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SECOND SEMI-ANNUAL SECOND YEAR GROUNDWATER MONITORING LETTER REPORT FOR BP WELLS SITE NAS CECIL FIELD FL

5/4/2010

TETRA TECH NUS INC

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PITT-05-10-003

May 4, 2010

Project Number 112G02267

Mr. David Grabka
Florida Department of Environmental Protection
Bob Martinez Center
Division of Waste Management
Federal Programs Section
2600 Blairstone Road
Mail Station 4535
Tallahassee, Florida 32399-2400

Reference: CLEAN IV Contract Number N62470-08-D-1001
Contract Task Order JM09

Subject: Groundwater Monitoring Report, 2nd Semi-Annual, 2nd Year - January 2010
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Dear Mr. Grabka:

Tetra Tech NUS, Inc. (Tetra Tech) is pleased to submit this Semi-Annual Groundwater Monitoring Report for the referenced Contract Task Order for the BP Wells Site. This Groundwater Monitoring Report was prepared for Naval Facilities Engineering Command Southeast (NAVFAC SE) under the Comprehensive Long-Term Environmental Action Navy (CLEAN) V Contract Number N62470-08-D-1001.

The primary objective of current activities at this site is to conduct semi-annual monitoring of groundwater associated with the shallow and intermediate zones of the surficial aquifer. The sampling program is being conducted in accordance with the revised Natural Attenuation Monitoring Plan (NAMP) submitted to the Florida Department of Environmental Protection (FDEP) on May 29, 2008, based on Chapter 62-770.690, Florida Administrative Code. The NAMP is provided in Attachment A. This report summarizes the field operations and analytical results for the sampling event conducted during the week of January 18, 2010, for the subject site. The work was performed in general accordance with FDEP Standard Operating Procedures (SOPs) under DEP-SOP-001/01.

BACKGROUND

The BP Wells Site is located on the north-south flightline, southeast of Building 880. During assessment activities in 1999 and 2000, five shallow wells (CEF-BP-1S through CEF-BP-4S and CEF-BP-6S) and one intermediate well (CEF-BP-5I) were installed at the site and subsequently sampled. The groundwater was determined to be contaminated with petroleum-related hydrocarbons. After this initial assessment, Tetra Tech conducted a Site Assessment to identify the extent of groundwater contamination as well as the groundwater flow direction.

Based on the results of this Site Assessment, a NAMP was prepared and submitted to FDEP in 2000, which issued a NAMP Approval Order (NAMPAO) on August 31, 2000. In accordance with this NAMPAO, Tetra Tech performed the first two semi-annual monitoring events in April and October of 2001, and hydrocarbon concentrations (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, ethylbenzene, toluene, and total xylenes) in groundwater exceeded Natural Attenuation Default Concentrations (NADCs) during both

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sampling events. The second monitoring report recommended that a Remedial Action Plan (RAP) be prepared for this site because contaminant concentrations at the source well (CEF-BP-1S) were greater than NADCs and because there was a significant increase in contaminant concentrations. On February 20, 2002, FDEP concurred that a RAP was warranted. Injection wells CEF-BP-7S through CEF-BP-9S were installed during subsequent remedial actions including three in-situ oxygen curtain (iSOC™) diffusers installed in the three new injection wells, located about 10 to 15 feet from the existing monitoring wells. The results of these injections were evaluated by Tetra Tech in their April 2004 Tetra Tech Enhanced Natural Attenuation Treatability Study Evaluation Report for the BP Wells Site, which determined that remediation efforts were not completely successful. Further groundwater monitoring of the BP Wells Site was not undertaken until a groundwater sampling event was performed in November 2006 in conjunction with the Tank G82 Site. The two sites were sampled at the same time because they are adjacent to each other. Groundwater analytical results confirmed that natural attenuation was occurring at the site and that concentrations of contaminants of concern (COCs) had been decreasing over time.

In May 2008, CH2MHill submitted an updated NAMP, which recommended long term, semi-annual monitoring of COCs (BTEX and naphthalene (EPA Method 8260B), PAHs (including 1-methylnaphthalene and 2-methylnaphthalene) (EPA Method 8270SIM), and TRPH (FL-PRO Method)) and natural attenuation parameters (dissolved methane (Method RSK 175), nitrate/nitrite and sulfate (EPA Method 300.0), and sulfide (Method SM4500-S2F)),for both Building G-82,Tank G-82, and the BP Wells Site, based on the results of the November 2006 groundwater sampling event. Semi-annual sampling in accordance with the updated NAMP began in July 2008. Groundwater Cleanup Target Levels (GCTLs) for ethylbenzene, total xylenes, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and isopropyl benzene were exceeded in the source well (CEF-BP-1S) during the July 2008 sampling event. The July 2008 concentration of isopropyl benzene in downgradient well CEF-BP-6S also slightly exceeded its GCTL.

During the January 2009 sampling event, GCTLs and NADCs for ethylbenzene, xylenes, naphthalene, isopropyl benzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were exceeded at CEF-BP-1S. The January 2009 concentrations of isopropylbenzene and 1,2,4-trimethylbenzene also exceeded GCTLs in downgradient well CEF-BP-6S.

During the July 2009 sampling event, GCTLs and NADCs for 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropyl benzene, and xylenes were exceeded at CEF-BP-1S. The GCTLs for ethylbenzene and indeno'(1,2,3-cd)pyrene were also exceeded at CEF-BP-1S. Concentrations of (VOCs) (1,2,4-trimethylbenzene, isopropyl benzene, and xylenes) exceeded their respective GCTLs at CEF-BP-6S, and concentrations of PAHs [benzo(a)anthracene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene] exceeded their respective GCTLs at upgradient CEF-BP-7S and downgradient CEF-BP-9S.

FIELD OPERATIONS

Based on discussions at the May 2009 Base Cleanup Team (BCT) meeting, a decision was made (Decision No. 755; Meeting Minute No. 2553) to collect groundwater samples from existing wells CEF-BP-1S, CEF-BP-4S, CEF-BP-5I, CEF-BP-6S, CEF-BP-7S, CEF-BP-8S, and CEF-BP-9S on January 18 and 19, 2010 during the routine semi-annual sampling event. Monitoring wells CEF-BP-2S and CEF-BP-3S were temporarily eliminated for this sampling event in lieu of CEF-7S, CEF-BP-08S, and CEF-BP-09S to refine delineation of the source area. The analyses for these samples were conducted in accordance with the updated NAMP. Monitoring well locations are provided on Figure 1.

The samples were collected and placed on ice and subsequently delivered via FedEx under chain of custody to Empirical Laboratories in Nashville, Tennessee, for analysis. The laboratory analyzed the samples from CEF-BP-1S, CEF-BP-5I, and CEF-BP-6S for VOCs using United States Environmental Protection Agency (USEPA) Method SW-846 8260B; for PAHs including 1-methylnaphthalene and 2-methylnaphthalene using USEPA Method 8270; for total recoverable petroleum hydrocarbons (TRPH)

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using the Florida Petroleum-Range Organics (FL-PRO) method; sulfate, nitrate, and nitrite using USEPA Method 300.0; for sulfide using USEPA Method SM4500-S2F, and for alkalinity using USEPA Method 310.2. The laboratory analyzed the samples from CEF-BP-4S, CEF-BP-7S, CEF-BP-8S, and CEF-BP-9S for VOCs using USEPA Method SW-846 8260B; PAHs including 1-methylnaphthalene and 2-methylnaphthalene using USEPA Method 8270; and TRPH using the FL-PRO method.

Prior to obtaining groundwater samples, synoptic water levels and total well depths were measured and recorded on a site-specific groundwater measurement sheet for all wells (except CEF-BP-7S, 8S, and 9S) at the BP Wells Site. On January 18, 2010, depths to water at the BP Wells Site ranged from 7.08 feet below top of casing (btoc) (CEF-BP-1S) to 8.31 feet btoc (CEF-BP-3S). Depth-to-water measurements, top-of-casing elevations, and groundwater elevations are presented in Table 1. General sampling protocols were in accordance with FDEP SOPs and Tetra Tech SOP SA-1.1.

RESULTS

The groundwater elevation data and flow direction for the shallow zone across the BP Wells Site (except CEF-BP-7S, 8S, and 9S) are shown on Figure 2. Based on the data, the inferred direction of groundwater flow in the shallow zone of the surficial aquifer is predominantly east-southeast.

Concentrations reported by the laboratory for groundwater samples collected during this sampling event were compared to FDEP GCTLs and NADCs. The data and standards are presented in Table 2. Monitoring well CEF-BP-1S detected concentrations of total xylenes [520 micrograms per liter (µg/L)], isopropyl benzene (16 µg/L), 1,2,4-trimethylbenzene (450 µg/L), and 1,3,5-trimethylbenzene (140 µg/L) in excess of their respective GCTLs and NADCs. Ethylbenzene (170 µg/L) and naphthalene (60 µg/L) were also detected in CEF-BP-1S at concentrations exceeding their GCTLs. Isopropyl benzene (28 µg/L) and 1,2,4-trimethylbenzene (170 µg/L) were also detected in CEF-BP-6S at concentrations exceeding their respective GCTLs and NADCs. 1,3,5-Trimethylbenzene (40 µg/L), ethylbenzene (150 µg/L), total xylenes (200 µg/L) and naphthalene (29 µg/L) were also detected in CEF-BP-6S at concentrations exceeding GCTLs. Concentrations of the remaining analytes in CEF-BP-1S and CEF-BP-6S were either less than method detection limits (MDLs) or less than GCTLs. Laboratory data is presented in Attachment B. Figure 3 summarizes VOC analytical results and depicts the estimated extent of the VOC plume between CEF-BP-1S and CEF-BP-6S. Figure 4 summarizes PAH analytical results and depicts the estimated extent of the naphthalene plume (between CEF-BP-1S and CEF-BP-6S).

Based on decisions made at the May 2009 BCT meeting, wells CEF-BP-7S, CEF-BP-8S, and CEF-BP-9S were sampled for VOCs, PAHs, and TRPH due to their close proximity to source well CEF-BP-1S. No detections of concentrations exceeding GCTLs were observed. In all of the other wells sampled, all of the other analytes were either not detected or were detected at estimated concentrations less than GCTLs.

Geochemical data were collected and analyzed in accordance with the 2008 NAMP. The natural attenuation parameters included dissolved oxygen (DO), dissolved carbon dioxide/alkalinity, methane, nitrate/nitrite, and sulfate/sulfide. Low-flow pumping was used and FDEP SOPs were followed during DO analyses. The results of geochemical analyses for all of the wells are provided in Table 2.

Dissolved Oxygen

DO measurements were made in the field using a CHEMetrics test kit (Model K-7501), which can obtain accurate determinations of DO between 0.05 and 12 milligrams per liter (mg/L). Field-measured DO concentrations in January 2010 ranged from 0.15 mg/L in CEF-BP-6S to 0.9 mg/L in CEF-BP-1S and CEF-BP-5I.

Dissolved Carbon Dioxide/Alkalinity

Dissolved carbon dioxide was measured in the field using CHEMetrics test kits (Models K-1910, K-1920, and K-1925). Field-measured dissolved carbon dioxide concentrations were 60 mg/L (CEF-BP-6S), 42

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mg/L (CEF-BP-1S) and 0.22 mg/L (CEF-BP-5I). Alkalinity is a measure of the acid-neutralizing capacity of water, expressed in this report as mg/L of calcium carbonate ($CaCO_3$). Laboratory-measured alkalinity ranged from values at 4.06 mg/L at CEF-BP-5I to 136 mg/L for CEF-BP-6S.

Methane
Methanogenesis is an anaerobic biodegradation process whereby methane-producing microbes utilize carbon dioxide as an electron acceptor and generate methane as a byproduct of fermentation. Concentrations of methane ranged from non-detect in CEF-BP-4S to 1,360 mg/L in CEF-BP-6S.

Sulfate/Sulfide
Sulfate concentrations ranged from 4.89 mg/L in CEF-BP-5I to 10.2 mg/L in source well CEF-BP-1S. Sulfide was not detected in any of the wells for which it was analyzed (CEF-BP-1S, CEF-BP-6S, and CEF-BP-5I).

Nitrate/Nitrite
Nitrate ranged from non-detect in CEF-BP-5I and CEF-BP-6S to 0.308 mg/L in CEF-BP-1S. Nitrite was not detected in any of the wells for which it was analyzed (CEF-BP-1S, CEF-BP-6S, and CEF-BP-5I).

CONCLUSIONS AND RECOMMENDATIONS

The shallow groundwater flow direction in the area of BP Wells site is to the east-southeast, which is consistent with previous sampling events since 2000.

GCTLs for total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, isopropyl benzene, naphthalene and ethylbenzene were exceeded in source well CEF-BP-1S. NADCs for total xylenes, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and isopropyl benzene were also exceeded in source well CEF-BP-1S. GCTLs for 1,2,4-trimethylbenzene, isopropyl benzene, 1,3,5-trimethylbenzene, ethylbenzene, total xylenes and naphthalene were exceeded in CEF-BP-6S. NADCs for 1,2,4-trimethylbenzene and isopropyl benzene were exceeded in CEF-BP-6S.

The following observation for source well CEF-BP-1S and downgradient well CEF-BP-6S are based on the data collected in January 2010:

CEF-BP-1S

- Total xylenes concentration remained greater than two times the NADC of 200 µg/L.
- Isopropyl benzene continued to be detected at a concentration two times the NADC of 8 µg/L.
- 1,2,4-Trimethylbenzene continued to be detected at a concentration greater than four times the NADC of 100 µg/L.
- 1,3,5-Trimethylbenzene exceeded its NADC of 100 µg/L.
- Ethylbenzene and naphthalene continued to exceed their respective GCTLs.

CEF-BP-6S

- 1,2,4-Trimethylbenzene was detected at a concentration greater than the NADC of 100 µg/L.
- Isopropyl benzene was detected at a concentration greater than two times the NADC of 8 µg/L.
- 1,3,5-Trimethylbenzene, ethylbenzene, total xylenes, and naphthalene concentrations exceeded their respective GCTLs.

No other analytes were detected in excess of GCTLs in any of the other wells sampled. In the two wells that did have detections in excess of GCTLs, the concentrations were within the same range as previous detections; however CEF-BP-06S appears to have an increasing trend.

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Natural attenuation parameters were collected in accordance with the 2008 NAMP. No background concentrations are available for comparison of these results; therefore, only limited conclusions can be drawn from data collected. Therefore, it is recommended that the geochemical parameter analysis portion of the 2008 NAMP be discontinued.

These results and possible paths forward were discussed during the February 2010 BCT meeting (Meeting Minute No. 2603). Past attempts to remediate groundwater at the site with in-situ oxygen curtain (iSOC™) diffusers were not successful, and no soil samples have been collected in the grassy area around the source well CEF-BP-1S. It was identified that assessment of the soil in the anticipated source area was appropriate. Therefore, it was determined that up to three soil samples would be collected in the area of CEF-BP-1S. In addition, two shallow monitoring wells will be installed approximately 40-feet to the south and the southeast of CEF-BP-6S to provide downgradient monitoring wells. The meeting minutes identified that the Uniform Federal Policy-Sampling Analysis Plan (UFP-SAP) for this site was in Navy Chemist review at the time of the BCT meeting; therefore, a Field Task Modification Request (FTMR) will be submitted to the Navy requesting this additional assessment upon approval and submittal of the UFP-SAP. Implementation of a FTMR will occur upon its approval.

The next semi-annual groundwater sampling event is currently scheduled to be conducted in July 2010. It is proposed that the seven wells currently being evaluated (CEF-BP-1S, CEF-BP-4S, CEF-BP-15I, CEF-BP-6S, CEF-BP-7S, CEF-BP-8S, CEF-BP-9S) plus the two newly installed downgradient wells be sampled and analyzed for VOCs, PAHs, and TRPH as identified above.

If you have any questions regarding this submittal, please feel free to contact Kara Wimble at (904) 730-4669, extension 217, or via e-mail at Kara.Wimble@tetratech.com or Robert Simcik at (412) 921-8163.

Sincerely,

Kara F. Wimble
Project Scientist

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

Attachments (4)

c: A. Sanford, NAVFAC SE (1 copy)
M. Davidson, NAVFAC SE (1 copy)
M. Halil, CH2M Hill (electronic only)
S. Currie, Tetra Tech CTO JM09 project file (1 copy, unbound)
J. Trepanowski, Tetra Tech
M. Jonnet, Tetra Tech (1 copy)
J. Johnson, Tetra Tech (1 copy for Information Repository)
M. Boerio, Tetra Tech (electronic copy)

CERTIFICATION

The information contained herein is based on the investigation data and information obtained from previously submitted reports. If conditions are determined to exist that differ from those described, the undersigned engineer should be notified to evaluate the effects of any additional information on the information described in this report. This Groundwater Monitoring Report, 2nd Semi-Annual, 2nd Year-January 2010 was submitted for the BP Wells Site at Former Naval Air Station Cecil Field, Jacksonville, Florida, and should not be construed to apply to any other site.

ROBERT FRANK SIMCIK
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PROFESSIONAL ENGINEER

Robert F. Simcik, P.E.
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TABLES

Table 1
Groundwater Elevation and Monitoring Well Construction Data

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Well Number	Total Depth of Well (feet btoc)	Top of Casing Elevation (feet above msl)	9/23/2002		1/6/2003		4/17/2003		7/17/2003	
			Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above 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

Well Number	Total Depth of Well (feet btoc)	Top of Casing Elevation (feet above msl)	7/24/2008		1/26/2009		7/15/2009		1/18/2010	
			Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)	Depth to Water (feet btoc)	Groundwater Elevation (feet above msl)
CEF-BP-1S	14.72	71.28	NM	NM	7.82	63.46	4.98	66.30	7.08	64.20
CEF-BP-2S	14.48	71.78	5.80	65.98	8.24	63.54	5.37	66.41	7.51	64.27
CEF-BP-3S	14.57	72.38	6.62	65.76	9.03	63.35	6.19	66.19	8.31	64.07
CEF-BP-4S	14.75	72.28	6.55	65.73	8.96	63.32	6.13	66.15	8.23	64.05
CEF-BP-5I	34.39	71.63	5.78	65.85	8.19	63.44	5.31	66.32	7.43	64.20
CEF-BP-6S	14.20	71.87	6.09	65.78	8.48	63.39	5.64	66.23	7.73	64.14

msl = Mean sea level.
btoc = Below top of casing.
NA = Not available.
NM = Not measured.

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well								
			CEF-BP-1S				CEF-BP-4S				
			7/23/2008	1/26/2009	7/14/2009	1/18/2010	7/23/2008	1/28/2009		7/14/2009	1/18/2010
								Sample	Duplicate		
VOCs (USEPA Method 8260B) (µg/L)											
1,2,4-Trimethylbenzene	10	100	**440 [G]**	**664 [G] [N]**	**480 [G] [N]**	**450 D [G] [N]**	0.38 U	0.22 U	2.2 U	0.14 U	0.14 U
1,3,5-Trimethylbenzene	10	100	**140 [G]**	**212 [G] [N]**	**150 [G] [N]**	**140 D [G] [N]**	0.22 U	0.2 U	0.2 U	0.1 U	0.1 U
Benzene	1	10	**2.3 U [G]**	**2 U [G]**	**1.2 U [G]**	0.55 UD	0.23 U	0.40 U	0.40 U	0.12 U	0.12 U
Ethylbenzene	30	300	**200 [G]**	**304 [G] [N]**	**220 [G]**	**170 D [G]**	0.34 U	0.43 U	0.43 U	0.1 U	0.1 U
Isopropylbenzene	0.8	8	**20 [G] [N]**	**28.1 [G] [N]**	**19 [G] [N]**	**16 D [G] [N]**	0.23 U	0.2 U	0.2 U	0.11 U	0.11 U
Toluene	40	400	2.8 U	1.9 J	1.4 U	0.67 JD	0.28 U	0.35 U	0.35 U	0.14 U	0.14 U
Total Xylenes	20	200	**670 [G] [N]**	**705 [G] [N]**	**770 [G] [N]**	**520 D [G] [N]**	0.38 U	1.2 U	1.2 U	0.21 U	0.21 U
PAHs (USEPA Method 8270C SIM) (µg/L)											
1-Methylnaphthalene	28	280	7.3	16.4	12	9.9	0.01 U	0.24 U	0.24 U	0.3 U	0.018 U
2-Methylnaphthalene	28	280	17	**31.3 [G]**	22	20	0.02 U	0.24 U	0.24 U	0.3 U	0.018 U
Acenaphthene	20	200	0.08 J	0.48 U	0.3 U	0.12 J	0.02 U	0.48 U	0.48 U	0.3 U	0.018 U
Acenaphthylene	210	2100	0.01 U	0.48 U	0.023 U	0.066 J	0.01 U	0.48 U	0.48 U	0.023 U	0.018 U
Anthracene	2100	21000	0.02 U	0.48 U	0.046 U	0.068 J	0.02 U	0.48 U	0.48 U	0.046 U	0.026 J
Benzo(a)anthracene	0.05	5	0.01 U	0.048 U	0.023 U	0.048 J	0.01 U	0.048 U	0.048 U	0.023 U	0.092 U
Benzo(a)pyrene	0.2	2	0.01 U	0.048 U	0.078 J	0.018 U	0.01 U	0.048 U	0.048 U	0.023 U	0.092 U
Benzo(b)fluoranthene	0.05	5	0.01 U	0.048 U	0.023 U	0.039 J	p	0.048 U	0.048 U	0.023 U	0.092 U
Benzo(k)fluoranthene	0.5	50	0.03 U	0.048 U	0.023 U	0.038 J	0.03 U	0.048 U	0.048 U	0.023 U	0.092 U
Benzo(g,h,i)perylene	210	2100	0.03 U	0.048 U	0.023 U	0.018 U	0.03 U	0.048 U	0.048 U	0.023 U	0.018 U
Chrysene	4.8	480	0.01 U	0.095 U	0.023 U	0.049 J	0.01 U	0.095 U	0.095 U	0.023 U	0.092 U
Dibenzo(a,h)anthracene	0.005	0.05	0.02 U	0.048 U	0.0046 U	0.018 U	0.02 U	0.048 U	0.048 U	0.0046 U	0.018 U
Fluoranthene	280	2,800	0.04 J	0.24 U	0.046 U	0.23 U	0.01 U	0.24 U	0.24 U	0.046 U	0.23 U
Fluorene	280	2,800	0.1	0.48 U	0.3 U	0.15 J	0.01 U	0.48 U	0.48 U	0.3 U	0.018 U
Indeno(1,2,3-cd)pyrene	0.05	5	0.02 U	0.048 U	0.43 J	0.018 U	0.02 U	0.048 U	0.048 U	0.023 U	0.018 U
Naphthalene	14	140	**66 [G]**	**103 [G]**	NA	**60 [G]**	0.11	0.24 U	0.24 U	NA	0.018 U
Phenanthrene	210	2100	0.11	0.24 U	0.28	0.26	0.02 U	0.24 U	0.24 U	0.023 U	0.092 U
Pyrene	210	2100	0.009 U	0.24 U	0.046 U	0.076 U	0.009 U	0.24 U	0.24 U	0.046 U	0.023 U

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well								
			CEF-BP-1S				CEF-BP-4S				
			7/23/2008	1/26/2009	7/14/2009	1/18/2010	7/23/2008	1/28/2009 Sample	1/28/2009 Duplicate	7/14/2009	1/18/2010
Petroleum Hydrocarbons (FL-PRO) (µg/L)											
TPH	5000	50,000	2,520	2,580	3,700	2,650	42 U	160 U	160 U	160 U	235 U
Miscellaneous Parameters (mg/L)											
Alkalinity	NC	NC	99	152	125	133	NA	NA	NA	NA	NA
Nitrate as N	10	NC	0.14 J	0.050 U	0.05 U	0.308	NA	NA	NA	NA	NA
Nitrite	1	NC	0.002 U	**2.3 [G]**	0.15	0.1 U	NA	NA	NA	NA	NA
Sulfate	250	NC	7.8	7.6	4.91 J	10.2	NA	NA	NA	NA	NA
Sulfide	NC	NC	0.45 U	0.6 U	0.96	2.4 U	NA	NA	NA	NA	NA
Volatile Organic Gasses (µg/L)											
Methane	NC	NC	30	504	640	996	NA	NA	NA	NA	NA

