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NAS CECIL FIELD, FL
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THIRD QUARTER TREATABILITY STUDY LETTER REPORT FOR BP WELLS NAS CECIL FIELD FL

11/21/2003

TETRA TECH NUS INC

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Document Tracking Number 04JAX0020

November 21, 2003

Project Number N4248

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 III Contract Number N62467-94-D-0888
Contract Task Order Number 0248

Subject: Third Quarter Treatability Study Letter Report – BP Wells
Naval Air Station Cecil Field
Jacksonville, Florida

Dear Mr. Grabka:

Tetra Tech NUS, Inc. (TtNUS) is pleased to submit this Third Quarter Treatability Study Letter Report for the subject site. This report was prepared for the United States Navy (Navy) Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH) under Contract Task Order 0248 for the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888. This report provides a site history, purpose and goals of the study, and the results of the third quarter groundwater sampling event conducted at the site.

Site History

From 1999 to 2000, contamination assessment activities were performed at the BP Wells site (see Figure 1) to determine the extent of petroleum-impacted soil and groundwater at the site. A due diligence investigation was conducted by Golder Associates, Inc. in 1999 for the new property tenants (Jacksonville Airport Authority and Air Kaman). The reported results indicated the presence of petroleum-impacted groundwater at the site. Subsequently, the Navy directed TtNUS to conduct a site assessment. A Site Assessment Report (TtNUS, 2000) was submitted to the Florida Department of Environmental Protection (FDEP) recommending that a natural attenuation monitoring plan be implemented at the site. The FDEP approved the plan and issued a Natural Attenuation Monitoring Plan Approval Order (NAMPAO) on August 31, 2000. In accordance with the NAMPAO, TtNUS performed the first two semi-annual groundwater sampling events in April and October of 2001. Since the contaminant concentrations at the source well were greater than the applicable natural attenuation default source concentrations and because the contaminant concentrations were increasing, the second monitoring report recommended the semi-annual monitoring program be suspended and that a Remedial Action Plan (RAP) be prepared for the site. On February 20, 2002, the FDEP agreed that a RAP was warranted. Subsequently, TtNUS recommended a treatability study be performed to evaluate the effectiveness of in-situ enhanced bioremediation at the site. The in-situ submerged oxygen curtain (iSOC®) technology would be evaluated to perform this test. In June 2002, TtNUS submitted an Enhanced Natural Attenuation Treatability Study (ENATS) Work Plan for the BP Wells site.

Purpose and Goals

The purpose of the ENATS was to determine the effectiveness of the iSOC® technology in reducing hydrocarbon concentrations in groundwater at the BP Wells site. iSOC® is a specially designed microporous mass transfer device developed and manufactured by inVentures Technologies, Inc. (iTi) for use in groundwater remediation. iSOC® is based on iTi's proprietary Gas inFusion™ technology. The iSOC® technology dissolves oxygen into the groundwater without bubbles through an iSOC® diffuser. The iSOC® diffuser looks similar to a stainless steel bladder pump from the outside and is 1.62 inches in diameter and 15 inches in length. The sizing allows the iSOC® diffuser to be placed inside a 2-inch groundwater monitoring well. The iSOC® diffuser is placed into a monitoring well, and the diffuser is connected to a tank of welding grade oxygen. The proprietary diffusion technology of iSOC® increases dissolved oxygen (DO) concentrations in the groundwater from ambient conditions, which are usually less than 2 milligrams per liter (mg/L), to levels above the solubility limit for oxygen, which is approximately 7 mg/L. In some cases, supersaturated conditions can be achieved with DO concentrations in the 50 to 70 mg/L range. The increase in DO creates aerobic conditions that can stimulate in-situ aerobic respiration or bioremediation of the petroleum hydrocarbon plume.

As part of the treatability study, it was proposed that three iSOC® diffusers be installed in new monitoring wells (also called injection wells). A baseline sampling event and four quarters of groundwater sampling is planned. Groundwater samples will be collected from three selected monitoring wells. These wells include a source well (that was sampled as part of the NAMPAO), an upgradient well, and a downgradient well. Quarterly groundwater monitoring letter reports will be prepared, and a Treatability Study Evaluation Report will be submitted after the completion of the fourth quarter of groundwater sampling.

Third Quarter Groundwater Sampling Activities

On July 17, 2003, TtNUS personnel mobilized to the site to conduct the third quarter groundwater sampling event. Prior to collecting groundwater samples, the depth-to-water was measured and recorded in select monitoring wells. Depth-to-water measurements were taken from the top of the well casings. Groundwater elevations were calculated from the depth-to-water measurements and the top-of-casing elevations. Depth-to-water measurements and groundwater elevations are summarized in Table 1. Groundwater elevations and estimated groundwater flow direction are depicted on Figure 2.

Groundwater samples were collected from three monitoring wells (CEF-BP-1S, CEF-BP-2S, and CEF-BP-6S) for the third quarter sampling event. The field data sheets for the third quarter sampling event are provided in Attachment A. After collection, groundwater samples were placed on ice and shipped overnight via Federal Express to Accutest Laboratories in Orlando, Florida. The groundwater samples were analyzed for the volatile organic compounds ethylbenzene; total xylenes; 1,2,4-trimethylbenzene; and 1,3,5-trimethylbenzene to maintain consistency with the previous sampling events conducted under the NAMPAO. The laboratory analytical report is provided in Attachment B.

TtNUS also collected select natural attenuation parameters from monitoring wells CEF-BP-1S, CEF-BP-2S, and CEF-BP-6S. Samples were analyzed using field test kits for alkalinity, carbon dioxide, ferrous iron, hydrogen sulfide, sulfide, and DO. The field data sheets for these parameters are provided in Attachment C. Samples were collected for laboratory analysis for methane, total organic carbon, nitrite, nitrate, phosphate, and sulfate. The laboratory natural attenuation samples were shipped on ice overnight to Accutest Laboratories in Orlando, Florida. This laboratory data is included in the same laboratory report in Attachment B.

Discussion of Groundwater Flow Data

The groundwater flow elevation data from this third quarter sampling event indicates the groundwater is flowing to the southeast (see Figure 2). This flow direction is consistent with the previous data from the First Quarter Treatability Study Letter Report (TtNUS, 2003).

Discussion of Groundwater Analytical Results

The laboratory analytical results from the baseline sampling event indicate that ethylbenzene; total xylenes; and 1,2,4-trimethylbenzene were detected in source monitoring well CEF-BP-1S at concentrations that exceeded respective groundwater cleanup target levels (GCTLs). The concentration of 1,3,5-trimethylbenzene reported for monitoring well CEF-BP-1S was below standard laboratory detection limits (SLDLs). The concentrations of all compounds of concern (COCs) reported for perimeter monitoring wells CEF-BP-2S and CEF-BP-6S were below SLDLs. The laboratory analytical results are summarized in Table 2.

The laboratory analytical results from the third quarter sampling event indicate that ethylbenzene; total xylenes; 1,2,4-trimethylbenezne; and 1,3,5-trimethylbenzene were detected in source monitoring well CEF-BP-1S at concentrations that exceeded their respective GCTLs. The concentrations of all COCs reported for upgradient monitoring well CEF-BP-2S were below SLDLs. Ethylbenzene was detected at the SLDL, and total xylenes were estimated at a concentration below the SLDL in downgradient well CEF-BP-6S. No trimethylbenzenes were detected in CEF-BP-6S. The laboratory analytical results are summarized in Table 2 and depicted on Figure 3.

A comparison of the third quarter results to the baseline analytical results, first quarter analytical results, and the second quarter analytical results indicates a significant decrease in COC concentrations in the source well since the second quarter. DO concentrations in the source well (CEF-BP-1S) and downgradient well (CEF-BP-6S) are essentially unchanged, but the DO concentration in the upgradient well (CEF-BP-2S) increased.

The natural attenuation parameters collected during the third quarter sampling event were compared to general guidelines to determine if aerobic (oxidizing) or anaerobic (reducing) conditions exist at the site. The data for the groundwater from well CEF-BP-1S is not definitive and suggests that it is still in a reducing state. The increase in the methane and ferrous iron concentrations and the low DO concentration suggest anaerobic reducing conditions. However, the increase in oxidation reduction potential (ORP) and decrease in nitrate, sulfide, and hydrogen sulfide concentrations suggest oxidizing conditions. The groundwater in the vicinity of upgradient well CEF-BP-2S remains in an oxidizing state. Based upon the data, it appears that CEF-BP-6S is still under marginal aerobic conditions.

The trends of many parameters from upgradient through the source to downgradient for a given quarter are more indicative of anaerobic activity:

- The DO concentration has been relatively high upgradient, less than 1 mg/L at the source, and then slightly higher downgradient.
- ORP has been highly positive upgradient, highly negative at the source, and positive downgradient.
- Ferrous iron has been at trace concentrations upgradient, relatively high at the source, and relatively low downgradient.
- Nitrate concentrations have been low upgradient and then lower at the source.
- Alkalinity and carbon dioxide concentrations have been relatively low upgradient and then much higher at the source.

A summary of the natural attenuation parameters is provided in Table 3. Table 4 shows the concentrations of DO in the three injection wells and the select monitoring wells under study.

Conclusions

Although the results of the natural attenuation parameters are inconclusive, the significant decrease in COC concentrations in the source well indicates that the iSOC® system is impacting the groundwater. However, additional data is needed to draw definitive conclusions regarding the effectiveness of the treatability study.

Based on the data presented in this report, TtNUS recommends that the treatability study at the BP Wells site be continued as specified in the Treatability Study Work Plan. If you have any questions regarding the information presented in this document, please contact me by phone at (813) 806-0202 or via e-mail at calliganp@ttnus.com.

Sincerely,

Paul E. Calligan, P.G.
Task Order Manager

Mervin W. Dale, P.G.
Florida Professional Geologist
P.G. Number 000917

MERVIN W. DALE
LICENSE
NO. 917
STATE OF FLORIDA
PROFESSIONAL GEOLOGIST

PEC/md

Attachments (10)

pc: Mr. G. Magwood, NAVFAC EFD SOUTH (CD only)
Mr. M. Perry, TtNUS (unbound and CD)
Ms. D. Wroblewski, TtNUS (cover letter only)
Project File

TABLES

Table 1
Groundwater Elevation and Monitoring Well Construction Data

Third Quarter Treatability Study Letter Report
BP Wells
Naval Air Station Cecil Field
Jacksonville, Florida

Well Number	Total Depth of Well (ft, btoc)	Top of Casing Elevation (ft, NAVD)	9/23/2002		1/6/2003		4/17/2003		7/17/2003	
			Depth to Water (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation (ft, msl)	Depth to Water (ft, btoc)	Groundwater Elevation (ft, msl)
CEF-BP-1S	14.72	71.28	5.10	66.18	6.00	65.28	5.75	65.53	4.63	66.65
CEF-BP-2S	14.48	71.78	5.42	66.36	6.41	65.37	6.14	65.64	5.02	66.76
CEF-BP-3S	14.57	72.38	6.32	66.06	NA	NA	6.98	65.40	5.90	66.48
CEF-BP-4S	14.75	72.28	6.30	65.98	NA	NA	6.96	65.32	5.86	66.42
CEF-BP-5I	34.39	71.63	5.45	66.18	NA	NA	6.11	65.52	5.01	66.62
CEF-BP-6S	14.20	71.87	5.79	66.08	6.72	65.15	6.44	65.43	5.35	66.52
CEF-308LN-1S	NA	NA	NF	NA	NF	NA	NF	NA	NF	NA

Notes:
NAVD = North American Vertical Datum, 1988
msl = mean sea level
btoc = below top of casing
NA = not available
NF = not found

Table 2
Groundwater Analytical Results

Third Quarter Treatability Study Letter Report
BP Wells
Naval Air Station Cecil Field
Jacksonville, Florida

Sample Location		**CEF-BP-1S**			
Monitoring Well Type		Source Well			
Sample Identification Number CEF-BP-		01S-03	GW-1S-04	GW-01S-05	GW-01S-06
Collection Date		10/3/2002	1/6/2003	4/17/2003	7/17/2003
COCs	**GCTL1 (µg/L)**	**Baseline Sampling**	**1st Quarter Event**	**2nd Quarter Event**	**3rd Quarter Event**
Ethylbenzene	30	**117**	**161**	**198**	**48**
1,2,4-Trimethylbenzene	10	**262**	**224**	**313**	**118**
1,3,5-Trimethylbenzene	10	5U	**71.5**	**143**	**38.4**
Total Xylenes	20	**658**	**811**	**662**	**236**

