report will document this treatability study. The Baseline Monitoring Report was submitted in August 2003, followed by the submission of the First Quarter Post-Injection Monitoring Report in September 2003.

Groundwater Monitoring Activities

TtNUS personnel conducted the second post-injection quarterly groundwater monitoring event on December 9, 2003. The quarterly post-injection groundwater monitoring event included:

- Measurement of static water levels (SWLs) to determine groundwater elevation and flow direction.
- Collection of groundwater samples from three site monitoring wells for laboratory analysis.
- Field and laboratory analyses for NA parameters.

Groundwater samples for field and laboratory analysis were collected from the following monitoring wells as specified in the treatability study work plan:

- MW-1S
- MW-2S
- TW-4

Groundwater samples were collected from the monitoring wells in general accordance with the current FDEP Standard Operating Procedures (SOPs [dated January 2001]). Depth-to-water was measured, and the wells were purged prior to sample collection. Purging was accomplished with a peristaltic pump using low flow purge technique. During purging, field parameters (pH, conductivity, temperature, DO, and oxidation-reduction potential) were measured at approximately 5 to 10 minute intervals using a Horiba U-22 multiparameter instrument equipped with a flow-through cell. The instrument was calibrated according to the manufacturer's specifications at the beginning of each day. Sample turbidity was monitored using a La Motte Turbidimeter.

Following the well purging activities, the groundwater samples were analyzed in the field for the following NA parameters: ferrous iron, alkalinity, carbon dioxide, DO, and hydrogen sulfide. Groundwater Sample Log Sheets compiled during purging and sampling at each location are provided in Attachment A.

Laboratory Analysis

Groundwater samples were collected from site monitoring wells for off-site analysis of:

- Polynuclear aromatic hydrocarbons (PAHs) by United States Environmental Protection Agency (USEPA) SW 846 Method 8270 with selective ion monitoring (SIM).
- Total Organic Carbon (TOC) by USEPA Method 415.1.
- Sulfate by USEPA Method 375.4.

After collection, groundwater samples were placed on ice and shipped overnight via Federal Express to Katahdin Analytical Services in Westbrook, Maine. The validated groundwater analytical reports are included in Attachment B.

Groundwater Elevation and Flow Direction

The water level data collected on December 9, 2003 are provided in Attachment A. The groundwater elevations for the baseline, first quarter, and second quarter monitoring events are summarized in Table 1. The top-of-casing elevations for selected monitoring wells at UST Site 14 were surveyed using the known elevation of 18.56 feet mean sea level (MSL) at monitoring well MW-3S as the vertical datum. The water level data were used to estimate groundwater elevation and flow direction at the site (Figure 4). Free product was not detected in the site monitoring wells.

The water level data collected during the second quarterly post-injection monitoring event indicate that groundwater flow in the UST Site 14 area is in a easterly direction. This flow direction is consistent with previously reported groundwater flow data.

Groundwater Analytical Results

The analytical results for the groundwater samples collected during the baseline, first, and second quarter monitoring events are summarized in Table 2. Sample locations with the GCTL exceedances indicated are shown on Figure 5. As indicated on Table 2, none of the detected concentrations in source area monitoring well TW-4 or the remaining sampled wells exceeded the FDEP action levels.

The following GCTL exceedances were reported in groundwater samples collected from UST Site 14 during the second quarter sampling event:

Compound	Florida GCTL	Location Detected	Concentration
Naphthalene	20 micrograms per liter (μg/L)	TW-4	58 μg/L
		MW-2S	22 μg/L
1-Methylnaphthalene	20 μg/L	TW-4	89 μg/L
		MW-2S	46 μg/L
2-Methylnaphthalene	20 μg/L	TW-4	79 μg/L
		MW-2S	40 μg/L

No PAHs were detected in the groundwater samples collected from MW-1S.

A review of the baseline, first, and second quarter post-injection groundwater sampling events results indicates the naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene concentrations in monitoring wells MW-2S and TW-4 have increased. During the baseline sampling event in June, low levels of PAHs were reported in MW-2S, 1-methylnaphthalene (with a concentration of 21 μg/L) as the only parameter exceeding its GCTL of 20 μg/L. No PAH detections were reported for the baseline groundwater sample collected from TW-4. During the first quarter post-injection monitoring event, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations exceeding the respective FDEP GCTLs. Results from the second quarter post-injection monitoring event indicate the concentrations of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene exceeded above the concentrations detected during the first quarter post-injection monitoring results.

NA Parameter Results

Table 3 provides a summary of the NA results and a list of the preferred range of NA parameters to have conditions conducive to biodegradation. The concentration of each parameter and concentration changes between monitoring events with respect to background levels indicate whether the site is conducive to aerobic degradation of naturally occurring microbes. This geochemical data provides a secondary line of evidence to determine if enhanced NA is occurring. The first measurements were recorded on June 23, 2003, and are considered baseline values of the parameters because they were recorded prior to ORC® injection. The trends and a discussion of how the NA parameter measurements compare to the baseline values are discussed below.

Based on the available data for the site, determination of a conclusive site trend for the NA parameters is difficult. Site trends for NA parameters will be evaluated in future quarterly and the final post-injection report.

Conclusions

Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene concentrations in MW-2S and TW-4 have increased compared to the analytical results from the baseline and first quarter monitoring events. Concentrations of these three analytes were greater than GCTLs in MW-2S and TW-4. The ORC® injection appears to have initially released additional oxygen to the site groundwater, but the oxygen concentration in groundwater appears to be declining. Increased DO levels compared to the baseline values were reported in MW-1S and MW-2S; however, the concentrations have declined less than the concentrations from the first quarter. Additionally, the decrease in DO, along with the observed levels of other NA parameters suggests that an anaerobic condition may be present.

TTNUS recommends the treatability study be continued as designed in the work plan, with the addition of the sampling and analysis of two upgradient monitoring wells, MW-4 and 30GS146. The additional monitoring well samples will provide information concerning upgradient groundwater conditions to determine if the site is being impacted by an upgradient source.

If you have any questions with regard to this submittal, please contact me by calling (850) 385-9899 or via e-mail at walkerg@ttnus.com.

Sincerely,

Gerald Walker PG
Florida License No. PG-0001180
Task Order Manager

GW/whe

Attachments (4)

c: Ms. T. Vaught, FDEP
Mr. G. Campbell, NAS Pensacola
Ms. D. Wroblewski, TtNUS (cover letter only)
Mr. M. Perry/File, TtNUS (unbound copy)
Project File/Tallahassee

TABLES

TABLE 1
GROUNDWATER ELEVATION SUMMARY - UST SITE 14 TANKS 681/682
SITE MONITORING WELLS
NAS PENSACOLA, PENSACOLA FLORIDA

Well ID	Well Depth [1]	Top of Casing Elevation [2]	December 9, 2003		September 24, 2003		June 23, 2003	
			Depth to Water (ft)	Groundwater Elevation	Depth to Water (ft)	Groundwater Elevation	Depth to Water (ft)	Groundwater Elevation
MW-1S	22.7	18.75	17.69	1.06	17.39	1.36	18.42	0.33
MW-2S	23.2	20.46	19.21	1.25	18.78	1.68	18.91	1.55
MW-3S	23.9	18.56	17.20	1.36	16.68	1.88	NM	NM
MW-4S	22.8	24.29	20.44	3.85	20.24	4.05	NM	NM
MW-5S	23.2	20.79	17.00	3.79	NM	NM	NM	NM
TW-4	28.0	25.21	24.20	1.01	23.80	1.41	23.85	1.36
MW-100	28.1	25.46	24.31	1.15	23.84	1.62	23.99	1.47