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well								
			CEF-BP-5I				CEF-BP-6S				
			7/23/2008	1/26/2009	7/14/2009	1/18/2010	7/23/2008	1/26/2009	7/14/2009	8/17/2009	1/18/2010
VOCs (USEPA Method 8260B) (µg/L)											
1,2,4-Trimethylbenzene	10	100	0.38 U	0.22 U	0.18 J	0.1 U	0.38 U	**17.8 [G]**	**28 [G]**	**19 [G]**	**170 [G] [N]**
1,3,5-Trimethylbenzene	10	100	0.22 U	0.2 U	0.1 U	0.13 U	0.22 U	2.2	5.3	3.1	**40 [G]**
Benzene	1	10	0.23 U	0.40 U	0.12 U	0.11 U	0.23 U	0.40 U	0.12 U	NA	0.11 U
Ethylbenzene	30	300	0.34 U	0.43 U	0.1 U	0.13 U	6.5	17.3	18	12	**150 [G]**
Isopropylbenzene	0.8	8	0.23 U	0.2 U	0.11 U	0.15 U	**1.1 [G]**	**2 [G]**	**2.3 [G]**	**1.3 [G]**	**28 [G] [N]**
Toluene	40	400	0.28 U	0.35 U	0.14 U	0.1 U	0.28 U	0.35 U	0.16 J	0.1 U	1.5
Total Xylenes	20	200	0.38 U	1.2 U	0.21 U	0.22 U	0.53 J	10.9	**22 [G]**	10	**200 [G]**
PAHs (USEPA Method 8270C SIM) (µg/L)											
1-Methylnaphthalene	28	280	0.01 U	0.24 U	0.3 U	0.032 J	0.31	0.99	1.3	2.1	7.4
2-Methylnaphthalene	28	280	0.3 J	0.24 U	0.3 U	0.043 U	0.28	1.3	1.6	3.1	7.1
Acenaphthene	20	200	0.02 U	0.48 U	0.3 U	0.027 J	0.02 U	0.48 U	0.3 U	0.32 U	0.083 J
Acenaphthylene	210	2100	0.01 U	0.48 U	0.023 U	0.02 J	0.01 U	0.48 U	0.023 U	0.24 U	0.018 U
Anthracene	2100	21000	0.02 U	0.48 U	0.046 U	0.03 J	0.02 U	0.48 U	0.046 U	NA	0.018 U
Benzo(a)anthracene	0.05	5	0.01 U	0.048 U	0.023 U	0.037 J	0.03 J	0.048 U	0.097	0.024 U	0.018 U
Benzo(a)pyrene	0.2	2	0.01 U	0.048 U	0.023 U	0.018 U	0.01 U	0.048 U	0.023 U	0.024 U	0.018 U
Benzo(b)flouranthene	0.05	5	0.01 U	0.048 U	0.023 U	0.031 J	0.01 U	0.048 U	0.023 J	0.024 U	0.018 U
Benzo(k)flouranthene	0.5	50	0.03 U	0.048 U	0.023 U	0.031 J	0.03 U	0.048 U	0.1	0.024 U	0.018 U
Benzo(g,h,i)perylene	210	2100	0.03 U	0.048 U	0.023 U	0.018 U	0.03 U	0.048 U	0.023 U	NA	0.018 U
Chrysene	4.8	480	0.01 U	0.095 U	0.023 U	0.037 J	0.01 U	0.095 U	0.023 U	0.024 U	0.018 U
Dibenzo(a,h)anthracene	0.005	0.05	0.02 U	0.048 U	0.0046 U	0.018 U	0.02 U	0.048 U	0.0046 U	0.019 U	0.018 U
Fluoranthene	280	2,800	0.01 U	0.24 U	0.046 U	0.23 U	0.01 U	0.24 U	0.1	0.048 U	0.23 U
Fluorene	280	2,800	0.01 U	0.48 U	0.3 U	0.031 J	0.03 J	0.48 U	0.3 U	0.032 U	0.053 J
Indeno(1,2,3-cd)pyrene	0.05	5	0.02 U	0.048 U	0.023 U	0.018 U	0.02 U	0.048 U	0.023 U	0.027 J	0.018 U
Naphthalene	14	140	0.04 J	0.24 U	NA	0.043 J	0.97	3.5	NA	7	**29 [G]**
Phenanthrene	210	2100	0.02 U	0.24 U	0.023 U	0.044 U	0.02 U	0.24 U	0.026 J	0.068 J	0.028 U
Pyrene	210	2100	0.009 U	0.24 U	0.046 U	0.044 U	0.009 U	0.24 U	0.046 U	NA	0.018 U

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well								
			CEF-BP-5I				CEF-BP-6S				
			7/23/2008	1/26/2009	7/14/2009	1/18/2010	7/23/2008	1/26/2009	7/14/2009	8/17/2009	1/18/2010
Petroleum Hydrocarbons (FL-PRO) (µg/L)											
TPH	5000	50,000	42 U	160 U	160 U	235 U	106 J	428	180 J	NA	1300
Miscellaneous Parameters (mg/L)											
Alkalinity	NC	NC	13	2.5 U	4.29	4.06	160	141	103	NA	136
Nitrate as N	10	NC	0.36 J	0.12	0.219	0.25 U	0.004 U	0.05 U	0.279	NA	0.083 U
Nitrite	1	NC	0.002 U	1	0.050 U	0.1 U	0.002 U	**1.9 [G]**	0.05 U	NA	0.1 U
Sulfate	250	NC	9.8	13.1	11.4	4.89	10	15.4	10.1	NA	7.4
Sulfide	NC	NC	0.45 U	0.66 J	0.800 U	2.4 U	0.45 U	1.1	0.8 U	NA	2.4 U
Volatile Organic Gasses (µg/L)											
Methane	NC	NC	0.4 J	0.21 J	0.5 U	3.51 U	218	520	420	NA	1360

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well							
			CEF-BP-7S			CEF-BP-8S		CEF-BP-9S		
			7/15/2009	1/19/2010		7/15/2009	1/18/2010	7/15/2009		1/18/2010
				Sample	Duplicate			Sample	Duplicate	
VOCs (USEPA Method 8260B) (µg/L)										
1,2,4-Trimethylbenzene	10	100	0.1 U	0.14 U	0.14 U	0.1 U	0.38 J	0.1 U	0.1 U	0.14 U
1,3,5-Trimethylbenzene	10	100	0.13 U	0.1 U	0.1 U	0.13 U	0.13 U	0.13 U	0.13 U	0.1 U
Benzene	1	10	0.11 U	0.12 U	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	0.12 U
Ethylbenzene	30	300	0.13 U	0.1 U	0.1 U	0.13 U	0.23 J	0.13 U	0.13 U	0.1 U
Isopropylbenzene	0.8	8	0.15 U	0.11 U	0.11 U	0.15 U	0.15 U	0.15 U	0.15 U	0.11 U
Toluene	40	400	0.1 U	0.14 U	0.14 U	0.1 U	0.1 U	0.1 U	0.1 U	0.14 U
Total Xylenes	20	200	0.22 U	0.21 U	0.21 U	0.22 U	0.25 J	0.22 U	0.22 U	0.21 U
PAHs (USEPA Method 8270C SIM) (µg/L)										
1-Methylnaphthalene	28	280	0.3 U	0.03 J	0.018 U	0.3 U	0.018 U	0.3 U	0.3 U	0.035 J
2-Methylnaphthalene	28	280	0.3 U	0.035 J	0.018 U	0.3 U	0.018 U	0.3 U	0.3 U	0.038 J
Acenaphthene	20	200	0.3 U	0.018 U	0.018 U	0.3 U	0.018 U	0.3 U	0.3 U	0.05 J
Acenaphthylene	210	2100	0.039 J	0.018 U	0.018 U	0.023 U	0.018 U	0.023 U	0.023 U	0.042 J
Anthracene	2100	21000	0.046 U	0.026 J	0.018 U	0.046 U	0.018 U	0.046 U	0.046 U	0.057 J
Benzo(a)anthracene	0.05	5	**0.16 [G]**	0.092 U	0.018 U	0.023 U	0.022 J	**0.097 [G]**	**0.098 [G]**	0.092 U
Benzo(a)pyrene	0.2	2	0.058 J	0.018 U	0.018 U	0.023 U	0.018 U	0.023 U	0.023 U	0.092 U
Benzo(b)flouranthene	0.05	5	**0.086 J [G]**	0.018 U	0.018 U	0.023 U	0.019 J	0.025 J	0.027 J	0.092 U
Benzo(k)flouranthene	0.5	50	0.14	0.018 U	0.018 U	0.1	0.02 J	0.11	0.11	0.092 U
Benzo(g,h,i)perylene	210	2100	0.023 U	0.018 U	0.018 U	0.023 U	0.018 U	0.023 U	0.023 U	0.018 U
Chrysene	4.8	480	0.053 J	0.092 U	0.018 U	0.023 U	0.023 J	0.023 U	0.023 U	0.092 U
Dibenzo(a,h)anthracene	0.005	0.05	**0.19 [G]**	0.018 U	0.018 U	0.0046 U	0.018 U	0.0046 U	**0.17 [G]**	0.018 U
Fluoranthene	280	2,800	0.046 U	0.23 U	0.018 U	0.046 U	0.23 U	0.046 U	0.046 U	0.23 U
Fluorene	280	2,800	0.3 U	0.018 U	0.018 U	0.3 U	0.018 U	0.3 U	0.3 U	0.056 J
Indeno(1,2,3-cd)pyrene	0.05	5	**0.35 [G]**	0.018 U	0.018 U	0.23 U	0.018 U	0.023 UJ	**0.32 J [G]**	0.018 U
Naphthalene	14	140	NA	0.028 J	0.018 U	NA	0.026 J	NA	NA	0.034 J
Phenanthrene	210	2100	0.023 U	0.092 U	0.018 U	0.23 U	0.026 U	0.23 U	0.23 U	0.092 U
Pyrene	210	2100	0.046 U	0.23 U	0.23 U	0.046 U	0.026 U	0.046 U	0.046 U	0.23 U

Table 2: Summary of Detections in Groundwater

2nd Semi-Annual, 2nd Year - January 2010 Groundwater Sampling Event
BP Wells Site
Naval Air Station Cecil Field
Jacksonville, Florida

Constituent	FDEP GCTL	FDEP NADC	Monitoring Well							
			CEF-BP-7S			CEF-BP-8S		CEF-BP-9S		
			7/15/2009	1/19/2010		7/15/2009	1/18/2010	7/15/2009		1/18/2010
				Sample	Duplicate			Sample	Duplicate	
Petroleum Hydrocarbons (FL-PRO) (µg/L)										
TPH	5000	50,000	160 U	235 U	235 U	235 U	235 U	160 U	160 U	235 U
Miscellaneous Parameters (mg/L)										
Alkalinity	NC	NC	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate as N	10	NC	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite	1	NC	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	NC	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	NC	NC	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Gasses (µg/L)										
Methane	NC	NC	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

U = Less than laboratory method detection limit.
J - Estimated value
GCTL = Groundwater Cleanup Target Level
[G] indicates that the concentration exceeds the FDEP GCTLs
[N] indicates that the concentration exceeds the NADC
NS = Not Sampled
NA = Not analyzed for that constituent
NC = No criteria available for constituent.
V = This constituent was also detected in the method blank and the data should be interpreted with caution.
D = This sample was rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve.

FIGURES

DRAWN BY MJJ	DATE 13Mar10	MONTORING WELL LOCATION MAP 2ND SEMI-ANNUAL, 2ND YEAR GROUNDWATER MONITORING REPORT BP WELLS SITE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV 0

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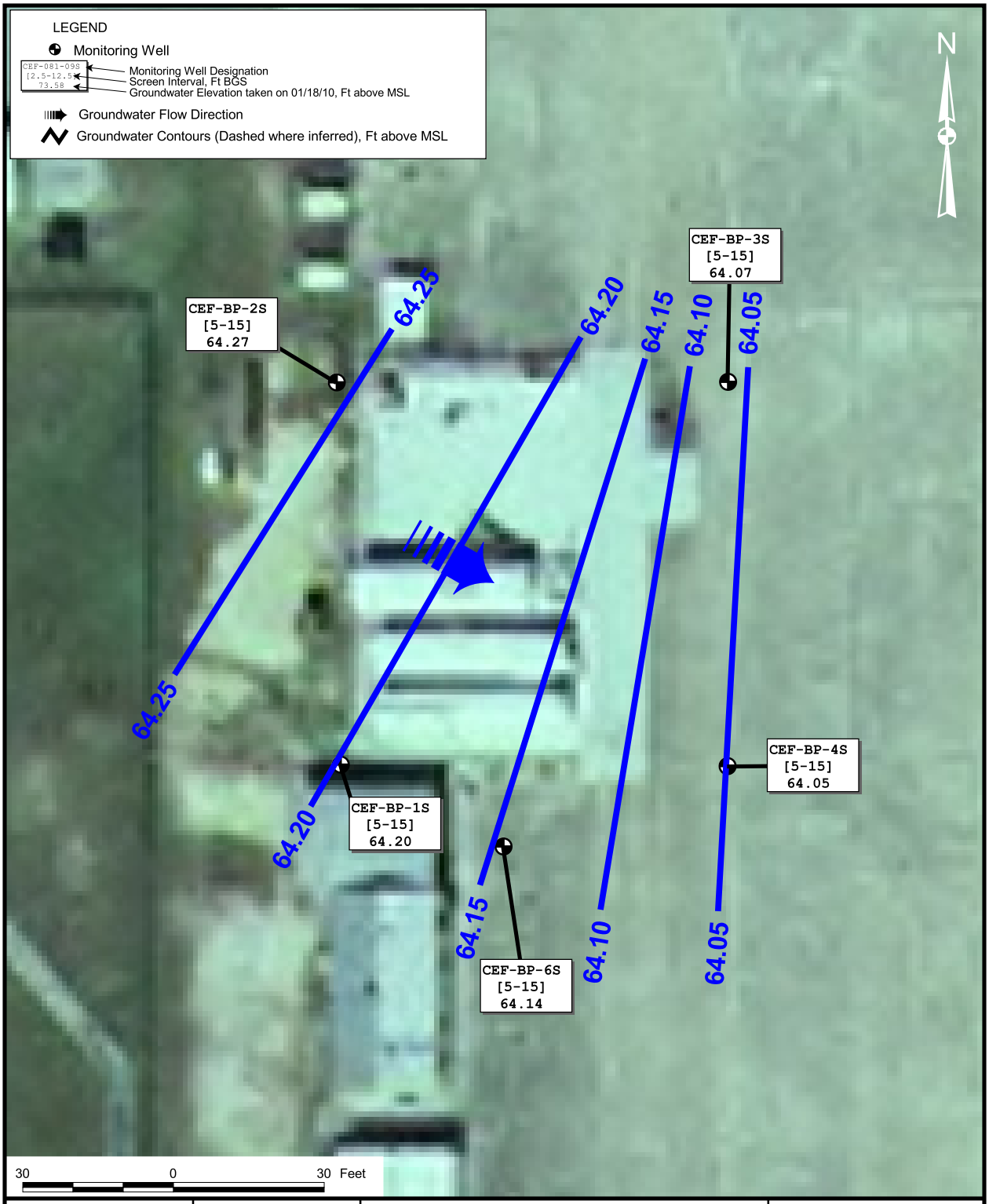

DRAWN BY MJJ	DATE 13Mar10	SHALLOW SURFICIAL AQUIFER GROUNDWATER FLOW MAP (01/18/10) 2ND SEMI-ANNUAL, 2ND YEAR GROUNDWATER MONITORING REPORT BP WELLS SITE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 2267
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 / REV 0

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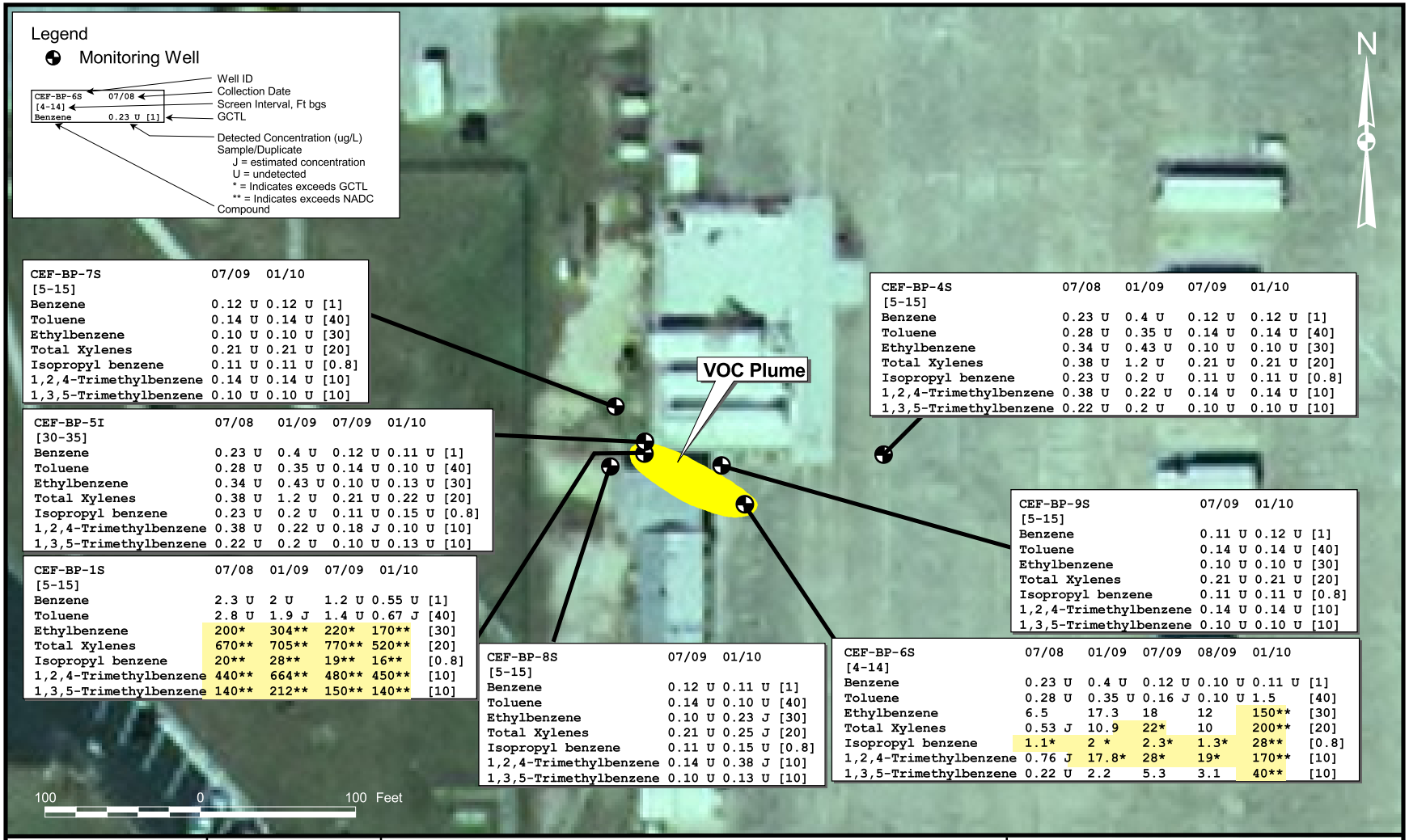

CEF-BP-7S	07/09	01/10
[5-15]		
Benzene	0.12 U	0.12 U [1]
Toluene	0.14 U	0.14 U [40]
Ethylbenzene	0.10 U	0.10 U [30]
Total Xylenes	0.21 U	0.21 U [20]
Isopropyl benzene	0.11 U	0.11 U [0.8]
1,2,4-Trimethylbenzene	0.14 U	0.14 U [10]
1,3,5-Trimethylbenzene	0.10 U	0.10 U [10]

CEF-BP-5I	07/08	01/09	07/09	01/10
[30-35]				
Benzene	0.23 U	0.4 U	0.12 U	0.11 U [1]
Toluene	0.28 U	0.35 U	0.14 U	0.10 U [40]
Ethylbenzene	0.34 U	0.43 U	0.10 U	0.13 U [30]
Total Xylenes	0.38 U	1.2 U	0.21 U	0.22 U [20]
Isopropyl benzene	0.23 U	0.2 U	0.11 U	0.15 U [0.8]
1,2,4-Trimethylbenzene	0.38 U	0.22 U	0.18 J	0.10 U [10]
1,3,5-Trimethylbenzene	0.22 U	0.2 U	0.10 U	0.13 U [10]

CEF-BP-1S	07/08	01/09	07/09	01/10
[5-15]				
Benzene	2.3 U	2 U	1.2 U	0.55 U [1]
Toluene	2.8 U	1.9 J	1.4 U	0.67 J [40]
Ethylbenzene	200*	304**	220*	170** [30]
Total Xylenes	670**	705**	770**	520** [20]
Isopropyl benzene	20**	28**	19**	16** [0.8]
1,2,4-Trimethylbenzene	440**	664**	480**	450** [10]
1,3,5-Trimethylbenzene	140**	212**	150**	140** [10]

CEF-BP-8S	07/09	01/10
[5-15]		
Benzene	0.12 U	0.11 U [1]
Toluene	0.14 U	0.10 U [40]
Ethylbenzene	0.10 U	0.23 J [30]
Total Xylenes	0.21 U	0.25 J [20]
Isopropyl benzene	0.11 U	0.15 U [0.8]
1,2,4-Trimethylbenzene	0.14 U	0.38 J [10]
1,3,5-Trimethylbenzene	0.10 U	0.13 U [10]

CEF-BP-4S	07/08	01/09	07/09	01/10
[5-15]				
Benzene	0.23 U	0.4 U	0.12 U	0.12 U [1]
Toluene	0.28 U	0.35 U	0.14 U	0.14 U [40]
Ethylbenzene	0.34 U	0.43 U	0.10 U	0.10 U [30]
Total Xylenes	0.38 U	1.2 U	0.21 U	0.21 U [20]
Isopropyl benzene	0.23 U	0.2 U	0.11 U	0.11 U [0.8]
1,2,4-Trimethylbenzene	0.38 U	0.22 U	0.14 U	0.14 U [10]
1,3,5-Trimethylbenzene	0.22 U	0.2 U	0.10 U	0.10 U [10]

CEF-BP-9S	07/09	01/10
[5-15]		
Benzene	0.11 U	0.12 U [1]
Toluene	0.14 U	0.14 U [40]
Ethylbenzene	0.10 U	0.10 U [30]
Total Xylenes	0.21 U	0.21 U [20]
Isopropyl benzene	0.11 U	0.11 U [0.8]
1,2,4-Trimethylbenzene	0.14 U	0.14 U [10]
1,3,5-Trimethylbenzene	0.10 U	0.10 U [10]

CEF-BP-6S	07/08	01/09	07/09	08/09	01/10
[4-14]					
Benzene	0.23 U	0.4 U	0.12 U	0.10 U	0.11 U [1]
Toluene	0.28 U	0.35 U	0.16 J	0.10 U	1.5 [40]
Ethylbenzene	6.5	17.3	18	12	150** [30]
Total Xylenes	0.53 J	10.9	22*	10	200** [20]
Isopropyl benzene	1.1*	2 *	2.3*	1.3*	28** [0.8]
1,2,4-Trimethylbenzene	0.76 J	17.8*	28*	19*	170** [10]
1,3,5-Trimethylbenzene	0.22 U	2.2	5.3	3.1	40** [10]

DATE MJJ 30Jan10	NAVFAC	VOC ANALYTICAL RESULTS 2ND SEMI-ANNUAL, 2ND YEAR GROUNDWATER MONITORING REPORT BP WELLS SITE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	DRAWN BY / CONTRACT NUMBER 2267
CHECKED BY / DATE			APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3 / REV 0

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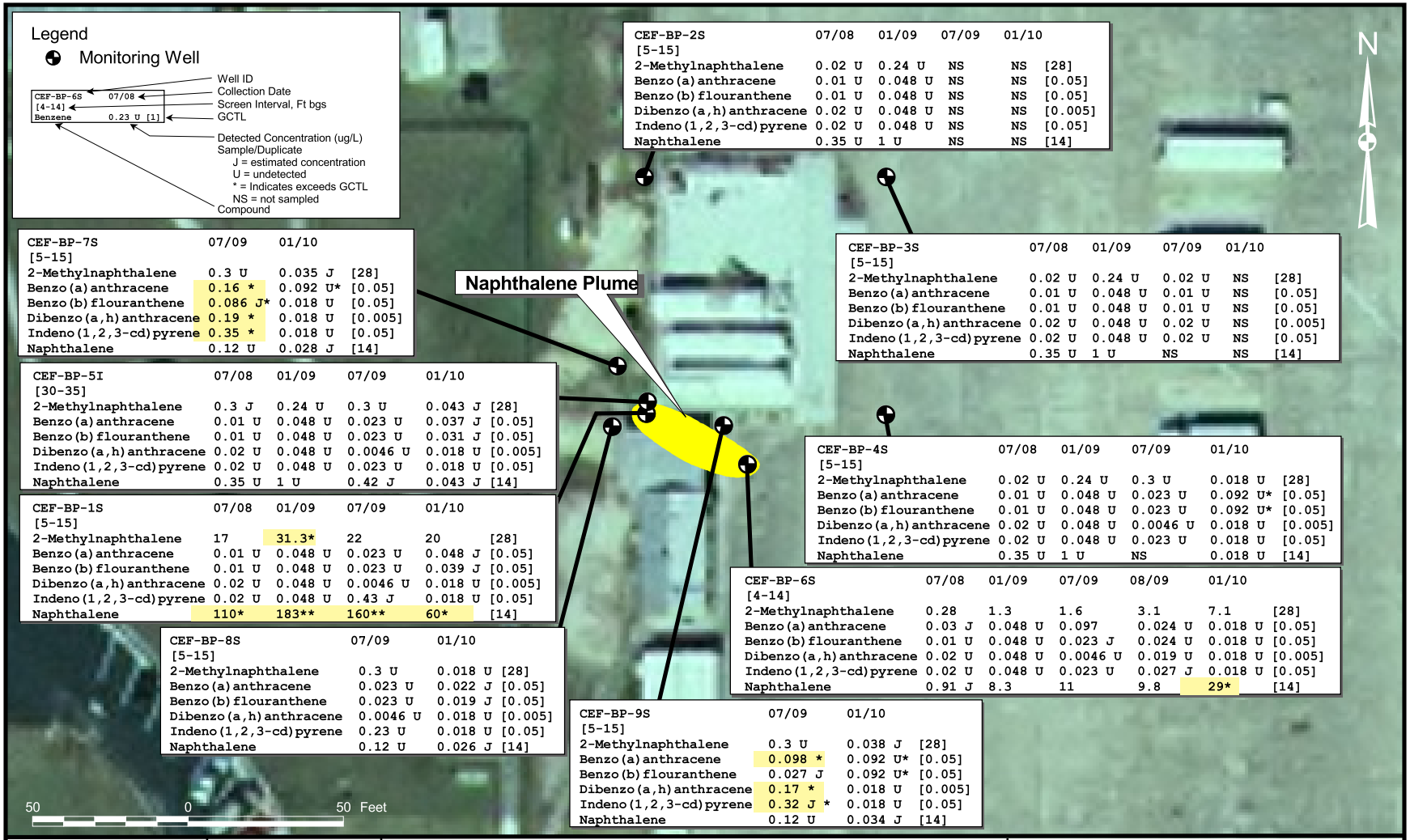

CEF-BP-2S [5-15]	07/08	01/09	07/09	01/10	
2-Methylnaphthalene	0.02 U	0.24 U	NS	NS	[28]
Benzo(a)anthracene	0.01 U	0.048 U	NS	NS	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	NS	NS	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	NS	NS	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	NS	NS	[0.05]
Naphthalene	0.35 U	1 U	NS	NS	[14]

CEF-BP-7S [5-15]	07/09	01/10	
2-Methylnaphthalene	0.3 U	0.035 J	[28]
Benzo(a)anthracene	0.16 *	0.092 U*	[0.05]
Benzo(b)flouranthene	0.086 J*	0.018 U	[0.05]
Dibenzo(a,h)anthracene	0.19 *	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.35 *	0.018 U	[0.05]
Naphthalene	0.12 U	0.028 J	[14]

CEF-BP-3S [5-15]	07/08	01/09	07/09	01/10	
2-Methylnaphthalene	0.02 U	0.24 U	0.02 U	NS	[28]
Benzo(a)anthracene	0.01 U	0.048 U	0.01 U	NS	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	0.01 U	NS	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	0.02 U	NS	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	0.02 U	NS	[0.05]
Naphthalene	0.35 U	1 U	NS	NS	[14]