Sample Location		**CEF-BP-2S**			
Monitoring Well Type		Upgradient Well			
Sample Identification Number CEF-BP-		02S-3A	GW-2S-04	GW-02S-05	GW-02S-06
Collection Date		10/3/2002	1/6/2003	4/17/2003	7/17/2003
COCs	**GCTL1 (µg/L)**	**Baseline Sampling**	**1st Quarter Event**	**2nd Quarter Event**	**3rd Quarter Event**
Ethylbenzene	30	1U	1U	1U	1U
1,2,4-Trimethylbenzene	10	1U	1U	1U	1U
1,3,5-Trimethylbenzene	10	1U	1U	1U	1U
Total Xylenes	20	3U	3U	3U	3U

Sample Location		**CEF-BP-6S**			
Monitoring Well Type		Downgradient Well			
Sample Identification Number CEF-BP-		06S-03	GW-6S-04	GW-06S-05	GW-06S-06
Collection Date		9/24/2002	1/6/2003	4/17/2003	7/17/2003
COCs	**GCTL1 (µg/L)**	**Baseline Sampling**	**1st Quarter Event**	**2nd Quarter Event**	**3rd Quarter Event**
Ethylbenzene	30	1U	1U	1.2	1.0
1,2,4-Trimethylbenzene	10	1U	1U	1U	1U
1,3,5-Trimethylbenzene	10	1U	1U	1U	1U
Total Xylenes	20	3U	3U	3U	1.4 J

Notes:
[1]GCTLs taken from Chapter 62-770, Florida Administrative Code.
Bold values shown on table are above respective GCTLs.
U = value shown adjacent to this letter is the reporting limit concentration
J = estimated
µg/L = micrograms per liter

Table 3
Natural Attenuation Analytical Results

Third Quarter Treatability Study Letter Report
BP Wells
Naval Air Station Cecil Field
Jacksonville, Florida

Sample Location		CEF-BP-1S			CEF-BP-2S			CEF-BP-6S		
Monitoring Well Type		Source Well			Upgradient Well			Downgradient Well		
Sample Identification Number CEF-BP-		01S-03	01S-05	01S-06	02S-3A	02S-05	02S-06	06S-03	06S-05	06S-06
Collection Date		1/30/2003	4/17/2003	7/17/2003	1/30/2003	4/17/2003	7/17/2003	1/30/2003	4/17/2003	7/17/2003
COCs and Data										
Fixed-Base Laboratory COCs	**Units**	**Fixed-Base Laboratory Results**								
Methane	µg/L	14.0	6.62	24.5	1.40	5.76	0.50U	136	149	84.7
Nitrogen, Nitrate	mg/L	0.41	0.11	0.10U	0.88	0.34	0.10U	0.13	0.71	0.25
Nitrogen, Nitrite	mg/L	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
Phosphate, Ortho	mg/L	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
Sulfate	mg/L	20U	20U	20U	20U	20U	20U	20U	20U	20U
Total Organic Carbon	mg/L	12.0	11.6	13.0	4.0	4.7	4.8	9.0	6.1	6.5
Field Natural Attenuation COCs	**Units**	**Field Natural Attenuation Results**								
pH	S.U.	6.29	6.51	6.41	6.27	6.56	7.21	6.16	6.05	6.22
Conductivity	mS/cm	0.321	0.269	0.298	0.194	0.167	0.150	0.264	0.245	0.252
Turbidity	NTU	0	0.5	0.96	18	18.1	11.9	14	4.59	0
DO (by meter in flow cell)	mg/L	0.062	0.26	0.25	1.97	2.51	4.74	0.86	0.64	0.96
Temperature	°C	19.1	20.90	25.25	21.08	22.10	26.99	22.31	22.70	26.79
ORP	mV	-110	-114.9	-97.3	130.3	140.0	57.7	26.1	78.0	30.3
DO (by kit)	mg/L	0.6	0.8	0.6	2.0	3.0	6	0.4	1.0	1
Sulfide	mg/L	0	0.2	0	0	0	0	0	0	0
Carbon Dioxide	mg/L	300	70	45	30	16	11	50	25	70
Alkalinity	mg/L	250	130	100	70	70	54	80	70	55
Ferrous Iron	mg/L	0.16	1.41	2	0.08	0.02	0	0.18	0.08	0
Hydrogen Sulfide	mg/L	0.3	2.0	0.5	0	0	0	0.0	0.1	0

Notes:
S.U. = standard units
NTU = nephelometric turbidity units
mV = millivolt
mS/cm = millisiemens per centimeter
°C = degrees celsius

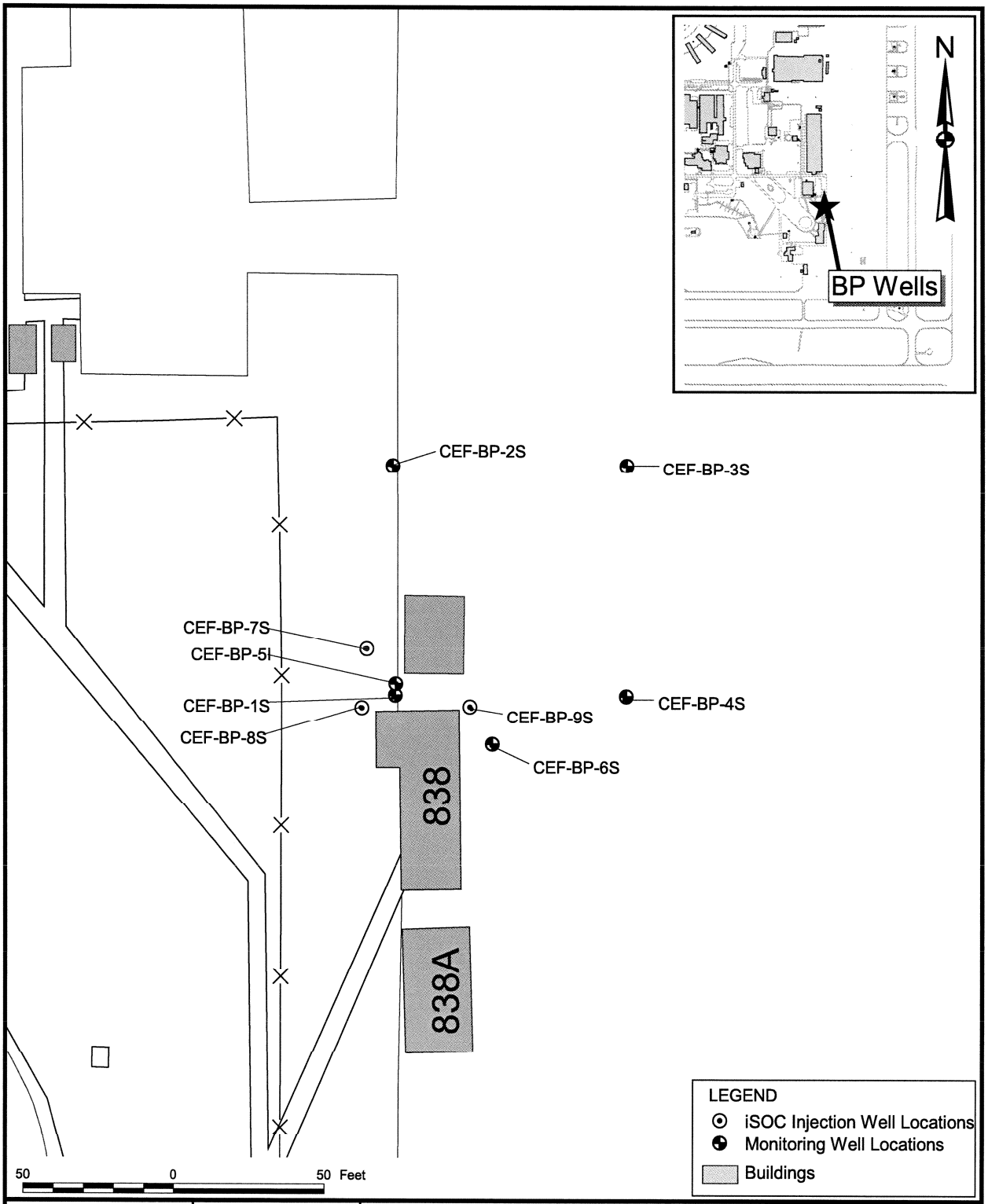
Table 4
DO Concentrations in Injection Wells and Select Monitoring Wells

Third Quarter Treatability Study Letter Report
BP Wells
Naval Air Station Cecil Field
Jacksonville, Florida

Sample Location	Well Type	Collection Dates							
		9/24/2002	10/3/2002	1/6/2003	1/29/2003	1/30/2003	3/14/2003	4/17/2003	7/17/2003
CEF-BP-1S (1)	Monitoring Well	0.90	0.05	0.62	NC	0.062	NC	0.26	0.25
CEF-BP-2S (1)	Monitoring Well	7.80	0.77	3.19	NC	1.97	NC	2.51	4.74
CEF-BP-6S (1)	Monitoring Well	0.93	NC	0.96	NC	0.86	NC	0.64	0.96
CEF-BP-7S (2)	Injection Well	NC	NC	NC	31.5	NC	39.03	13.42	39.50
CEF-BP-8S (2)	Injection Well	NC	NC	NC	18.75	NC	40.33	13.66	40.64
CEF-BP-9S (2)	Injection Well	NC	NC	NC	41.51	NC	39.00	14.98	40.24

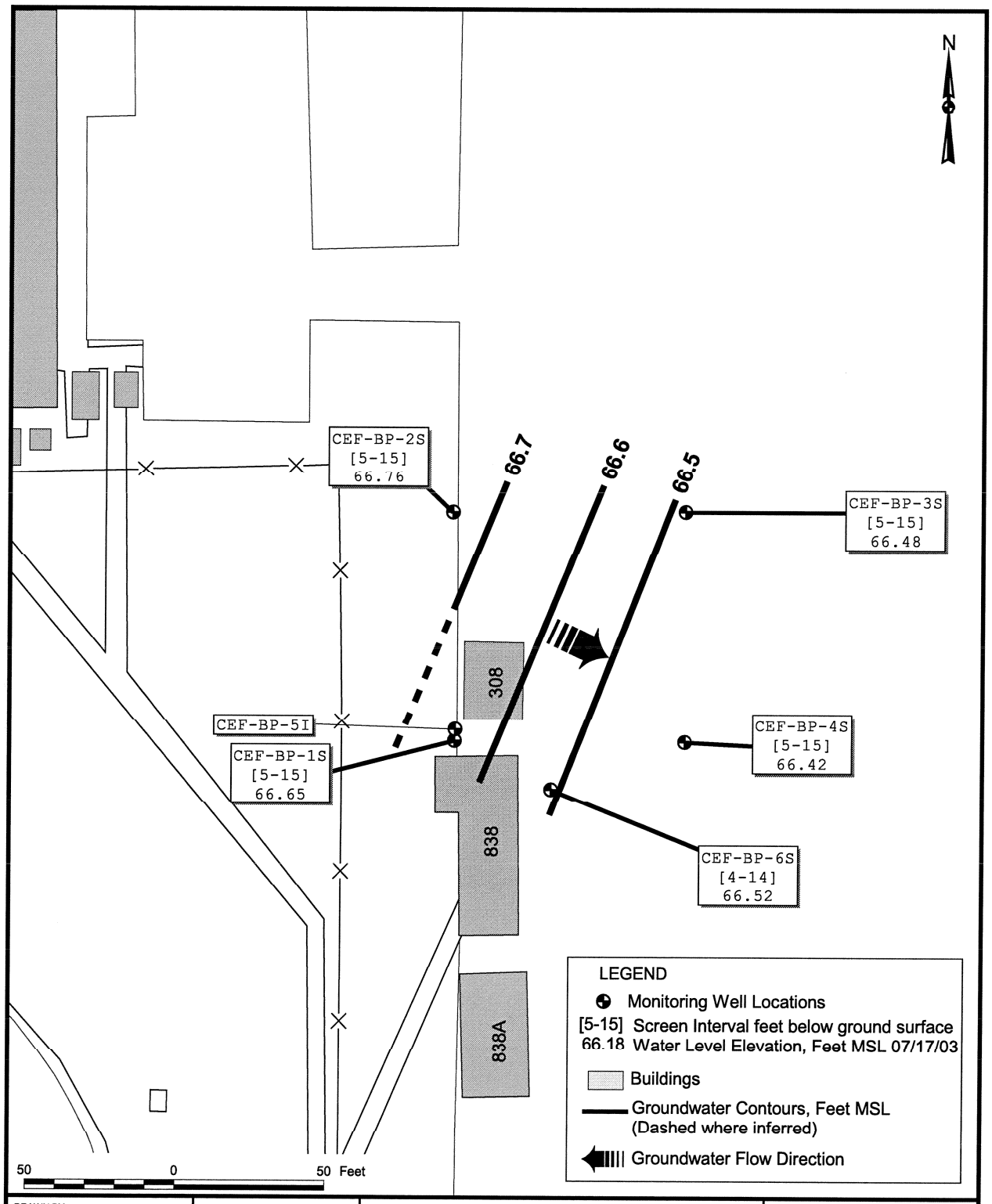
Notes:
DO units are in mg/L.
(1) Measurements collected by meter in a flow cell; thus, may be subject to outside influences and fluctuation.
(2) Measurements collected by meter in the well.
iSOC® began discharging oxygen on October 9, 2002.
NC = not collected