Notes:
[1] Well depths are in feet below top of casing
[2] Top of casing and groundwater elevations are in feet above mean sea level
NM = Not measured

TABLE 2
SUMMARY OF DETECTED ANALYTES IN GROUNDWATER-UST SITE 14 TANKS 681/682
PERIMETER AND CONTAMINATED WELLS
NAS PENSACOLA, PENSACOLA, FLORIDA

Sample No.			PEN-681/682-MW1S			PEN-681/682-MW2S			PEN-681/682-TW4[3]		
Monitoring Well Location			MW-1S			MW-2S			TW-4		
Sampling Event			Baseline	1Q	2Q	Baseline	1Q	2Q	Baseline	1Q	2Q
Collect Date			6/23/2003	9/23/2003	12/9/2003	6/23/2003	9/23/2003	12/9/2003	6/23/2003	9/23/2003	12/9/2003
	GCTL[1] (µg/L)	FDEP Action Levels[2] (µg/L)									
PAHs [4] (µg/L)											
1-Methylnaphthalene	**20**	**20** / 200	--	--	--	**21**	**38**	**46**	--	**42**	**89**
2-Methylnaphthalene	**20**	**20** / 200	--	--	--	13	**39**	**40**	--	**47**	**79**
Acenaphthene	20	NC	--	--	--	--	--	3 J	--	--	5.6 J
Acenaphthylene	2100	NC	--	--	--	2.3 J	--	--	--	--	--
Fluorene	280	NC	--	--	--	4.7	6.4 J	7.3	--	--	8.1
Naphthalene	**20**	NC	--	--	--	3.3 J	**25**	**22**	--	**29**	**58**
Phenanthrene	210	NC	--	--	--	--	--	2.8 J	--	--	6.1 J
Miscellaneous [5] (mg/L)											
Sulfate	250	NC	12	14	16	7.2	--	9.5	3.2	--	--
Total Organic Carbon (TOC)	NA	NC	4.2	4.9	3	27	14	12	2	15	16

[1] Groundwater Cleanup Target Level as provided in Chapter 62-777, F.A.C. Sulfate GCTL as provided in Chapter 62-550, F.A.C.
[2] Action levels established for perimeter/contaminated monitoring wells in MOP Approval Order dated July 2, 2002
[3] Monitoring well TW-4 is designated as a contaminated monitoring well in MOP Approval Order dated July 2, 2002.
[4] PAHs = Polynuclear aromatic hydrocarbons (SW-846 8270 SIM)
[5] USEPA 375.4 (Sulfate); USEPA 415.1 (TOC)

Notes:

Bold indicates an exceedance of limits.
Bold indicates which regulatory limit has been exceeded.
µg/L = micrograms per liter
-- = Analyte not detected above the instrument detection limit
NC = No criteria
J = Compound was detected at an estimated concentration
mg/L = milligrams per liter
NA = Not applicable
F.A.C. = Florida Administrative Code
MOP = Monitoring Only Plan
Q = Quarter

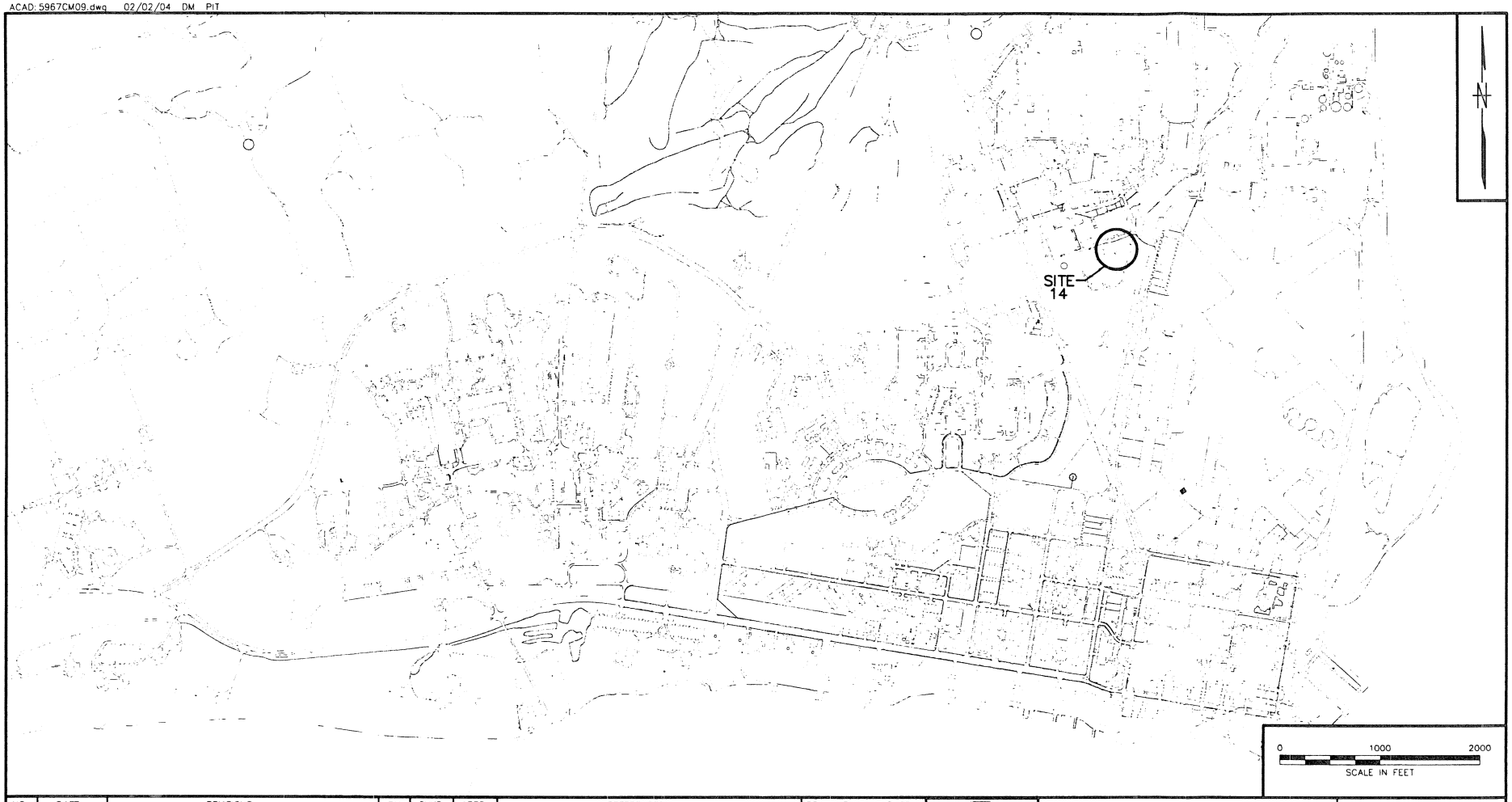
TABLE 3
SUMMARY OF M0NITORED NATURAL ATTENUATION PARAMETERS IN GROUNDWATER
UST SITE 14 / TANKS 681/682
PERIMETER AND CONTAMINATED WELLS
NAS PENSACOLA, PENSACOLA, FLORIDA