CEF-BP-5I [30-35]	07/08	01/09	07/09	01/10	
2-Methylnaphthalene	0.3 J	0.24 U	0.3 U	0.043 J	[28]
Benzo(a)anthracene	0.01 U	0.048 U	0.023 U	0.037 J	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	0.023 U	0.031 J	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	0.0046 U	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	0.023 U	0.018 U	[0.05]
Naphthalene	0.35 U	1 U	0.42 J	0.043 J	[14]

CEF-BP-4S [5-15]	07/08	01/09	07/09	01/10	
2-Methylnaphthalene	0.02 U	0.24 U	0.3 U	0.018 U	[28]
Benzo(a)anthracene	0.01 U	0.048 U	0.023 U	0.092 U*	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	0.023 U	0.092 U*	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	0.0046 U	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	0.023 U	0.018 U	[0.05]
Naphthalene	0.35 U	1 U	NS	0.018 U	[14]

CEF-BP-1S [5-15]	07/08	01/09	07/09	01/10	
2-Methylnaphthalene	17	31.3*	22	20	[28]
Benzo(a)anthracene	0.01 U	0.048 U	0.023 U	0.048 J	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	0.023 U	0.039 J	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	0.0046 U	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	0.43 J	0.018 U	[0.05]
Naphthalene	110*	183**	160**	60*	[14]

CEF-BP-6S [4-14]	07/08	01/09	07/09	08/09	01/10	
2-Methylnaphthalene	0.28	1.3	1.6	3.1	7.1	[28]
Benzo(a)anthracene	0.03 J	0.048 U	0.097	0.024 U	0.018 U	[0.05]
Benzo(b)flouranthene	0.01 U	0.048 U	0.023 J	0.024 U	0.018 U	[0.05]
Dibenzo(a,h)anthracene	0.02 U	0.048 U	0.0046 U	0.019 U	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.02 U	0.048 U	0.023 U	0.027 J	0.018 U	[0.05]
Naphthalene	0.91 J	8.3	11	9.8	29*	[14]

CEF-BP-8S [5-15]	07/09	01/10	
2-Methylnaphthalene	0.3 U	0.018 U	[28]
Benzo(a)anthracene	0.023 U	0.022 J	[0.05]
Benzo(b)flouranthene	0.023 U	0.019 J	[0.05]
Dibenzo(a,h)anthracene	0.0046 U	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.23 U	0.018 U	[0.05]
Naphthalene	0.12 U	0.026 J	[14]

CEF-BP-9S [5-15]	07/09	01/10	
2-Methylnaphthalene	0.3 U	0.038 J	[28]
Benzo(a)anthracene	0.098 *	0.092 U*	[0.05]
Benzo(b)flouranthene	0.027 J	0.092 U*	[0.05]
Dibenzo(a,h)anthracene	0.17 *	0.018 U	[0.005]
Indeno(1,2,3-cd)pyrene	0.32 J *	0.018 U	[0.05]
Naphthalene	0.12 U	0.034 J	[14]

DATE		DRAWN BY	CONTRACT NUMBER
MJJ	30Jan10	MJJ	2267
CHECKED BY	DATE	APPROVED BY	DATE
COST/SCHEDULE-AREA		APPROVED BY	DATE
SCALE	AS NOTED	DRAWING NO.	FIGURE 4
		REV	0

NAVFAC

PAH ANALYTICAL RESULTS
2ND SEMI-ANNUAL, 2ND YEAR
GROUNDWATER MONITORING REPORT
BP WELLS SITE
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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ATTACHMENT A

NATURAL ATTENUATION MONITORING PLAN

Natural Attenuation Monitoring Work Plan, Building G-82 (Tank G-82) and BP Wells Sites,

Former Naval Air Station Cecil Field, Jacksonville, Florida

PREPARED FOR: Cecil Field Base Cleanup Team

PREPARED BY: CH2M HILL Project Team

DATE: May 29, 2008

PROJECT NUMBER: 271591

1.0 Introduction

This technical memorandum outlines the long-term monitored natural attenuation (MNA) program requirements to be implemented at the Building G-82 (Tank G-82) and the BP Wells Sites at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. Figure 1 shows the location of the sites within NAS Cecil Field.

CH2M HILL Constructors, Inc. (CH2M HILL) conducted a site-wide groundwater sampling event during November 2006. Geochemical data were evaluated to determine if natural attenuation was occurring in groundwater at the two sites and if parameter concentrations were decreasing in response to naturally occurring degradation processes. The evaluation involved comparing geochemical data from source area and downgradient monitoring wells to background values measured in upgradient wells. Based on these results, a long-term monitoring program for natural attenuation parameters was developed for implementation, as described below.

1.1 Site Background

The MNA program focuses on the Building G-82 and BP Wells Sites.

1.1.1 Building G-82 Site

The Building G-82 Site comprised an air traffic control tower and underground storage tank (UST) G-82 located at the former NAS Cecil Field in Jacksonville, Florida. Tank G-82 was used to store diesel fuel for emergency generators. Tank G-82 was removed in June 1997. Soil and groundwater have been impacted near the UST as a result of leaks originating from Tank G-82. The leaking tank released an unknown volume of fuel to the environment.

Following the removal of Tank G-82, a piezometer (CEF-G-82-1S, see Figure 2) was installed near the former location of the tank in January 1998. The hydrocarbon compounds 1-methylnaphthalene and 2-methylnaphthalene were detected in groundwater samples collected from CEF-G-82-1S at concentrations that exceeded Florida Department of Environmental Protection (FDEP) Groundwater Cleanup Target Levels (GCTLs). In January 1999, Harding Lawson Associates (HLA) performed additional sampling and prepared a

Confirmatory Sampling Report (CSR) recommending the completion of additional site assessment (SA) to determine the extent of hydrocarbons in the soil and groundwater.

Between October 1999 and July 2000, Tetra Tech NUS, Inc. (TtNUS) conducted the SA at Building G-82. Five shallow monitoring wells (CEF-G-82-2S through 6S) and one intermediate monitoring well (CEF-G-82-2I) were installed, and samples were collected to determine the extent of hydrocarbons in the soil and groundwater. TtNUS recommended excavation of 280 cubic yards (yd^3) of soil that contained volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) that exceeded FDEP Soil Cleanup Target Levels (SCTLs). Following soil removal, TtNUS recommended MNA as the remedial approach for groundwater.

During 2001, CH2M HILL was contracted by Southern Division Naval Facilities Engineering Command (NAVFAC) to perform the soil excavation work. The objective of the work was to excavate and dispose of the soil exceeding the FDEP SCTLs. Soil removal continued until either headspace readings using an organic vapor analyzer (OVA) were below 10 parts per million (ppm) or predetermined excavation boundaries (foundation boundaries and concrete aircraft apron) were reached. Approximately 148 tons of petroleum-impacted soil was removed. Following completion of the excavation activities, confirmation samples were collected from the north and south excavation walls to verify that remaining soil met the SCTLs. The analytical results from these samples indicated that the north and south excavation extent was complete. However, OVA readings from the east and west excavation walls indicated headspace concentrations exceeded 10 ppm, suggesting petroleum-impacted soil with concentrations above the SCTLs likely remained outside the limits of excavation. However, due to the close proximity of the excavation to the foundation of Building G-82 and the aircraft apron, excavation activities were terminated to prevent potential damage to the infrastructure.

Following the removal action in October 2001, TtNUS performed a supplemental assessment of the site. The results of the supplemental assessment and the associated sampling were presented in the Site Assessment Report Addendum (SARA) (TtNUS, 2001).

As part of the SARA, subsurface soil samples were collected from six locations along Building G-82 and along the flightline apron. These samples were collected outside the excavation area to evaluate residual contamination following the removal action. The samples were collected at a depth of 5 to 6 feet below land surface and were analyzed for VOCs, PAHs, and Total Recoverable Petroleum Hydrocarbons (TRPH). Based on the results of the original six samples, Synthetic Precipitation Leaching Procedure (SPLP) analyses were also performed. The SARA concluded that approximately 49 yd^3 of contaminated soil remained along Building G-82 and the flightline apron. TRPH was present above its SCTLs. Xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected in the leachate of the SPLP samples at concentrations that exceed their respective GCTLs.

In April, 2002, the Base Realignment and Closure (BRAC) team (BCT) recommended sampling of subsurface soil for the purpose of identifying the TRPH subclassification. Three samples were collected; however, one sample contained TRPH below the SCTLs and was not subclassified. Of the two samples that were analyzed for TRPH hydrocarbon-chain speciation, one sample contained concentrations of one fraction (C12 – C16, aliphatic) that exceeded its subclassification SCTLs. Based on these results, TtNUS recommended a

pilot-scale air sparging treatability study for the site. These findings were presented to the BCT at the May 15, 2002, meeting. The BCT agreed that an air sparging treatability pilot study should be performed.

No action was taken until a site-wide groundwater sampling event in November 2006. The results of the sampling event (discussed in Section 1.2) indicated that natural attenuation was occurring and the concentration of the contaminants of concern had been decreasing in the absence of active remediation.

A technical memorandum presenting the groundwater sampling results was prepared by CH2M HILL and presented to FDEP (CH2M HILL, 2007). A copy of this technical memorandum is included in Attachment 1. During the September 2007 BCT meeting, FDEP agreed that, based on the 2006 site-wide groundwater sampling results, no active remediation, such as air sparging, was needed at the Building G-82 Site.

1.1.2 BP Wells Site

The BP Wells Site is located on the north-south flightline, southeast of Building 880, on the west edge of the flightline apron. From 1999 to 2000, assessment activities were performed to determine the extent of hydrocarbons in soil and groundwater beneath the BP Wells Site. A due diligence investigation was conducted by Golder Associates, Inc. (1999) for the new property tenants (Jacksonville Airport Authority and Air Kaman). Four shallow wells (CEF-BP-1S through 4S, and CEF-BP-6S) and one intermediate well (CEF-BP-5I) were installed at the site (Figure 2). The reported results indicated the presence of hydrocarbons in groundwater beneath the site.

Subsequently, the Navy directed TtNUS to conduct an SA. The SA confirmed the presence of contaminated groundwater and identified the groundwater flow direction to the southeast. A Site Assessment Report (SAR) (2000) was submitted to the 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 semiannual groundwater sampling events in April and October of 2001. Because the hydrocarbon concentrations at the source well were greater than the applicable natural attenuation default concentrations (NADCs) and because the contaminant concentrations appeared to be increasing, the second monitoring report recommended that the semiannual 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 that a treatability study be performed to evaluate the effectiveness of in-situ enhanced bioremediation at the site. In-situ Submerged Oxygen Curtain (iSOC™) technology was to be evaluated to perform this test. In April 2004, TtNUS submitted an Enhanced Natural Attenuation Treatability Study (ENATS) Work Plan for the BP Wells Site.

Similar to the Building G-82 Site, no action was taken until a site-wide groundwater sampling event was conducted in November 2006. The results of the sampling event, discussed in Section 1.2, indicate that natural attenuation was occurring at the site and the concentration of the contaminants of concern had been decreasing.

1.1.3 Remedial Action Objectives

The remedial action objective for the Building G-82 and BP Wells Sites is to achieve cleanup of groundwater contaminant concentrations to levels below the Florida GCTLs with a short-term remedial action objective to achieve reduction of contaminant concentrates to below the Florida NADCs.

1.2 Natural Attenuation Monitoring

1.2.1 Groundwater Contamination Summary

In November 2006, the following monitoring wells were sampled for contaminant characterization:

- Building G-82 Site: CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-3S, CEF-G82-4S, CEF-G82-5S, and CEF-G82-6S.
- BP Wells Site: CEF-BP-1S, CEF-BP-2S, CEF-BP-3S, CEF-BP-4S, CEF-BP-5I, and CEF-BP-6S.

Groundwater samples from both sites were analyzed for VOCs (U.S. Environmental Protection Agency [EPA] Method 8260B), PAHs (EPA Method 8310), and TRPH (Florida Petroleum Residual Organic [FL-PRO] Method).

Building G-82 Site

In November 2006, the following compounds were detected at concentrations exceeding the GCTLs: isopropylbenzene (cumene), naphthalene, and 1-methylnaphthalene in wells CEF-G82-1S and CEF-G82-2S; 2-methylnaphthalene in well CEF-G82-2S; and benzo(a)pyrene and dibenz(a,h)anthracene in well CEF-G82-1S. The benzo(a)pyrene detection of 7.95 micrograms per liter (µg/L) and the dibenz(a,h)anthracene detection of 35.9 µg/L in well CEF-G82-1S also exceeded NADC criteria of 2 µg/L and 0.05 µg/L, respectively.

Only groundwater sampled from wells CEF-G82-1S and CEF-G82-2S contained constituents at levels exceeding GCTLs during the November 2006 sampling event. Groundwater sampled from the surrounding monitoring wells (CEF-G82-3S, CEF-G82-4S, CEF-G82-5S, and CEF-G82-6S) and the well screened below the shallow monitoring wells (CEF-G82-2I) did not contain constituents of concern at elevated levels.

The following parameters were historically detected at concentrations above the GCTLs in well CEF-BP-2S: benzene, ethylbenzene, total xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene. In general, the concentrations of VOCs (benzene, ethylbenzene, and total xylenes) in well CEF-G82-2S decreased in concentration when compared to previous sampling events, suggesting that biodegradation of these compounds is occurring. Concentrations of the PAH compounds 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)pyrene, and dibenz(a,h)anthracene increased slightly compared to historical results. However, because PAHs are less mobile and tend to be more persistent than VOCs, it is expected that future monitoring will indicate that PAHs decrease over time, similarly to the VOCs, at this site. A summary of the historical analytical results from the Building G-82 Site is presented as the third attachment in Attachment 1.

BP Wells Site

In November 2006, the following compounds were detected at concentrations exceeding the GCTLs: isopropylbenzene (cumene), ethylbenzene, total xylenes, 1,3,5-trimethylbenzene, and 1,2,4- trimethylbenzene. All exceedances occurred in well CEF-BP-1S; however, one of these detections exceeded NADC criteria. The remaining wells at the BP Wells Site did not show any exceedances of either the GCTLs or NADC criteria.

Comparison of the November 2006 test data with historical sampling data collected in 2003 (2003 data is presented as the second attachment in Attachment 1) indicates that hydrocarbon concentrations in groundwater beneath the BP Wells Site have decreased in concentration.

1.2.2 Future Remedial Action

Future remedial action at the Building G-82 and BP Wells Sites includes long-term monitoring of natural attenuation in groundwater for an initial period of 3 years. Additional monitoring requirements will be evaluated at the end of the third year of monitoring.

1.3 Long-Term Monitoring for Natural Attenuation

1.3.1 Objectives

The objective of long-term monitoring for natural attenuation at the Building G-82 and BP Wells Sites is to collect the physical and chemical data necessary to monitor changes in dissolved hydrocarbon concentrations and verify that conditions continue to be favorable for natural attenuation to occur. Remediation for groundwater will be complete when dissolved hydrocarbon concentrations naturally attenuate to concentration below the Florida GCTLs.

1.3.2 Significance of Natural Attenuation Parameters for Long-Term Monitoring

Monitoring key natural attenuation parameters will help determine if water quality conditions remain favorable for biological degradation of hydrocarbons to occur and if parameter concentrations continue to decrease in response to the degradation processes. The following parameters will be evaluated during each sampling event: dissolved oxygen (DO), Oxidation Reduction Potential (ORP), pH, nitrates/nitrite, sulfate, sulfide, and methane. Groundwater quality in background wells will be compared to wells containing parameters in exceedance of GCTLs. A discussion of the MNA measurements made during the November 2006 sampling event is provided below.

Dissolved Oxygen (DO)

DO measurements were made to determine the distribution of DO in groundwater relative to the distribution of dissolved hydrocarbons. In the absence of hydrocarbons, DO concentrations in groundwater typically range from 1.0 to 1.5 milligrams per liter (mg/L) depending on water temperature (i.e., DO concentrations are higher in cold water and lower in warm water). DO is often depleted in groundwater contaminated with hydrocarbons as a result of in-situ biodegradation. Oxygen is consumed and carbon dioxide is produced in the biodegradation process.

In groundwater beneath the Building G-82 Site, DO concentrations ranged from 0.36 mg/L (CEF-G82-2I) to 0.84 mg/L (CEF-G82-5S). The DO concentrations measured in wells CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-4S, and CEF-G82-6S were below those in the background well CEF-G82-3S. These data suggest that subsurface conditions are

suboptimal for aerobic hydrocarbon biodegradation. However, general reductions in VOC concentrations over time suggest that anaerobic biodegradation of contaminants may be occurring.

DO concentrations at the BP Wells Site ranged from 0.6 mg/L (CEF-BP-1S) to 1.50 mg/L (CEF-BP-3S) as measured using the Chemetrics® field test kits during the November 2006 sampling event. The DO concentration of 0.6 mg/L in well CEF-BP-1S was slightly below the DO measured in the upgradient (background) well CEF-BP-2S at 0.8 mg/L. With the exception of well CEF-BP-1S, which showed slightly elevated VOCs, the DO readings at the site were generally similar to background levels. These data suggest that subsurface conditions are suboptimal for aerobic hydrocarbon biodegradation. However, contaminant concentration reductions suggest that anaerobic biodegradation of contaminants may be occurring.

Oxidation Reduction Potential (ORP)

ORP is a measure of the relative tendency of ions in solution to transfer electrons. As electron acceptors are utilized, the ORP of the groundwater decreases. As DO is consumed, the ORP will decline and perhaps become negative.

ORP across the BP Wells Site ranged from -126.0 millivolts (mV) to 186.7 mV. Negative ORP levels were measured at only two well locations: CEF-BP-1S (-117.9 mV) and CEF-BP-6S (-126.0 mV). The negative ORP detected in groundwater sampled from these locations suggests that reducing conditions are prevalent in the vicinity of well CEF-BP-1S. This was the only well with parameter concentrations above GCTLs.

ORP across the Building G-82 Site ranged from -127.2 mV to 233.8 mV. ORP levels were similar in wells CEF-G82-1S (-127.2 mV) and CEF-G82-2S (-126.0 mV). These were the only monitoring wells with significantly negative ORP, and they were also the only wells with contaminant concentrations above GCTLs. Similar to the BP Wells Site, these results suggest that reducing conditions are prevalent in the vicinity of the wells showing elevated contaminant concentrations in groundwater.

pH

The pH of groundwater has an effect on the presence and activity of microbial populations in groundwater. Microbes capable of degrading petroleum hydrocarbons generally prefer pH values varying from 6 to 8 standard units.

At the BP Wells Site, groundwater pH values ranged from 5.13 (CEF-BP-5I) to 6.49 (CEF-BP-1S) with a background value of 6.37 (CEF-BP-2S), generally within the preferred range of values for microbial activity. Further, pH in groundwater sampled from monitoring well CEF-BP-1S, the only well with parameter concentrations above GCTLs, was 6.49.

At the Building G-82 Site, the pH values ranged from 4.97 (CEF-G82-4S) to 6.02 (CEF-G82-2S) with a background value of 5.81 (CEF-G82-3S), indicating that optimal pH conditions for microbial activity were not present at all locations at this site. However, pH values in the vicinity of CEF-G82-1S and CEF-G82-2S (the two wells with contaminant concentrations exceeding GCTLs) were 5.96 and 6.02, respectively, indicating that in this area of the site, pH is generally within the range optimal for microbial activity.

Nitrates/Nitrite

After DO has been depleted, biodegradation of hydrocarbons may continue anaerobically using total nitrate/nitrite as electron acceptors (denitrification). Nitrate/nitrite concentrations will be lower in the wells containing hydrocarbons (such as benzene, toluene, ethylbenzene, and xylenes [BTEX]), if biodegradation is occurring. Nitrate and nitrite were detected in seven of the eight monitoring wells in which the parameters were analyzed.

At the BP Wells Site, nitrate and nitrite were detected in three of the four monitoring wells in which the parameter was analyzed. The nitrate and nitrite concentrations, ranging from non-detect to 561 µg/L in the downgradient wells, were lower than the concentration of the background well CEF-BP-2S (733 µg/L). No nitrate/nitrite was detected in groundwater sampled from CEF-BP-1S, the only monitoring well with contaminant concentrations exceeding GCTLs, suggesting that reducing conditions are favorable for denitrification in this area.

At the Building G-82 Site, the nitrate and nitrite concentrations ranging from 44 to 66 µg/L in the downgradient wells were similar to the concentration in background well CEF-G82-3S (72 µg/L). The presence of nitrate and nitrite in the areas of impacted groundwater suggests that conditions are unfavorable for denitrification..

Sulfate/Sulfide

After DO and total nitrogen have been depleted in the aquifer, sulfate may be used as an electron acceptor for anaerobic biodegradation. This process is termed sulfate reduction, and results in the production of sulfide. Portions of the hydrocarbon plume undergoing anaerobic biodegradation may have depleted sulfate concentrations and caused elevated sulfide concentrations. Sulfate reducing conditions are favorable at redox potentials of -200 mV and pH of 7.

Sulfate was detected in each of the four wells that were monitored for the parameter at the BP Wells Site. The concentrations of sulfate were higher in the downgradient wells than in the background well. The presence of sulfate in the areas of impacted groundwater at concentrations higher than background and low sulfide concentrations suggest that conditions favorable for sulfate reduction are not present.

Sulfate was detected in two of the four wells that were monitored for the parameter at the Building G-82 Site. The concentrations of sulfate were lower in the downgradient wells than the background well. Sulfate was not present in groundwater sampled from CEF-G82-1S, (the area of highest levels of contaminants of concern) and was detected at levels below those detected in the background sample in groundwater sampled from CEF-G82-2S (the only other site monitoring well to contain contaminants at levels exceeding GCTLs); additionally, sulfide was detected in groundwater sampled from CEF-G82-1S and CEF-G82-2S at levels exceeding those detected in the background sample. The absence or limited presence of sulfate in the areas of impacted groundwater at concentrations lower than background, coupled with the presence of sulfide at concentrations higher than background, suggests that subsurface conditions at the site may be favorable for sulfate reduction in these areas.

Methane

The presence of methane in groundwater at concentrations above background is a good indicator that methanogenesis is occurring. During methanogenesis, carbon dioxide is used as an electron acceptor and methane is formed. The presence of methane in groundwater is also indicative of strong reducing conditions.

Dissolved methane was detected in three of the four wells analyzed at the BP Wells Site. The concentration of methane exceeded background concentrations in wells CEF-BP-1S, CEF-BP-5I, and CEF-BP-6S. The presence of methane above background concentrations may be indicative of anaerobic microbial degradation of hydrocarbons occurring at the site.

Dissolved methane was detected in each of the four wells analyzed at the Building G-82 Site. The concentration of methane exceeded background (estimated 1.63 µg/L) significantly in wells CEF-G82-1S (1,340 µg/L) and CEF-G82-2S estimated 680 µg/L), suggesting anaerobic microbial degradation of hydrocarbons is occurring in these source areas.

2.0 Sampling and Analysis Plan for Natural Attenuation Monitoring

This section describes the sampling procedures that will be followed during execution of the work scope. Analytical methods, data quality objectives, protocol for equipment decontamination, and procedures used for the collection of samples for waste characterization are discussed in this section.

2.1 Sampling Objectives

The objective of long-term monitoring for natural attenuation at the Building G-82 and BP Wells Sites is to collect the physical and chemical data necessary to monitor changes in dissolved hydrocarbon concentrations and verify that conditions continue to be favorable for natural attenuation to occur. Remediation for groundwater will be complete when dissolved hydrocarbon concentrations naturally attenuate to concentration below the Florida GCTLs. In order to achieve these objectives, the following tasks will be performed:

- Measure water levels quarterly to obtain the data required to prepare potentiometric surface maps and to evaluate fluctuations in groundwater elevation.
- Collect the following water quality measurements from 13 wells (CEF-BP-1S, CEF-BP-2S, CEF-BP-3S, CEF-BP-4S, CEF-BP-5I, CEF-BP-6S, CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-3S, CEF-G82-4S, CEF-G82-5S, and CEF-G82-6S) during the well purging process to evaluate the physical parameters of the aquifer: pH, conductivity, turbidity, DO, ORP, and temperature.
- Collect groundwater samples from 13 wells (CEF-BP-1S, CEF-BP -2S, CEF-BP-3S, CEF-BP-4S, CEF-BP-5I, CEF-BP-6S, CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-3S, CEF-G82-4S, CEF-G82-5S, and CEF-G82-6S) for the analysis of BTEX and naphthalene by EPA Method 8260B, PAHs (16 PAHs including both 1-methylnaphthalene and 2-methylnaphthalene) by EPA Method 8270SIM, and TPH by the FL-PRO Method.
- Collect groundwater samples from eight wells (CEF-BP-1S, CEF-BP-2S, CEF-BP-5I, CEF-BP-6S, CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, and CEF-G82-3S) for the analysis of sulfate/sulfide, alkalinity, nitrate/nitrite, and methane.

Details regarding completion of these tasks are described below.

2.2 Monitoring Well Network

The following eight wells will be analyzed for the MNA parameters: dissolved methane (Method RSK 175), nitrate/nitrite and sulfate (EPA Method 300.0), and sulfide (Method SM4500-S_2 F):

- BP Wells Site: CEF-BP-1S, CEF-BP-2S, CEF-BP-5I, and CEF-BP-6S.
- Building G-82 Site: CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, and CEF-G82-3S.

The following 13 wells will be analyzed for BTEX and naphthalene by EPA Method 8260B, PAHs (including 1-methylnaphthalene and 2-methylnaphthalene) by EPA Method 8270SIM, and TRPH by the FL-PRO Method:

- BP Wells Site: CEF-BP-1S, CEF-BP-2S, CEF-BP-3S, CEF-BP-4S, CEF-BP-5I, and CEF-BP-6S.
- Building G-82 Site: CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-3S, CEF-G82-4S, CEF-G82-5S, and CEF-G82-6S.

Requirements for sample collection, preservation, and analysis are listed in Table 1.

2.3 Frequency of Monitoring

Based on discussions during the January 2008 NASCF BCT Meeting, groundwater will be monitored on a quarterly basis for the first year of long-term monitoring for the Building G-82 Site and on a semiannually basis for the BP Wells Site. During the second year, semiannual groundwater will be performed at both sites. During the third year, annual groundwater monitoring will performed at both sites. After the completion of the third year of monitoring, the natural attenuation progress will be evaluated to determine if additional monitoring is necessary.