FIGURES



DRAWN BY MJJ	DATE 24Mar03	SITE LOCATION MAP BP WELLS SITE TREATABILITY STUDY NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 4248
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV 0

P:\GIS\NAS CecilField\BP-Wells 06.apr 23Oct03 MJJ Layout01



DRAWN BY MJJ — DATE 24Mar03	GROUNDWATER FLOW MAP (07/17/03)	CONTRACT NUMBER 4248	
CHECKED BY — DATE	BP WELLS SITE	APPROVED BY — DATE	
COST/SCHEDULE-AREA	TREATABILITY STUDY	APPROVED BY — DATE	
SCALE AS NOTED	NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	DRAWING NO. FIGURE 2	REV 0

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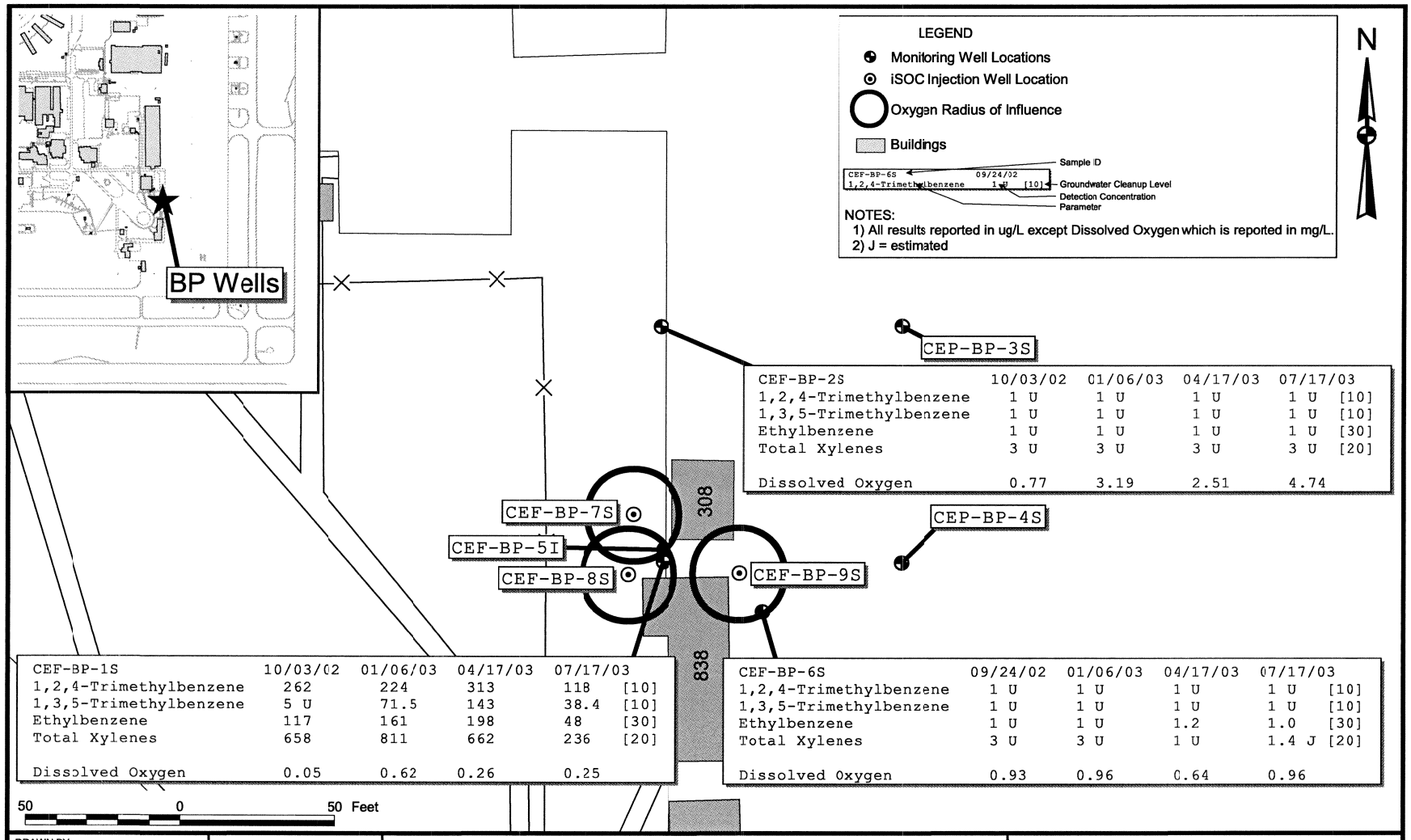

CEF-BP-2S	10/03/02	01/06/03	04/17/03	07/17/03	
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	[10]
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	[10]
Ethylbenzene	1 U	1 U	1 U	1 U	[30]
Total Xylenes	3 U	3 U	3 U	3 U	[20]
Dissolved Oxygen	0.77	3.19	2.51	4.74	

CEF-BP-1S	10/03/02	01/06/03	04/17/03	07/17/03	
1,2,4-Trimethylbenzene	262	224	313	118	[10]
1,3,5-Trimethylbenzene	5 U	71.5	143	38.4	[10]
Ethylbenzene	117	161	198	48	[30]
Total Xylenes	658	811	662	236	[20]
Dissolved Oxygen	0.05	0.62	0.26	0.25	

CEF-BP-6S	09/24/02	01/06/03	04/17/03	07/17/03	
1,2,4-Trimethylbenzene	1 U	1 U	1 U	1 U	[10]
1,3,5-Trimethylbenzene	1 U	1 U	1 U	1 U	[10]
Ethylbenzene	1 U	1 U	1.2	1.0	[30]
Total Xylenes	3 U	3 U	1 U	1.4 J	[20]
Dissolved Oxygen	0.93	0.96	0.64	0.96	

DRAWN BY MJJ	DATE 24Mar03	COC AND DO MAP (09/24/02 - 07/17/03)	CONTRACT NUMBER 4248
CHECKED BY	DATE	BP WELLS SITE	APPROVED BY — DATE —
COST/SCHEDULE-AREA		TREATABILITY STUDY	APPROVED BY — DATE —
SCALE AS NOTED		NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	DRAWING NO. FIGURE 3 REV 0

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ATTACHMENT A

THIRD QUARTER FIELD DATA FOR JULY 2003:
FIELD CALIBRATION LOG
GROUNDWATER SAMPLE LOG SHEETS
LOW FLOW PURGE DATA SHEETS

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NAS CECIL FIELD

SITE NAME: BP Wells

PROJECT No.: N4248MW0050245

INSTRUMENT NAME/MODEL: see below

MANUFACTURER: see below

SERIAL NUMBER: see below

Date of Calibration	Instrument Name and Model	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		
				pH Cond	pH Cond	ORP			
7/17/03	YSI	04788	S. McGuire	4.24/4.68	4.00/4.49	241/219		3133	
7/17/03	Lamotte	4079-1103	S. McGuire	0.1/9.9	0.0/10.0			BLMTS 15	
7/17/03	Photovac	ED JF 343	S. McGuire	96.9	100.0			02-2230	

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site:	BP Wells Treatability Study, NASCF	Sample ID No.:	CEF-BP-23 01S -06
Project No.:	N4248MW0050245	Sample Location:	CEF-BP-23 01S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: S. McGuire

SAMPLING DATA

Date: 7/17/03 Time: 1645	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Method: Peristaltic	Clear	6.41	0.298	25.25	0.96	0.25	-97.3	

PURGE DATA

Date: 7/17/03	
Method:	Peristaltic
Monitor Reading (ppm):	960
Well Casing Diameter:	2-inch
Well Casing Material:	PVC
Total Well Depth (ft):	14.0
Static Water Level (ft):	4.63
One Casing Volume(~~gal/L~~):	448ml
Start Purge (hrs):	1615
End Purge (hrs):	1640
Total Purge Time (min):	25
Total Vol. Purged (~~gal~~/L):	5

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Laboratory	Collected
TOC	HCL	1 - 250 ml amber glass	Accutest	✓
NO3, NO2, PO4, SO4	none	1 - 1 liter HDPE	Accutest	✓
Dissolved Methane	HCL	3 - 40 ml vials	Accutest	✓
Select VOCs	HCL	3 - 40 ml vials	Accutest	✓

OBSERVATIONS / NOTES

Flow Thru Cell = 350 ml
Tubing = 7 ml/ft × 14 ft = 98 ml
Dedicated tubing in situ.

LAB INFO

LAB: Accutest
4405 Vineland Rd., C-15
Orlando, FL 32811

COC #: 2329

Check if Collected:

[X] MS / MSD [ ] DUPLICATE / ID No.: None

Signature(s): Scott R. McG

SRM use same I.D. as sample.

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD
PROJECT NUMBER: N4248MW0050245

WELL ID.: CEF-BP-015
DATE: 7/17/03

Time (Hrs.)	Water Level (Ft. below TOC)	Cum.Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1615	4.63									
1620	4.91	1	200	6.42	0.248	11.1	0.46	25.75	-123.6	
1625	4.91	2	200	6.40	0.262	5.52	0.67	25.51	-137.8	
1630	4.91	3	200	6.39	0.296	3.35	0.22	25.31	-122.1	
1635	4.91	4	200	6.44	0.296	1.64	0.21	25.19	-114.9	
1640	4.91	5	200	6.41	0.298	0.96	0.25	25.25	-97.3	
1645	Sample collected									

SIGNATURE(S): Scott R. McCy

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: BP Wells Treatability Study, NASCF
Project No.: N4248MW0050245

Sample ID No.: CEF-BP- 02S -06
Sample Location: CEF-BP- 02S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: S. McGuire

SAMPLING DATA

Date: 7/17/03	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Time: 1535								
Method: Peristaltic	clear	7.21	0.150	26.99	11.9	4.74	57.7	

PURGE DATA

Date: 7/17/03	
Method:	Peristaltic
Monitor Reading (ppm):	0
Well Casing Diameter:	2-inch
Well Casing Material:	PVC
Total Well Depth (ft):	14.0
Static Water Level (ft):	5.02
One Casing Volume(~~gal/L~~):	448 ml
Start Purge (hrs):	1445
End Purge (hrs):	1530
Total Purge Time (min):	50
Total Vol. Purged (~~gal~~/L):	12.0

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Laboratory	Collected
TOC	HCL	1 - 250 ml amber glass	Accutest	✓
NO3, NO2, PO4, SO4	none	1 - 1 liter HDPE	Accutest	✓
Dissolved Methane	HCL	3 - 40 ml vials	Accutest	✓
Select VOCs	HCL	3 - 40 ml vials	Accutest	✓

OBSERVATIONS / NOTES

Flow Thru Cell = 350 ml
Tubing = 7 ml/ft x 14 ft = 98 ml
Dedicated tubing in situ.