Sample Location			PEN-681/682-MW1S			PEN-681/682-MW2S			PEN-681/682-TW4		
Sampling Event			Baseline	1Q	2Q	Baseline	1Q	2Q	Baseline	1Q	2Q
Collect Date			6/23/2003	9/23/2003	12/9/2003	6/23/2003	9/23/2003	12/9/2003	6/23/2003	9/23/2003	12/9/2003
	Preferred Range	Units									
Field Parameters											
Dissolved Oxygen	> 5 mg/L	mg/L	0.2	3.0	2.0	0.2	1.0	1.0	3	2.0	0.8
Carbon Dioxide	> 2X	mg/L	30	50	12.5	85	40	16	30	50	22.5
Alkalinity	> 2X	mg/L	55	100	40	60	100	37.5	90	110	120
Ferrous iron	> 1 mg/L	mg/L	2.6	3.0	1.8	3.4	2.6	1.6	0	2.0	1.8
Hydrogen Sulfide	NA	mg/L	0	0	0	>5.0	0.85	6.0	0	0.23	0.38
Temperature	> 20° C	°C	23.41	23.76	23.58	23.44	24.76	23.83	22.10	23.58	24.03
pH	5 < pH < 9	SU	6.10	5.87	6.26	6.05	6.30	6.68	6.61	6.01	7.29
Oxidation-Reduction potential	< 50 mV or < -100 mV	mV	180	27	3	-107.4	-168	-154	10	-97	-274
Laboratory Parameters											
Sulfate	NA	µg/L	12	14	16	7.2	--	9.5	3.2	--	--
Total Organic Carbon (TOC)	NA	µg/L	4.2	4.9	3	27	14	12	2	15	16

Notes:
µg/L = micrograms per liter
mg/L = milligrams per liter
°C = Degrees Celsius
SU = Standard pH Units
mV = Millivolts

FIGURES

ACAD: 5967CM09.dwg 02/02/04 DM PIT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DM DATE 2/2/04
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE LOCATION MAP
UST SITE 14
NAS PENSACOLA
PENSACOLA, FLORIDA

CONTRACT NO. 5967
APPROVED BY DATE
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DRAWING NO. FIGURE 1
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

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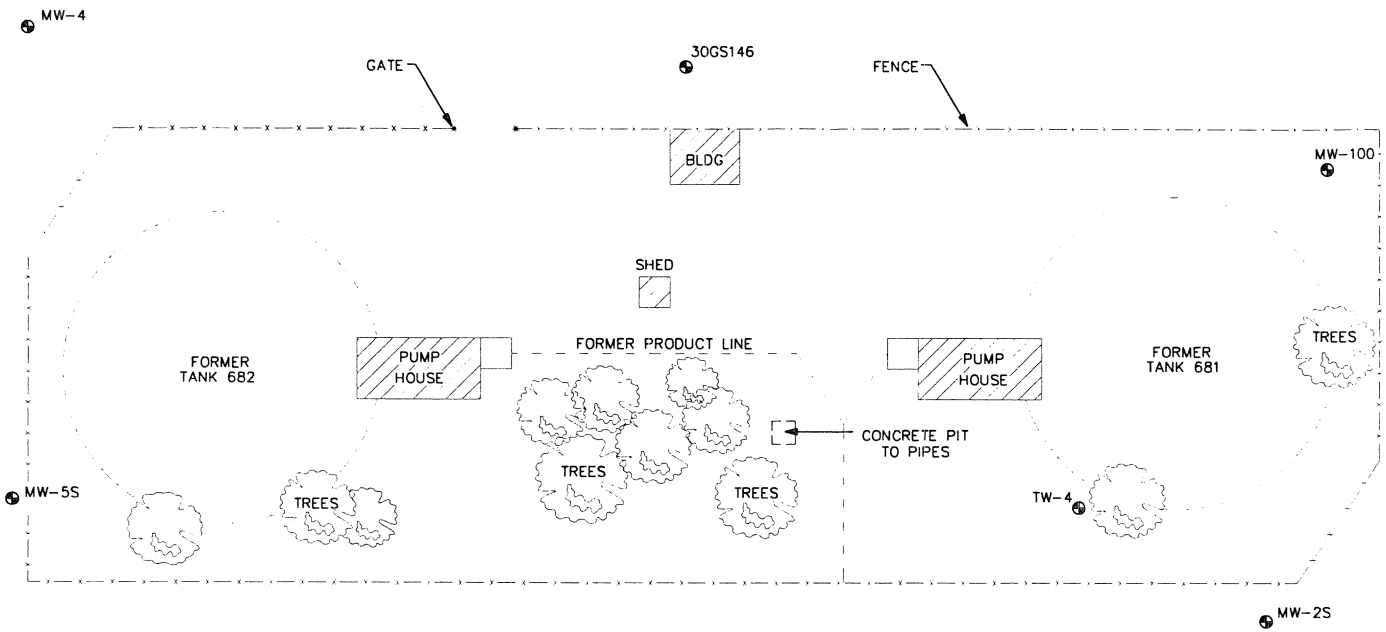

LEGEND:

MW-2S — MONITORING WELL LOCATION AND DESIGNATION

0 40 80
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DM DATE 2/2/04
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE PLAN
SITE 14
SECOND QUARTER GROUNDWATER SAMPLING EVENT
NAS PENSACOLA
PENSACOLA, FLORIDA

CONTRACT NO. 5967
APPROVED BY DATE
APPROVED BY DATE
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REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