2.4 Data Quality Levels for Measurement Data

The samples will be collected in accordance with the EPA Region IV Field Branches Quality System and Technical Procedures, November 2007, and the FDEP Standard Operating Procedures (SOPs).

The sampling team will be qualified under the Navy Installation Restoration Chemical Data Quality Manual (IRCDQM), 1999 sampling requirements. A Navy-, U.S. Army Corps of Engineers (USACE)-, or Air Force Center for Engineering and the Environment (AFCEE)- and FDEP-approved laboratory will be used for all sample analyses.

TABLE 1
Requirements for Sample Collection, Preservation, and Analysis

Sample Task	Sample Point	Matrix	Sampling Frequency (Note 1)	Approx Sample No	Sampling Method	Sampling Equipment	TAT	DQO Level/ Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservation	Containers
Groundwater Sampling													
Groundwater Sampling	Monitoring Wells (6 wells – BP Wells Site; 7 wells – Bldg G-82 Site)	Water	1st & 3rd Quarter – 1st yr; Semiannually 2nd yr; Annually 3rd yr	13 + 2 DUP + 1 MS/MSD = 17 (per event); 85 total	Grab	Hand Bailer	14 days	DQO Level IV, CCI Level C	BTEX and naphthalene	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 mL vials
	Monitoring Wells (7 wells – Bldg G-82 Site)		2nd & 4th Quarter – 1st yr;	7 + 1 DUP + 1 MS/MSD = 10; 20 total					PAH including 1- & 2-methylnapthalene	8270SIM	7 days ext; 40-days analysis	Cool to 4°C	(2) 1-L amber glass
									TRPH	FL-PRO	7 days ext; 40-days analysis	HCl pH< 2; Cool to 4°C	(2) 1-L amber glass
	Monitoring Wells (4 wells – BP Wells Site; 4 wells – Bldg G-82 Site)	Water	1st & 3rd Quarter – 1 yr; Semiannually 2nd yr; Annually 3rd yr	8 + 1 DUP + 1 MS/MSD = 11 (per event) – 55 total	Grab	Hand Bailer	14 days		Sulfate	300.0 / 300.1	28 days	Cool to 4°C	(1) 500-mL plastic
	Monitoring Wells (4 wells – Bldg G-82 Site)		2nd & 4th Quarter – 1st yr;	4 + 1 DUP + 1 MS/MSD = 7; 14 total					Sulfide	SM 4500-S2-F	7 days	Cool to 4°C, pH>9 w/NaOH; add Zinc Acetate	(1) 1000-mL plastic
									Nitrate	300.0	48 hours	Cool to 4°C	(1) 500-mL plastic
									Nitrite	300.0	48 hours	Cool to 4°C	(1) 500-mL plastic
									Methane	RSK-175	14 days	Cool to 4°C, pH <2 w/HCl, no headspace	(2) 40 mL vials

TABLE 1
Requirements for Sample Collection, Preservation, and Analysis

Sample Task	Sample Point	Matrix	Sampling Frequency (Note 1)	Approx Sample No	Sampling Method	Sampling Equipment	TAT	DQO Level/ Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservation	Containers
	Equipment Rinsate Blank	Water	1 per 10% of sampling	1 per event	Prepared in Field	Analyte-free water, SS funnel	14 days		BTEX and naphthalene	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 mL vials
									PAH including 1- & 2-methylnapthalene	8270SIM	7 days ext; 40-days analysis	Cool to 4°C	(2) 1-L amber glass
									TRPH	FL-PRO	7 days ext; 40-days analysis	HCl pH< 2; Cool to 4°C	(2) 1-L amber glass
									Sulfate	300.0 / 300.1	28 days	Cool to 4°C	(1) 500-mL plastic
									Sulfide	SM 4500-S2-F	7 days	Cool to 4°C, pH>9 w/NaOH; add Zinc Acetate	(1) 1000-mL plastic
									Nitrate	300.0 / 300.1	48 hours	Cool to 4°C	(1) 500-mL plastic
									Nitrite	300.0 / 300.1	48 hours	Cool to 4°C	(1) 500-mL plastic
									Methane	RSK-175	14 days	Cool to 4°C, pH <2 w/HCl, no headspace	(2) 40 mL vials
	Trip Blank	Water	1 per cooler containing volatile samples	7	Prepared by Lab	N/A	14 days		BTEX and naphthalene	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 mL vials
Waste Characterization Sampling													
Disposal of Liquid Waste from well development, purge water, etc.	55-gallon drums containing liquid waste	Water	One per event	7	Grab	Drum thief or dip jar	7 days	DQO Level III, CCI Level B	TCL Volatiles	8260B	14 days	HCl pH< 2; Cool to 4°C	(2) 40 ml vial
									TCL Semi-volatiles	8270C	7 days ext; 40-days analysis	Cool to 4°C	(2) 1-L amber glass

TABLE 1
Requirements for Sample Collection, Preservation, and Analysis

Sample Task	Sample Point	Matrix	Sampling Frequency (Note 1)	Approx Sample No	Sampling Method	Sampling Equipment	TAT	DQO Level/ Data Package Reqmnt	Required Analysis	Analytical Method	Holding Time	Sample Preservation	Containers
									TCL Pesticides	8081A	7 days ext; 40-days analysis		(2) 1-L amber glass
									Herbicides	8151A	7 days ext; 40-days analysis		(2) 1-L amber glass
									PCBs	8082	7 days ext; 40-days analysis		(2) 1-L amber glass
									TAL Metals	6010B/7470 A	180 days; Hg = 28 days	HNO_3 pH< 2; Cool to 4°C	(1) 500ml HDPE
									Ignitability	1010A/1030	ASAP	Cool to 4°C	(1) 500ml HDPE
									Corrosivity	9040B	ASAP		

Note 1: BTEX + Naphthalene, PAHs, TRPH, and MNA parameters will be collected from wells at both sites during the 1st and 3rd quarterly events in the first year; during both semiannual events in the second year; and annually during the 3rd year. Only the wells at the Building G-82 Site will be collected for these parameters during the 2nd and 4th quarterly events in the first year.

DQO – Data Quality Objective
MS/MSD – Matrix Spike/Matrix Spike Duplicate
PCBs – polychlorinated biphenyls
TAL – Target Analyte List
TCL – Target Compound List

2.5 Groundwater Sampling and Analyses

Samples will be collected from all BP Wells Site and Building G-82 Site wells and analyzed for BTEX and naphthalene, PAHs, and TRPH. In addition, samples will be collected from four wells at each site (eight total) for MNA analyses. Groundwater samples will be collected following the EPA's procedures for low-flow groundwater sampling. The procedure outlined below is based on the EPA's report entitled, "Ground Water Issue: Low-Flow (Minimal-Drawdown) Ground-Water Sampling Procedures," (EPA, 1996) and is as follows:

1. Slowly lower the decontaminated pump or pump intake to the middle of the screened interval to minimize excessive mixing of the stagnant water in the casing above the screen with water within screened zone and to minimize re-suspension of solids that may have accumulated at the bottom of the well.

2. Once the pump is positioned in the well, an airtight flow-through cell (equipped with a YSI-type water quality meter) will be connected to the water discharge line.

3. A water level meter will then be lowered into the well to monitor changes in water level during pumping. Once purging begins, water level measurements will be monitored, and pumping rates will be adjusted so that the rate is between 0.1 to 0.3 liter per minute (L/min) to maintain minimal drawdown.

4. While purging, field parameters (DO, pH, temperature, conductivity, salinity, turbidity, and ORP) will be measured every 3 to 5 minutes using a YSI-type meter and will be recorded until all parameters have stabilized for 3 consecutive readings. Once field parameter stabilization is achieved, the sample bottles will be filled.

5. Water samples will be collected by directing the groundwater discharge stream from the pump so that it runs down the inside of the sample bottle with a minimum amount of splashing. To minimize VOC loss, samples to be analyzed for BTEX and naphthalene will be collected first, followed by the analyses for PAHs, TRPH, sulfate/sulfide, alkalinity, nitrate/nitrite, total organic carbon, and ferrous iron. The sample bottles for each analysis are as follows:

   – BTEX and naphthalene by EPA Method 8260B: Three 40-milliliter (mL) volatile organic analytic (VOA) vials containing a hydrochloric acid (HCl) preservative. Fill bottles so there is no headspace within the bottles.

   – PAHs by EPA Method 8270SIM: Two 1-liter amber bottles. Fill to the top of the bottle.

   – TRPH by the FL-PRO Method: Two 1-liter amber bottles containing either hydrochloric acid (HCl) or sulfuric acid (H_2SO_4) preservative. Fill to the top of the bottle.

   – Sulfide by Method SM 4500S_2-F: One 1,000-mL bottle containing sodium hydroxide (NaOH) and zinc acetate preservative for sulfide. Fill to the top of each bottle.

   – Nitrate, nitrite, and sulfate by EPA Method 300.0: One 1000-mL plastic bottle. Fill to the top of the bottle.

- Methane by RSK-175: Two 40-mL VOA vials or amber glass bottle containing either HCl preservative. Fill with no headspace.

6. Cap each bottle and affix label to the bottle. Label information will include laboratory, project name and number, sample identification, station identification, preservative, analysis, sampler's initials, sample date, and time. Place samples in appropriate containers and pack with ice in coolers.

Requirements for sample collection, preservation, and analysis are listed in Table 1. Samples will be delivered to the laboratory as soon as possible to allow the samples to be analyzed within the specified holding times. Requirements for quality assurance/quality control (QA/QC) samples are listed in Table 1.

Residual purge water collected during sampling will be transferred to a 55-gallon drum and will be characterized in accordance with this Sampling and Analysis Plan and disposed of based on the results of sampling analyses.

2.6 Waste Characterization and Incidental Waste Stream Sampling and Analyses

Waste characterization samples will be collected to evaluate the handling and treatment and disposal requirements of accumulated decontamination water and purge water. Water characterization samples will be collected from containment drums prior to disposal. One composite sample (and one grab for VOC analysis) will be collected per event. Water samples will be collected as follows and analyzed for the parameters listed in Table 1:

1. Use a bailer or dip jar and collect a water sample from its containment.
2. Fill the sample containers for volatile analyses first (grab sample). The 40-mL vials will be filled so that there is no headspace in each vial.
3. Then fill the sample containers for the remaining analyses.
4. Label and package the samples for shipment to the laboratory.

2.7 Equipment Decontamination

Sampling methods and equipment have been selected to minimize decontamination requirements and the possibility of cross-contamination. The following procedure will be used for all sampling equipment used to collect routine samples undergoing trace organic or inorganic analyses.

Reusable sampling equipment will be decontaminated before the initial sample is collected and between sampling locations using the following procedure:

1. Clean with potable water and Alconox® or equivalent laboratory grade detergent using a brush, if necessary, to remove particulate matter and surface films.
2. Rinse thoroughly with potable water.
3. Rinse thoroughly with analyte-free water.
4. Rinse thoroughly with isopropanol (pesticide-grade). Do not rinse polyvinyl chloride or plastic items with isopropanol.

5. Rinse thoroughly with organic/analyte-free water.
6. Allow equipment to air dry completely.

2.8 Sample Documentation

Sampling documentation will include the following:

- Numbered Chain-of-Custody Forms
- Sample log book, which includes the following information:
  - Name of laboratories and contacts to which the samples were sent, turnaround time requested, and data results, when possible
  - Termination of a sample point or parameter and reasons
  - Unusual appearance or odor of a sample
  - Measurements, volume of flow, temperature, and weather conditions
  - Details of QC samples obtained
  - Field analytical equipment, and equipment utilized to make physical measurements
  - Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment
  - Sampling station identification
  - Date and time of sample collection
  - Sampler(s)' name(s) and company
  - How the sample was collected
  - Weather conditions that may affect the sample (e.g., rain, extreme heat or cold, wind, etc.)
- Sample Labels
- Custody Seals

2.9 Field Quality Control

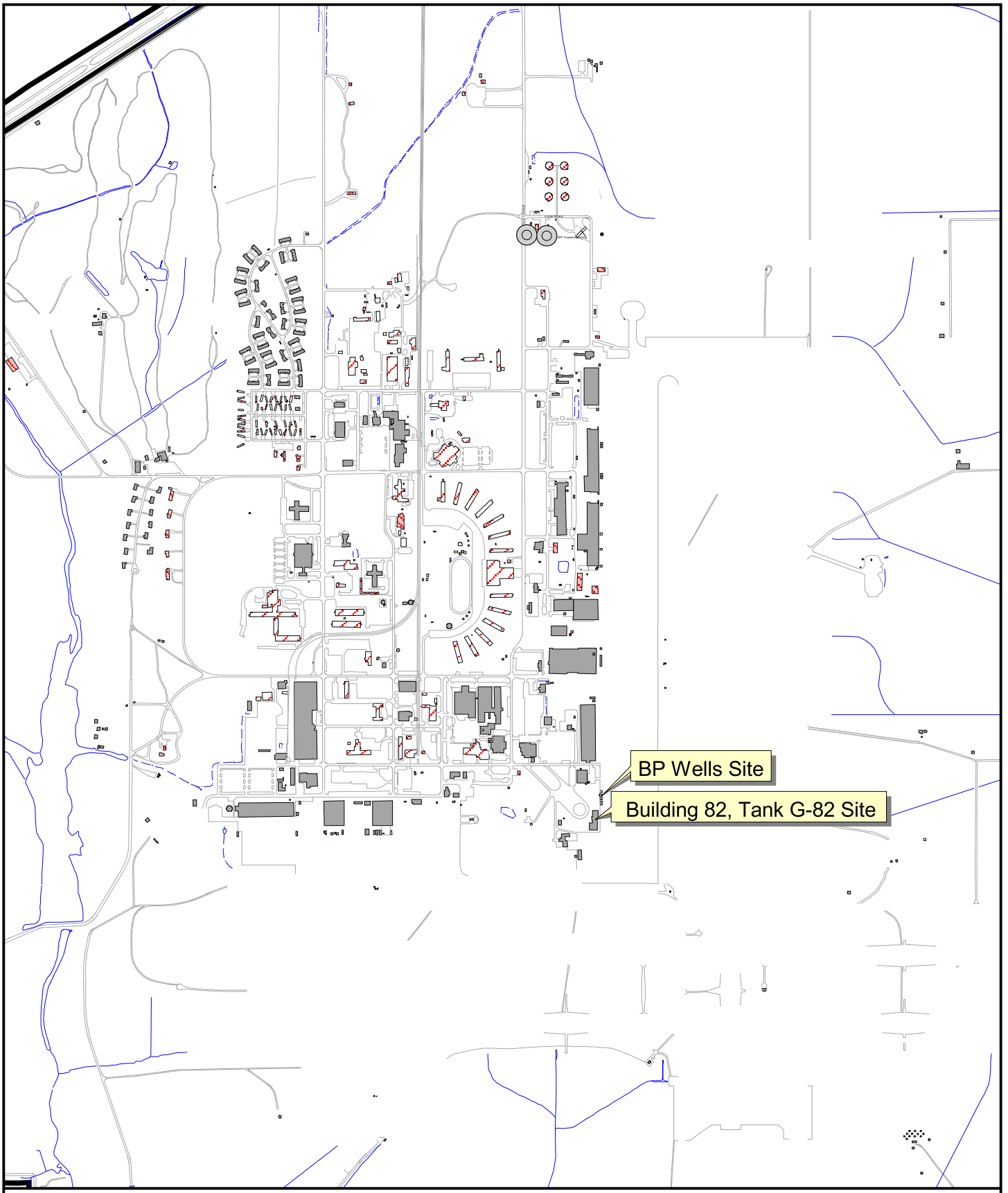
Field duplicate samples and equipment blank samples will be collected at a minimum frequency of 10 percent times the total number of samples (rounded to nearest whole number) collected for an analysis. One trip blank sample will be provided at a frequency of one per sample cooler containing volatile samples. MS/MSDs will be required at a frequency of one per sample event or a minimum of 5 percent of the total number (rounded to nearest whole number) of samples collected for an analysis. QC samples are not required for waste characterization. Quantity and frequency are detailed in Table 1.

2.10 Reporting

A report will be compiled at the completion of each of the monitoring events. Each performance monitoring report will include a description of the field sampling event, field data, updated potentiometric surface maps, validated analytical data from the monitoring event, a discussion of the MNA parameters, and charts showing trends of contaminants of concern concentrations over the period of the MNA long-term monitoring.

Figures

NOTE: Original figure created in color



N

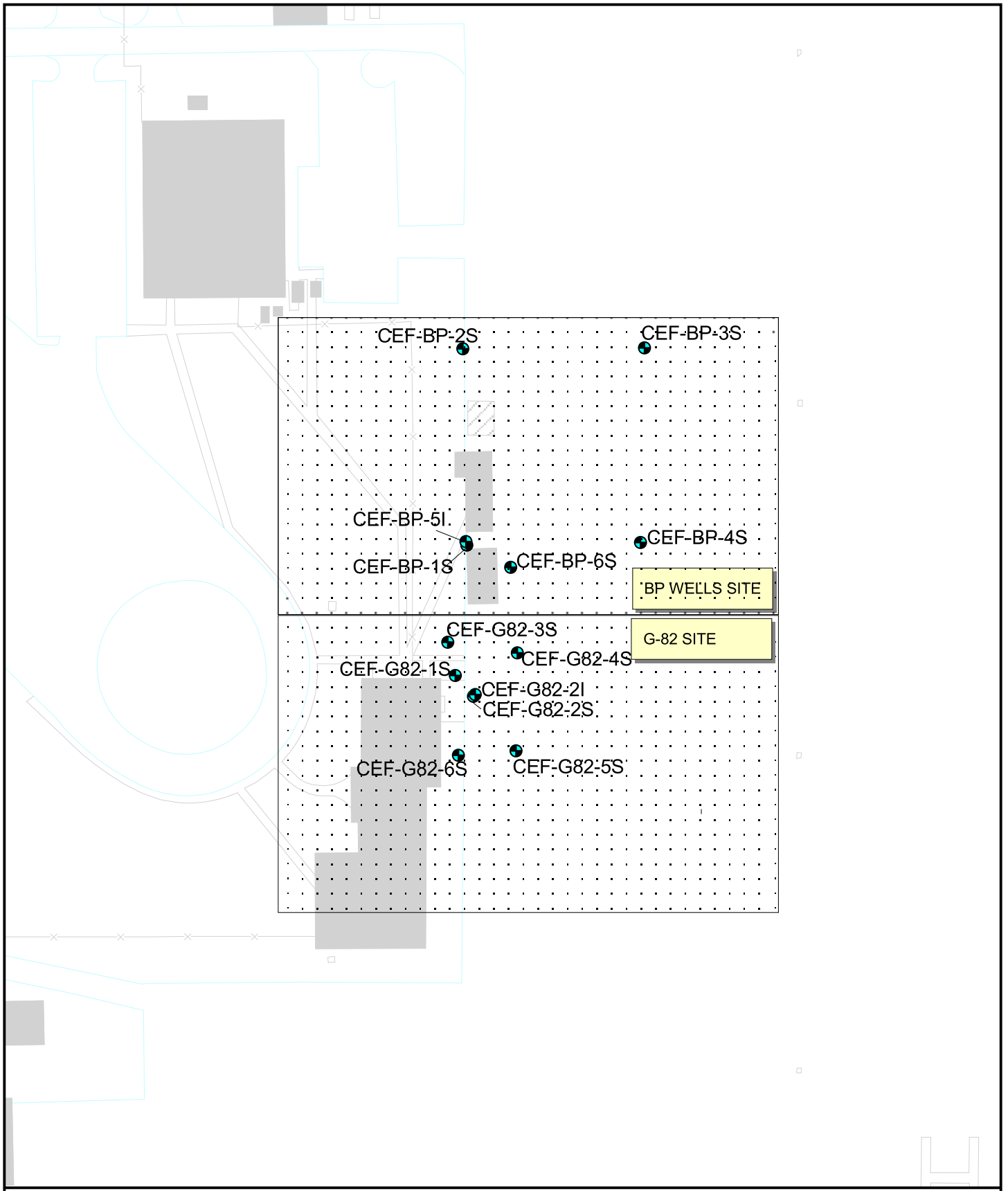
0 1000 2000 Feet

1 inch = 1376.99 feet

Figure 1
Site Location
Bldg. G-82 and BP Wells Sites
Former NAS Cecil Field, Jacksonville, FL

CH2MHILL

File Path: c:\gis\nas_cecilfield.apr, Date: 30 Oct 2006 14:38, User: SNAIK1, NAS Cecil Field Area [Florida State Plane Coordinate System NAD 83 Units Feet] - Figure 1-1 Site Location



N

0 80 160 Feet

1 inch = 124 feet

Figure 2
Locations of Groundwater Monitoring Wells
Building G-82 and BP Wells Sites
Former NAS Cecil Field, Jacksonville, FL

CH2MHILL

File Path: c:\gis\nas_cecilfield.apr, Date: 05 May 2008 13:35, User: SNAIK1, NAS Cecil Field Area [Florida State Plane Coordinate System NAD 83 Units Feet] - Figure 2 Locations of Groundwater Monitoring Wells

Attachment 1

2007 CH2M HILL Technical Memorandum

Evaluation of Groundwater Analytical Results from BP Wells Site and Building 82 (Tank G82) Former Naval Air Station Cecil Field, Jacksonville, Florida

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CTO 0086 Project File

DATE: April 27, 2007

1.0 Introduction

This technical memorandum summarizes the findings from the sitewide groundwater monitoring conducted by CH2M HILL Constructors, Inc. (CH2M HILL) at the BP Wells Site and Building 82 Site (Tank G-82) at the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. This site-wide groundwater monitoring effort was conducted to assess current groundwater quality conditions and to evaluate whether natural attenuation of site contaminants is occurring at these two sites. This work was conducted based on the methodology described in the *Work Plan Addendum No. 18, CTO 86, NAS Cecil Field, Jacksonville, Florida* (CH2M HILL, November 2006).

2.0 Groundwater Monitoring

Figure 1 shows the locations of the BP Wells site and the Building G-82 site. Figure 2 shows the locations of the monitoring wells at these two sites.

The following monitoring wells at the BP well site and the Building G-82 Site were sampled in November 2006 for contaminant characterization:

- **BP Wells Site**: CEF-BP-1S, CEF-BP -2S, CEF-BP -3S, CEF-BP -4S, CEF-BP -5I, and –6S
- **Building G82 Site**: CEF-G82-1S, CEF-G82 -2I, CEF-G82-2S, CEF-G82-3S, CEF-G82-4S, CEF-G82-5I, and CEF-G82–6S

The groundwater samples from both sites were analyzed for the following parameters: volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 8260B, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8310, and total recoverable petroleum hydrocarbons (TRPH) by the Florida Petroleum Residual Organic (FL PRO) method. The analytical results of these samples are summarized in Table 1.

The following groundwater monitoring wells were sampled for the monitored natural attenuation (MNA) parameters:

- **BP Wells Site:** CEF-BP-1S, CEF-BP -2S, CEF-BP -5I, and CEF-BP –6S
- **Building G82 Site:** CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, and CEF-G82–3S

The groundwater samples were analyzed for the following MNA parameters: dissolved methane by EPA Method 8315, nitrate and nitrite by EPA Method 353.2, sulfate by EPA Method 375.4, sulfide by EPA Method 376.2, total organic carbon (TOC) by EPA Method 415.1 and total inorganic carbon (TIC) by EPA Method 415.1. The MNA groundwater analytical results are summarized in Table 2.

The groundwater in each monitoring well was tested in the field for pH, conductivity, turbidity, dissolved oxygen (DO), oxidation reducing potential (ORP) and temperature, as part of the sampling protocol. The results of the field tests are included in Table 2. The analytical laboratory and data validation reports for the groundwater sampling event are included in Attachment 1.

3.0 Summary of Findings from Groundwater Sampling

3.1 Contaminant Characterization Sampling Results

BP Wells Site

The following parameters were detected concentrations above the Florida Groundwater Cleanup Target Levels (GCTLs) during the November 2006 sampling event: isopropyl-benzene (cumene), ethylbenzene, total xylenes, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene. All reported exceedances were in well CEF-BP-1S. None of these detections exceeded the Florida Natural Attenuation Default Concentration (NADC) criteria. The remaining wells at the BP Wells site did not show any exceedances of either the GCTLs or NADC criteria.

A summary of the 2003 historical analytical results from the BP Well Site is included in Attachment 2. The following parameters were detected historically at concentrations above the GCTLs in well CEF-BP-1S: ethylbenzene, total xylenes, 1,3,5-trimethylbenzene, and 1,2,4-trimethylebenzene. In general, these site groundwater constituents at the BP Wells Site have decreased in concentrations when compared to the previous sampling events conducted during 2003.

Building G-82 Site

The following parameters were detected at concentrations above the GCTLs during the November 2006 monitoring well sampling event: isopropylbenzene (cumene), naphthalene and 1-methylnaphthalene in wells CEF-G82-1S and CEF-G82-2S; 2-methylnaphthalene in well CEF-G82-2S; and benzo(a)pyrene and dibenz(a,h)anthracene in well CEF-G82-1S. The benzo(a)pyrene detection of 7.95 micrograms per liter (µg/L) and the dibenz(a,h)anthracene detection of 35.9 µg/L in well CEF-G82-1S also exceeded NADC standards of 2 µg/L and 0.05 µg/L, respectively.

A summary of the historical analytical results from the Building 82 Site is presented in Attachment 3. No parameters were detected historically at concentrations above the GCTLs in well CEF-G82-1S. The following parameters were historically detected at concentrations above the GCTLs in well CEF-BP-2S: benzene, ethylbenzene, total xylenes, 1-methyl-naphthalene, 2-methylnaphthalene, and naphthalene. In general, the concentrations of VOCs (benzene, ethylbenzene, and total xylenes) in well CEF-G82-2S from the November 2006 sampling event decreased in concentrations when compared to the previous sampling events. However, the concentrations of PAHs 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)pyrene and dibenz(a,h)anthracene increased slightly when compared with historical results.

3.2 MNA Analytical Results

Geochemical data were evaluated to determine if natural attenuation is continuing to occur in groundwater at the two sites and if parameter concentrations are decreasing in response to naturally-occurring degradation processes. The evaluation involves comparing geochemical data from source area and downgradient monitoring wells to background values measured in upgradient wells. The parameters evaluated included DO, ORP, pH, nitrate and nitrite, sulfate and sulfide, and dissolved methane. A discussion of the results of each parameter is presented below.