LAB INFO

LAB: Accutest
4405 Vineland Rd., C-15
Orlando, FL 32811
COC #: 2329

Check if Collected:

[ ] MS / MSD [ ] DUPLICATE / ID No.: None

Signature(s): Scott R. McGuire

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD
PROJECT NUMBER: N4248MW0050245

WELL ID.: CEF-BP-25
DATE: 7/17/03

Time (Hrs.)	Water Level (Ft. below TOC)	Cum.Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
1445	5.02									
1450	5.04	1	200	7.20	0.158	77.0	6.34	27.63	46.7	
1455	5.04	2	200	7.17	0.157	45.2	6.02	27.82	46.8	
1500	5.04	3	200	7.22	0.156	40.9	5.46	27.79	46.8	
1505	5.04	4	200	7.22	0.156	36.4	5.19	27.46	47.3	
1510	5.04	5	200	7.21	0.155	33.4	5.70	27.46	48.3	
1515	5.04	6	200	7.20	0.154	29.8	5.56	27.77	51.3	
1520	5.04	8	200	7.21	0.151	21.4	5.13	27.02	54.5	
1525	5.04	10	200	7.20	0.149	16.2	4.99	26.96	58.6	
1530	5.04	12	200	7.21	0.150	11.9	4.74	26.99	57.7	
1535	Sample collected									

SIGNATURE(S): L. McG

Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: BP Wells Treatability Study, NASCF
Project No.: N4248MW0050245

Sample ID No.: CEF-BP- 06S -06
Sample Location: CEF-BP- 06S

[X] Monitoring Well
[ ] Domestic Well
[ ] Other:

Sampler: S. McGuire

SAMPLING DATA

Date: 7/17/03 Time: 1010	Color	pH S.U.	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/L	ORP mV	
Method: Peristaltic	Clear	6.22	0.252	26.79	0	0.96	30.3	

PURGE DATA

Date:	7/17/03
Method:	Peristaltic
Monitor Reading (ppm):	0
Well Casing Diameter:	2-inch
Well Casing Material:	PVC
Total Well Depth (ft):	14.0
Static Water Level (ft):	5.35
One Casing Volume(gal/L):	448 ml
Start Purge (hrs):	0930
End Purge (hrs):	1005
Total Purge Time (min):	35
Total Vol. Purged (~~gal~~/L):	14

See Attached Low Flow Purge Data Sheet for Purge Data

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Laboratory	Collected
TOC	HCL	1 - 250 ml amber glass	Accutest	✓
NO3, NO2, PO4, SO4	none	1 - 1 liter HDPE	Accutest	✓
Dissolved Methane	HCL	3 - 40 ml vials	Accutest	✓
Select VOCs	HCL	3 - 40 ml vials	Accutest	✓

OBSERVATIONS / NOTES

Flow Thru Cell = 350 ml
Tubing = 7ml/ft x 14ft = 98 ml
Dedicated tubing in situ.

LAB INFO

LAB: Accutest
4405 Vineland Rd., C-15
Orlando, FL 32811
COC #: 2329

Check if Collected:

☐ MS / MSD ☒ DUPLICATE / ID No.: CEF-BP-GW-DUP1-06

Signature(s): Scott R. McGuire

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME: NAS CECIL FIELD
PROJECT NUMBER: N4248MW0050245

WELL ID.: CEF-BP-065
DATE: 7/17/03

Time (Hrs.)	Water Level (Ft. below TOC)	Cum.Vol. (liters)	Flow (mL/Min.)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments
0930	5.35		400		~~0.300~~ 0.285					
0935	5.60	2	400	6.89	0.288	21.4	1.24	25.46	92.9	
0940	5.60	4	400	6.68	0.279	12.5	0.99	26.71	71.5	
0945	5.60	6	~~6~~ 5.400	6.26	0.264	5.18	0.81	26.90	55.7	
0950	5.60	8	400	6.23	0.263	3.12	1.67	26.81	58.4	
0955	5.60	10	400	6.21	0.261	1.12	1.02	26.69	45.5	
1000	5.60	12	400	6.19	0.261	0	0.99	26.65	43.3	
1005	5.60	14	400	6.22	0.252	0	0.96	26.79	30.3	
1010	Sample collected									

SIGNATURE(S): L. McG

ATTACHMENT B

THIRD QUARTER LABORATORY REPORT FOR JULY 2003 EVENT

Southeast
ACCUTEST
Laboratories

08/05/03

Technical Report for

Tetra Tech, NUS

NAS Cecil Field-CTO-248

WR#N4248-WR362

Accutest Job Number: F18642

Report to:

Total number of pages in report: 42

ACCREDITED IN ACCORDANCE WITH nelac

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.

Harry Behzadi, Ph.D.
Laboratory Director

Certifications: FL (DOH E83510), NC (573), NJ (FL002), MA (FL946), IA (366), LA (03051), KS (E-10327), SC, AK

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

Sample Summary

Tetra Tech, NUS

Job No: F18642

NAS Cecil Field-CTO-248
Project No: WR#N4248-WR362

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
F18642-1	07/17/03	10:10	SMG	07/18/03	AQ	Ground Water	CEF-BP-GW-06S-06
F18642-2	07/17/03	15:35	SMG	07/18/03	AQ	Ground Water	CEF-BP-GW-02S-06
F18642-3	07/17/03	16:45	SMG	07/18/03	AQ	Ground Water	CEF-BP-GW-01-06
F18642-4	07/17/03	00:00	SMG	07/18/03	AQ	Ground Water	CEF-BP-GW-DUP1-06

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-BP-GW-06S-06		
Lab Sample ID:	F18642-1	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0023066.D	1	07/31/03	JG	n/a	n/a	VG819
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	1.0	1.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	1.4	3.0	1.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	106%		86-115%
17060-07-0	1,2-Dichloroethane-D4	109%		78-125%
2037-26-5	Toluene-D8	95%		87-113%
460-00-4	4-Bromofluorobenzene	102%		84-117%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-BP-GW-06S-06		
Lab Sample ID:	F18642-1	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8015B MOD	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XY011088.D	1	07/23/03	CV	n/a	n/a	GXY287
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	84.7	0.50	0.30	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Report of Analysis

Client Sample ID:	CEF-BP-GW-06S-06		
Lab Sample ID:	F18642-1	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
		Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate	0.25	0.10	mg/l	1	07/19/03 12:20	LL	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	07/19/03 12:20	LL	EPA 300/SW846 9056
Phosphate, Ortho	< 0.10	0.10	mg/l	1	07/19/03	SJL	EPA 365.3
Sulfate	< 20	20	mg/l	1	07/19/03 12:20	LL	EPA 300/SW846 9056
Total Organic Carbon	6.5	1.0	mg/l	1	07/21/03	SL	EPA 415.1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-BP-GW-02S-06		
Lab Sample ID:	F18642-2	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0023067.D	1	07/31/03	JG	n/a	n/a	VG819
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	1.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%		86-115%
17060-07-0	1,2-Dichloroethane-D4	107%		78-125%
2037-26-5	Toluene-D8	96%		87-113%
460-00-4	4-Bromofluorobenzene	100%		84-117%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Report of Analysis

Client Sample ID:	CEF-BP-GW-02S-06		
Lab Sample ID:	F18642-2	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8015B MOD	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XY011089.D	1	07/23/03	CV	n/a	n/a	GXY287
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.30	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Report of Analysis

Client Sample ID:	CEF-BP-GW-02S-06		
Lab Sample ID:	F18642-2	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
		Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	07/19/03 13:04	LL	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	07/19/03 13:04	LL	EPA 300/SW846 9056
Phosphate, Ortho	< 0.10	0.10	mg/l	1	07/19/03	SJL	EPA 365.3
Sulfate	< 20	20	mg/l	1	07/19/03 13:04	LL	EPA 300/SW846 9056
Total Organic Carbon	4.8	1.0	mg/l	1	07/21/03	SL	EPA 415.1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CEF-BP-GW-01-06		
Lab Sample ID:	F18642-3	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0023068.D	1	07/31/03	JG	n/a	n/a	VG819
Run #2	G0023085.D	5	07/31/03	JG	n/a	n/a	VG819

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	48.0	1.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	118 [a]	5.0	2.5	ug/l	
108-67-8	1,3,5-Trimethylbenzene	38.4	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	236	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%	113%	86-115%
17060-07-0	1,2-Dichloroethane-D4	107%	106%	78-125%
2037-26-5	Toluene-D8	99%	96%	87-113%
460-00-4	4-Bromofluorobenzene	103%	101%	84-117%

(a) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-BP-GW-01-06		
Lab Sample ID:	F18642-3	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8015B MOD	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XY011090.D	1	07/23/03	CV	n/a	n/a	GXY287
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	24.5	0.50	0.30	ug/l	

ND – Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-BP-GW-01-06		
Lab Sample ID:	F18642-3	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
		Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	07/19/03 13:19	LL	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	07/19/03 13:19	LL	EPA 300/SW846 9056
Phosphate, Ortho	< 0.10	0.10	mg/l	1	07/19/03	SJL	EPA 365.3
Sulfate	< 20	20	mg/l	1	07/19/03 13:19	LL	EPA 300/SW846 9056
Total Organic Carbon	13.0	1.0	mg/l	1	07/21/03	SL	EPA 415.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-BP-GW-DUP1-06		
Lab Sample ID:	F18642-4	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8260B	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	G0023069.D	1	07/31/03	JG	n/a	n/a	VG819
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

VOA Special List

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	0.51	1.0	0.50	ug/l	J
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	1.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	3.0	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	101%		86-115%
17060-07-0	1,2-Dichloroethane-D4	104%		78-125%
2037-26-5	Toluene-D8	94%		87-113%
460-00-4	4-Bromofluorobenzene	100%		84-117%

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Report of Analysis

Client Sample ID:	CEF-BP-GW-DUP1-06		
Lab Sample ID:	F18642-4	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
Method:	SW846 8015B MOD	Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	XY011093.D	1	07/23/03	CV	n/a	n/a	GXY287
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	87.2	0.50	0.30	ug/l	

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

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

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-BP-GW-DUP1-06		
Lab Sample ID:	F18642-4	Date Sampled:	07/17/03
Matrix:	AQ - Ground Water	Date Received:	07/18/03
		Percent Solids:	n/a
Project:	NAS Cecil Field-CTO-248		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate	0.33	0.10	mg/l	1	07/19/03 13:34	LL	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	07/19/03 13:34	LL	EPA 300/SW846 9056
Phosphate, Ortho	< 0.10	0.10	mg/l	1	07/19/03	SJL	EPA 365.3
Sulfate	< 20	20	mg/l	1	07/19/03 13:34	LL	EPA 300/SW846 9056
Total Organic Carbon	6.6	1.0	mg/l	1	07/21/03	SL	EPA 415.1

RL = Reporting Limit

GC/MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Internal Standard Area Summaries
- Surrogate Recovery Summaries
- Initial and Continuing Calibration Summaries

Blank Spike Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VG819-BS	G0023064.D	1	07/31/03	JG	n/a	n/a	VG819

The QC reported here applies to the following samples: Method: SW846 8260B

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
100-41-4	Ethylbenzene	25	24.5	98	76-117
95-63-6	1,2,4-Trimethylbenzene	25	25.8	103	76-124
108-67-8	1,3,5-Trimethylbenzene	25	26.2	105	75-121
1330-20-7	Xylene (total)	75	78.7	105	78-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	103%	86-115%
17060-07-0	1,2-Dichloroethane-D4	107%	78-125%
2037-26-5	Toluene-D8	98%	87-113%
460-00-4	4-Bromofluorobenzene	100%	84-117%

Method Blank Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VG819-MB	G0023065.D	1	07/31/03	JG	n/a	n/a	VG819

The QC reported here applies to the following samples: Method: SW846 8260B

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	Result	RL	MDL	Units	Q
100-41-4	Ethylbenzene	ND	2.0	0.50	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	0.50	ug/l	
1330-20-7	Xylene (total)	ND	6.0	1.0	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	107%	86-115%
17060-07-0	1,2-Dichloroethane-D4	111%	78-125%
2037-26-5	Toluene-D8	97%	87-113%
460-00-4	4-Bromofluorobenzene	100%	84-117%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F18657-1MS	G0023077.D	1	07/31/03	JG	n/a	n/a	VG819
F18657-1MSD	G0023078.D	1	07/31/03	JG	n/a	n/a	VG819
F18657-1	G0023072.D	1	07/31/03	JG	n/a	n/a	VG819

The QC reported here applies to the following samples: Method: SW846 8260B

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	F18657-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
100-41-4	Ethylbenzene	ND		25	23.9	96	23.6	94	1	72-119/7
95 63 6	1,2,4 Trimethylbenzene	ND		25	25.9	104	24.5	98	6	71-124/8
108-67-8	1,3,5-Trimethylbenzene	ND		25	25.4	102	25.5	102	0	71-119/7
1330-20-7	Xylene (total)	ND		75	76.0	101	76.5	102	1	73-123/8

CAS No.	Surrogate Recoveries	MS	MSD	F18657-1	Limits
1868-53-7	Dibromofluoromethane	106%	108%	104%	86-115%
17060-07-0	1,2-Dichloroethane-D4	109%	108%	111%	78-125%
2037-26-5	Toluene-D8	98%	99%	95%	87-113%
460-00-4	4-Bromofluorobenzene	100%	101%	104%	84-117%

Instrument Performance Check (BFB)