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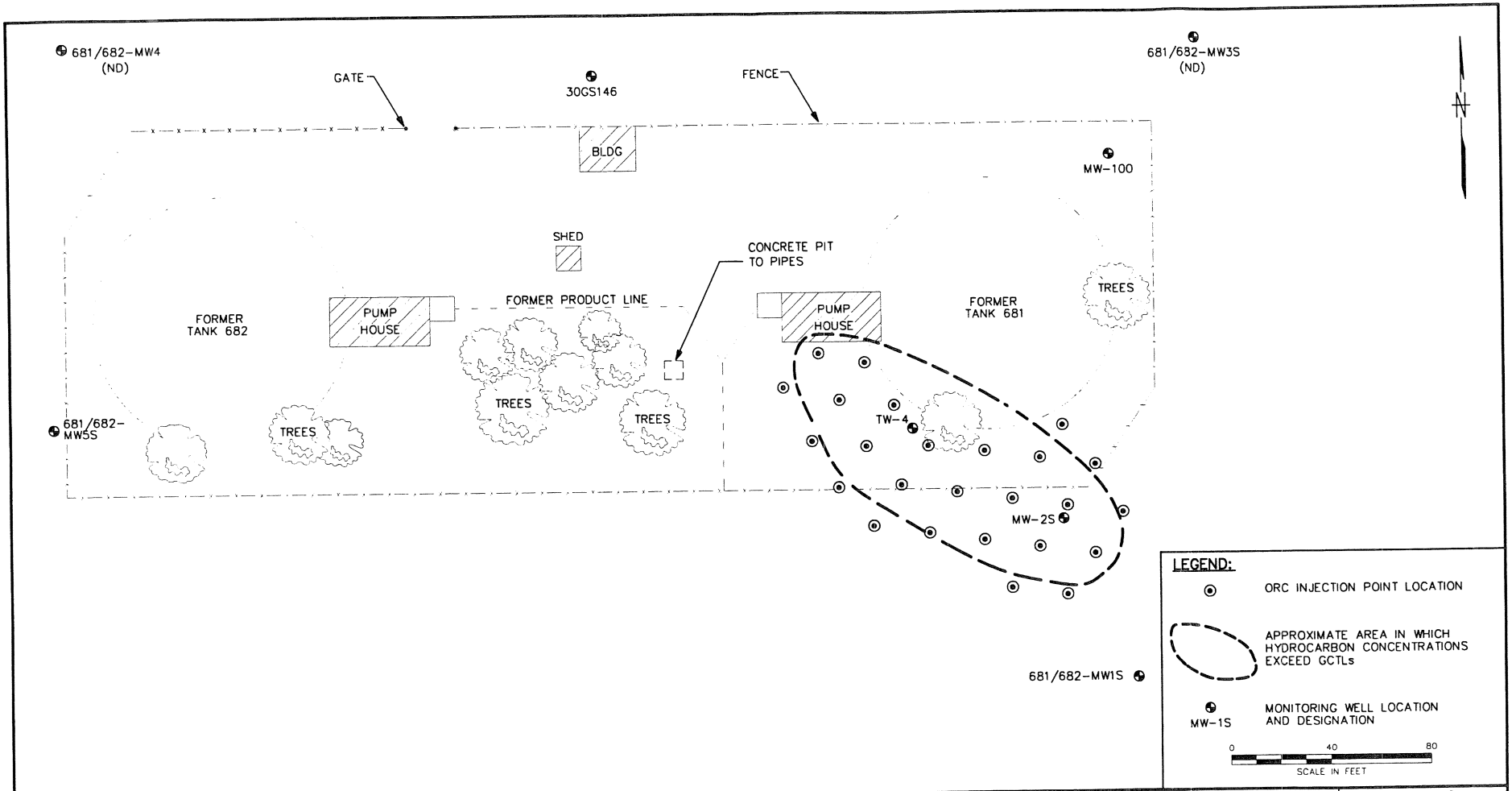

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

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CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

ORC INJECTION LOCATIONS
UST SITE 14
SECOND QUARTER GROUNDWATER SAMPLING EVENT
U.S. NAVAL AIR STATION PENSACOLA
PENSACOLA, FLORIDA

CONTRACT NO. 5967
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REV. 0

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03JAX0092

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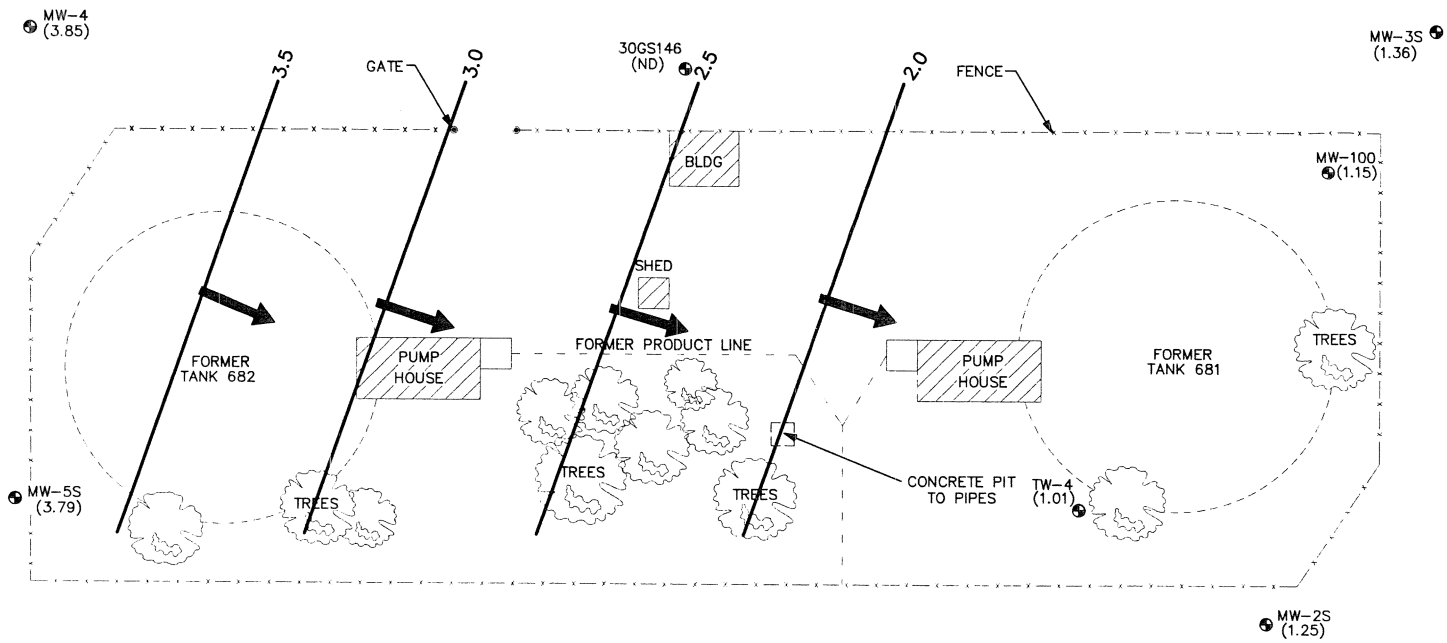

LEGEND:

MW-2S	MONITORING WELL LOCATION AND DESIGNATION
2.0	GROUNDWATER ELEVATIONS CONTOURS
(ND)	NO DATA
(1.68)	GROUNDWATER ELEVATION (ft msl)
	ESTIMATED GROUNDWATER FLOW DIRECTION

0 40 80
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DM DATE 2/2/04
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER ELEVATIONS DEC. 9, 2003
UST SITE 14
SECOND QUARTER GROUNDWATER SAMPLING EVENT
NAS PENSACOLA
PENSACOLA, FLORIDA

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REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