3.2.1 BP Wells Site

Dissolved Oxygen

DO measurements were recorded in each monitoring well during the November 2006 groundwater sampling event. Typically, DO concentrations below 1.0 milligram per liter (mg/L) indicate conditions are anoxic and a reducing environment is present. DO concentrations at the BP Wells Site ranged from 0.6 mg/L (CEF-BP-1S) to 1.50 mg/L (CEF-BP-3S) as measured using the Chemetrics® field test kits. The DO concentration of 0.6 mg/L in well CEF-BP-1S was slightly below the DO measured in the upgradient (background) well CEF-BP-2S at 0.8 mg/L. With the exception of well CEF-BP-1S, which showed slightly elevated VOCs, the DO readings at the site are generally similar to background levels. These data suggest that subsurface conditions are suboptimal for aerobic hydrocarbon biodegradation. However, contaminant concentration reductions indicate that anaerobic biodegradation of contaminants could be occurring.

Oxidation/Reduction Potential (Redox potential)

Redox potential is a measure of the relative tendency of ions in solution to transfer electrons. As electron acceptors are utilized, the redox potential of the groundwater decreases. As DO is consumed, the redox potential will decline and become negative. Redox potentials across the BP Well Site ranged from –126 millivolts (mV) to 186.7 mV. The lowest redox level was measured in CEF BP-6S. Negative redox potentials were also measured in source area monitoring well CEF-BP-1S, which suggests that reducing conditions are favorable for biodegradation in the vicinity of CEF-BP-1S. This is the only well with parameter concentrations above GCTLs.

pH

The pH of groundwater has an effect on the presence and activity of microbial populations in groundwater. Microbes capable of degrading petroleum hydrocarbons generally prefer pH values varying from 6 to 8 standard units. The pH values range from 5.13 (CEF-BP-5I) to 6.49 (CEF-BP-1S) with a background value of 6.37 (CEF-BP-2S), generally within the preferred range of values for microbial activity.

Nitrate/Nitrite

After DO has been depleted, biodegradation of hydrocarbons may continue anaerobically using total nitrate and nitrite as electron acceptors (denitrification). Nitrate and nitrite concentrations will be lower in the wells containing hydrocarbons if biodegradation is occurring. Nitrate and nitrite were detected in three of the four monitoring wells in which the parameter was analyzed. The nitrate and nitrite concentrations, ranging from non-detect to 561 ug/L in the downgradient wells, were lower than the concentrations of the background well CEF-BP-2S (733 ug/L). The presence of nitrate/nitrite in the areas of impacted groundwater suggests that reducing conditions favorable for denitrification are not present.

Sulfate/Sulfide

After DO and total nitrogen have been depleted in the aquifer, sulfate may be used as an electron acceptor for anaerobic biodegradation. This process is termed sulfate reduction and results in the production of sulfide. Portions of the plume containing hydrocarbons and undergoing anaerobic biodegradation may have depleted the sulfate concentrations and elevated the sulfide concentrations. Sulfate reducing conditions are favorable at redox potentials of –200 mV and ph of 7. Sulfate was detected in each of the four wells that were monitored for the parameter. The concentrations of sulfate were higher in the downgradient wells than in the background well. The presence of sulfate in the areas of impacted groundwater at concentrations higher than background and low sulfide concentrations suggest that conditions favorable for sulfate reduction are not present.

Dissolved Methane

The presence of methane in groundwater at concentrations above background is a good indicator that methanogenesis is occurring. During methanogenesis, carbon dioxide is used as an electron acceptor and methane is formed. The presence of methane in groundwater is indicative of strong reducing conditions. Methane was detected in three of the four wells analyzed. The concentration of methane exceeded background concentrations in wells CEF-BP-1S, CEF-BP -5I, and CEF-BP-6S. The presence of methane above background concentrations may be indicative of anaerobic microbial degradation of hydrocarbons occurring at the site.

3.2.2 Building G-82 Site

Dissolved Oxygen

DO concentrations in groundwater at the Building G-82 site ranged from 0.36 mg/L (in well CEF-G82-2I) to 0.84 mg/L (in well CEF-G82-5S). The DO concentrations measured in wells CEF-G82-1S, CEF-G82-2I, CEF-G82-2S, CEF-G82-4S, and CEF-G82–6S were below those in

the background well CEF-G82-3S. These data suggest that subsurface conditions are suboptimal for aerobic hydrocarbon biodegradation. However, general reductions in VOC concentrations over time indicate that biological degradation of contaminants is occurring.

Oxidation/Reduction Potential

Redox potentials across the Building G-82 Site ranged from –127.2 mV to 233.8 mV. The lowest redox level was measured in well CEF-G82-2S at -127.2 mV. Significantly negative redox potentials were measured only in monitoring wells CEF-G82-1S and CEF-G82–2I, suggesting that reducing conditions are prevalent in the vicinity of these wells, which are the only wells with contaminant concentrations above GCTLs.

pH

The pH of groundwater has an effect on the presence and activity of microbial populations in groundwater. Microbes capable of degrading petroleum hydrocarbons generally prefer pH values varying from 6 to 8 standard units. The pH values range from 4.97 (CEF-G82-4S) to 6.02 (CEF-G82-2S) with a background value of 5.81 (CEF-G82-3S), indicating that optimal pH conditions for microbial activity are not present at all locations at this site.

Nitrate/Nitrite

Nitrate and nitrite were detected in each of the four monitoring wells in which the parameter was analyzed. The nitrate and nitrite concentrations ranging from 44 to 66 ug/L in the downgradient wells were similar to the concentration in background well CEF-G82-3S (72 µg/L). The presence of nitrate and nitrite in the areas of impacted groundwater suggests that reducing conditions favorable for denitrification are not present.

Sulfate/Sulfide

Sulfate was detected in two of the four wells that were monitored for the parameter. The concentrations of sulfate were lower in the downgradient wells than the background well. The presence of sulfate in the areas of impacted groundwater at concentrations higher than background suggests that subsurface conditions at the site may not be favorable for sulfate reduction.

Dissolved Methane

Dissolved methane was detected in each of the four wells analyzed. The concentration of methane exceeded background in wells CEF-G82-1S, CEF-G82-2I, and CEF-G82-2S. Because methane is not present in gasoline or diesel fuel, the presence of methane above background concentrations may be indicative of anaerobic microbial degradation of hydrocarbons.

4.0 Conclusions

At the BP Wells Site, the following parameters were detected at concentrations above the GCTLs during the November 2006 sampling event: isopropylbenzene (cumene), ethylbenzene, total xylenes, 1,3,5-trimethylbenzene, and 1,2,4-trimethylebenzene in well CEF-BP-1S. Contaminant concentrations exceeded the GCTLs at only one monitoring well (CEF-BP-1S). Based on the laboratory analytical results, site contaminant concentrations in remaining wells at the BP Well site did not exceed GCTLs, and none of the detected

concentrations at this site exceed the NADC criteria. In general, the November 2006 site groundwater contaminant concentrations at the BP Wells site have decreased when compared to the historical sampling events. The MNA sampling data indicate that anaerobic degradation processes may be prevalent at the site.

Based on the analytical results, the residual groundwater contamination at this site appears to remain localized around the source area well CEF-BP-1S and does not appear to have migrated downgradient since the last sampling event in October 2003. Additionally, the impervious paved surface at the site acts as a barrier against the infiltration of precipitation, thus reducing the contaminant migration potential.

At the Building G-82 Site, the following parameters were detected at concentrations above the GCTLs during the well November 2006 sampling event: isopropylbenzene (cumene), naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)pyrene and dibenz(a,h)-anthracene. Only the dibenz(a,h)anthracene detection in well CEF-G82-1S exceeded the NADC criteria.

In summary, the concentrations of VOCs (benzene, ethylbenzene, and xylenes) in the source area well CEF-G82-2S have decreased in concentrations when compared to the previous sampling events, and the concentrations of PAHs have remained similar in CEF-G82-2S and increased slightly in well CEF-G82-1S, when compared to the historical results.

The single NADC exceedance in the source well CEF-G82-1S of dibenz(a,h)anthracene and the appearance of benzo(a)pyrene (two compounds which were not previously detected at the site above laboratory detection limits) appear to be anomalous. The PAH concentrations in CEF-G82-1S should be monitored further to establish concentration trends over time.

Tables

TABLE 1

Groundwater Analytical Results

Bldg. G82 and BP Site Groundwater

Parameter			BP WELL SITE							Building 82 Tank G82 Site							
	Station ID		CEF-BP-1S	CEF-BP-2S	CEF-BP-3S	CEF-BP-4S		CEF-BP-5I	CEF-BP-6S	CEF-G82-1S	CEF-G82-2I		CEF-G82-2S	CEF-G82-3S	CEF-G82-4S	CEF-G82-5S	CEF-G82-6S
	Sample ID		86BP1SW061108	86BP2SW061107	86BP3SW061102	86BP4SW061102	86BPDPW061102	86BP5IW061107	86BP6SW061108	86G821SW061108	86G822IW061106	86G82DPW061106	86G822SW061106	86G823SW061106	86G824SW061102	86G825SW061102	86G826SW061102
	Sample Date		11/8/2006	11/7/2006	11/2/2006	11/2/2006	11/2/2006	11/7/2006	11/8/2006	11/8/2006	11/6/2006	11/6/2006	11/6/2006	11/6/2006	11/2/2006	11/2/2006	11/2/2006
	GCTL[1]	NADC					FIELD DUP					FIELD DUP					
SW8260B	Units in ug/L																
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	1.15 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2,4-Trichlorobenzene	70	700	3.34 JB	5 U	5 U	5 U	5 U	5 U	3.39 JB	3.44 JB	1.08 J	5 U	5 U	5 U	3.55 J	3.57 J	5 U
1,2,4-Trimethylbenzene	10	100	**60.8 JB**	5 U	0.201 J	5 U	5 U	5 U									
1,3,5-Trimethylbenzene (Mesitylene)	10	100	**19 JB**	5 U	0.224 J	5 U	5 U	5 U									
1,2-Dichlorobenzene	600	6000	5 UJ	5 U	0.277 J	5 U	5 U	5 U	5 UJ	5 UJ	5 U	0.35 J	5 U	5 UJ	5 U	5 U	5 U
1,3-Dichlorobenzene	210	2100	5 U	5 U	0.25 JB	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	6300	63000	5.42 JB	89	25 UJ	25 UJ	25 UJ	25 U	25 JB	32.8 JB	3.25 J	6.72 B	18 J	15.9 B	7.38 JB	17.1 JB	25 U
Benzene	1	10	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.447 J	5 U	5 U	5 U	5 U	5 U
Bromomethane	9.8	98	5 U	5 UJ	5 U	5 U	5 U	5 UJ	0.924 JB	5 U	5 UJ	0.74 B	5 UJ	0.926 B	5 U	5 U	5 U
cyclohexane	NE	NE	5.74	5 U	5 U	5 U	5 U	5 U	5 U	3.97 J	5 U	5 U	2.62 J	5 U	5 U	5 U	5 U
Ethylbenzene	30	300	**53.1**	5 U	5 U	5 U	5 U	5 U	0.458 J	6.21	5 U	5 U	11.1	5 U	0.433 J	5 U	5 U
Isopropylbenzene (Cumene)	0.8	8	**5.61**	5 U	0.179 J	5 U	5 U	5 U	5 U	**3.66 J**	5 U	5 U	**4.02 J**	5 U	5 U	5 U	5 U
methylcyclohexane	NE	NE	9.53	5 U	0.173 J	5 U	5 U	5 U	3.95 J	4.04 J	5 U	5 U	3.23 J	5 U	5 U	5 U	5 U
Methylene chloride	5	50	10 U	10 U	1.74 JB	1.58 JB	1.46 JB	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene (PCE)	3	30	5 UJ	5 U	0.406 J	0.233 J	5 U	5 U	5 UJ	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 U	5 U
Toluene	40	400	3.16 J	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Xylenes, total	20	200	**101 J**	10 U	0.61 J	10 U	10 U	10 U	10 UJ	12.1 J	10 U	10 UJ	5.89 J	10 UJ	10 U	10 U	10 U
SW8310																	
1-methylnaphthalene	28	280	8.66 J	1 U	1 U	1 U	1 U	1 U	1 U	**48.8**	1 U	1 U	**138 J**	1 U	6.11 J	1 U	1 U
2-Methylnaphthalene	28	280	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	**65.9 J**	1 U	1 U	1 U	1 U
Acenaphthylene	210	2100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5 U	1 U	1 U	5.54 J	1 U	1 U	1 U	1 U
Benzo(a)pyrene	0.2	2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**7.95 J**	0.1 U	0.1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenz(a,h)anthracene	0.005	0.05	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**35.9 J**	0.1 U	0.1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U
Fluorene	280	2800	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.51 J	0.5 U	0.5 U	3.98 J	0.5 U	0.5 U	0.5 U	0.5 U
Naphthalene	14	140	6.47	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**40.7 J**	0.5 U	0.5 U	**56.5 J**	0.5 U	0.5 U	0.5 U	0.5 U
FLPRO																	
Petroleum hydrocarbons	5000	50000	459 B	126 B	86.4 B	112 B	114 B	69 JB	133 B	613 B	59 JB	59 JB	878 JB	54 JB	202 B	274 B	86 B

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC GCTLs reported in µg/L
U - The analyte was analyzed for, but not detected.
J - Result is estimated
UJ- Value non-detect, estimated.
JB- Estimated value; the analyte was detected in the associated method and/or calibration blank.
NE - Not Established at time of rule adoption
Bold indicates concentration exceeds GCTL.
Shaded indicates concentration exceeds NADC.

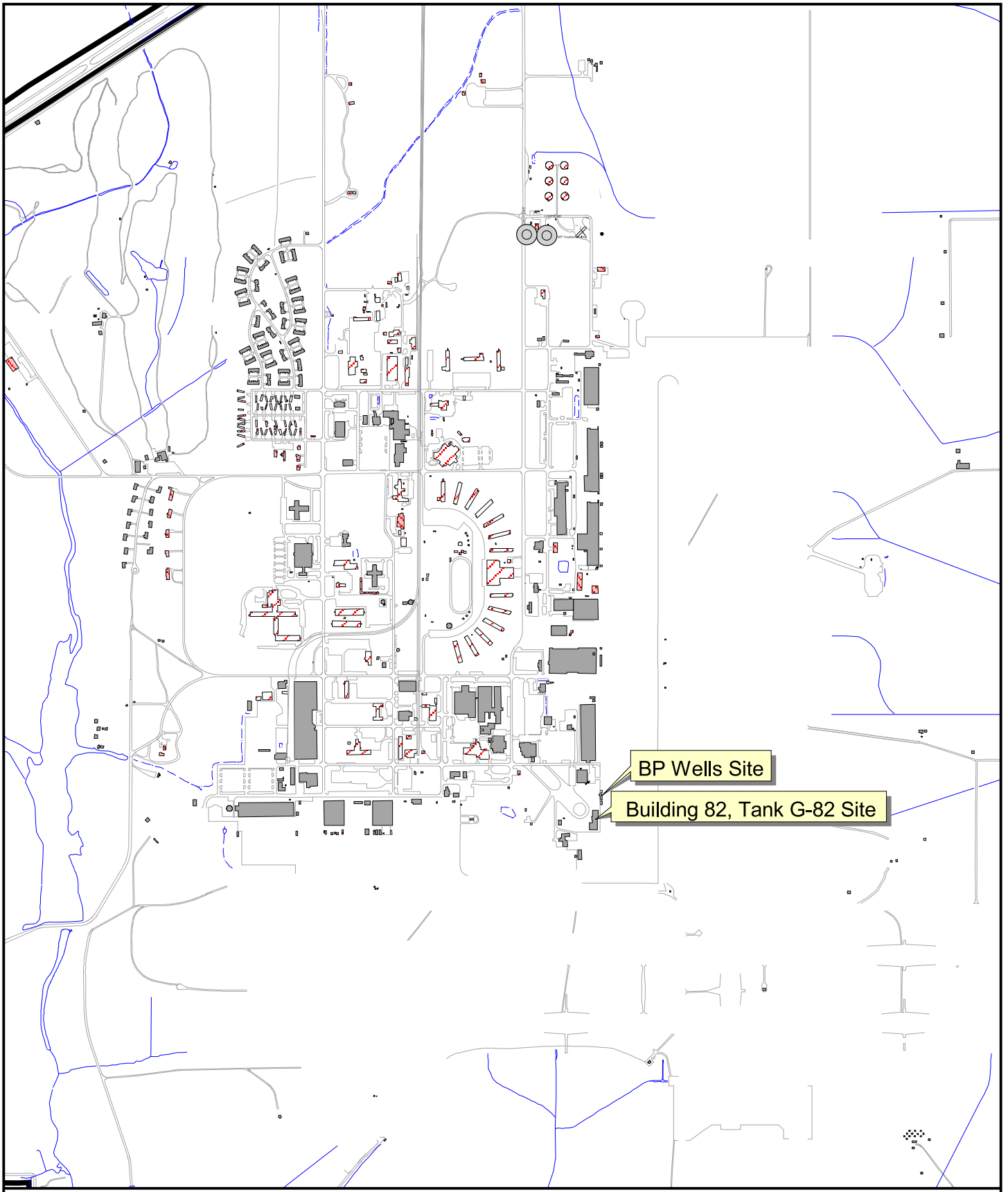
TABLE 2
MNA Parameter Results
Bldg. G82 and BP Site Groundwater

Station ID	CEF-BP-1S	CEF-BP-2S	CEF-BP-3S	CEF-BP-4S		CEF-BP-5I	CEF-BP-6S	CEF-G82-1S	CEF-G82-2I		CEF-G82-2S	CEF-G82-3S	CEF-G82-4S	CEF-G82-5S	CEF-G82-6S
Sample ID	86BP1SW061108	86BP2SW061107	86BP3SW061102	86BP4SW061102	86BPDPW061102	86BP5IW061107	86BP6SW061108	86G821SW061108	86G822IW061106	86G82DPW061106	86G822SW061106	86G823SW061106	86G824SW061102	86G825SW061102	86G826SW061102
Sample Date	11/8/2006	11/7/2006	11/2/2006	11/2/2006	11/2/2006	11/7/2006	11/8/2006	11/8/2006	11/6/2006	11/6/2006	11/6/2006	11/6/2006	11/2/2006	11/2/2006	11/2/2006
					FIELD DUP					FIELD DUP					
Parameter	**Units in ug/L**														
Nitrogen, nitrate (as n)	10 U	709 B	NA	NA	NA	561 B	10 U	10 U	10 U	10 U	36	65	NA	NA	NA
Nitrogen, nitrite	10 U	24	NA	NA	NA	10 U	3 J	44	66	59	18	7 J	NA	NA	NA
Sulfate (as SO4)	6300	4200 J	NA	NA	NA	10400	8600	5000 U	5000 J	5400	6800	31600	NA	NA	NA
E376.1															
Sulfide	4000 U	1600 J	NA	NA	NA	3200 J	4000 U	8000	3200 JB	3200 JB	5200 JB	2800 JB	NA	NA	NA
E415.1															
Total Inorganic Carbon	9400	6000	NA	NA	NA	24600	6800	6500	9600 JB	8400 JB	24900 JB	20000 JB	NA	NA	NA
Total organic carbon	9000	2300	NA	NA	NA	1000 U	8100	16700	910 J	1100	9900	7700	NA	NA	NA
RSK-175															
Methane	7.8	2 U	NA	NA	NA	1.26 J	1230	1340	2.27 JB	2.09 JB	680 JB	1.63 JB	NA	NA	NA
Field Parameteters															
pH	6.49	6.37	6.24	6.43	6.43	5.13	5.96	5.96	5.08	5.08	6.02	5.81	4.97	5.25	5
Cond. (mmhos/cm)	399	199	176	248	248	87	210	210	54	54	262	265	93	129	97
Dissolved Oxygen (mg/L) Field	0.3	0.53	1.97	0.69	0.69	1.07	0.37	0.37	0.36	0.36	0.51	0.78	0.64	0.84	0.65
Dissolved Oxygen (mg/L) Chemets	0.6	0.8	1.5	1	1	1	0.8	0.6	0.3	0.3	0.6	0.8	0.6	1	1
Dissolved Oxygen (mg/L) Hach	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.8	1
ORP (mV)	-117.9	129.9	186.7	76.5	76.5	261	-126	-126	-7	-7	-127.2	200.4	99.4	69.7	233.8
Temp. (^{o}C)	24.4	25.5	28.5	28.2	28.2	23.79	23.28	23.2	23.6	23.6	24.5	24.4	28.5	26.9	24.5
Turbidity (NTUs)	0.33	7.6	7.57	29.7	29.7	0.73	3.67	61.7	99.3	99.3	21.1	3.92	4.3	5.83	24

J - Result is estimated.
UJ- Value non-detect, estimated.
JB- Estimated value; the analyte was detected in the associated method and/or calibration blank.
mS/cm = millisiemans per centimeter
NTU = nephelometric turbidity units
mg/L = milligrams per liter
^{o}C = degrees Celsius
ORP = oxygen reducing potential
mV = millivolts
NA - Not analyzed

Figures

NOTE: Original figure created in color



N

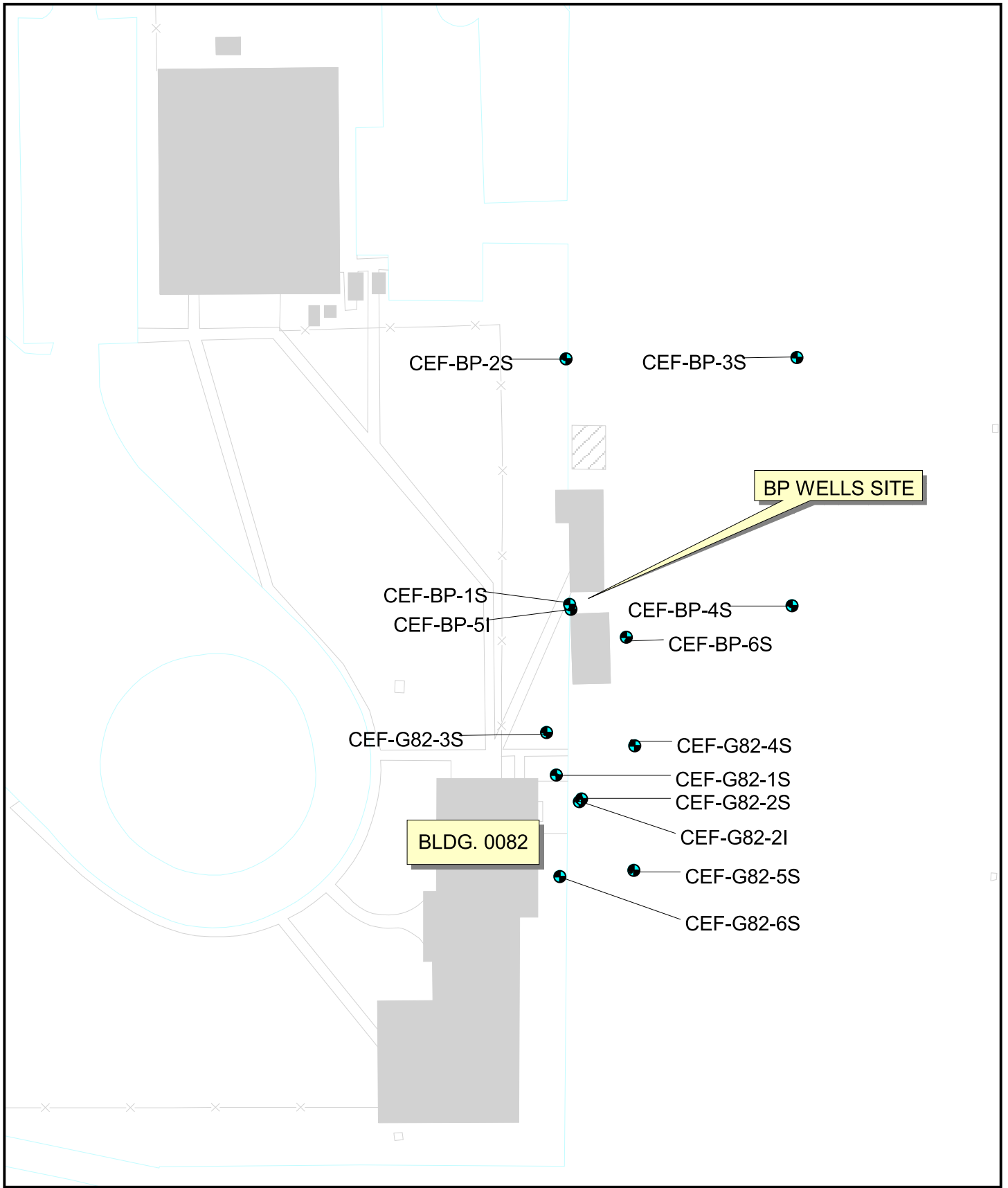
0 1000 2000 Feet

1 inch = 1376.99 feet

Figure 1
Site Location
Bldg. G-82 and BP Wells Sites
Former NAS Cecil Field, Jacksonville, FL

CH2MHILL

File Path: c:\gis\nas_cecilfield.apr, Date: 30 Oct 2006 14:38, User: SNAIK1, NAS Cecil Field Area [Florida State Plane Coordinate System NAD 83 Units Feet] - Figure 1-1 Site Location



Monitoring Wells

N

0 60 120 Feet

1 inch = 78 feet

Figure 2
Locations of Groundwater Monitoring Wells
BP Wells and Bldg. G-82 Sites
Former NAS Cecil Field, Jacksonville, FL

CH2MHILL

File Path: c:\gis\nas_cecilfield.apr, Date: 25 Apr 2007 19:18, User: SNAIK1, NAS Cecil Field Area [Florida State Plane Coordinate System NAD 83 Units Feet] - Figure 1-2 Locations of Groundwater Monitoring Wells

Attachment 1

Laboratory Analytical Reports
(provided on CD)