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample:	VG819-BFB	Injection Date:	07/31/03
Lab File ID:	G0023061.D	Injection Time:	08:57
Instrument ID:	GCMSG		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	4283	19.7		Pass
75	30.0 - 60.0% of mass 95	10380	47.7		Pass
95	Base peak, 100% relative abundance	21745	100.0		Pass
96	5.0 - 9.0% of mass 95	1763	8.1		Pass
173	Less than 2.0% of mass 174	30	0.14	(0.14) [a]	Pass
174	50.0 - 100.0% of mass 95	21437	98.6		Pass
175	5.0 - 9.0% of mass 174	1615	7.4	(7.5) [a]	Pass
176	95.0 - 101.0% of mass 174	20453	94.1	(95.4) [a]	Pass
177	5.0 - 9.0% of mass 176	1551	7.1	(7.6) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
VG819-CC806	G0023063.D	07/31/03	10:11	01:14	Continuing cal 70PPB
VG819-BS	G0023064.D	07/31/03	10:38	01:41	Blank Spike
VG819-MB	G0023065.D	07/31/03	11:05	02:08	Method Blank
F18642-1	G0023066.D	07/31/03	11:32	02:35	CEF-BP-GW-06S-06
F18642-2	G0023067.D	07/31/03	11:59	03:02	CEF-BP-GW-02S-06
F18642-3	G0023068.D	07/31/03	12:26	03:29	CEF-BP-GW-01-06
F18642-4	G0023069.D	07/31/03	12:53	03:56	CEF-BP-GW-DUP1-06
ZZZZZZ	G0023070.D	07/31/03	13:20	04:23	(unrelated sample)
ZZZZZZ	G0023071.D	07/31/03	13:47	04:50	(unrelated sample)
F18657-1	G0023072.D	07/31/03	14:14	05:17	(used for QC only; not part of job F18642)
ZZZZZZ	G0023074.D	07/31/03	14:41	05:44	(unrelated sample)
ZZZZZZ	G0023075.D	07/31/03	15:08	06:11	(unrelated sample)
ZZZZZZ	G0023076.D	07/31/03	15:35	06:38	(unrelated sample)
F18657-1MS	G0023077.D	07/31/03	16:02	07:05	Matrix Spike
F18657-1MSD	G0023078.D	07/31/03	16:29	07:32	Matrix Spike Duplicate
ZZZZZZ	G0023079.D	07/31/03	16:56	07:59	(unrelated sample)
ZZZZZZ	G0023080.D	07/31/03	17:23	08:26	(unrelated sample)
ZZZZZZ	G0023081.D	07/31/03	17:50	08:53	(unrelated sample)
ZZZZZZ	G0023082.D	07/31/03	18:16	09:19	(unrelated sample)
ZZZZZZ	G0023083.D	07/31/03	18:45	09:48	(unrelated sample)
ZZZZZZ	G0023084.D	07/31/03	19:14	10:17	(unrelated sample)
F18642-3	G0023085.D	07/31/03	19:42	10:45	CEF-BP-GW-01-06
ZZZZZZ	G0023086.D	07/31/03	20:09	11:12	(unrelated sample)
ZZZZZZ	G0023087.D	07/31/03	20:36	11:39	(unrelated sample)

Instrument Performance Check (BFB)

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample:	VG806-BFB	Injection Date:	07/17/03
Lab File ID:	G0022755.D	Injection Time:	11:01
Instrument ID:	GCMSG		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	3147	19.4		Pass
75	30.0 - 60.0% of mass 95	7060	43.5		Pass
95	Base peak, 100% relative abundance	16233	100.0		Pass
96	5.0 - 9.0% of mass 95	1303	8.0		Pass
173	Less than 2.0% of mass 174	97	0.6	(0.6) [a]	Pass
174	50.0 - 100.0% of mass 95	16227	100.0		Pass
175	5.0 - 9.0% of mass 174	1329	8.2	(8.2) [a]	Pass
176	95.0 - 101.0% of mass 174	15897	97.9	(98.0) [a]	Pass
177	5.0 - 9.0% of mass 176	1002	6.2	(6.3) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
VG806-IC806	G0022756.D	07/17/03	11:27	00:26	Initial cal 1PPB
VG806-IC806	G0022757.D	07/17/03	11:54	00:53	Initial cal 5PPB
VG806-IC806	G0022758.D	07/17/03	12:21	01:20	Initial cal 20PPB
VG806-ICC806	G0022759.D	07/17/03	12:48	01:47	Initial cal 40PPB
VG806-IC806	G0022760.D	07/17/03	13:15	02:14	Initial cal 70PPB
VG806-IC806	G0022761.D	07/17/03	13:42	02:41	Initial cal 100PPB
VG806-MB	G0022764.D	07/17/03	15:13	04:12	Method Blank
ZZZZZZ	G0022765.D	07/17/03	15:40	04:39	(unrelated sample)
VG806-BS	G0022766.D	07/17/03	16:07	05:06	Blank Spike
ZZZZZZ	G0022767.D	07/17/03	16:35	05:34	(unrelated sample)
ZZZZZZ	G0022768.D	07/17/03	17:04	06:03	(unrelated sample)
F18547-2	G0022769.D	07/17/03	17:31	06:30	(used for QC only; not part of job F18642)
F18547-2MS	G0022770.D	07/17/03	17:58	06:57	Matrix Spike
F18547 2MSD	G0022771.D	07/17/03	18:24	07:23	Matrix Spike Duplicate
ZZZZZZ	G0022772.D	07/17/03	18:51	07:50	(unrelated sample)
ZZZZZZ	G0022773.D	07/17/03	19:18	08:17	(unrelated sample)
ZZZZZZ	G0022774.D	07/17/03	19:45	08:44	(unrelated sample)
ZZZZZZ	G0022775.D	07/17/03	20:12	09:11	(unrelated sample)
ZZZZZZ	G0022776.D	07/17/03	20:39	09:38	(unrelated sample)
ZZZZZZ	G0022777.D	07/17/03	21:06	10:05	(unrelated sample)
ZZZZZZ	G0022781.D	07/17/03	22:53	11:52	(unrelated sample)
VG807-BS	G0022782.D	07/17/03	23:20	12:19	Blank Spike
VG807-MB	G0022783.D	07/17/03	23:47	12:46	Method Blank
T4777-4	G0022784.D	07/18/03	00:14	13:13	(used for QC only; not part of job F18642)

Instrument Performance Check (BFB)

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample:	VG806-BFB	Injection Date:	07/17/03
Lab File ID:	G0022755.D	Injection Time:	11:01
Instrument ID:	GCMSG		

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
T4777-4MS	G0022785.D	07/18/03	00:41	13:40	Matrix Spike
T4777-4MSD	G0022786.D	07/18/03	01:08	14:07	Matrix Spike Duplicate

Volatile Internal Standard Area Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Check Std:	VG819-CC806	Injection Date:	07/31/03
Lab File ID:	G0023063.D	Injection Time:	10:11
Instrument ID:	GCMSG	Method:	SW846 8260B

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT
Check Std	1825095	11.08	1342199	14.65	741913	17.18	194275	7.97
Upper Limit [a]	3650190	11.58	2684398	15.15	1483826	17.68	388550	8.47
Lower Limit [b]	912548	10.58	671100	14.15	370957	16.68	97138	7.47

Lab Sample ID	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT
VG819-BS	1803943	11.08	1288127	14.65	713192	17.18	199041	7.96
VG819-MB	1777800	11.08	1300846	14.65	698535	17.18	180534	7.97
F18642-1	1721532	11.08	1322910	14.65	731246	17.18	157966	7.97
F18642-2	1776712	11.08	1304252	14.65	707108	17.18	190213	7.97
F18642-3	1807557	11.08	1327664	14.65	727573	17.18	171505	7.97
F18642-4	1820423	11.08	1340929	14.65	712249	17.18	176854	7.97
ZZZZZZ	1772759	11.08	1323403	14.65	746366	17.18	167434	7.97
ZZZZZZ	1738942	11.08	1242820	14.65	701312	17.18	157951	7.96
F18657-1	1731843	11.08	1307864	14.65	689913	17.19	160946	7.97
ZZZZZZ	1699370	11.08	1290869	14.66	698966	17.19	151274	7.97
ZZZZZZ	1683956	11.08	1292451	14.65	711509	17.19	161828	7.96
ZZZZZZ	1650847	11.08	1303709	14.65	688273	17.19	160472	7.96
F18657-1MS	1604219	11.08	1194600	14.65	676600	17.18	170970	7.97
F18657-1MSD	1646680	11.08	1234126	14.65	689384	17.19	151462	7.97
ZZZZZZ	1662706	11.08	1261301	14.65	685574	17.18	159800	7.98
ZZZZZZ	1630848	11.08	1235900	14.65	682751	17.19	165021	7.97
ZZZZZZ	1658706	11.08	1232794	14.65	670619	17.18	168699	7.97
ZZZZZZ	1660882	11.08	1258151	14.65	702298	17.19	165551	7.97
ZZZZZZ	1668242	11.08	1264499	14.65	676278	17.19	160938	7.98
ZZZZZZ	1663406	11.08	1271581	14.65	705842	17.18	171171	7.97
F18642-3	1697632	11.07	1310397	14.65	725630	17.19	160906	7.98
ZZZZZZ	1726777	11.08	1308957	14.65	713994	17.18	169436	7.97
ZZZZZZ	1729980	11.08	1301924	14.65	709490	17.18	173715	7.97

IS 1 = Fluorobenzene
IS 2 = Chlorobenzene-D5
IS 3 = 1,4-Dichlorobenzene-d4
IS 4 = Tert Butyl Alcohol-D10

(a) Upper Limit = + 100% of check standard area; Retention time + 0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

Volatile Surrogate Recovery Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Method: SW846 8260B Matrix: AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
F18642-1	G0023066.D	106.0	109.0	95.0	102.0
F18642-2	G0023067.D	104.0	107.0	96.0	100.0
F18642-3	G0023085.D	113.0	106.0	96.0	101.0
F18642-3	G0023068.D	101.0	107.0	99.0	103.0
F18642-4	G0023069.D	101.0	104.0	94.0	100.0
F18657-1MS	G0023077.D	106.0	109.0	98.0	100.0
F18657-1MSD	G0023078.D	108.0	108.0	99.0	101.0
VG819-BS	G0023064.D	103.0	107.0	98.0	100.0
VG819-MB	G0023065.D	107.0	111.0	97.0	100.0

Surrogate Compounds	Recovery Limits
S1 = Dibromofluoromethane	86-115%
S2 = 1,2-Dichloroethane-D4	78-125%
S3 = Toluene-D8	87-113%
S4 = 4-Bromofluorobenzene	84-117%

Initial Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG806-ICC806
Lab FileID: G0022759.D

Response Factor Report MSVOA1

Method : C:\HPCHEM\1\METHODS\7173AP9.M (RTE Integrator)
Title : SW-846 Method 5030B/8260B & EPA 624
Last Update : Thu Jul 17 16:04:07 2003
Response via : Initial Calibration

Calibration Files
1 =G0022756.D 2 =G0022757.D 3 =G0022758.D
4 =G0022759.D 5 =G0022760.D 6 =G0022761.D