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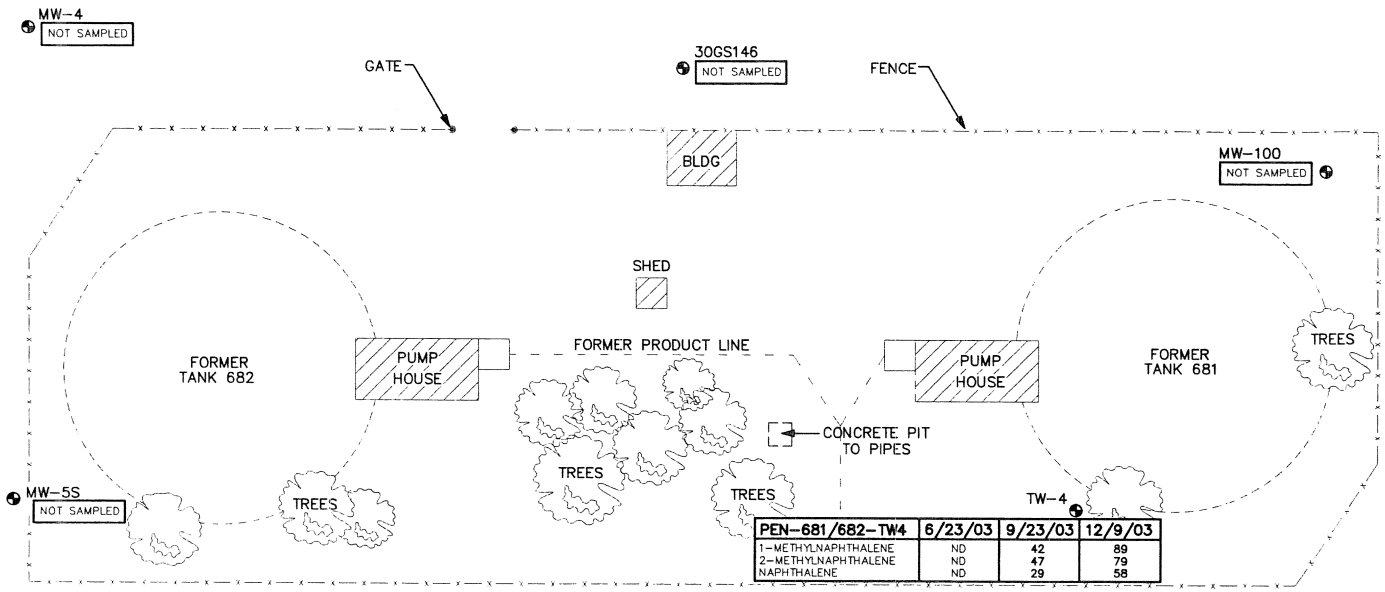

PEN-681/682-TW4	6/23/03	9/23/03	12/9/03
1-METHYLNAPHTHALENE	ND	42	89
2-METHYLNAPHTHALENE	ND	47	79
NAPHTHALENE	ND	29	58

MW-2S

PEN-681/682-MW2S	6/23/03	9/23/03	12/9/03
1-METHYLNAPHTHALENE	21	38	46
2-METHYLNAPHTHALENE	13	39	40
NAPHTHALENE	3.3	25	22

MW-1S

PEN-681/682-MW1S	6/23/03	9/23/03	12/9/03
1-METHYLNAPHTHALENE	ND	ND	ND
2-METHYLNAPHTHALENE	ND	ND	ND
NAPHTHALENE	ND	ND	ND

LEGEND:

MW-2S — MONITORING WELL LOCATION AND DESIGNATION

ND — NOT DETECTED

NOTE:

GROUNDWATER CLEANUP TARGET LEVEL

PAHs	GCTL
1. 1-METHYLNAPHTHALENE	20
2-METHYLNAPHTHALENE	20
NAPHTHALENE	20

2. ANALYTE CONCENTRATIONS MEASURED IN MICROGRAMS/LITER (ug/L)
3. EXCEEDANCES ARE IN BOLD

0 40 80
SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY DATE: DM 2/2/04
CHECKED BY DATE
COST/SCHED-AREA
SCALE: AS NOTED

GROUNDWATER EXCEEDANCES
UST SITE 14
SECOND QUARTER GROUNDWATER SAMPLING EVENT
NAS PENSACOLA
PENSACOLA, FLORIDA

CONTRACT NO. 5967
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DRAWING NO. FIGURE 5
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

ATTACHMENT A

FIELD DATA FORMS

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: TS @ Site 14, NAS Pensacola
Project No.: N5967
Location: UST Site 14
Personnel: M. Akers, B. Olson
Weather Conditions:
Measuring Device Heron Dipper-T Water Level Indicator
Tidally Influenced: Yes ___ No _X_
Remarks:

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
MW-1S	12/8/2003	1250	18.75	22.91	17.69	NA	1.06	
MS-2S	12/8/2003	1246	20.46	23.22	19.21	NA	1.25	
MW-3S	12/8/2003	1255	18.56	23.45	17.20	NA	1.36	
MW-4S	12/8/2003	1235	24.29	22.95	20.44	NA	3.85	
MW-5S	12/8/2003	1232	20.79	22.95	17.00	NA	3.79	
TW-4	12/8/2003	1240	25.21	28.01	24.20	NA	1.01	
MW-100	12/8/2003	1242	25.46	28.13	24.31	NA	1.15	
30GS146	12/8/2003	1244	NA	30.98	22.80	NA	NA	

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS Pensacola - GW TS @ SITE 14
Project No.: N5967 / CTO 302

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PEN-681/682-TW4-03
Sample Location: TW-4
Sampled By: B. OLSON
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/9/2003	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Salinity
Time: 0845	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	%
Method: Peristaltic	Clear	7.29	0.321	24.03	2.9	0	-274	--

PURGE DATA:

Date: 12/9/2003	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Salinity
Method: Peristaltic	INIT	7.2	0.386	23.85	5.5	2.83	-247	--
Monitor Reading (ppm):		**See Low Flow Purge Data Sheet**						
Well Casing Diameter & Material	0.5 GAL	7.36	0.388	24.02	5.1	0.29	-271	--
Type: 2" PVC	1.0 GAL	7.35	0.349	24.02	3.3	0	-274	--
Total Well Depth (TD): 28.10	1.5 GAL	7.32	0.337	24.03	3.0	0	-275	--
Static Water Level (WL): 24.16	2.0 GAL	7.29	0.321	24.03	2.9	0	-274	--
One Casing Volume(gal/L): 0.62 GAL								
Start Purge (hrs): 0830								
End Purge (hrs): 0845								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 2 GAL								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 -- PAH	NA	2 - 1L Ambers	YES
USEPA 415.1 -- TOC	H2S04	2 - 40mL VOA Vials	YES
USEPA 300.0 -- SULFATE	4degC	1 - 125mL HDPE	YES

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Dissolved Oxygen	0.8 mg/L
Ferrous Iron	1.8 mg/L
Hydrogen Sulfide	0.38 mg/L
Carbon Dioxide	22.5 mg/L
Alkalinity (Methyl Red)	120 mg/L

Circle if Applicable:

MS/MSD **Duplicate ID No.:**

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS Pensacola - GW TS @ SITE 14
Project No.: N5967 / CTO 302

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PEN-681/682-MW-2S-03
Sample Location: MW-2S
Sampled By: MTA
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/9/2003	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Salinity
Time: 0925	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	%
Method: Peristaltic	Clear	6.68	0.203	23.83	0	0	-154	0.01

PURGE DATA:

Date: 12/9/2003	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Salinity
Method: Peristaltic	1.8 L	6.57	0.203	23.76	0	0.23	-107	0.01
Monitor Reading (ppm):		See Low Flow Purge Data Sheet						
Well Casing Diameter & Material	3.6 L	6.63	0.204	23.81	0	0	-123	0.01
Type: 1" PVC	5.4 L	6.67	0.203	23.82	0	0	-136	0.01
Total Well Depth (TD): 23.28	7.2 L	6.68	0.203	23.83	0	0	-154	0.01
Static Water Level (WL): 19.16								
One Casing Volume(gal/L): 1.3 L								
Start Purge (hrs): 0913								
End Purge (hrs): 0925								
Total Purge Time (min): 12								
Total Vol. Purged (gal/L): 7.2 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 -- PAH	NA		YES
USEPA 415.1 -- TOC	H2S04		YES
USEPA 300.0 -- SULFATE	4degC		YES