Attachment 2

BP Well Site Historical Analytical Results

Historical Detects in BP Wells - NAS Cecil Field

LOCID	SAMPLEID	QCTYPE	CAS	PARAMETER	RESULT	UNIT	QUALIFIER	FRACTION	MATR	SAMPLEDATE	SAMPLECODE
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	71-43-2	BENZENE	0.56	UG/L	J	OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	TTNUS001	TOTAL PETROLEUM HYDROCA	0.561	MG/L		PET	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	208-96-8	ACENAPHTHYLENE	2	UG/L		OS	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7439-95-4	MAGNESIUM	9420	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7440-23-5	SODIUM	2430	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7439-97-6	MERCURY	0.11	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7440-66-6	ZINC	45.5	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	91-20-3	NAPHTHALENE	3.9	UG/L		OS	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	108-88-3	TOLUENE	38.5	UG/L		OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	1330-20-7	TOTAL XYLENES	114	UG/L		OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7440-09-7	POTASSIUM	2260	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	100-41-4	ETHYLBENZENE	20.9	UG/L		OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7439-89-6	IRON	209	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7440-39-3	BARIUM	5.6	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	7440-70-2	CALCIUM	26800	UG/L		M	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	45.9	UG/L		OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	108-67-8	1,3,5-TRIMETHYLBENZENE	16.1	UG/L		OV	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-01	NM	91-57-6	2-METHYLNAPHTHALENE	2.7	UG/L		OS	GW	02/03/2000	NORMAL
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	TTNUS054	M+P-XYLENES	67.1	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	108-67-8	1,3,5-TRIMETHYLBENZENE	13.5	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	95-63-6	1,2,4-TRIMETHYLBENZENE	39.7	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	100-41-4	ETHYLBENZENE	15	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	95-47-6	O-XYLENE	19.1	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP1-GW-01S-02-D	FD	108-88-3	TOLUENE	30.1	UG/L		OV	GW	03/27/2000	DUP
CEF-BP-1S	CEF-BP-GW-01S-01-D	FD	95-63-6	1,2,4-TRIMETHYLBENZENE	144	UG/L		OV	GW	04/11/2001	DUP
CEF-BP-1S	CEF-BP-GW-01S-01-D	FD	108-67-8	1,3,5-TRIMETHYLBENZENE	49.9	UG/L		OV	GW	04/11/2001	DUP
CEF-BP-1S	CEF-BP-GW-01S-01-D	FD	1330-20-7	TOTAL XYLENES	432	UG/L		OV	GW	04/11/2001	DUP
CEF-BP-1S	CEF-BP-GW-01S-01A	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	156	UG/L		OV	GW	05/22/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-01A	NM	108-67-8	1,3,5-TRIMETHYLBENZENE	53.8	UG/L		OV	GW	05/22/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-01A	NM	1330-20-7	TOTAL XYLENES	634	UG/L		OV	GW	05/22/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-02A	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	360	UG/L		OV	GW	11/06/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-02A	NM	108-67-8	1,3,5-TRIMETHYLBENZENE	124	UG/L		OV	GW	11/06/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-02A	NM	1330-20-7	TOTAL XYLENES	894	UG/L		OV	GW	11/06/2001	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-03	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	262	UG/L		OV	GW	10/03/2002	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-03	NM	100-41-4	ETHYLBENZENE	117	UG/L		OV	GW	10/03/2002	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-03	NM	1330-20-7	TOTAL XYLENES	658	UG/L		OV	GW	10/03/2002	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	224	UG/L		OV	GW	01/06/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04	NM	108-67-8	1,3,5-TRIMETHYLBENZENE	71.5	UG/L		OV	GW	01/06/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04	NM	100-41-4	ETHYLBENZENE	161	UG/L		OV	GW	01/06/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04	NM	1330-20-7	TOTAL XYLENES	811	UG/L		OV	GW	01/06/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04A	NM	14797-55-8	NITRATE	0.41	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04A	NM	TTNUS003	TOTAL ORGANIC CARBON	12	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-04A	NM	74-82-8	METHANE	14	UG/L		OV	GW	01/30/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	74-82-8	METHANE	6.55	UG/L		OV	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	14797-55-8	NITRATE	0.12	MG/L		MISC	GW	04/17/2003	DUP

Historical Detects in BP Wells - NAS Cecil Field

LOCID	SAMPLEID	QCTYPE	CAS	PARAMETER	RESULT	UNIT	QUALIFIER	FRACTION	MATR	SAMPLEDATE	SAMPLECODE
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	TTNUS003	TOTAL ORGANIC CARBON	11.7	MG/L		MISC	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	95-63-6	1,2,4-TRIMETHYLBENZENE	273	UG/L		OV	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	108-67-8	1,3,5-TRIMETHYLBENZENE	144	UG/L		OV	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	100-41-4	ETHYLBENZENE	184	UG/L		OV	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01S-05-D	FD	1330-20-7	TOTAL XYLENES	542	UG/L		OV	GW	04/17/2003	DUP
CEF-BP-1S	CEF-BP-GW-01-06	NM	74-82-8	METHANE	24.5	UG/L		OV	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01-06	NM	108-67-8	1,3,5-TRIMETHYLBENZENE	38.4	UG/L		OV	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01-06	NM	95-63-6	1,2,4-TRIMETHYLBENZENE	118	UG/L		OV	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01-06	NM	100-41-4	ETHYLBENZENE	48	UG/L		OV	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01-06	NM	1330-20-7	TOTAL XYLENES	236	UG/L		OV	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-01-06	NM	TTNUS003	TOTAL ORGANIC CARBON	13	MG/L		MISC	GW	07/17/2003	NORMAL
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	1330-20-7	TOTAL XYLENES	1040	UG/L		OV	GW	10/16/2003	DUP
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	TTNUS003	TOTAL ORGANIC CARBON	12.4	MG/L		MISC	GW	10/16/2003	DUP
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	74-82-8	METHANE	28.3	UG/L		OV	GW	10/16/2003	DUP
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	108-67-8	1,3,5-TRIMETHYLBENZENE	130	UG/L		OV	GW	10/16/2003	DUP
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	95-63-6	1,2,4-TRIMETHYLBENZENE	460	UG/L		OV	GW	10/16/2003	DUP
CEF-BP-1S	CEF-BP-GW-1S-07-D	FD	100-41-4	ETHYLBENZENE	207	UG/L		OV	GW	10/16/2003	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7429-90-5	ALUMINUM	1790	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-70-2	CALCIUM	41200	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7439-95-4	MAGNESIUM	1010	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-39-3	BARIUM	11.5	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-50-8	COPPER	1.2	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7439-89-6	IRON	758	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7439-97-6	MERCURY	0.19	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-66-6	ZINC	8.6	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-23-5	SODIUM	12100	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-62-2	VANADIUM	9.2	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP1-GW-02S-01-D	FD	7440-09-7	POTASSIUM	3270	UG/L		M	GW	02/03/2000	DUP
CEF-BP-2S	CEF-BP-GW-02S-04A	NM	74-82-8	METHANE	1.4	UG/L		OV	GW	01/30/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-04A	NM	14797-55-8	NITRATE	0.88	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-04A	NM	TTNUS003	TOTAL ORGANIC CARBON	4	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-05	NM	14797-55-8	NITRATE	0.34	MG/L		MISC	GW	04/17/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-05	NM	TTNUS003	TOTAL ORGANIC CARBON	4.7	MG/L		MISC	GW	04/17/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-05	NM	74-82-8	METHANE	5.76	UG/L		OV	GW	04/17/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-02S-06	NM	TTNUS003	TOTAL ORGANIC CARBON	4.8	MG/L		MISC	GW	07/17/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-2S-07	NM	TTNUS003	TOTAL ORGANIC CARBON	4.6	MG/L		MISC	GW	10/16/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-2S-07	NM	14797-55-8	NITRATE	0.33	MG/L		MISC	GW	10/16/2003	NORMAL
CEF-BP-2S	CEF-BP-GW-2S-07	NM	74-82-8	METHANE	12.9	UG/L		OV	GW	10/16/2003	NORMAL
CEF-BP-6S	CEF-BP1-GW-06S-01	NM	67-64-1	ACETONE	26.3	UG/L		OV	GW	03/27/2000	NORMAL
CEF-BP-6S	CEF-BP1-GW-06S-01	NM	67-66-3	CHLOROFORM	1.1	UG/L		OV	GW	03/27/2000	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-04A	NM	14797-55-8	NITRATE	0.13	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-04A	NM	TTNUS003	TOTAL ORGANIC CARBON	9	MG/L		MISC	GW	01/30/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-04A	NM	74-82-8	METHANE	136	UG/L		OV	GW	01/30/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-05	NM	14797-55-8	NITRATE	0.71	MG/L		MISC	GW	04/17/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-05	NM	TTNUS003	TOTAL ORGANIC CARBON	6.1	MG/L		MISC	GW	04/17/2003	NORMAL

Historical Detects in BP Wells - NAS Cecil Field

LOCID	SAMPLEID	QCTYPE	CAS	PARAMETER	RESULT	UNIT	QUALIFIER	FRACTION	MATR	SAMPLEDATE	SAMPLECODE
CEF-BP-6S	CEF-BP-GW-06S-05	NM	100-41-4	ETHYLBENZENE	1.2	UG/L		OV	GW	04/17/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-05	NM	74-82-8	METHANE	149	UG/L		OV	GW	04/17/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-06S-06-D	FD	100-41-4	ETHYLBENZENE	0.51	UG/L	J	OV	GW	07/17/2003	DUP
CEF-BP-6S	CEF-BP-GW-06S-06-D	FD	TTNUS003	TOTAL ORGANIC CARBON	6.6	MG/L		MISC	GW	07/17/2003	DUP
CEF-BP-6S	CEF-BP-GW-06S-06-D	FD	14797-55-8	NITRATE	0.33	MG/L		MISC	GW	07/17/2003	DUP
CEF-BP-6S	CEF-BP-GW-06S-06-D	FD	74-82-8	METHANE	87.2	UG/L		OV	GW	07/17/2003	DUP
CEF-BP-6S	CEF-BP-GW-6S-07	NM	TTNUS003	TOTAL ORGANIC CARBON	8.5	MG/L		MISC	GW	10/16/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-6S-07	NM	14797-55-8	NITRATE	0.34	MG/L		MISC	GW	10/16/2003	NORMAL
CEF-BP-6S	CEF-BP-GW-6S-07	NM	74-82-8	METHANE	738	UG/L		OV	GW	10/16/2003	NORMAL

Attachment 3

Building G82 Site Historical Analytical Results

TABLE 3-1

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
SITE ASSESSMENT REPORT BUILDING 82, TANK G82
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

Location Sample Number Sample Date Well Depth, Feet	FDEP GCTL, FAC 62-777	CEF-G82-1S CEF-G82-GW-1S-01 07-Oct-99 15	CEF-G82-2S CEF-G82-GW-2S-01 07-Oct-99 14	CEF-G82-3S CEF-G82-GW-3S-01 07-Oct-99 14	CEF-G82-2I CEF-G82-GW-2I-02 22-Feb-00 35
Volatile Organic Compounds (ug/L)					
BENZENE	1	1 U	19 J	1 U	1 U
CHLOROFORM	5.7	1 U	2 U	1 U	1.2
ETHYLBENZENE	30	3.3	50 J	1 U	1 U
TOLUENE	40	1 U	6.8	1 U	1 U
XYLENES,TOTAL	20	3.8	196	3 U	3 U
Semivolatile Organic Compounds (ug/L)					
1-METHYLNAPHTHALENE	20	8.7 J	53.4 J	1.1 UJ	2.4 U
2-METHYLNAPHTHALENE	20	11.6 J	53.9 J	1.1 UJ	2.4 U
ACENAPHTHENE	20	1 UJ	1.8 J	1.1 UJ	2.4 U
ACENAPHTHYLENE	210	1 UJ	1.8 J	1.1 UJ	2.4 U
FLUORANTHENE	280	1 UJ	2.3 J	1.1 UJ	2.4 U
FLUORENE	280	1.9 J	6.3 J	1.1 UJ	2.4 U
NAPHTHALENE	20	6.8 J	24.5 J	1.1 UJ	2.4 U
PHENANTHRENE	210	4 J	18.7 J	1.1 UJ	2.4 U
Total Petroleum Hydrocarbons (mg/L)					
TRPH (C8-C40)	5	1.19	3.57	0.5 U	NM

Notes:

GCTL- Groundwater Cleanup Target Level
Shaded values are greater than criteria.
µg/L - migrogram per liter
mg/L - milligram per liter
NM - Not measured
U - Not detected at detection limit shown
J - Estimated value

ATTACHMENT B

ANALYTICAL LABORATORY REPORT
(JANUARY 2010)

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. SIMCIK**	**DATE:**	**FEBRUARY 25, 2010**
FROM:	**A. COGNETTI**	**COPIES:**	**DV FILE**

SUBJECT: **DATA VALIDATION – ORGANIC AND INORGANIC DATA**
SELECT VOC/ OVG/ PAH/ TRPH/ ALKALINITY/ SULFATE/ DISSOLVED SULFIDE/ NITRATE/ NITRITE
LIMITED REVIEW
NAS CECIL FIELD – CTO JM09
SAMPLE DELIVERY GROUP (SDG) –CTOJM09CF_001

SAMPLES: 6/Aqueous/VOC

CEF-BP-1S-20100118	CEF-BP-5I-20100118	CEF-BP-6S-20100118
CEF-BP-8S-20100118	Trip Blank 7492	Trip Blank 7493

3/Aqueous/OVG/Alkalinity/Sulfate/Dissolved Sulfide/Nitrate/Nitrite

CEF-BP-1S-20100118	CEF-BP-5I-20100118	CEF-BP-6S-20100118

4/Aqueous/PAH/TRPH

CEF-BP-1S-20100118	CEF-BP-5I-20100118	CEF-BP-6S-20100118
CEF-BP-8S-20100118		

Overview

The sample set for NAS CECIL FIELD, CTO JM09, SDG CTOJM09CF_001, consists of four (4) aqueous environmental samples and two (2) trip blanks. There are no field duplicate pairs associated with this SDG. All samples were analyzed for select volatile organic compounds (VOC); benzene, ethylbenzene, isopropylbenzene, naphthalene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and xylenes (total). The four (4) aqueous environmental samples were also analyzed for polycyclic aromatic hydrocarbons (PAH) and Total Recoverable Petroleum Hydrocarbons (TRPH). Three (3) aqueous environmental samples were analyzed for organic volatile gases (OVG), alkalinity, sulfate, dissolved sulfide, nitrate and nitrite.

The samples were collected by Tetra Tech NUS on January 18, 2010 and analyzed by Empirical Laboratory. The TRPH-Florida PRO analyses were done by Microbac. All analyses were performed under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA/QC) criteria. VOC analyses were conducted using SW-846 method 8260B. Organic volatile gases were analyzed according to method RSKSOP-175. PAH analyses followed SW-846 Method 8270C SIM. TRPH analyses followed the Florida PRO method. Alkalinity, dissolved sulfide, sulfate nitrate and nitrite analyses followed methods EPA 310.1 (alkalinity), SM4500S2CF (dissolved sulfide) and EPA 300.0 for the remaining anions, respectively.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial and Continuing Calibrations
  • Laboratory Method Blank Analyses
* • Detection Limits

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

Volatiles

A contaminant was detected in laboratory method blank 0A26004-BLK1 affecting all of the samples.

Contaminant	Maximum Concentration (ug/L)	Action Level (ug/L)
Naphthalene	1.3	6.5

An action level of 5X the maximum contaminant concentration of naphthalene was established to evaluate samples for laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. Positive naphthalene results less than the action level were qualified as (U). No action was taken on the trip blank results.

Sample CEF-BP-1S-20100118 was diluted 5X in order to obtain concentrations of analytes within the instrument calibration range.

Organic Volatile Gases

Methane was detected in the laboratory method blank 0A22004-BLK1 affecting all of the samples.

Contaminant	Maximum Concentration (ug/L)	Action Level (ug/L)
Methane	2.56	12.8

An action level of 5X the maximum contaminant concentration of methane was established to evaluate samples for laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. Positive methane results with concentrations less than the action level were qualified as (U).

Sample CEF-BP-6S-20100118 was diluted 15X in order to obtain a concentration of methane within instrument calibration range.

PAH

Several contaminants were detected in the laboratory method blank 0A20005-BLK1 affecting all of the samples.

Contaminant	Maximum Concentration (ug/L)	Action Level (ug/L)
Fluoranthene	0.036	0.18
2-methylnaphthalene	0.021	0.105
Phenanthrene	0.036	0.18
Pyrene	0.039	0.195

An action level of 5X the maximum contaminant concentration of contaminant was established to evaluate samples for laboratory contamination. Dilution factors and sample aliquots were taken into

consideration during the application of all action levels. Positive results less than the action level were qualified as (U).

Sample CEF-BP-1S-20100118 was diluted 5X in order to obtain a concentration of naphthalene within instrument calibration range.

The continuing calibration on January 23, 2010, benzo(a)anthracene and chrysene had a percent difference greater than the 25% quality control limit. The naphthalene result for CEF-BP-1S-20100118 was the only reported result from that analysis. No action was warranted.

Alkalinity- None.

Sulfate- None.

Dissolved Sulfide- None.

Nitrate

Nitrate was detected in the method blank 0A19012-BLK1 affecting all of the samples.

Contaminant	Maximum Concentration (ug/L)	Action Level (ug/L)
Nitrate	0.054	0.27

An action level of 5X the maximum contaminant concentration of nitrate was established to evaluate samples for laboratory contamination. Dilution factors and sample aliquots were taken into consideration during the application of all action levels. Positive nitrate results less than the action level were qualified as (U).

Nitrite- None.

Notes

Positive results reported below the reporting limit (RL) but above the method detection limit (MDL) for the organic analyses were qualified as estimated, "J".

Naphthalene was analyzed in both the volatile and PAH fraction. The naphthalene results from the PAH fraction were used for validation purposes.

Executive Summary

Laboratory Performance: Method blank contamination was detected in the volatile, OVG, PAH and nitrate analyses.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review", October 1999, the "National Functional Guidelines for Inorganic Data Review", October 2004, and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories", January 2006.

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

Ann Cognetti

Tetra Tech NUS
Ann Cognetti
Chemist/ Data Validator

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

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

Appendix A

Qualified Analytical Results

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can be any number of issues; e.g. poor chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-5I-20100118			CEF-BP-6S-20100118			CEF-BP-8S-20100118		
SDG: CTOJM09CF_001	LAB_ID	1001107-02			1001107-01			1001107-03			1001107-04		
FRACTION: OV	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,2,4-TRIMETHYLBENZENE		450			0.1	U		170			0.38	J	P
1,3,5-TRIMETHYLBENZENE		140			0.13	U		40			0.13	U	
BENZENE		0.55	U		0.11	U		0.11	U		0.11	U	
ETHYLBENZENE		170			0.13	U		150			0.23	J	P
ISOPROPYLBENZENE		16			0.15	U		28			0.15	U	
TOLUENE		0.67	J	P	0.1	U		1.5			0.1	U	
TOTAL XYLENES		520			0.22	U		200			0.25	J	P

PROJ_NO: 02267	NSAMPLE	Trip Blank 7492			Trip Blank 7493		
SDG: CTOJM09CF_001	LAB_ID	1001107-05			1001107-06		
FRACTION: OV	SAMP_DATE	1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM		
	UNITS	UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0		
	DUP_OF						
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,2,4-TRIMETHYLBENZENE		0.1	U		0.1	U	
1,3,5-TRIMETHYLBENZENE		0.13	U		0.13	U	
BENZENE		0.11	U		0.11	U	
ETHYLBENZENE		0.13	U		0.13	U	
ISOPROPYLBENZENE		0.15	U		0.15	U	
TOLUENE		0.1	U		0.1	U	
TOTAL XYLENES		0.22	U		0.22	U	

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-1S-20100118-DL			CEF-BP-5I-20100118			CEF-BP-6S-20100118		
SDG: CTOJM09CF_001	LAB_ID	1001107-02			1001107-02DL			1001107-01			1001107-03		
FRACTION: PAH	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		9.9						0.032	J	P	7.4		
2-METHYLNAPHTHALENE		20						0.043	U	A	7.1		
ACENAPHTHENE		0.12	J	P				0.027	J	P	0.083	J	P
ACENAPHTHYLENE		0.066	J	P				0.02	J	P	0.018	U	
ANTHRACENE		0.068	J	P				0.03	J	P	0.018	U	
BENZO(A)ANTHRACENE		0.048	J	P				0.037	J	P	0.018	U	
BENZO(A)PYRENE		0.018	U					0.018	U		0.018	U	
BENZO(B)FLUORANTHENE		0.039	J	P				0.031	J	P	0.018	U	
BENZO(G,H,I)PERYLENE		0.018	U					0.018	U		0.018	U	
BENZO(K)FLUORANTHENE		0.038	J	P				0.031	J	P	0.018	U	
CHRYSENE		0.049	J	P				0.037	J	P	0.018	U	
DIBENZO(A,H)ANTHRACENE		0.018	U					0.018	U		0.018	U	
FLUORANTHENE		0.23	U	A				0.23	U	A	0.23	U	A
FLUORENE		0.15	J	P				0.031	J	P	0.053	J	P
INDENO(1,2,3-CD)PYRENE		0.018	U					0.018	U		0.018	U	
NAPHTHALENE					60			0.043	J	P	29		
PHENANTHRENE		0.26						0.044	U	A	0.028	U	A
PYRENE		0.076	U	A				0.044	U	A	0.018	U	

PROJ_NO: 02267	NSAMPLE	CEF-BP-8S-20100118		
SDG: CTOJM09CF_001	LAB_ID	1001107-04		
FRACTION: PAH	SAMP_DATE	1/18/2010		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	UG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		0.018	U	
2-METHYLNAPHTHALENE		0.018	U	
ACENAPHTHENE		0.018	U	
ACENAPHTHYLENE		0.018	U	
ANTHRACENE		0.018	U	
BENZO(A)ANTHRACENE		0.022	J	P
BENZO(A)PYRENE		0.018	U	
BENZO(B)FLUORANTHENE		0.019	J	P
BENZO(G,H,I)PERYLENE		0.018	U	
BENZO(K)FLUORANTHENE		0.02	J	P
CHRYSENE		0.023	J	P
DIBENZO(A,H)ANTHRACENE		0.018	U	
FLUORANTHENE		0.23	U	A
FLUORENE		0.018	U	
INDENO(1,2,3-CD)PYRENE		0.018	U	
NAPHTHALENE		0.026	J	P
PHENANTHRENE		0.026	U	A
PYRENE		0.026	U	A

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-5I-20100118			CEF-BP-6S-20100118			CEF-BP-6S-20100118-DL		
SDG: CTOJM09CF_001	LAB_ID	1001107-02			1001107-01			1001107-03			1001107-03RE		
FRACTION: OVG	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ETHANE		1	U		1	U		1	U				
ETHENE		1	U		1	U		1	U				
METHANE		996			3.51	U	A				1360		

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-5I-20100118			CEF-BP-6S-20100118			CEF-BP-8S-20100118		
SDG: CTOJM09CF_001	LAB_ID	L10010376-02			L10010376-01			L10010376-03			L10010376-04		
FRACTION: PET	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF												
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL PETROLEUM HYDROCARBONS		2650			235	U		1300			235	U	

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-5I-20100118			CEF-BP-6S-20100118		
SDG: CTOJM09CF_001	LAB_ID	1001107-02			1001107-01			1001107-03		
FRACTION: MISC	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	MG/L			MG/L			MG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
ALKALINITY		133			4.06			136		
NITRATE-N		0.308			0.25	U	A	0.083	U	A
NITRITE-N		0.1	U		0.1	U		0.1	U	
SULFATE		10.2			4.89			7.4		

PROJ_NO: 02267	NSAMPLE	CEF-BP-1S-20100118			CEF-BP-5I-20100118			CEF-BP-6S-20100118		
SDG: CTOJM09CF_001	LAB_ID	1001107-02			1001107-01			1001107-03		
FRACTION: MISCF	SAMP_DATE	1/18/2010			1/18/2010			1/18/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM		
	UNITS	MG/L			MG/L			MG/L		
	PCT_SOLIDS	0.0			0.0			0.0		
	DUP_OF									
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
SULFIDE		2.4	U		2.4	U		2.4	U	

Appendix B

Results as Reported by the Laboratory

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-1S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110702D

Level: (low/med) LOW Date Sampled: 01/18/10 13:00

% Moisture: not dec. _____ Date Analyzed: 01/25/10 19:59

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 5.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.55	5.0		UD
100-41-4	Ethylbenzene	0.65	5.0	170	D
98-82-8	Isopropylbenzene	0.75	4.0	16	D
91-20-3	Naphthalene	0.50	5.0	91	VD
108-88-3	Toluene	0.50	5.0	0.67	ID
95-63-6	1,2,4-Trimethylbenzene	0.50	5.0	450	D
108-67-8	1,3,5-Trimethylbenzene	0.65	5.0	140	D
1330-20-7	Xylene(total)	1.1	5.0	520	D

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-5I
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110701

Level: (low/med) LOW Date Sampled: 01/18/10 11:30

% Moisture: not dec. _____ Date Analyzed: 01/25/10 15:59

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0		U
98-82-8	Isopropylbenzene	0.15	0.80		U
91-20-3	Naphthalene	0.10	1.0	1.2	V
108-88-3	Toluene	0.10	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0		U
1330-20-7	Xylene(total)	0.22	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-6S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110703

Level: (low/med) LOW Date Sampled: 01/18/10 14:30

% Moisture: not dec. _____ Date Analyzed: 01/25/10 16:29

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0	150	
98-82-8	Isopropylbenzene	0.15	0.80	28	
91-20-3	Naphthalene	0.10	1.0	45	V
108-88-3	Toluene	0.10	1.0	1.5	
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0	170	
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0	40	
1330-20-7	Xylene(total)	0.22	1.0	200	

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-8S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-04

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110704

Level: (low/med) LOW Date Sampled: 01/18/10 15:40

% Moisture: not dec. _____ Date Analyzed: 01/25/10 16:59

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0	0.23	I
98-82-8	Isopropylbenzene	0.15	0.80		U
91-20-3	Naphthalene	0.10	1.0	2.3	V
108-88-3	Toluene	0.10	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0	0.38	I
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0		U
1330-20-7	Xylene(total)	0.22	1.0	0.25	I

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

TRIP BLANK 7492

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-05

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110705

Level: (low/med) LOW Date Sampled: 01/18/10 :

% Moisture: not dec. _____ Date Analyzed: 01/25/10 14:59

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0		U
98-82-8	Isopropylbenzene	0.15	0.80		U
91-20-3	Naphthalene	0.10	1.0	1.3	V
108-88-3	Toluene	0.10	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0		U
1330-20-7	Xylene(total)	0.22	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