		Compound	1	2	3	4	5	6	Avg	%RSD
1)	I	Fluorobenzene	----------ISTD----------							
2)		Dichlorodifluoromet		0.197	0.237	0.215	0.208	0.186	0.208	9.27
3)	P	Chloromethane	0.367	0.360	0.400	0.369	0.331	0.320	0.358	8.06
4)	C	Vinyl Chloride	0.332	0.315	0.352	0.328	0.307	0.289	0.321	6.80
5)		Bromomethane	0.243	0.257	0.241	0.205	0.177	0.150	0.212	20.04
		----- Quadratic regression ----- Coefficient = 0.9995								
		Response Ratio = 0.00227 + 0.24197 *A + -0.04691 *A^2								
6)		Chloroethane	0.205	0.207	0.230	0.207	0.193	0.183	0.204	7.86
7)		Trichlorofluorometh		0.250	0.279	0.281	0.272	0.261	0.268	4.77
8)		Ethyl Ether	0.226	0.220	0.241	0.232	0.217	0.219	0.226	4.16
9)		1,2-Dichloro-1,1,2-	0.325	0.337	0.361	0.344	0.329	0.311	0.335	5.10
10)	C	1,1-Dichloroethene	0.340	0.348	0.412	0.394	0.378	0.366	0.373	7.37
11)		Freon 113	0.229	0.247	0.283	0.267	0.247	0.227	0.250	8.73
12)		Carbon Disulfide	0.741	0.776	0.853	0.782	0.734	0.706	0.765	6.71
13)		Iodomethane	0.410	0.448	0.480	0.468	0.451	0.453	0.452	5.25
14)		Acrolein	0.016	0.021	0.020	0.019	0.020	0.020	0.019	8.00
15)		Allyl chloride	0.302	0.378	0.437	0.453	0.436	0.437	0.407	14.19
16)		Methylene Chloride		0.469	0.405	0.382	0.360	0.343	0.392	12.50
17)		Acetone		0.076	0.071	0.062	0.057	0.057	0.065	13.48
18)		Methyl acetate	0.160	0.164	0.158	0.152	0.144	0.145	0.154	5.36
19)		trans-1,2-Dichloroe	0.377	0.383	0.416	0.398	0.384	0.367	0.388	4.46
20)		Hexane	0.229	0.218	0.246	0.230	0.214	0.194	0.222	7.88
21)		Methyl Tert Butyl E	0.501	0.589	0.627	0.600	0.567	0.566	0.575	7.46
22)		Acetonitrile	0.029	0.029	0.027	0.028	0.026	0.026	0.027	5.67
23)		Di-isopropyl ether	0.634	0.719	0.815	0.836	0.814	0.824	0.774	10.35
24)		Chloroprene		0.304	0.397	0.396	0.413	0.409	0.384	11.79
25)	P	1,1-Dichloroethane	0.505	0.493	0.511	0.485	0.454	0.448	0.483	5.47
26)		Acrylonitrile	0.067	0.077	0.078	0.077	0.064	0.062	0.071	10.22
27)		ETBE	0.488	0.733	0.714	0.721	0.677	0.677	0.668	13.64
28)		Vinyl acetate	0.447	0.551	0.533	0.571	0.524	0.513	0.523	8.18
29)		cis-1,2-Dichloroeth	0.257	0.258	0.292	0.281	0.272	0.271	0.272	4.87
30)		2,2-Dichloropropane		0.349	0.355	0.335	0.315	0.308	0.332	6.19
31)		Bromochloromethane	0.196	0.167	0.165	0.162	0.149	0.151	0.165	10.18
32)		Cyclohexane		0.306	0.403	0.406	0.388	0.364	0.373	10.96
33)	C	Chloroform	0.449	0.509	0.507	0.471	0.450	0.429	0.469	7.02
34)		Tetrahydrofuran		0.058	0.058	0.059	0.057	0.054	0.057	3.80
35)	S	Dibromofluoromethan	0.323	0.326	0.323	0.317	0.306	0.305	0.317	2.88
36)		Carbon Tetrachlorid	0.380	0.369	0.386	0.360	0.340	0.320	0.359	7.03
37)		1,1,1-Trichloroetha	0.328	0.353	0.410	0.390	0.369	0.359	0.368	7.78
38)		2-Butanone	0.086	0.094	0.100	0.093	0.087	0.089	0.092	5.99
39)		1,1-Dichloropropene	0.245	0.266	0.344	0.325	0.322	0.312	0.302	12.66
40)		Propionitrile	0.030	0.031	0.030	0.029	0.027	0.028	0.029	5.08
41)		Methacrylonitrile	0.138	0.147	0.146	0.140	0.129	0.131	0.138	5.49
42)		Benzene	0.895	0.929	0.991	0.913	0.849	0.820	0.900	6.75
43)		TAME	0.486	0.645	0.651	0.619	0.603	0.597	0.600	10.02

Initial Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG806-ICC806
Lab FileID: G0022759.D

44)	S	1,2-Dichloroethane-	0.333	0.339	0.341	0.330	0.316	0.310	0.328	3.81
45)		1,2-Dichloroethane	0.354	0.374	0.363	0.348	0.336	0.327	0.350	4.94
46)		Trichloroethene	0.256	0.252	0.291	0.273	0.262	0.253	0.264	5.68
47)		Methylcyclohexane	0.287	0.283	0.375	0.367	0.364	0.335	0.335	12.30
48)		Dibromomethane	0.168	0.180	0.185	0.170	0.164	0.159	0.171	5.63
49)	C	1,2-Dichloropropane	0.217	0.239	0.271	0.258	0.253	0.251	0.248	7.36
50)		Bromodichloromethan	0.293	0.346	0.379	0.344	0.334	0.329	0.338	8.32
51)		Methyl methacrylate	0.153	0.169	0.184	0.194	0.191	0.200	0.182	9.83
52)		2-Chloroethyl vinyl	0.095	0.128	0.144	0.142	0.133	0.133	0.129	13.64
53)		cis-1,3-Dichloropro	0.308	0.380	0.424	0.413	0.403	0.398	0.388	10.77
54)	I	Chlorobenzene-d5	----------ISTD----------							
55)	S	Toluene-d8	1.242	1.216	1.237	1.287	1.292	1.338	1.269	3.56
56)	C	Toluene	1.078	1.171	1.285	1.282	1.265	1.245	1.221	6.67
57)		2-Nitropropane	0.078	0.081	0.083	0.083	0.083	0.086	0.082	3.25
58)		4-Methyl-2-pentanon	0.198	0.236	0.257	0.257	0.254	0.261	0.244	9.98
59)		trans-1,3-Dichlorop	0.512	0.471	0.499	0.490	0.491	0.498	0.493	2.74
60)		Tetrachloroethene	0.411	0.439	0.582	0.443	0.430	0.424	0.455	13.97
61)		Ethyl methacrylate		0.290	0.344	0.364	0.371	0.373	0.348	9.97
62)		1,1,2-Trichloroetha	0.241	0.255	0.248	0.255	0.248	0.248	0.249	2.16
63)		Dibromochloromethan	0.345	0.366	0.377	0.375	0.375	0.388	0.371	3.95
64)		1,3-Dichloropropane	0.464	0.469	0.502	0.495	0.488	0.490	0.485	3.10
65)		1,2-Dibromoethane	0.280	0.288	0.304	0.304	0.306	0.318	0.300	4.58
66)		2-hexanone		0.146	0.181	0.173	0.178	0.181	0.172	8.70
67)		1-Chlorohexane		0.298	0.410	0.414	0.422	0.417	0.392	13.51
68)	C	Ethylbenzene	1.450	1.344	1.369	1.327	1.307	1.282	1.346	4.36
69)	P	Chlorobenzene	0.902	0.862	0.909	0.876	0.847	0.825	0.870	3.72
70)		1,1,1,2-Tetrachloro	0.356	0.342	0.377	0.366	0.362	0.364	0.361	3.17
71)		m,p-Xylene	0.796	0.915	1.041	1.023	1.029	0.981	0.964	9.78
72)		o-Xylene		0.878	1.114	1.104	1.126	1.115	1.067	9.97
73)		Styrene		0.746	0.902	0.906	0.903	0.893	0.870	8.00
74)	P	Bromoform	0.238	0.260	0.279	0.282	0.279	0.291	0.271	7.03
75)		Isopropylbenzene		0.917	1.245	1.219	1.243	1.230	1.171	12.16
76)	I	1,4-Dichlorobenzene-d	----------ISTD----------							
77)	S	4-Bromofluorobenzen	0.870	0.913	0.892	0.921	0.923	0.911	0.905	2.24
78)		cis-1,4-Dichloro-2-	0.276	0.241	0.230	0.219	0.215	0.212	0.232	10.36
79)		n-Propylbenzene	2.312	2.476	2.770	2.698	2.606	2.480	2.557	6.56
80)		Bromobenzene	0.841	0.769	0.782	0.752	0.736	0.703	0.764	6.12
81)	P	1,1,2,2-Tetrachloro	0.813	0.707	0.662	0.613	0.571	0.550	0.653	14.93
82)		1,3,5-Trimethylbenz	1.292	1.622	1.861	1.829	1.779	1.699	1.680	12.45
83)		2-Chlorotoluene	1.640	1.902	2.028	1.970	1.896	1.812	1.875	7.26
84)		trans-1,4-Dichloro-	0.187	0.183	0.198	0.190	0.182	0.176	0.186	4.05
85)		1,2,3-Trichloroprop	0.179	0.212	0.189	0.177	0.171	0.162	0.182	9.54
86)		Cyclohexanone		0.011	0.015	0.016	0.014	0.014	0.014	11.87
87)		4-Chlorotoluene	1.230	1.688	1.796	1.762	1.733	1.624	1.639	12.76
88)		tert-Butylbenzene	0.780	1.010	1.147	1.153	1.104	1.059	1.042	13.37
89)		1,2,4-Trimethylbenz	1.293	1.733	1.831	1.855	1.792	1.689	1.699	12.23
90)		Pentachloroethane	0.447	0.499	0.274	0.477	0.463	0.461	0.437	18.67
91)		sec-Butylbenzene		1.924	2.319	2.256	2.195	2.119	2.163	7.04
92)		4-Isopropyltoluene	1.350	1.596	1.917	1.866	1.857	1.750	1.723	12.51
93)		1,3-Dichlorobenzene	1.251	1.264	1.342	1.288	1.241	1.195	1.264	3.89
94)		1,4-Dichlorobenzene	1.567	1.397	1.382	1.309	1.246	1.231	1.355	9.13
95)		n-Butylbenzene	0.800	0.908	1.166	1.133	1.112	1.071	1.032	14.06
96)		Benzyl Chloride	0.189	0.239	0.281	0.257	0.249	0.244	0.243	12.43
97)		1,2-Dichlorobenzene	1.220	1.251	1.321	1.225	1.213	1.172	1.234	4.04
98)		1,2-Dibromo-3-Chlor	0.167	0.161	0.116	0.112	0.115	0.107	0.130	20.71

----- Linear regression ----- Coefficient = 0.9979
Response Ratio = 0.00401 + 0.10713 *A

Initial Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG806-ICC806
Lab FileID: G0022759.D

99)		Hexachlorobutadiene	0.426	0.423	0.378	0.368	0.364	0.368	0.388	7.47
100)		1,2,4-Trichlorobenz	0.950	0.888	0.913	0.876	0.881	0.846	0.892	3.99
101)		Naphthalene	1.399	1.474	1.552	1.536	1.487	1.429	1.479	4.00
102)		1,2,3-Trichlorobenz	0.778	0.773	0.817	0.810	0.790	0.744	0.785	3.40
103)	I	Tert Butyl Alcohol-d1 ----------ISTD----------								
104)		Ethanol	0.206	0.246	0.173	0.161	0.147	0.155	0.181	20.87
		----- Linear regression ----- Coefficient = 0.9977								
		Response Ratio = 0.02411 + 0.14963 *A								
105)		Tert Butyl Alcohol	1.146	1.070	1.069	0.963	0.931	0.954	1.022	8.32
106)		Isobutyl alcohol	0.474	0.453	0.180	0.165	0.383	0.390	0.341	39.73
107)		1,4-Dioxane	0.115	0.123	0.133	0.129	0.127	0.128	0.126	5.16

(#) = Out of Range

7173AP9.M Fri Jul 18 10:29:45 2003 RP1

Continuing Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG819-CC806
Lab FileID: G0023063.D

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\073103\G0023063.D
Acq On : 31 Jul 2003 10:11 am
Sample : cc806-70ppb
Misc : ms2443,vg819,,,,,
MS Integration Params: RTEINT.P

Vial: 1
Operator: JuanG
Inst : MSVOA1
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\7173AP9.M (RTE Integrator)
Title : SW-846 Method 5030B/8260B & EPA 624
Last Update : Thu Jul 17 16:04:07 2003
Response via : Multiple Level Calibration