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Dissolved Oxygen	1.0 mg/L
Ferrous Iron	1.6 mg/L
Hydrogen Sulfide	6.0 mg/L
Carbon Dioxide	16 mg/L
Alkalinity (Methyl Red)	37.5 mg/L

Circle if Applicable:

MS/MSD **Duplicate ID No.:**

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: NAS Pensacola - GW TS @ SITE 14
Project No.: N5967 / CTO 302

[] Domestic Well Data
[X] Monitoring Well Data
[] Other Well Type:
[] QA Sample Type:

Sample ID No.: PEN-681/682-MW-1S-03
Sample Location: MW-1S
Sampled By: MTA
C.O.C. No.:
Type of Sample:
[X] Low Concentration
[] High Concentration

SAMPLING DATA:

Date: 12/9/2003	Color	pH	S.C.	Temp.	Turbidity	DO	ORP	Salinity
Time: 0845	Visual	Standard	mS/cm	^{0}C	NTU	mg/l	mV	%
Method: Peristaltic	Clear	6.26	0.178	23.58	8.32	1.17	3	0.01

PURGE DATA:

Date: 12/9/2003	Volume	pH	S.C.	Temp. (C)	Turbidity	DO	ORP	Salinity
Method: Peristaltic	1.8 L	6.08	0.177	23.32	61.9	1.33	30	0.01
Monitor Reading (ppm):		**See Low Flow Purge Data Sheet**						
Well Casing Diameter & Material	3.6 L	6.18	0.177	23.55	41.3	1.71	19	0.01
Type: 1" PVC	5.4 L	6.21	0.177	23.56	19.8	0.96	12	0.01
Total Well Depth (TD): 22.76	7.2 L	6.24	0.178	23.58	9.21	1.21	7	0.01
Static Water Level (WL): 18.63	9.0 L	6.26	0.178	23.58	8.32	1.17	3	0.01
One Casing Volume(gal/L): 1.3 L								
Start Purge (hrs): 0829								
End Purge (hrs): 0844								
Total Purge Time (min): 15								
Total Vol. Purged (gal/L): 9 L								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected
SW-846 -- PAH	NA		YES
USEPA 415.1 -- TOC	H2S04		YES
USEPA 300.0 -- SULFATE	4degC		YES

NATURAL ATTENUATION PARAMETERS / OBSERVATIONS / NOTES

Dissolved Oxygen	2.0 mg/L
Ferrous Iron	1.8 mg/L
Hydrogen Sulfide	ND
Carbon Dioxide	12.5 mg/L
Alkalinity (Methyl Red)	40 mg/L

Circle if Applicable:

MS/MSD | **Duplicate ID No.:**

Signature(s):

TBD: To Be Determined

Tetra Tech NUS, Inc.

EQUIPMENT CALIBRATION LOG

PROJECT NAME : TS @ 3 UST Sites, NAS Pensacola

INSTRUMENT NAME/MODEL: U-22

SITE NAME: UST Sites 14, 17, 1120

MANUFACTURER: Horiba

PROJECT No.: N5967, CTO 302

SERIAL NUMBER: NA

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		
12/9/2003	NA	B. OLSON	--	--	3.75	4.00	3502	pH
12/9/2003	NA	B. OLSON	--	--	3.95	4.49	3502	mS/cm
12/10/2003	NA	B. OLSON	--	--	4.04	3.99	3502	pH
12/10/2003	NA	B. OLSON	--	--	5.23	4.53	3502	mS/cm
12/11/2003	NA	B. OLSON	--	--	4.12	4.01	3502	pH
12/11/2003	NA	B. OLSON	--	--	3.98	4.67	3502	mS/cm

ATTACHMENT B

GROUNDWATER ANALYTICAL REPORT

Tetra Tech NUS, Inc.

Internal Correspondence

TO: Mr. Gerald Walker

FROM: Michael T. Akers

DATE: January 23, 2004

CC: File

SUBJECT: Data Validation – VOC, PAH, TRPH, TOC, Sulfate
CTO302 – NAS Pensacola / OLF Bronson
SDG 302-5

SAMPLES: 9 / Aqueous / VOC / PAH / TRPH / TOC / Sulfate

BRN-1120-MW13R-03
BRN-1120-MW24-03
BRN-1120-MW29-03
BRN-1120-MW14R-03
BRN-1120-MW27-03
BRN-1120-MW35-03
BRN-1120-MW16R-03
BRN-1120-MW28-03
BRN-1120-RB121003-03

11 / Aqueous / PAH / TOC / Sulfate

NASP-17-MW01-03
NASP-17-MW04-03
NASP-17-MW09-03
PEN-681/682-MW2S-03
NASP-17-MW02-03
NASP-17-MW05-03
NASP-17-MW11-03
PEN-681/682-TW4-03
NASP-17-MW03-03
NASP-17-MW07-03
PEN-681/682-MW1S-03

OVERVIEW

The sample set for CTO 302, SDG F302-5, Naval Air Station (NAS) Pensacola and Outlying Landing Field (OLF) Bronson, Pensacola, Florida consists of twenty (20) aqueous environmental samples. The environmental samples from OLF Bronson were analyzed for Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), Total Recoverable Petroleum Hydrocarbons (TRPH), Total Organic Carbon (TOC), and Sulfate. The environmental samples from NAS Pensacola were analyzed PAHs, TOC, and Sulfate

The samples were collected by Tetra Tech NUS on December 9th and 10th, 2003 and analyzed by Katahdin Analytical Services. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW-846 8260B (VOCs), SW-846 8270 SIM (PAHs), FDEP FL-PRO (TRPH), USEPA 415.1 (TOC) and USEPA 375.4 (Sulfate) analytical and reporting protocol. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Laboratory method/field quality control blank results
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter.

VOC Fraction

- All control criteria were met for this fraction.

PAH Fraction

- All quality control criteria were met for this fraction.

TRPH Fraction

- *Laboratory Blank Analysis*

  Affected samples: BRN-1120-MW13R-03, BRN-1120-MW14R-03, BRN-1120-MW16R-03, BRN-1120-MW24-03, BRN-1120-MW27-03, BRN-1120-MW28-03, BRN-1120-MW35-03, BRN-1120-RB121003-03

Parameter	Maximum Concentration (µg/L)	Action Level (µg/L)
TRPH	590	2950

The action level is set at 5x the maximum concentration found in the associated blanks. Any detections between the IDL and the AL are qualified "U" due to blank contamination.

- All other control criteria were met for this fraction.

Miscellaneous (TOC and Sulfate) Fraction

- All quality control criteria were met for this fraction.

Executive Summary

Laboratory performance: TRPH was qualified as non-detected in multiple samples due to laboratory method blank contamination.

Other factors affecting data quality: None

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1996), and the NFESC guidelines "Navy Installation Restoration Chemical Data Quality Manual" (September, 1999). The text of the 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)."

Michael T. Akers

Project Chemist
Tetra Tech NUS, Inc.