TRIP BLANK 7493

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-06

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0110706

Level: (low/med) LOW Date Sampled: 01/18/10 :

% Moisture: not dec. _____ Date Analyzed: 01/25/10 15:29

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0		U
98-82-8	Isopropylbenzene	0.15	0.80		U
91-20-3	Naphthalene	0.10	1.0	1.2	V
108-88-3	Toluene	0.10	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0		U
1330-20-7	Xylene(total)	0.22	1.0		U

FORM I VOA

ANALYSIS DATA SHEET

CEF-BP-1S-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 13:00
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-02
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (ug/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
74-82-8	Methane	996	1.00	3.00	1	~~B~~	RSK175	0A22004	01/22/10 13:00
74-84-0	Ethane		1.00	3.00	1	U	RSK175	0A22004	01/22/10 13:00
74-85-1	Ethylene		1.00	3.00	1	U	RSK175	0A22004	01/22/10 13:00

WL
1/25/10

ANALYSIS DATA SHEET

CEF-BP-5I-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 11:30
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-01
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (ug/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
74-82-8	Methane	3.51	1.00	3.00	1	~~B~~ V	RSK175	0A22004	01/22/10 12:37
74-84-0	Ethane		1.00	3.00	1	U	RSK175	0A22004	01/22/10 12:37
74-85-1	Ethylene		1.00	3.00	1	U	RSK175	0A22004	01/22/10 12:37

ML 1/26/10

ANALYSIS DATA SHEET

CEF-BP-6S-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 14:30
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-03
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (ug/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
74-82-8	Methane	2530	1.00	3.00	1	~~B~~ ~~E~~ L	RSK175	0A22004	01/22/10 13:22
74-82-8	Methane	1360	15.0	45.0	15	D ~~B~~	RSK175	0A22004	01/22/10 14:18
74-84-0	Ethane		1.00	3.00	1	U	RSK175	0A22004	01/22/10 13:22
74-85-1	Ethylene		1.00	3.00	1	U	RSK175	0A22004	01/22/10 13:22

1/26/10

1/25/10

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-1S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-02

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0110702

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/18/10 13:00

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 10:54

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92	0.12	I
208-96-8	Acenaphthylene	0.018	0.092	0.066	I
120-12-7	Anthracene	0.018	0.23	0.068	I
56-55-3	Benzo(a)anthracene	0.018	0.092	0.048	I
205-99-2	Benzo(b)fluoranthene	0.018	0.092	0.039	I
207-08-9	Benzo(k)fluoranthene	0.018	0.092	0.038	I
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092	0.049	I
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.089	IV
86-73-7	Fluorene	0.018	0.92	0.15	I
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92	9.9	
91-57-6	2-Methylnaphthalene	0.018	0.92	20	V
91-20-3	Naphthalene	0.018	0.92	49	L
85-01-8	Phenanthrene	0.018	0.092	0.26	V
129-00-0	Pyrene	0.018	0.23	0.076	IV

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-1S
-20100118DL

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-02DL

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0110702D

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/18/10 13:00

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/23/10 10:14

Injection Volume: 1.0(uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.092	4.6	0.14	ID
208-96-8	Acenaphthylene	0.092	0.46		UD
120-12-7	Anthracene	0.092	1.2		UD
56-55-3	Benzo(a)anthracene	0.092	0.46		UD
205-99-2	Benzo(b)fluoranthene	0.092	0.46		UD
207-08-9	Benzo(k)fluoranthene	0.092	0.46		UD
191-24-2	Benzo(g,h,i)perylene	0.092	0.46		UD
50-32-8	Benzo(a)pyrene	0.092	0.46		UD
218-01-9	Chrysene	0.092	0.46		UD
53-70-3	Dibenz(a,h)anthracene	0.092	0.46		UD
206-44-0	Fluoranthene	0.092	1.2		UD
86-73-7	Fluorene	0.092	4.6	0.16	ID
193-39-5	Indeno(1,2,3-cd)pyrene	0.092	0.46		UD
90-12-0	1-Methylnaphthalene	0.092	4.6	11	D
91-57-6	2-Methylnaphthalene	0.092	4.6	22	DV
91-20-3	Naphthalene	0.092	4.6	60	D
85-01-8	Phenanthrene	0.092	0.46	0.26	IDV
129-00-0	Pyrene	0.092	1.2		UD

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-5I
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-01

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0110701

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/18/10 11:30

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted: 01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 10:20

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92	0.027	I
208-96-8	Acenaphthylene	0.018	0.092	0.020	I
120-12-7	Anthracene	0.018	0.23	0.030	I
56-55-3	Benzo(a)anthracene	0.018	0.092	0.037	I
205-99-2	Benzo(b)fluoranthene	0.018	0.092	0.031	I
207-08-9	Benzo(k)fluoranthene	0.018	0.092	0.031	I
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092	0.037	I
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.043	IV
86-73-7	Fluorene	0.018	0.92	0.031	I
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92	0.032	I
91-57-6	2-Methylnaphthalene	0.018	0.92	0.043	IV
91-20-3	Naphthalene	0.018	0.92	0.043	I
85-01-8	Phenanthrene	0.018	0.092	0.044	IV
129-00-0	Pyrene	0.018	0.23	0.044	IV

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-6S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-03

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0110703

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/18/10 14:30

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 11:28

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92	0.083	I
208-96-8	Acenaphthylene	0.018	0.092		U
120-12-7	Anthracene	0.018	0.23		U
56-55-3	Benzo(a)anthracene	0.018	0.092		U
205-99-2	Benzo(b)fluoranthene	0.018	0.092		U
207-08-9	Benzo(k)fluoranthene	0.018	0.092		U
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092		U
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.019	IV
86-73-7	Fluorene	0.018	0.92	0.053	I
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92	7.4	
91-57-6	2-Methylnaphthalene	0.018	0.92	7.1	V
91-20-3	Naphthalene	0.018	0.92	29	
85-01-8	Phenanthrene	0.018	0.092	0.028	IV
129-00-0	Pyrene	0.018	0.23		U

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-8S
-20100118

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 1001107-04

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0110704

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/18/10 15:40

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 12:01

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92		U
208-96-8	Acenaphthylene	0.018	0.092		U
120-12-7	Anthracene	0.018	0.23		U
56-55-3	Benzo(a)anthracene	0.018	0.092	0.022	I
205-99-2	Benzo(b)fluoranthene	0.018	0.092	0.019	I
207-08-9	Benzo(k)fluoranthene	0.018	0.092	0.020	I
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092	0.023	I
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.025	IV
86-73-7	Fluorene	0.018	0.92		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92		U
91-57-6	2-Methylnaphthalene	0.018	0.92		U
91-20-3	Naphthalene	0.018	0.92	0.026	I
85-01-8	Phenanthrene	0.018	0.092	0.026	IV
129-00-0	Pyrene	0.018	0.23	0.026	IV

FORM I SV

Report Number: L10010376
Report Date : January 28, 2010

Sample Number: L10010376-02
Client ID: CEF-BP-1S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/18/2010 13:00
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 14:43
Run Date: 01/27/2010 20:17
File ID: 14G24916.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO		2650		469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	109	82	142	
n-triacontane-d62	49.7	42	193	

Microbac

Report Number: L10010376
Report Date : January 28, 2010

Sample Number: L10010376-01
Client ID: CEF-BP-5I-201001
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/18/2010 11:30
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 15:25
Run Date: 01/27/2010 19:35
File ID: 14G24915.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	92.7	82	142	
n-triacontane-d62	42.9	42	193	

U Not detected at or above adjusted sample detection limit

Microbac

Report Number: L10010376
Report Date : January 28, 2010

Sample Number: L10010376-03
Client ID: CEF-BP-6S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/18/2010 14:30
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 14:43
Run Date: 01/27/2010 20:59
File ID: 14G24917.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO		1300		469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	92.1	82	142	
n-triacontane-d62	29.0	42	193	*

* Surrogate or spike compound out of range

Microbac

Report Number: L10010376
Report Date : January 28, 2010

Sample Number: L10010376-04
Client ID: CEF-BP-8S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/18/2010 15:40
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 15:25
Run Date: 01/27/2010 21:41
File ID: 14G24918.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	97.7	82	142	
n-triacontane-d62	41.7	42	193	*

U Not detected at or above adjusted sample detection limit
* Surrogate or spike compound out of range

Microbac

ANALYSIS DATA SHEET

CEF-BP-1S-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 13:00
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-02
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (mg/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
184-96-258	Sulfide		0.800	2.40	0.68	U	SM4500S2CF	0A21010	01/21/10 11:57
14797-55-8	Nitrate as N	0.308	0.0330	0.250	1		E300.0	0A19012	01/19/10 15:45
NA	Alkalinity, Total (as CACO3)	133	1.00	1.00	1		SM2320B	0A19015	01/19/10 15:20
14797-65-0	Nitrite as N		0.0330	0.100	1	U	E300.0	0A19012	01/19/10 15:45
14808-79-8	Sulfate as SO4	10.2	0.330	1.00	1		E300.0	0A19012	01/19/10 15:45

ANALYSIS DATA SHEET

CEF-BP-5I-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 11:30
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-01
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (mg/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
184-96-258	Sulfide		0.800	2.40	0.68	U	SM4500S2CF	0A21010	01/21/10 11:56
14797-55-8	Nitrate as N	0.250	0.0330	0.250	1		E300.0	0A19012	01/19/10 14:35
NA	Alkalinity, Total (as CACO3)	4.06	1.00	1.00	1		SM2320B	0A19015	01/19/10 15:15
14797-65-0	Nitrite as N		0.0330	0.100	1	U	E300.0	0A19012	01/19/10 14:35
14808-79-8	Sulfate as SO4	4.89	0.330	1.00	1		E300.0	0A19012	01/19/10 14:35

ANALYSIS DATA SHEET

CEF-BP-6S-20100118

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Matrix: Ground Water
Sampled: 01/18/10 14:30
% Solids: 0.00

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Laboratory ID: 1001107-03
Received: 01/19/10 09:30

CAS NO.	Analyte	Concentration (mg/L)	MDL	RL	Dilution Factor	Q	Method	Batch	Analyzed
184-96-258	Sulfide		0.800	2.40	0.68	U	SM4500S2CF	0A21010	01/21/10 11:57
14797-55-8	Nitrate as N	0.0830	0.0330	0.250	1	J	E300.0	0A19012	01/19/10 16:02
NA	Alkalinity, Total (as CACO3)	136	1.00	1.00	1		SM2320B	0A19015	01/19/10 15:35
14797-65-0	Nitrite as N		0.0330	0.100	1	U	E300.0	0A19012	01/19/10 16:02
14808-79-8	Sulfate as SO4	7.40	0.330	1.00	1		E300.0	0A19012	01/19/10 16:02

Appendix C

Support Documentation

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER № - 2013 | PAGE ___ OF ___

PROJECT NO: 112605267

FACILITY: NAS Cecil Field BP Wells

SAMPLERS (SIGNATURE)

PROJECT MANAGER: Rob Simcik

PHONE NUMBER:

FIELD OPERATIONS LEADER: Kara Wimble

PHONE NUMBER: 904 636-6125

CARRIER/WAYBILL NUMBER: FEDEX Airbill 861351421608

LABORATORY NAME AND CONTACT: Empirical Laboratories

ADDRESS: 621 Mainstream Drive Suite 270

CITY, STATE: Nashville, TN 37228

STANDARD TAT ☐

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

DATE YEAR 2010	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	BTEX	VOCs 8260B	PAHs w/ methylnaphthalene 8270 SIM	TRPH FL-PRO	methane, ethane, ethene RSK-175	Alkalinity (310.1)	Anions EPA 300.0	Dissolved Sulfide	COMMENTS
								CONTAINER TYPE PLASTIC (P) or GLASS (G)	G	G	G	G	P	P			
								PRESERVATIVE USED	HCl	—	H_2SO_4	HCl	—	—	NaOH		
1/18	1130	CEF-BP-5I-20100118				GW	G	14	X	X	X	X	X	X			Cool to 4° C -01
1/18	1300	CEF-BP-1S-20100118				GW	G	14	X	X	X	X	X	X			-02
1/18	1430	CEF-BP-6S-20100118				GW	G	14	X	X	X	X	X	X			-03
1/18	1540	CEF-BP-8S-20100118				GW	G	7	X	X	X						-04
		Trip Blanks						4									-05, -06
		(Trip Blank 7492)															
		(Trip Blank 7493)															

1001107

1. RELINQUISHED BY	DATE 1/19/10	TIME 1830	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE 1/19/10	TIME 09:30

COMMENTS Please note 7 day turn around

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

1. lor.

4/02R FORM NO. TtNUS-001

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER № - 2013 | PAGE ___ OF ___

PROJECT NO: 112605267

FACILITY: NAS Cecil Field BP Wells

SAMPLERS (SIGNATURE)

PROJECT MANAGER: Rob Simeik

PHONE NUMBER:

FIELD OPERATIONS LEADER: Kara Wimble

PHONE NUMBER: 904 636-6125

CARRIER/WAYBILL NUMBER: FEDEX Airbill 861351421608

LABORATORY NAME AND CONTACT: Empirical Laboratories

ADDRESS: 621 Mainstream Drive Suite 270

CITY, STATE: Nashville, TN 37228

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G, G, G, G, P, P

PRESERVATIVE USED: HCl, —, H2SO4, HCl, —, 2N NaOH

TYPE OF ANALYSIS: BTEX VOCs 8260B; PAHs w/ methylnaphthalene 8270 SIM; TRPH FL-PRO; methane, ethane, ethene RSK-175; Alkalinity (310.1); Chlorides EPA 300.0; Dissolved Sulfide

DATE YEAR 2010	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	BTEX VOCs 8260B	PAHs w/ methylnaphthalene 8270 SIM	TRPH FL-PRO	methane, ethane, ethene RSK-175	Alkalinity (310.1)	Chlorides EPA 300.0	Dissolved Sulfide		COMMENTS
																	1001107
1/18	1130	CEF-BP-5I-20100118				GW	G	14	X	X	X	X	X	X			Cool to 4° C -01
1/18	1300	CEF-BP-1S-20100118				GW	G	14	X	X	X	X	X	X			-02
1/18	1430	CEF-BP-6S-20100118				GW	G	14	X	X	X	X	X	X			-03
1/18	1540	CEF-BP-8S-20100118				GW	G	7	X	X	X						-04
		Trip Blanks						4									-05, -06
		(Trip Blank 7492)															
		(Trip Blank 7493)															

	DATE	TIME		DATE	TIME
1. RELINQUISHED BY	1/19/10	1830	1. RECEIVED BY		
2. RELINQUISHED BY			2. RECEIVED BY		
3. RELINQUISHED BY			3. RECEIVED BY	1/19/10	09:30

COMMENTS Please note 7 day turn around

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

1.1or.

4/02R FORM NO. TINUS-001

HOLDTIME

SDG CTOJM09CF_

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
ALK	MG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/19/2010	01/19/2010	1.110 41666	4.583 33333	1.156 25
ALK	MG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/19/2010	01/19/2010	0.985 41666	5.972 33333	1.045 13888
ALK	MG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/19/2010	01/19/2010	1.047 91666	4.930 55555	1.097 33333
NTA	MG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/19/2010	01/19/2010	0.979 86111	0.134 79333	1.114 58333
NTA	MG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/19/2010	01/19/2010	1.042 36111	0.086 11111	1.128 47333
NTA	MG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/19/2010	01/19/2010	0.917 36111	0.146 53777	1.063 88888
NTI	MG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/19/2010	01/19/2010	0.979 86111	0.134 79333	1.114 58333
NTI	MG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/19/2010	01/19/2010	1.042 36111	0.086 11111	1.128 47333
NTI	MG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/19/2010	01/19/2010	0.917 36111	0.146 53777	1.063 88888
SO4	MG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/19/2010	01/19/2010	1.042 36111	0.086 11111	1.128 47333
SO4	MG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/19/2010	01/19/2010	0.979 86111	0.134 79333	1.114 58333
SO4	MG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/19/2010	01/19/2010	0.917 36111	0.146 53777	1.063 88888
DSUL	MG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/21/2010	01/21/2010	2.937 5	8.055 55555	3.018 05555
DSUL	MG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/21/2010	01/21/2010	2.812 5	8.125 00000	2.893 75000
DSUL	MG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/21/2010	01/21/2010	2.875	8.125 00000	2.956 25000

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
OV	%	Trip Blank 7492	1001107-05	NM	01/18/2010	01/25/2010	01/25/2010	7.624 30555	0	7.624 30555
OV	%	Trip Blank 7493	1001107-06	NM	01/18/2010	01/25/2010	01/25/2010	7.645 13888	0	7.645 13888
OV	%	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/25/2010	01/25/2010	7.290 07222	0	7.290 07222
OV	%	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/25/2010	01/25/2010	7.186 80555	0	7.186 80555
OV	%	CEF-BP-8S-20100118	1001107-04	NM	01/18/2010	01/25/2010	01/25/2010	7.054 86111	0	7.054 86111
OV	%	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/25/2010	01/25/2010	7.082 63888	0	7.082 63888
OV	UG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/25/2010	01/25/2010	7.186 80555	0	7.186 80555
OV	UG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/25/2010	01/25/2010	7.290 07222	0	7.290 07222
OV	UG/L	CEF-BP-8S-20100118	1001107-04	NM	01/18/2010	01/25/2010	01/25/2010	7.054 86111	0	7.054 86111
OV	UG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/25/2010	01/25/2010	7.082 63888	0	7.082 63888
OV	UG/L	Trip Blank 7492	1001107-05	NM	01/18/2010	01/25/2010	01/25/2010	7.624 30555	0	7.624 30555
OV	UG/L	Trip Blank 7493	1001107-06	NM	01/18/2010	01/25/2010	01/25/2010	7.645 13888	0	7.645 13888
ETHA	UG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/22/2010	01/22/2010	3.873 61111	0.172 01666	4.046 52777
ETHA	UG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/22/2010	01/22/2010	3.748 61111	0.204 16666	3.952 77777
ETHA	UG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/22/2010	01/22/2010	3.811 11111	0.188 88888	4
ETHE	UG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/22/2010	01/22/2010	3.873 61111	0.172 01666	4.046 52777
ETHE	UG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/22/2010	01/22/2010	3.748 61111	0.204 16666	3.952 77777
ETHE	UG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/22/2010	01/22/2010	3.811 11111	0.188 88888	4

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
METH	UG/L	CEF-BP-6S-20100118-DL	1001107-03RE	NM	01/18/2010	01/22/2010	01/22/2010	3.748 61111	0.243 05555	3.991 66666
METH	UG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/22/2010	01/22/2010	3.811 11111	0.188 88888	4
METH	UG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/22/2010	01/22/2010	3.873 61111	0.172 91666	4.046 52777
METH	UG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/22/2010	01/22/2010	3.748 61111	0.204 16666	3.952 77777
SIM	%	CEF-BP-8S-20100118	1001107-04	NM	01/18/2010	01/20/2010	01/22/2010	1.784 72222	2.063 19444	3.847 91666
SIM	%	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/20/2010	01/22/2010	1.833 33333	2.040 27777	3.873 61111
SIM	%	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/20/2010	01/22/2010	1.958 33333	1.993 05555	3.951 38888
SIM	%	CEF-BP-1S-20100118-DL	1001107-02DL	NM	01/18/2010	01/20/2010	01/23/2010	1.895 83333	2.988 88888	4.884 72222
SIM	%	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/20/2010	01/22/2010	1.895 83333	2.016 66666	3.912 50000
SIM	UG/L	CEF-BP-1S-20100118-DL	1001107-02DL	NM	01/18/2010	01/20/2010	01/23/2010	1.895 83333	2.988 88888	4.884 72222
SIM	UG/L	CEF-BP-1S-20100118	1001107-02	NM	01/18/2010	01/20/2010	01/22/2010	1.895 83333	2.016 66666	3.912 50000
SIM	UG/L	CEF-BP-6S-20100118	1001107-03	NM	01/18/2010	01/20/2010	01/22/2010	1.833 33333	2.040 27777	3.873 61111
SIM	UG/L	CEF-BP-8S-20100118	1001107-04	NM	01/18/2010	01/20/2010	01/22/2010	1.784 72222	2.063 19444	3.847 91666
SIM	UG/L	CEF-BP-5I-20100118	1001107-01	NM	01/18/2010	01/20/2010	01/22/2010	1.958 33333	1.993 05555	3.951 38888
TPH	UG/L	CEF-BP-8S-20100118	L10010376-04	NM	01/18/2010	01/25/2010	01/27/2010	6.781 94444	2.468 75	9.250 69444
TPH	UG/L	CEF-BP-1S-20100118	L10010376-02	NM	01/18/2010	01/25/2010	01/27/2010	6.893 05555	2.410 41666	9.303 47222
TPH	UG/L	CEF-BP-5I-20100118	L10010376-01	NM	01/18/2010	01/25/2010	01/27/2010	6.955 55555	2.381 24999	9.336 80555
TPH	UG/L	CEF-BP-6S-20100118	L10010376-03	NM	01/18/2010	01/25/2010	01/27/2010	6.830 55555	2.439 58333	9.270 13888

ORGANIC CASE NARRATIVE
Tetra Tech NUS, Inc./Nas Cecil Field (BP Wells) JM09
SDG: CTOJM09CF_001

Sampled	Received	Lab ID	Client ID
1/18/2010	1/19/2010	1001107-01	CEF-BP-5I-20100118
1/18/2010	1/19/2010	1001107-02	CEF-BP-1S-20100118
1/18/2010	1/19/2010	1001107-03	CEF-BP-6S-20100118
1/18/2010	1/19/2010	1001107-04	CEF-BP-8S-20100118
1/18/2010	1/19/2010	1001107-05	Trip Blank 7492
1/18/2010	1/19/2010	1001107-06	Trip Blank 7493

Volatiles

Method: The samples were analyzed by USEPA SW-846 Methods 5030B/8260B (purge and trap then capillary column GC/MS) for waters upon receipt to the laboratory in satisfactory condition.

Comments: The volatile analyses for these samples were satisfactorily completed within sample holding times and met the corresponding specifications with the following note/exceptions:

- Samples were analyzed for an abbreviated target list of benzene, ethylbenzene, isopropylbenzene, naphthalene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and xylene (total).
- Naphthalene was detected in the method blank above the quantitation limit. Reported concentrations in the associated samples are qualified with a "V".
- 0A60024-BLK1LCS Results: Isopropylbenzene exceeded the upper recovery limit of 125% at 136%. All other recoveries were within limits.
- Quantitation signals were manually integrated in order to accurately reflect the peak areas based on the technical judgment of the analyst. A listing of the manual integrations performed and reason for the integration is included with the logs. Before and after "pictures" are available at the laboratory where manual integrations were performed.

I certify that, to the best of my knowledge and based upon my inquiry of those individuals immediately responsible for obtaining the information, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Jade Holliman
Organic Manager

ANALYTICAL REPORT TERMS AND QUALIFIERS (ORGANIC)

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix.

EQL: The estimated quantitation limit (EQL), also known as the reporting limit (RL), is defined as the estimated concentration above which quantitative results can be obtained with a specific degree of confidence. Empirical Laboratories defines the EQL to be at or near the lowest standard of the calibration curve.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the MDL.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

I: The presence of an "I" to the right of an analytical result indicates that the reported result is estimated. The data pass the identification criteria indicating that the compound is present, but the calculated result is less than the EQL/RL.

L: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with a "L". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

V: The presence of a "V" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

J1: The reported analyte concentration may have a low bias as the CCV exceeded the limit on the low side.

J2: The reported analyte concentration may have a high bias as the CCV exceeded the limit on the high side.