Min. RRF : 0.001 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	I	Fluorobenzene	1.000	1.000	0.0	129	0.00
2		Dichlorodifluoromethane	0.208	0.193	7.2	120	0.00
3	P	Chloromethane	0.358	0.322	10.1	126	0.00
4	C	Vinyl Chloride	0.321	0.313	2.5	131	0.00
5		Bromomethane	0.212	0.199	6.1	145	-0.01
6		Chloroethane	0.204	0.214	-4.9	142	0.00
7		Trichlorofluoromethane	0.268	0.321	-19.8	152	0.00
8		Ethyl Ether	0.226	0.261	-15.5	155	0.00
9		1,2-Dichloro-1,1,2-trifluor	0.335	0.359	-7.2	141	0.00
10	C	1,1-Dichloroethene	0.373	0.423	-13.4	144	0.00
11		Freon 113	0.250	0.275	-10.0	143	-0.01
12		Carbon Disulfide	0.765	0.821	-7.3	144	0.00
13		Iodomethane	0.452	0.499	-10.4	143	-0.01
14		Acrolein	0.019	0.024	-26.3#	154	0.00
15		Allyl chloride	0.407	0.450	-10.6	133	-0.01
16		Methylene Chloride	0.392	0.389	0.8	139	0.00
17		Acetone	0.065	0.067	-3.1	150	-0.01
18		Methyl acetate	0.154	0.162	-5.2	146	0.00
19		trans-1,2-Dichloroethene	0.388	0.415	-7.0	139	-0.01
20		Hexane	0.222	0.244	-9.9	147	-0.01
21		Methyl Tert Butyl Ether	0.575	0.669	-16.3	152	0.00
22		Acetonitrile	0.027	0.029	-7.4	146	-0.01
23		Di-isopropyl ether	0.774	0.861	-11.2	136	0.00
24		Chloroprene	0.384	0.442	-15.1	138	-0.01
25	P	1,1-Dichloroethane	0.483	0.495	-2.5	141	0.00
26		Acrylonitrile	0.071	0.081	-14.1	165	0.00
27		ETBE	0.668	0.776	-16.2	148	-0.01
28		Vinyl acetate	0.523	0.550	-5.2	135	-0.01
29		cis-1,2-Dichloroethene	0.272	0.290	-6.6	138	0.00
30		2,2-Dichloropropane	0.332	0.355	-6.9	145	0.00
31		Bromochloromethane	0.165	0.167	-1.2	144	-0.01
32		Cyclohexane	0.373	0.397	-6.4	132	-0.01
33	C	Chloroform	0.469	0.471	-0.4	135	0.00
34		Tetrahydrofuran	0.057	0.058	-1.8	130	0.00
35	S	Dibromofluoromethane	0.317	0.320	-0.9	135	-0.01
36		Carbon Tetrachloride	0.359	0.341	5.0	129	0.00
37		1,1,1-Trichloroethane	0.368	0.384	-4.3	134	-0.01
38		2-Butanone	0.092	0.094	-2.2	139	0.00
39		1,1-Dichloropropene	0.302	0.332	-9.9	133	-0.01
40		Propionitrile	0.029	0.030	-3.4	144	0.00
41		Methacrylonitrile	0.138	0.137	0.7	138	0.00
42		Benzene	0.900	0.862	4.2	131	0.00

Continuing Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG819-CC806
Lab FileID: G0023063.D

43		TAME	0.600	0.656	-9.3	140	0.00
44	S	1,2-Dichloroethane-d4	0.328	0.348	-6.1	142	0.00
45		1,2-Dichloroethane	0.350	0.364	-4.0	139	-0.01
46		Trichloroethene	0.264	0.271	-2.7	133	0.00
47		Methylcyclohexane	0.335	0.382	-14.0	135	0.00
48		Dibromomethane	0.171	0.178	-4.1	140	0.00
49	C	1,2-Dichloropropane	0.248	0.267	-7.7	136	0.00
50		Bromodichloromethane	0.338	0.376	-11.2	145	0.00
51		Methyl methacrylate	0.182	0.217	-19.2	146	0.00
52		2-Chloroethyl vinyl ether	0.129	0.145	-12.4	140	-0.01
53		cis-1,3-Dichloropropene	0.388	0.430	-10.8	137	0.00
54	I	Chlorobenzene-d5	1.000	1.000	0.0	133	0.00
55	S	Toluene-d8	1.269	1.282	-1.0	132	0.00
56	C	Toluene	1.221	1.226	-0.4	129	0.00
57		2-Nitropropane	0.082	0.091	-11.0	145	0.00
58		4-Methyl-2-pentanone	0.244	0.254	-4.1	133	0.00
59		trans-1,3-Dichloropropene	0.493	0.513	-4.1	139	0.00
60		Tetrachloroethene	0.455	0.402	11.6	124	0.00
61		Ethyl methacrylate	0.348	0.382	-9.8	137	0.00
62		1,1,2-Trichloroethane	0.249	0.242	2.8	130	0.00
63		Dibromochloromethane	0.371	0.382	-3.0	135	0.00
64		1,3-Dichloropropane	0.485	0.481	0.8	131	0.00
65		1,2-Dibromoethane	0.300	0.310	-3.3	135	0.00
66		2-hexanone	0.172	0.174	-1.2	130	0.00
67		1-Chlorohexane	0.392	0.409	-4.3	129	0.00
68	C	Ethylbenzene	1.346	1.239	7.9	126	0.00
69	P	Chlorobenzene	0.870	0.807	7.2	127	0.00
70		1,1,1,2-Tetrachloroethane	0.361	0.341	5.5	125	0.00
71		m,p-Xylene	0.964	0.951	1.3	123	0.00
72		o-Xylene	1.067	1.069	-0.2	126	0.00
73		Styrene	0.870	0.863	0.8	127	0.00
74	P	Bromoform	0.271	0.273	-0.7	130	-0.01
75		Isopropylbenzene	1.171	1.179	-0.7	126	0.00
76	I	1,4-Dichlorobenzene-d4	1.000	1.000	0.0	127	0.00
77	S	4-Bromofluorobenzene	0.905	0.934	-3.2	129	0.00
78		cis-1,4-Dichloro-2-butene	0.232	0.212	8.6	126	0.00
79		n-Propylbenzene	2.557	2.564	-0.3	125	0.00
80		Bromobenzene	0.764	0.724	5.2	125	0.00
81	P	1,1,2,2-Tetrachloroethane	0.653	0.607	7.0	136	0.00
82		1,3,5-Trimethylbenzene	1.680	1.780	-6.0	127	0.00
83		2-Chlorotoluene	1.875	1.859	0.9	125	0.00
84		trans-1,4-Dichloro-2-Butene	0.186	0.180	3.2	126	-0.01
85		1,2,3-Trichloropropane	0.182	0.182	0.0	136	0.00
86		Cyclohexanone	0.014	0.017	-21.4#	157	0.00
87		4-Chlorotoluene	1.639	1.691	-3.2	124	0.00
88		tert-Butylbenzene	1.042	1.091	-4.7	126	0.00
89		1,2,4-Trimethylbenzene	1.699	1.673	1.5	119	-0.01
90		Pentachloroethane	0.437	0.473	-8.2	130	0.00
91		sec-Butylbenzene	2.163	2.165	-0.1	126	-0.01
92		4-Isopropyltoluene	1.723	1.788	-3.8	123	0.00
93		1,3-Dichlorobenzene	1.264	1.224	3.2	126	0.00
94		1,4-Dichlorobenzene	1.355	1.220	10.0	125	0.00
95		n-Butylbenzene	1.032	1.103	-6.9	126	0.00
96		Benzyl Chloride	0.243	0.272	-11.9	139	0.00
97		1,2-Dichlorobenzene	1.234	1.166	5.5	122	0.00
98		1,2-Dibromo-3-Chloropropane	0.130	0.122	6.2	135	0.00
99		Hexachlorobutadiene	0.388	0.337	13.1	118	0.00
100		1,2,4-Trichlorobenzene	0.892	0.831	6.8	120	0.00

Continuing Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG819-CC806
Lab FileID: G0023063.D

101		Naphthalene	1.479	1.551	-4.9	133	0.00
102		1,2,3-Trichlorobenzene	0.785	0.742	5.5	120	-0.01
103	I	Tert Butyl Alcohol-d10	1.000	1.000	0.0	169	0.00
104		Ethanol	0.181	0.144	20.4#	165	-0.01
105		Tert Butyl Alcohol	1.022	0.930	9.0	169	0.00
106		Isobutyl alcohol	0.341	0.315	7.6	139	0.02
107		1,4-Dioxane	0.126	0.114	9.5	152	0.00

Average % D = 6.8

(#) = Out of Range SPCC's out = 0 CCC's out = 0
G0022760.D 7173AP9.M Fri Aug 01 12:30:44 2003 RP1

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Surrogate Recovery Summaries
- GC Surrogate Retention Time Summaries
- Initial and Continuing Calibration Summaries

Blank Spike Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY287-BS	XY011087.D	1	07/23/03	CV	n/a	n/a	GXY287

The QC reported here applies to the following samples: Method: SW846 8015B MOD

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	108	100	50-126

Duplicate Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F18642-3DUP	XY011091.D	1	07/23/03	CV	n/a	n/a	GXY287
F18642-3	XY011090.D	1	07/23/03	CV	n/a	n/a	GXY287

The QC reported here applies to the following samples: Method: SW846 8015B MOD

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	F18642-3 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	24.5		23.1		6	29

Method Blank Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY287-MB	XY011086.D	1	07/23/03	CV	n/a	n/a	GXY287

The QC reported here applies to the following samples: Method: SW846 8015B MOD

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.30	ug/l	

Matrix Spike Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F18642-2MS	XY011092.D	1	07/23/03	CV	n/a	n/a	GXY287
F18642-2	XY011089.D	1	07/23/03	CV	n/a	n/a	GXY287

The QC reported here applies to the following samples: Method: SW846 8015B MOD

F18642-1, F18642-2, F18642-3, F18642-4

CAS No.	Compound	F18642-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	ND		108	105	97	50-150 [a]

(a) Advisory control limits.

Initial Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: GXY287-ICC287
Lab FileID: XY011079.D

Response Factor Report VOA5

Method : C:\HPCHEM\2\METHODS\80150723.M (Chemstation Integrator)
Title : EPA 8015B Dissolved gases in water
Last Update : Wed Jul 23 09:40:01 2003
Response via : Initial Calibration

Calibration Files
1 =XY011077.D 2 =XY011078.D 3 =XY011079.D
4 =XY011080.D 5 =XY011081.D 6 =XY011082.D 7 =XY011083.D

Compound	1	2	3	4	5	6	7	Avg	%RSD
1)c Methane		1.349	1.154	1.289	1.301	1.275	1.169	1.256 E4	6.19
2)c Ethylene	2.085	2.258	2.217	2.460	2.472	2.429	2.192	2.302 E4	6.60
3)c Ethane	2.044	2.253	2.234	2.498	2.514	2.504	2.262	2.330 E4	7.72

(#) = Out of Range

80150723.M Wed Jul 23 13:38:11 2003 EF

Continuing Calibration Summary

Job Number: F18642
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: GXY287-ECC287
Lab FileID: XY011094.D

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\2\DATA\072303\XY011094.D
Acq On : 23 Jul 2003 1:10 pm
Sample : ecc287-1000
Misc : gc2674,gxy287,,,,,1
IntFile : EVENTS.E

Vial: 100
Operator: ClaireV
Inst : VOA5
Multiplr: 1.00

Method : C:\HPCHEM\2\METHODS\80150723.M (Chemstation Integrator)
Title : EPA 8015B Dissolved gases in water
Last Update : Wed Jul 23 09:40:01 2003
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	Amount	Calc.	%Dev	Area%	Dev(min)
1 c	Methane	1000.000	936.543	6.3	90	-0.06
2 c	Ethylene	1000.000	993.434	0.7	92	-0.02
3 c	Ethane	1000.000	1003.490	-0.3	93	-0.02

Average % D = 2.5

(#) = Out of Range SPCC's out = 0 CCC's out = 0
XY011081.D 80150723.M Wed Jul 23 13:38:27 2003 EF

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries
- Instrument Runlogs

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F18642
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Analyte	Batch ID	RL	MB Result	Units	BSP %Recov	QC Limits
Chloride	GP4296/GN12223	20	<20	mg/l	96.7	90-110%
Fluoride	GP4296/GN12223	0.20	<0.20	mg/l	110.0	90-110%
Nitrogen, Nitrate	GP4296/GN12223	0.10	<0.10	mg/l	96.0	90-110%
Nitrogen, Nitrite	GP4296/GN12223	0.10	<0.10	mg/l	99.0	90-110%
Phosphate, Ortho	GP4297/GN12228	0.10	<0.10	mg/l	106.0	87-112%
Sulfate	GP4296/GN12223	20	<20	mg/l	99.1	90-110%
Total Organic Carbon	GN12224	1.0	<1.0	mg/l	108.0	86-116%

Associated Samples:
Batch GN12224: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4296: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4297: F18642-1, F18642-2, F18642-3, F18642-4

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F18642
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Chloride	GP4296/GN12223	F18638-1	mg/l	206	206	0.0	0-20%
Fluoride	GP4296/GN12223	F18638-1	mg/l	<0.20	<0.20	9.5	0-20%
Nitrogen, Nitrate	GP4296/GN12223	F18638-1	mg/l	<0.10	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP4296/GN12223	F18638-1	mg/l	<0.10	<0.10	0.0	0-20%
Phosphate, Ortho	GP4297/GN12228	F18642-1	mg/l	<0.10	<0.10	11.7	0-22%
Sulfate	GP4296/GN12223	F18638-1	mg/l	20.9	20.9	0.0	0-20%
Total Organic Carbon	GN12224	F18641-1	mg/l	8.6	8.6	0.2	0-20%