PROJ_NO: 0020

SDG: 3025 MEDIA: WATER DATA FRACTION: PAH

nsample	PEN-681/682-MW1S-03
samp_date	12/9/2003
lab_id	WT3109-1RA2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	0.2	U	U	
2-METHYLNAPHTHALENE	0.2	U	U	
ACENAPHTHENE	0.2	U	U	
ACENAPHTHYLENE	0.2	U	U	
ANTHRACENE	0.2	U	U	
BENZO(A)ANTHRACENE	0.2	U	U	
BENZO(A)PYRENE	0.2	U	U	
BENZO(B)FLUORANTHENE	0.2	U	U	
BENZO(G,H,I)PERYLENE	0.2	U	U	
BENZO(K)FLUORANTHENE	0.2	U	U	
CHRYSENE	0.2	U	U	
DIBENZO(A,H)ANTHRACENE	0.2	U	U	
FLUORANTHENE	0.2	U	U	
FLUORENE	0.2	U	U	
INDENO(1,2,3-CD)PYRENE	0.2	U	U	
NAPHTHALENE	0.2	U	U	
PHENANTHRENE	0.2	U	U	
PYRENE	0.2	U	U	

nsample	PEN-681/682-MW2S-03
samp_date	12/9/2003
lab_id	WT3109-2DL
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	46			
2-METHYLNAPHTHALENE	40			
ACENAPHTHENE	3	J	J	
ACENAPHTHYLENE	4.7	U	U	
ANTHRACENE	4.7	U	U	
BENZO(A)ANTHRACENE	4.7	U	U	
BENZO(A)PYRENE	4.7	U	U	
BENZO(B)FLUORANTHENE	4.7	U	U	
BENZO(G,H,I)PERYLENE	4.7	U	U	
BENZO(K)FLUORANTHENE	4.7	U	U	
CHRYSENE	4.7	U	U	
DIBENZO(A,H)ANTHRACENE	4.7	U	U	
FLUORANTHENE	4.7	U	U	
FLUORENE	7.3			
INDENO(1,2,3-CD)PYRENE	4.7	U	U	
NAPHTHALENE	22			
PHENANTHRENE	2.8	J	J	
PYRENE	4.7	U	U	

nsample	PEN-681/682-TW4-03
samp_date	12/9/2003
lab_id	WT3109-3DL2
qc_type	NM
units	UG/L
Pct_Solids	
DUP_OF:	

Parameter	Result	Lab Qual	Val Qual	Qual Code
1-METHYLNAPHTHALENE	89			
2-METHYLNAPHTHALENE	79			
ACENAPHTHENE	5.6	J	J	
ACENAPHTHYLENE	7.5	U	U	
ANTHRACENE	7.5	U	U	
BENZO(A)ANTHRACENE	7.5	U	U	
BENZO(A)PYRENE	7.5	U	U	
BENZO(B)FLUORANTHENE	7.5	U	U	
BENZO(G,H,I)PERYLENE	7.5	U	U	
BENZO(K)FLUORANTHENE	7.5	U	U	
CHRYSENE	7.5	U	U	
DIBENZO(A,H)ANTHRACENE	7.5	U	U	
FLUORANTHENE	7.5	U	U	
FLUORENE	8.1			
INDENO(1,2,3-CD)PYRENE	7.5	U	U	
NAPHTHALENE	58			
PHENANTHRENE	6.1	J	J	
PYRENE	7.5	U	U	

PROJ_NO: 0020

SDG: 3025 MEDIA: WATER DATA FRACTION: MISC

nsample PEN-681/682-MW1S-03
samp_date 12/9/2003
lab_id WT3109-1
qc_type NM
Pct_Solids
DUP_OF:

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
SULFATE	MG/L	16			
TOTAL ORGANIC CARBON	MG/L	3			

nsample PEN-681/682-MW2S-03
samp_date 12/9/2003
lab_id WT3109-2
qc_type NM
Pct_Solids
DUP_OF:

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
SULFATE	MG/L	9.5			
TOTAL ORGANIC CARBON	MG/L	12			

nsample PEN-681/682-TW4-03
samp_date 12/9/2003
lab_id WT3109-3
qc_type NM
Pct_Solids
DUP_OF:

Parameter	units	Result	Lab Qual	Val Qual	Qual Code
SULFATE	MG/L	1	U	U	
TOTAL ORGANIC CARBON	MG/L	16			

WT3109

TETRA TECH NUS, INC.

CHAIN OF CUSTODY

NUMBER 4302

PAGE 1 OF 1

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
N0020	NAS Pensacola	Gerry Walker	8503859899	Katahdin ; Andrea Coldy
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		Bill Olson	8505102787	340 County Rd No. 5
		CARRIER/WAYBILL NUMBER		CITY, STATE
				Westbrook ME 04092

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

DATE YEAR 2003	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	PAHs 8310	TOC 415.1	SO4 300.6						COMMENTS
CONTAINER TYPE PLASTIC (P) or GLASS (G)									G	G	P						
PRESERVATIVE USED									N/A	H2SO4	N/A						
12/9	0845	PEN-681/682-MW15-03	MW15	—	—	GW	G	5	2	2	1						See WR
12/9	0925	PEN-681/682-MW25-03	MW25	—	—	GW	G	5	2	2	1						N5967-WR406
12/9	0845	PEN-681/682-TW4-03	TW4	—	—	GW	G	5	2	2	1						for Cmpd lists
																	and CRDL's.

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	12/9/03	1700	1. RECEIVED BY	12-10-03	0900
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

DISTRIBUTION WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 302 NAS PENSACOLA
PO No:
Sample Date: 12/09/03
Received Date: 12/10/03
Extraction Date: 12/11/03
Analysis Date: 01/06/04
Report Date: 01/13/2004
Matrix: WATER
% Solids: NA

Lab ID: WT3109-1RA2
Client ID: PEN-681/682-MW1S-03
SDG: CTO302-5
Extracted by: NB
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG5058
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene	U	0.20	1.0	0.20	0.20	0.047
91-57-6	2-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.075
90-12-0	1-Methylnaphthalene	U	0.20	1.0	0.20	0.20	0.075
208-96-8	Acenaphthylene	U	0.20	1.0	0.20	0.20	0.047
83-32-9	Acenaphthene	U	0.20	1.0	0.20	0.20	0.075
86-73-7	Fluorene	U	0.20	1.0	0.20	0.20	0.057
85-01-8	Phenanthrene	U	0.20	1.0	0.20	0.20	0.075
120-12-7	Anthracene	U	0.20	1.0	0.20	0.20	0.075
206-44-0	Fluoranthene	U	0.20	1.0	0.20	0.20	0.10
129-00-0	Pyrene	U	0.20	1.0	0.20	0.20	0.085
56-55-3	Benzo(a)anthracene	U	0.20	1.0	0.20	0.20	0.11
218-01-9	Chrysene	U	0.20	1.0	0.20	0.20	0.066
205-99-2	Benzo(b)fluoranthene	U	0.20	1.0	0.20	0.20	0.085
207-08-9	Benzo(k)fluoranthene	U	0.20	1.0	0.20	0.20	0.075
50-32-8	Benzo(a)pyrene	U	0.20	1.0	0.20	0.20	0.085
193-39-5	Indeno(1,2,3-cd)pyrene	U	0.20	1.0	0.20	0.20	0.094
53-70-3	Dibenzo(a,h)anthracene	U	0.20	1.0	0.20	0.20	0.14
191-24-2	Benzo(g,h,i)perylene	U	0.20	1.0	0.20	0.20	0.075
7297-45-2	2-Methylnaphthalene-d10		81%				
81103-79-9	Fluorene-d10		88%				
1718-52-1	Pyrene-d10		98%				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 302 NAS PENSACOLA
PO No:
Sample Date: 12/09/03
Received Date: 12/10/03
Extraction Date: 12/11/03
Analysis Date: 01/05/04
Report Date: 01/13/2004
Matrix: WATER
% Solids: NA

Lab ID: WT3109-2DL
Client ID: PEN-681/682-MW2S-03
SDG: CTO302-5
Extracted by: NB
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG5058
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene		22	25	0.20	4.7	1.2
91-57-6	2-Methylnaphthalene		40	25	0.20	4.7	1.9
90-12-0	1-Methylnaphthalene		46	25	0.20	4.7	1.9
208-96-8	Acenaphthylene	U	4.7	25	0.20	4.7	1.2
83-32-9	Acenaphthene	J	3.0	25	0.20	4.7	1.9
86-73-7	Fluorene		7.3	25	0.20	4.7	1.4
85-01-8	Phenanthrene	J	2.8	25	0.20	4.7	1.9
120-12-7	Anthracene	U	4.7	25	0.20	4.7	1.9
206-44-0	Fluoranthene	U	4.7	25	0.20	4.7	2.6
129-00-0	Pyrene	U	4.7	25	0.20	4.7	2.1
56-55-3	Benzo(a)anthracene	U	4.7	25	0.20	4.7	2.8
218-01-9	Chrysene	U	4.7	25	0.20	4.7	1.6
205-99-2	Benzo(b)fluoranthene	U	4.7	25	0.20	4.7	2.1
207-08-9	Benzo(k)fluoranthene	U	4.7	25	0.20	4.7	1.9
50-32-8	Benzo(a)pyrene	U	4.7	25	0.20	4.7	2.1
193-39-5	Indeno(1,2,3-cd)pyrene	U	4.7	25	0.20	4.7	2.4
53-70-3	Dibenzo(a,h)anthracene	U	4.7	25	0.20	4.7	3.5
191-24-2	Benzo(g,h,i)perylene	U	4.7	25	0.20	4.7	1.9
7297-45-2	2-Methylnaphthalene-d10		D				
81103-79-9	Fluorene-d10		D				
1718-52-1	Pyrene-d10		D				

KATAHDIN ANALYTICAL SERVICES
Report of Analytical Results

Client: Tetra Tech NUS, Inc
Project: CTO 302 NAS PENSACOLA
PO No:
Sample Date: 12/09/03
Received Date: 12/10/03
Extraction Date: 12/11/03
Analysis Date: 01/06/04
Report Date: 01/13/2004
Matrix: WATER
% Solids: NA

Lab ID: WT3109-3DL2
Client ID: PEN-681/682-TW4-03
SDG: CTO302-5
Extracted by: NB
Extraction Method: SW846 3510
Analyst: JCG
Analysis Method: SW846 M8270C
Lab Prep Batch: WG5058
Units: ug/L

CAS#	Compound	Flags	Results	DF	PQL	Adj.PQL	Adj.MDL
91-20-3	Naphthalene		58	40	0.20	7.5	1.9
91-57-6	2-Methylnaphthalene		79	40	0.20	7.5	3.0
90-12-0	1-Methylnaphthalene		89	40	0.20	7.5	3.0
208-96-8	Acenaphthylene	U	7.5	40	0.20	7.5	1.9
83-32-9	Acenaphthene	J	5.6	40	0.20	7.5	3.0
86-73-7	Fluorene		8.1	40	0.20	7.5	2.3
85-01-8	Phenanthrene	J	6.1	40	0.20	7.5	3.0
120-12-7	Anthracene	U	7.5	40	0.20	7.5	3.0
206-44-0	Fluoranthene	U	7.5	40	0.20	7.5	4.2
129-00-0	Pyrene	U	7.5	40	0.20	7.5	3.4
56-55-3	Benzo(a)anthracene	U	7.5	40	0.20	7.5	4.5
218-01-9	Chrysene	U	7.5	40	0.20	7.5	2.6
205-99-2	Benzo(b)fluoranthene	U	7.5	40	0.20	7.5	3.4
207-08-9	Benzo(k)fluoranthene	U	7.5	40	0.20	7.5	3.0
50-32-8	Benzo(a)pyrene	U	7.5	40	0.20	7.5	3.4
193-39-5	Indeno(1,2,3-cd)pyrene	U	7.5	40	0.20	7.5	3.8
53-70-3	Dibenzo(a,h)anthracene	U	7.5	40	0.20	7.5	5.7
191-24-2	Benzo(g,h,i)perylene	U	7.5	40	0.20	7.5	3.0
7297-45-2	2-Methylnaphthalene-d10		D				
81103-79-9	Fluorene-d10		D				
1718-52-1	Pyrene-d10		D				

Katahdin
ANALYTICAL SERVICES

Cert No E87

Report of Analytical Results

Client: Amy Thomson
Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh,PA 15220

Lab Sample ID: WT3109-1
Report Date: 06-JAN-04
Client PO: MSA-0402-N4113-05 N5967-
Project: CTO 302 NAS PENSACOLA
SDG: CTO302-5

Sample Description	Matrix	Date Sampled	Date Received
PEN-681/682-MW1S-03	AQ	09-DEC-03	10-DEC-03

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	By	Prep. Method	Prep. Date	By	Footnotes
Sulfate-Turbidimetric	16. mg/L	1	EPA 375.4	WG5290	31-DEC-03	KGT	N/A	N/A	N/A	
Total Organic Carbon	3.0 mg/L	1	EPA 415.1	WG5199	18-DEC-03	CYD	N/A	N/A	N/A	

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ANALYTICAL SERVICES

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Report of Analytical Results

Client: Amy Thomson
Tetra Tech NUS, Inc.
661 Andersen Drive
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Lab Sample ID: WT3109-2
Report Date: 06-JAN-04
Client PO: MSA-0402-N4113-05 N5967-
Project: CTO 302 NAS PENSACOLA
SDG: CTO302-5

Sample Description	Matrix	Date Sampled	Date Received
PEN-681/682-MW2S-03	AQ	09-DEC-03	10-DEC-03

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	By	Prep. Method	Prep. Date	By	Footnotes
Sulfate-Turbidimetric	9.5 mg/L	1	EPA 375.4	WG5290	31-DEC-03	KGT	N/A	N/A	N/A	
Total Organic Carbon	12. mg/L	1	EPA 415.1	WG5200	18-DEC-03	CYD	N/A	N/A	N/A	

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ANALYTICAL SERVICES

Cert No E876

Report of Analytical Results

Client: Amy Thomson
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Lab Sample ID: WT3109-3
Report Date: 06-JAN-04
Client PO: MSA-0402-N4113-05 N5967-
Project: CTO 302 NAS PENSACOLA
SDG: CTO302-5

Sample Description	Matrix	Date Sampled	Date Received
PEN-681/682-TW4-03	AQ	09-DEC-03	10-DEC-03

Parameter	Result	Adj PQL	Anal. Method	QC.Batch	Anal. Date	By	Prep. Method	Prep. Date	By	Footnotes
Sulfate-Turbidimetric	U1.0 mg/L	1	EPA 375.4	WG5290	31-DEC-03	KGT	N/A	N/A	N/A	
Total Organic Carbon	16. mg/L	1	EPA 415.1	WG5200	18-DEC-03	CYD	N/A	N/A	N/A	

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