Associated Samples:
Batch GN12224: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4296: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4297: F18642-1, F18642-2, F18642-3, F18642-4

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F18642
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Chloride	GP4296/GN12223	F18638-1	mg/l	206	100	291	85.0N(a)	90-110%
Fluoride	GP4296/GN12258	F18638-1	mg/l	<0.20	1	0.84	73.0N(a)	90-110%
Nitrogen, Nitrate	GP4296/GN12223	F18638-1	mg/l	<0.10	1	1.0	100.0	90-110%
Nitrogen, Nitrite	GP4296/GN12223	F18638-1	mg/l	<0.10	1	1.2	120.0N(a)	90-110%
Phosphate, Ortho	GP4297/GN12228	F18642-1	mg/l	<0.10	.300	0.37	109.0	74-126%
Sulfate	GP4296/GN12223	F18638-1	mg/l	20.9	100	110	89.1N(a)	90-110%
Total Organic Carbon	GN12224	F18641-1	mg/l	8.6	50.0	61.4	106.0	76-118%

Associated Samples:
Batch GN12224: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4296: F18642-1, F18642-2, F18642-3, F18642-4
Batch GP4297: F18642-1, F18642-2, F18642-3, F18642-4
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F18642
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Total Organic Carbon	GN12224	F18641-1	mg/l	8.6	50.0	61.6	0.3	

Associated Samples:
Batch GN12224: F18642-1, F18642-2, F18642-3, F18642-4

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: F18642
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

File ID: 03071901.IC Date Analyzed: 07/19/03 Methods: EPA 300/SW846 9056
Analyst: LL Run ID: GN12223
Parameters: Nitrogen, Nitrate,Nitrogen, Nitrite,Sulfate

Time	Sample Description	Dilution Factor	PS Recov	Comments
09:10	GN12223-ICV1	1		
09:24	GN12223-ICB1	1		
09:39	GN12223-CCV1	1		
09:53	GN12223-CCB1	1		
10:08	GP4296-MB1	1		
10:23	GP4296-B1	1		
10:37	GP4296-S1	1		
10:52	GP4296-D1	1		
11:07	F18638-1	1		(sample used for QC only; not part of login F18642)
11:22	ZZZZZZ	1		
11:36	ZZZZZZ	1		
11:51	ZZZZZZ	1		
12:06	ZZZZZZ	1		
12:20	F18642-1	1		
12:35	GN12223-CCV2	1		
12:50	GN12223-CCB2	1		
13:04	F18642-2	1		
13:19	F18642-3	1		
13:34	F18642-4	1		
---------->	Last reportable sample/prep for job F18642			
13:48	GP4296-S1	2		
14:03	ZZZZZZ	5		
14:18	ZZZZZZ	20		
14:33	GN12223-CCV3	1		
14:48	GN12223-CCB3	1		
---------->	Last reportable CCB for job F18642			

Refer to raw data for calibration curve and standards.

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 2329 F18642 PAGE 1 OF 1

PROJECT NO: N4248, CTO 248	FACILITY: BP Wells, NASCF	PROJECT MANAGER: PAUL CALLIGAN	PHONE NUMBER: 813 8060202
LABORATORY NAME AND CONTACT: ACCUTEST Sue Bell			
SAMPLERS (SIGNATURE): Scott R. McGuire	FIELD OPERATIONS LEADER: MEAN DAVE	PHONE NUMBER: 904 636 6125	ADDRESS: 4405 Vineland Rd, C-15
	CARRIER/WAYBILL NUMBER: FedEx 885 162 791		CITY, STATE: ORLANDO, FL 32811

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G P G
PRESERVATIVE USED: HCL HCL None HCL

TYPE OF ANALYSIS: SELECT VOCS * SW 8260 B; TOC EPA 415.1; SELECT ANIONS * EPA 300; DISSOLVED METHANE RSK SOP 147/175

	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	SELECT VOCS *	TOC	SELECT ANIONS *	DISSOLVED METHANE					COMMENTS
1	7/17	1010	CEF-BP-GW-06S-06				GW	G	8	3	1	1	3					Cool to 4°C
2	7/17	1535	CEF-BP-GW-02S-06				GW	G	8	3	1	1	3					
3	7/17	1645	CEF-BP-GW-01-06				GW	G	8	3	1	1	3					* See analyte
4	7/17	0000	CEF-BP-GW-DUP1-06				GW	G	8	3	1	1	3					list in work
																		release N4248-
																		WR362

Sam

1. RELINQUISHED BY: Scott R. McGuire	DATE: 7/17/03	TIME: 1800	1. RECEIVED BY: FedEx	DATE	TIME
2. RELINQUISHED BY: FED EX	DATE	TIME	2. RECEIVED BY: Muna Monammed	DATE: 7/18/03	TIME: 0930
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS: 2.6

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY) 4/02R

ATTACHMENT C

THIRD QUARTER FIELD NATURAL ATTENUATION DATA: GEOCHEMICAL FIELD ANALYTICAL LOG SHEETS

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050245**
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWD

Sample ID No.: **CEF-BP-GW-** 015 **-06**
Sample Location: **CEF-BP-GW-** 015
Duplicate: ☐
Blank: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Turbidity (NTU)	DO (Meter, mg/l)	Temp. (°C)	ORP (Eh) (+/- mv)	
Date: 7/17/03								
Time: 1645								
Method: Peristaltic	clear	6.41	0.298	0.96	0.25	25.25	-97.3	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment:
CHEMetrics Range ☑ 0 - 1.0 mg/L ☐ 1 - 12 mg/L
Analysis Time: 1715
CHEMetrics: 0.6 mg/L
Notes:

Sulfide (S^{2-}):

Equipment: Chemetrics (kit # K-9510)
Analysis Time: 1700
Concentration: 0 mg/L
Filtered: ☐
Notes:

Carbon Dioxide:

Equipment:
CHEMetrics (Range: 10-100 mg/L)
(1910, 1920, or 1925)
Analysis Time: 1655
CHEMetrics: 45 mg/L
Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050245**
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW-** 015 **-06**
Sample Location: **CEF-BP-GW-** 015
Duplicate: ☐
Blank: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Alkalinity:

Equipment: —

CHEMetrics (Range: 50-500 mg/L)

Kits: 9810, (9815), 9820

Analysis Time: 1720

Filtered: ☐

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	—	—	—

CHEMetrics: 100 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Ferrous Iron (Fe^{2+}):

Equipment: DR-700 (DR-890) IR-18C Color Wheel Other: _____ Analysis Time: 1705

Program/Module: 500nm 33

Concentration: 2 mg/L

Filtered: ☐

Notes:

Hydrogen Sulfide (H_2S):

Equipment: (HS-C) Other: _____ Analysis Time: 1710

Concentration: 0.5 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes:

QA/QC Checklist:

All data fields have been completed as necessary: ☑

Correct measurement units are cited in the SAMPLING DATA block: ☑

Multiplication is correct for each *Multiplier* table: ☑

Final calculated concentration is within the appropriate *Range Used* block: ☑

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☑

Title block is initialized by person who performed the QA/QC Checklist: ☑

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: NAS Cecil Field, BP Wells
Project No.: N4248.MW0050245
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: CEF-BP-GW-25 -06
Sample Location: CEF-BP-GW-25
Duplicate: ☐
Blank: ☐

SAMPLING DATA:

	Color (Visual)	pH (SU)	S.C. (mS/cm)	Turbidity (NTU)	DO (Meter, mg/l)	Temp. (°C)	ORP (Eh) (+/- mv)	
Date: 7/17/03								
Time: 1535								
Method: Peristaltic	Clear	7.21	0.150	11.9	4.74	26.99	57.7	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment:
CHEMetrics Range ☐ 0 - 1.0 mg/L ☑ 1 - 12 mg/L
Analysis Time: 1600
CHEMetrics: 6 mg/L
Notes:

Sulfide (S^{2-}):

Equipment: Chemetrics (kit # K-9510)
Analysis Time: 1604
Concentration: 0 mg/L
Filtered: ☐
Notes:

Carbon Dioxide:

Equipment: —
CHEMetrics (Range: 10-100 mg/L)
(1910, 1920, or 1925)
Analysis Time: 1610
CHEMetrics: 11 mg/L
Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050245**
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW- 2S** -06
Sample Location: **CEF-BP-GW- 2S**
Duplicate: ☐
Blank: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Alkalinity:

Analysis Time: 1555

Equipment: —

CHEMetrics (Range: 10-100 mg/L)

Kits: 9810, 9815, 9820

Filtered: ☐

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	—	—	—

CHEMetrics: 54 mg/L

Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Ferrous Iron (Fe^{2+}):

Equipment: DR-700 DR-8 90 IR-18C Color Wheel Other: _____ Analysis Time: 1550

Program/Module: 500nm 33

Concentration: 0 mg/L

Filtered: ☐

Notes:

Hydrogen Sulfide (H_2S):

Equipment: HS-C Other: _____ Analysis Time: 1545

Concentration: 0 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes:

QA/QC Checklist:

All data fields have been completed as necessary: ☑

Correct measurement units are cited in the SAMPLING DATA block: ☑

Multiplication is correct for each *Multiplier* table: ☑

Final calculated concentration is within the appropriate *Range Used* block: ☑

QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☑

Title block is initialized by person who performed the QA/QC Checklist: ☑

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050245**
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWB

Sample ID No.: **CEF-BP-GW-** 065 **-06**
Sample Location: **CEF-BP-GW-** 065
Duplicate: ☒
Blank: ☐

SAMPLING DATA:

Date: 7/17/03	Color	pH	S.C.	Turbidity	DO	Temp.	ORP (Eh)	
Time: 1010	(Visual)	(SU)	(mS/cm)	(NTU)	(Meter, mg/l)	(°C)	(+/- mv)	
Method: Peristaltic	Clear	6.22	0.252	0	0.96	26.79	30.3	

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Dissolved Oxygen:

Equipment:
CHEMetrics Range ☐ 0 - 1.0 mg/L ☒ 1 - 12 mg/L
Analysis Time: 1045
CHEMetrics: 1 / 1 mg/L
Notes:

Sulfide (S^{2-}):

Equipment: Chemetrics (kit # K-9510)
Analysis Time: 1435
Concentration: 0 / 0 mg/L
Filtered: ☐
Notes:

Carbon Dioxide:

Equipment:
CHEMetrics (Range: 10-100 mg/L)
(1910, 1920, or 1925)
Analysis Time: 1056
CHEMetrics: 70 / 70 mg/L
Notes:

Standard Additions: ☐ Titrant Molarity:_____ Digits Required: 1st.:_____ 2nd.:_____ 3rd.:_____

Tetra Tech NUS, Inc.

FIELD ANALYTICAL LOG SHEET
GEOCHEMICAL PARAMETERS

Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050245**
Sampled By: S. McGuire
Field Analyst: S. McGuire
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW-065** -06
Sample Location: **CEF-BP-GW-065**
Duplicate: ☒
Blank: ☐

SAMPLE COLLECTION/ANALYSIS INFORMATION:

Alkalinity:

Equipment: —

CHEMetrics (Range: 50-500 mg/L)
Kits: 9810, 9815, (9820)

Analysis Time: 1104
Filtered: ☐

Parameter:	Hydroxide	Carbonate	Bicarbonate
Relationship:	—	—	—

CHEMetrics: _____ mg/L 55/50
Notes:

Standard Additions: ☐ Titrant Molarity: _____ Digits Required: 1st.: _____ 2nd.: _____ 3rd.: _____

Ferrous Iron (Fe^{2+}):

Equipment: DR-700 (DR-8 90) IR-18C Color Wheel Other: Hach Test Kit
Program/Module: 500nm 33
Concentration: 0 / 0 mg/L
Analysis Time: 1040
Filtered: ☐
Notes:

Hydrogen Sulfide (H_2S):

Equipment: (HS-C) Other: _____
Analysis Time: 1035
Concentration: 0 / 0 mg/L
Exceeded 5.0 mg/L range on color chart: ☐
Notes:

QA/QC Checklist:

All data fields have been completed as necessary: ☑
Correct measurement units are cited in the SAMPLING DATA block: ☑
Multiplication is correct for each *Multiplier* table: ☑
Final calculated concentration is within the appropriate *Range Used* block: ☑
QA/QC sample (e.g., Std. Additions, etc.) frequency is appropriate as per the project planning documents: ☑
Title block is initialized by person who performed the QA/QC Checklist: ☑