M: The presence of an "M" to the right of an analytical result indicates that the sample matrix interfered with the quantitation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

I: The presence of an "I" to the right of an analytical result that the presence of a qualitative interference could have caused a false positive or over estimation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 1001107 Number of Coolers: 2 of 2

Client: TetraTech NUS Project: NAS Cecil Field BP Wells

Date/Time Received: **01/19/10 09:30** Date cooler(s) opened: **01/19/10**

Opened By (print): **WILLIAM SCHWAB** (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive?: FedEx UPS DHL Hand Delivered
   EL Courier Other: _____

If applicable, enter airbill number here: 1608

2. Were custody seals on outside of cooler(s)? ..... Yes No

How many: 1 Seal date: 12/18/10 Seal Initials: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... Yes No N/A
4. Were custody papers sealed in a plastic bag included in the sample cooler? ..... Yes No N/A
5. Were custody papers filled out properly (ink, signed, etc.)? ..... Yes No N/A
6. Did you sign custody papers in the appropriate place for acceptance? ..... Yes No N/A
7. Was project identifiable from custody papers? ..... Yes No N/A
8. If required, was enough ice present in the cooler(s)? ..... Yes No N/A

Type of Coolant: WET DRY BLUE NONE Temperature of Samples upon Receipt: 1.1°C

Dates samples were logged-in: **01/19/10**

9. Initial this form to acknowledge login of sample(s): (Name): Will Schwab (Initial): WS
10. Were all bottle lids intact and sealed tightly? ..... Yes No N/A
11. Did all bottles arrive unbroken? ..... Yes No N/A
12. Was all required bottle label information complete? ..... Yes No N/A
13. Did all bottle labels agree with custody papers? ..... Yes No N/A
14. Were correct containers used for the analyses indicated? ..... Yes No N/A
15. Were preservative levels correct in all applicable sample containers? ..... Yes No N/A
16. Was residual chlorine present in any applicable sample containers? ..... Yes No N/A
17. Was sufficient amount of sample sent for the analyses required? ..... Yes No N/A
18. Was headspace present in any included VOA vials? ..... Yes No N/A

pH < 2 for all EL-Pro sample

pH > 9 for all sulfide sample

If Non-Conformance issues were present, list by sample ID: _____

1L Amber broken in shipment for CEF-BP-SI-20100118. 1 vial broken for CEF-BP-15-20100118 CAR#: _____

contained Trip Blank 7443

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 1001107 Number of Coolers: 1 of 2

Client: Tetra Tech: NUS Project: NAS Cecil Field BP Wells

Date/Time Received: 01/19/10 09:30 Date cooler(s) opened: 01/19/10

Opened By (print): WILLIAM SCHWAB (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive?: FedEx UPS DHL Hand Delivered

EL Courier Other: _____

If applicable, enter airbill number here: 1769

2. Were custody seals on outside of cooler(s)? ..... Yes No

How many: 1 Seal date: 12/18/10 Seal Initials: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... Yes No N/A
4. Were custody papers sealed in a plastic bag included in the sample cooler? ..... Yes No N/A
5. Were custody papers filled out properly (ink, signed, etc.)? ..... Yes No N/A
6. Did you sign custody papers in the appropriate place for acceptance? ..... Yes No N/A
7. Was project identifiable from custody papers? ..... Yes No N/A
8. If required, was enough ice present in the cooler(s)? ..... Yes No N/A

Type of Coolant: WET DRY BLUE NONE Temperature of Samples upon Receipt: 3.2°C

Dates samples were logged-in: 01/19/10

9. Initial this form to acknowledge login of sample(s): (Name): _____ (Initial): _____
10. Were all bottle lids intact and sealed tightly? ..... Yes No N/A
11. Did all bottles arrive unbroken? ..... Yes No N/A
12. Was all required bottle label information complete? ..... Yes No N/A
13. Did all bottle labels agree with custody papers? ..... Yes No N/A
14. Were correct containers used for the analyses indicated? ..... Yes No N/A
15. Were preservative levels correct in all applicable sample containers? ..... Yes No N/A
16. Was residual chlorine present in any applicable sample containers? ..... Yes No N/A
17. Was sufficient amount of sample sent for the analyses required? ..... Yes No N/A
18. Was headspace present in any included VOA vials? ..... Yes No N/A

See page 2 of 2

If Non-Conformance issues were present, list by sample ID: _____

_____ CAR#: _____

Contained Trip Blank 7492

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Lab File ID: SEQ-TUN1 BFB Injection Date: 01/20/10

Instrument ID: VOA3 BFB Injection Time: 1251

GC Column: RTX-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	16.1
75	30.0 - 60.0% of mass 95	47.4
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.4
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	100.2
175	5.0 - 9.0% of mass 174	6.9 (6.8)1
176	95.0 - 101.0% of mass 174	95.5 (95.3)1
177	5.0 - 9.0% of mass 176	7.1 (7.4)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V3STD0.25PPB	SEQ-CAL1	SEQ-CAL1	01/20/10	1349
02	V3STD0.5PPB	SEQ-CAL2	SEQ-CAL2	01/20/10	1419
03	V3STD1.0PPB	SEQ-CAL3	SEQ-CAL3	01/20/10	1449
04	V3STD2.0PPB	SEQ-CAL4	SEQ-CAL4	01/20/10	1518
05	V3STD10PPB	SEQ-CAL5	SEQ-CAL5	01/20/10	1549
06	V3STD20PPB	SEQ-CAL6	SEQ-CAL6	01/20/10	1619
07	V3STD50PPB	SEQ-CAL7	SEQ-CAL7	01/20/10	1649
08	V3BLK0120LCS	V3BLK0120LCS	V3ICV01	01/20/10	1720
09	V3STD100PPB	SEQ-CAL8	SEQ-CAL8	01/20/10	1749
10	V3STD200PPB	SEQ-CAL9	SEQ-CAL9	01/20/10	1820
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page 1 of 1

FORM V VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Instrument ID: VOA3 Calibration Date(s): 01/20/10 01/20/10

Column: RTX-VRX ID: 0.25 (mm) Calibration Time(s): 1349 1820

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
Acetone	LINR	1.083e-002	5.677e-002		0.997
Acrolein	2ORDR	-0.5839726	282.058073	-370.33697	0.987
Acrylonitrile	AVRG		5.283e-002		7.6
tert-Amyl Methyl Ether	AVRG		0.51905228		10.7
Benzene	AVRG		0.79886193		7.2
Bromobenzene	AVRG		0.58538085		5.6
Bromochloromethane	LINR	2.398e-004	0.13595941		1.000
Bromodichloromethane	AVRG		0.30360989		5.7
Bromoform	AVRG		0.43425209		10.5
Bromomethane	LINR	7.465e-002	0.14484346		0.999
2-Butanone	LINR	0.21362220	6.359e-002		1.000
t-Butyl alcohol	LINR	0.14742157	1.352e-002		0.998
n-Butylbenzene	AVRG		1.03921227		10.4
sec-Butylbenzene	AVRG		1.43208888		11.1
tert-Butylbenzene	AVRG		1.38488033		9.4
Carbon disulfide	AVRG		0.45715574		5.9
Carbon tetrachloride	AVRG		0.32241373		6.5
Chlorobenzene	AVRG		1.51156047		10.3
Chloroethane	AVRG		0.11118258		6.7
2-Chloroethyl vinyl ether	AVRG		0.10516745		13.1
Chloroform	AVRG		0.40166617		11.0
Chloromethane	AVRG		0.16580167		10.8
2-Chlorotoluene	AVRG		1.14701628		7.0
4-Chlorotoluene	AVRG		1.20831497		6.0
Cyclohexane	AVRG		0.20538664		13.9
Dibromochloromethane	AVRG		0.55563017		7.7
1,2-Dibromo-3-chloropropane	AVRG		9.775e-002		13.2
1,2-Dibromoethane	AVRG		0.48076597		5.9
Dibromomethane	AVRG		0.15585945		8.6
1,2-Dichlorobenzene	AVRG		0.97502849		6.1
1,3-Dichlorobenzene	AVRG		1.03491424		6.4
1,4-Dichlorobenzene	AVRG		1.10410498		8.8
Dichlorodifluoromethane	AVRG		0.20514014		8.6
1,1-Dichloroethane	AVRG		0.32599029		7.0
1,2-Dichloroethane	AVRG		0.28046418		6.5
1,1-Dichloroethene	AVRG		0.17906994		6.5
cis-1,2-Dichloroethene	AVRG		0.21910559		7.6

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Instrument ID: VOA3 Calibration Date(s): 01/20/10 01/20/10

Column: RTX-VRX ID: 0.25 (mm) Calibration Time(s): 1349 1820

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
1,2-Dichloroethene(total)	AVRG		0.21114082		10.1
trans-1,2-Dichloroethene	AVRG		0.21361113		6.7
1,2-Dichloropropane	AVRG		0.19200726		6.3
1,3-Dichloropropane	AVRG		0.67804672		6.9
2,2-Dichloropropane	AVRG		0.24118210		10.8
1,1-Dichloropropene	AVRG		0.24495484		11.3
cis-1,3-Dichloropropene	AVRG		0.31655873		11.1
trans-1,3-Dichloropropene	AVRG		0.51918776		14.0
Ethylbenzene	AVRG		2.18150865		12.3
Ethyl methacrylate	LINR	1.578e-003	0.47604529		0.997
Hexachlorobutadiene	AVRG		0.35381884		13.1
2-Hexanone	2ORDR	0.16783252	4.06861098	0.47910830	0.999
Iodomethane	LINR	5.71e-002	0.27610065		0.999
Isopropylbenzene	AVRG		1.88365388		11.0
p-Isopropyltoluene	AVRG		1.07234224		9.9
Methyl acetate	AVRG		9.204e-002		6.7
Methylene chloride	2ORDR	2.658e-002	4.17584689	0.25320180	1.000
Methyl cyclohexane	AVRG		0.23532117		11.7
Methyl methacrylate	LINR	5.883e-002	0.12919357		0.999
4-Methyl-2-pentanone	LINR	3.759e-002	0.14477872		0.998
MTBE	AVRG		0.40294273		14.9
Naphthalene	LINR	3.945e-002	1.37974343		0.998
n-Propylbenzene	AVRG		1.63139085		10.7
Styrene	LINR	2.195e-002	1.67943434		0.999
1,1,1,2-Tetrachloroethane	AVRG		0.54287462		5.9
1,1,2,2-Tetrachloroethane	AVRG		0.37736023		6.4
Tetrachloroethene	AVRG		0.67684764		8.1
Tetrahydrofuran	AVRG		2.996e-002		14.4
Toluene	AVRG		1.18070525		8.1
1,2,3-Trichlorobenzene	AVRG		0.53078105		8.3
1,2,4-Trichlorobenzene	AVRG		0.62615355		7.9
1,1,1-Trichloroethane	AVRG		0.33290717		5.5
1,1,2-Trichloroethane	AVRG		0.33491476		4.7
Trichloroethene	AVRG		0.24044258		6.7
Trichlorofluoromethane	AVRG		0.37108687		7.7
Trichlorotrifluoroethane	AVRG		0.18816949		13.8
1,2,3-Trichloropropane	AVRG		0.18792606		6.4

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Instrument ID: VOA3 Calibration Date(s): 01/20/10 01/20/10

Column: RTX-VRX ID: 0.25 (mm) Calibration Time(s): 1349 1820

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
1,2,4-Trimethylbenzene	AVRG		1.25590819		11.1
1,3,5-Trimethylbenzene	AVRG		1.24338382		9.8
Vinyl acetate	LINR	0.11973487	0.17054859		0.999
Vinyl chloride	AVRG		0.17470678		11.0
m,p-Xylene	AVRG		1.80772800		5.8
Xylene(total)	AVRG		5.30922853		13.9
1-Chlorohexane	AVRG		1.06899576		7.4
Di-isopropyl ether	LINR	3.406e-002	0.49773830		1.000
ETBE	AVRG		0.43930555		14.8
Dibromofluoromethane	AVRG		0.28395841		2.6
1,2-Dichloroethane-d4	AVRG		5.766e-002		3.3
Toluene-d8	AVRG		2.12367678		3.4
Bromofluorobenzene	AVRG		0.99424322		3.5

FORM VI VOA

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Lab File ID: SEQ-TUN2 BFB Injection Date: 01/21/10

Instrument ID: VOA3 BFB Injection Time: 1334

GC Column: RTX-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.0
75	30.0 - 60.0% of mass 95	44.9
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.6 (0.6)1
174	Greater than 50.0% of mass 95	107.3
175	5.0 - 9.0% of mass 174	7.0 (6.6)1
176	95.0 - 101.0% of mass 174	102.0 (95.1)1
177	5.0 - 9.0% of mass 176	7.5 (7.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V3STD100PPB	SEQ-CALA	SEQ-CALA	01/21/10	1404
02	V3STD200PPB	SEQ-CALB	SEQ-CALB	01/21/10	1434
03	V3STD400PPB	SEQ-CALC	SEQ-CALC	01/21/10	1503
04	V3STD600PPB	SEQ-CALD	SEQ-CALD	01/21/10	1533
05	V3STD800PPB	SEQ-CALE	SEQ-CALE	01/21/10	1603
06	V3STD1000PPB	SEQ-CALF	SEQ-CALF	01/21/10	1733
07	V3STD2000PPB	SEQ-CALG	SEQ-CALG	01/21/10	1804
08	V3STD5000PPB	SEQ-CALH	SEQ-CALH	01/21/10	1834
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FORM V VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Instrument ID: VOA3 Calibration Date(s): 01/21/10 01/21/10

Column: RTX-VRX ID: 0.25 (mm) Calibration Time(s): 1404 1834

COMPOUND	CURVE	COEFFICENT A1	%RSD OR R^2
Acetaldehyde	AVRG	1.778e-002	6.6

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA93435

Instrument ID: VOA3 Calibration Date(s): 01/21/10 01/21/10

Column: RTX-VRX ID: 0.25 (mm) Calibration Time(s): 1404 1834

COMPOUND	AVERAGE RF	MIN. RF	%RSD	MAX. %RSD
Acetaldehyde	0.01778		6.6	15.0

FORM VI VOA

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Lab File ID: SEQ-TUN1 BFB Injection Date: 01/25/10

Instrument ID: VOA3 BFB Injection Time: 1021

GC Column: RTX-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	15.6
75	30.0 - 60.0% of mass 95	46.5
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.3
173	Less than 2.0% of mass 174	0.7 (0.7)1
174	Greater than 50.0% of mass 95	108.5
175	5.0 - 9.0% of mass 174	8.9 (8.2)1
176	95.0 - 101.0% of mass 174	105.3 (97.0)1
177	5.0 - 9.0% of mass 176	7.6 (7.2)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V3STD100PPB	SEQ-CCV1	SEQ-CCV1	01/25/10	1051
02	0A26004-BLK1	0A26004-BS1	V3LCS01	01/25/10	1301
03	0A26004-BLK1	0A26004-BLK1	V3BLK01	01/25/10	1429
04	TRIP BLANK 7	1001107-05	0110705	01/25/10	1459
05	TRIP BLANK 7	1001107-06	0110706	01/25/10	1529
06	CEF-BP-5I-20	1001107-01	0110701	01/25/10	1559
07	CEF-BP-6S-20	1001107-03	0110703	01/25/10	1629
08	CEF-BP-8S-20	1001107-04	0110704	01/25/10	1659
09	CEF-BP-1S-20	1001107-02	0110702D	01/25/10	1959
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FORM V VOA

FORM 7
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Instrument ID: VOA3 Calibration Date: 01/25/10 Time: 1051

Lab File ID: SEQ-CCV1 Init. Calib. Date(s): 12/17/08 01/21/10

Heated Purge: (Y/N) N Init. Calib. Times: 1502 1834

GC Column: RTX-VRX ID: 0.25 (mm)

COMPOUND	$\overline{RRF}$	RRF100	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Benzene	0.799	0.777	100.0	97.28		AVRG	-2.7	20.0
Ethylbenzene	2.181	2.165	100.0	99.24		AVRG	-0.8	20.0
Isopropylbenzene	1.884	2.027	100.0	107.6		AVRG	7.6	20.0
Naphthalene	1.123	1.243	100.0	91.26		LINR	-8.7	20.0
Toluene	1.181	1.193	100.0	101.0		AVRG	1.0	20.0
1,2,4-Trimethylbenzene	1.256	1.390	100.0	110.7		AVRG	10.7	20.0
1,3,5-Trimethylbenzene	1.243	1.353	100.0	108.8		AVRG	8.8	20.0
Xylene(total)	5.309	5.218	300.0	288.6		AVRG	-1.7	20.0
Dibromofluoromethane	0.284	0.282	30.00	29.84		AVRG	-0.5	
1,2-Dichloroethane-d4	0.058	0.056	30.00	28.91		AVRG	-3.6	
Toluene-d8	2.124	2.091	30.00	29.54		AVRG	-1.5	
Bromofluorobenzene	0.994	0.990	30.00	29.87		AVRG	-0.4	

FORM VII VOA

FORM 4
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

0A26004-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Lab File ID: V3BLK01 Lab Sample ID: 0A26004-BLK1

Date Analyzed: 01/25/10 Time Analyzed: 1429

Column: RTX-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

Instrument ID: VOA3

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	0A26004-BLK1	0A26004-BS1	V3LCS01	1301
02	TRIP BLANK 7	1001107-05	0110705	1459
03	TRIP BLANK 7	1001107-06	0110706	1529
04	CEF-BP-5I-20	1001107-01	0110701	1559
05	CEF-BP-6S-20	1001107-03	0110703	1629
06	CEF-BP-8S-20	1001107-04	0110704	1659
07	CEF-BP-1S-20	1001107-02	0110702D	1959
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COMMENTS:

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FORM IV VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

0A26004-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 0A26004-BLK1

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V3BLK01

Level: (low/med) LOW Date Sampled: _____

% Moisture: not dec. _____ Date Analyzed: 01/25/10 14:29

GC Column: RTX-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.11	1.0		U
100-41-4	Ethylbenzene	0.13	1.0		U
98-82-8	Isopropylbenzene	0.15	0.80		U
91-20-3	Naphthalene	0.10	1.0	1.3	
108-88-3	Toluene	0.10	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.10	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.13	1.0		U
1330-20-7	Xylene(total)	0.22	1.0		U

FORM I VOA

ORGANIC CASE NARRATIVE
Tetra Tech NUS, Inc./Nas Cecil Field (BP Wells) JM09
SDG: CTOJM09CF_001

Sampled	Received	Lab ID	Client ID
1/18/2010	1/19/2010	1001107-01	CEF-BP-5I-20100118
1/18/2010	1/19/2010	1001107-02	CEF-BP-1S-20100118
1/18/2010	1/19/2010	1001107-03	CEF-BP-6S-20100118

Volatile MEE Samples

Method: The samples were extracted/analyzed by USEPA SW-846 Method 8015B (headspace extraction followed by capillary column GC/FID – also commonly referred to as RSK-175) for waters upon receipt to the laboratory in satisfactory condition.
Comments: The volatile analyses for these samples were satisfactorily completed within sample holding times and met the corresponding specifications except for the following:

- Calibration: All requirements were met.
- Method Blank Results: Methane was detected in the method blank. Reported concentrations in the associated samples within 10x the method blank concentration are qualified with a "V".
- All samples were analyzed without dilution. Some samples required further dilution to bring methane within range of the initial calibration.
- As is necessary for all GC/LC chromatography, manual integrations were performed to correctly quantitate target analytes. A "before" chromatogram and "after" chromatogram is available at the laboratory for all sample analyses to provide information regarding the manual integrations performed.

I certify that, to the best of my knowledge and based upon my inquiry of those individuals immediately responsible for obtaining the information, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Jade Holliman
Organic Manager

HOLDING TIME SUMMARY
RSK175

Laboratory: Empirical Laboratories, LLC SDG: CTOJM09CF_001

Client: Tetra Tech NUS, Inc. (T010) Project: Cecil Field (BP Wells)

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
CEF-BP-5I-20100118	01/18/10 11:30	01/19/10 09:30	01/22/10 08:28	3.92	14.00	01/22/10 12:37	4.09	14.00	
CEF-BP-1S-20100118	01/18/10 13:00	01/19/10 09:30	01/22/10 08:28	3.85	14.00	01/22/10 13:00	4.04	14.00	
CEF-BP-6S-20100118	01/18/10 14:30	01/19/10 09:30	01/22/10 08:28	3.79	14.00	01/22/10 13:22	3.99	14.00	
CEF-BP-6S-20100118	01/18/10 14:30	01/19/10 09:30	01/22/10 08:28	3.79	14.00	01/22/10 14:18	4.03	14.00	

FORM 8
MEE ANALYTICAL SEQUENCE

Lab Name: EMPIRICAL LABS Contract:

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: SDGA33165

Column: CARBOXEN 1006 PLOT ID: 0.53 (mm) Cont. Calib. Date(s): 12/23/09

Instrument ID: GCVOA

THE ANALYTICAL SEQUENCE OF PERFORMANCE BLANKS, AND SAMPLES GIVEN BELOW:

	SURROGATE RT FROM CONTINUING CALIBRATION					
	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED	TIME ANALYZED	RT #	RT #
01	SEQ-CAL1	SEQ-CAL1	12/23/09	1456		
02	SEQ-CAL2	SEQ-CAL2	12/23/09	1543		
03	SEQ-CAL3	SEQ-CAL3	12/23/09	1605		
04	SEQ-CAL4	SEQ-CAL4	12/23/09	1627		
05	SEQ-CAL5	SEQ-CAL5	12/23/09	1648		
06	SEQ-CAL6	SEQ-CAL6	12/23/09	1710		
07	SEQ-CAL7	SEQ-CAL7	12/23/09	1732		
08	SEQ-ICV1	SEQ-ICV1	12/23/09	1754		
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QC LIMITS

Column used to flag retention time values with an asterisk.
* Values outside of QC limits.

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FORM VIII MEE

INITIAL CALIBRATION STANDARDS
RSK175

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Cecil Field (BP Wells)
Sequence:	9L36301	Instrument:	GL-GCVOA
Calibration:	9363001		

Standard ID	Description	Lab Sample ID	Lab File ID	Analysis Date/Time
09L0729	MEE CAL1 STD@0.002 ON COLUMN	9L36301-CAL1	002F0101.D	12/23/09 14:56
09L0730	MEE CAL2 STD@0.01 ON COLUMN	9L36301-CAL2	003F0101.D	12/23/09 15:43
09L0731	MEE CAL3 STD@0.02 ON COLUMN	9L36301-CAL3	004F0101.D	12/23/09 16:05
09L0732	MEE CAL4 STD@0.1 ON COLUMN	9L36301-CAL4	005F0101.D	12/23/09 16:27
09L0733	MEE CAL5 STD@0.2 ON COLUMN	9L36301-CAL5	006F0101.D	12/23/09 16:48
09L0734	MEE CAL6 STD@1.0 ON COLUMN	9L36301-CAL6	007F0101.D	12/23/09 17:10
09L0735	MEE CAL7 STD@4.0 ON COLUMN	9L36301-CAL7	008F0101.D	12/23/09 17:32

INITIAL CALIBRATION DATA (Continued)

RSK175

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Cecil Field (BP Wells)
Calibration:	9363001	Instrument:	GL-GCVOA
Matrix:	Water	Calibration Date:	12/23/2009 11:39:22AM

Compound	Mean RF	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Methane	585018.3	56.72661	4.593	0.1626365	0.995		0.995	
Ethane	714796.1	16.44601	9.991143	0.2492014			20	
Ethylene	675037.1	19.69405	9.260714	0.2120848			20	

WL
1/25/10

Data File: \\ELABNSH05\TARGET\chem\gcvoa.i\122309.b\009F0101.D
Report Date: 28-Dec-2009 16:57

Cat 1/7/10

Empirical Laboratories, LLC

ICV ~~CONTINUING CALIBRATION~~ COMPOUNDS

Instrument ID: gcvoa.i
Lab File ID: 009F0101.D
Analysis Type:
Lab Sample ID: SEQ-ICV1
Method: \\ELABNSH05\TARGET\chem\gcvoa.i\122309.b\mee.m

Injection Date: 23-DEC-2009 17:54
Init. Cal. Date(s): 09-NOV-2007 23-DEC-2009
Init. Cal. Times: 13:21 17:32
Quant Type: ESTD

COMPOUND	RRF	RF1	MIN RRF	%D	MAX %D
1 Methane	1.00000	1.18242	0.010	-18.2	20.0
3 Ethene	675037	759431	0.010	12.5	20.0
4 Ethane	714796	811032	0.010	13.5	20.0

12/29/09

ANALYSIS SEQUENCE SUMMARY
RSK175

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Cecil Field (BP Wells)
Sequence:	0A02209	Instrument:	GL-GCVOA
Calibration:	9363001		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	0A02209-CCV1	002F0101.D	01/22/10 10:42
LCS	0A22004-BS1	003F0101.D	01/22/10 11:17
LCS Dup	0A22004-BSD1	004F0101.D	01/22/10 11:39
Blank	0A22004-BLK1	005F0101.D	01/22/10 12:16
CEF-BP-5I-20100118	1001107-01	006F0101.D	01/22/10 12:37
CEF-BP-1S-20100118	1001107-02	007F0101.D	01/22/10 13:00
CEF-BP-6S-20100118	1001107-03	008F0101.D	01/22/10 13:22
CEF-BP-6S-20100118	1001107-03RE1	010F0101.D	01/22/10 14:18
Calibration Check	0A02209-CCV2	011F0101.D	01/22/10 14:40

Data File: \\ELABNSH05\TARGET\chem\gcvoa.i\012210.b\002F0101.D
Report Date: 22-Jan-2010 13:11

Empirical Laboratories, LLC

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: gcvoa.i
Lab File ID: 002F0101.D
Analysis Type:
Lab Sample ID: SEQ-CCV1
Method: \\ELABNSH05\TARGET\chem\gcvoa.i\012210.b\mee.m

Injection Date: 22-JAN-2010 10:42
Init. Cal. Date(s): 09-NOV-2007 23-DEC-2009
Init. Cal. Times: 13:21 17:32
Quant Type: ESTD

COMPOUND	RRF	RF1	MIN RRF	%D	MAX %D
1 Methane	1.00000	1.07566	0.010	-7.6	20.0
3 Ethene	675037	726146	0.010	7.6	20.0
4 Ethane	714796	747739	0.010	4.6	20.0

Data File: \\ELABNSH05\TARGET\chem\gcvoa.i\012210.b\011F0101.D
Report Date: 22-Jan-2010 15:28

Empirical Laboratories, LLC

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: gcvoa.i
Lab File ID: 011F0101.D
Analysis Type:
Lab Sample ID: SEQ-CCV2
Method: \\ELABNSH05\TARGET\chem\gcvoa.i\012210.b\mee.m

Injection Date: 22-JAN-2010 14:40
Init. Cal. Date(s): 09-NOV-2007 23-DEC-2009
Init. Cal. Times: 13:21 17:32
Quant Type: ESTD

COMPOUND	RRF	RF1	MIN RRF	%D	MAX %D
1 Methane	1.00000	1.02709	0.010	-2.7	20.0
3 Ethene	675037	690192	0.010	2.2	20.0
4 Ethane	714796	715815	0.010	0.1	20.0

METHOD BLANK DATA SHEET
RSK175

Laboratory:	Empirical Laboratories, LLC			SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)			Project:	Cecil Field (BP Wells)
Matrix:	Water	Laboratory ID:	0A22004-BLK1	File ID:	005F0101.D
Prepared:	01/22/10 08:28	Preparation:	RSK175	Initial/Final:	15 mL / 15 mL
Analyzed:	01/22/10 12:16	Instrument:	GL-GCVOA		
Batch:	0A22004	Sequence:	0A02209	Calibration:	9363001

CAS NO.	COMPOUND	CONC. (ug/L)	Q
74-82-8	Methane	2.56	J
74-84-0	Ethane	3.00	U
74-85-1	Ethylene	3.00	U

ORGANIC CASE NARRATIVE
Tetra Tech NUS, Inc./Nas Cecil Field (BP Wells) JM09
SDG: CTOJM09CF_001

Sampled	Received	Lab ID	Client ID
1/18/2010	1/19/2010	1001107-01	CEF-BP-5I-20100118
1/18/2010	1/19/2010	1001107-02	CEF-BP-1S-20100118
1/18/2010	1/19/2010	1001107-03	CEF-BP-6S-20100118
1/18/2010	1/19/2010	1001107-04	CEF-BP-8S-20100118

Low Concentration Semi-Volatiles

Method: The samples were extracted/analyzed for a client specified analyte list by USEPA SW-846 Methods 3510C/8270C (separatory funnel extraction then capillary column GC/MS) for waters upon receipt to the laboratory in satisfactory condition.
Comments: The volatile analyses for these samples were satisfactorily completed within sample holding times and met the corresponding specifications with the following note/exceptions:

- Note: These samples were analyzed for full-scan, low-concentration PAHs by employing a combination of sensitivity enhancing techniques in the extraction and analysis processes. AFCEE 4.02 Table 7.2.3.1-2 limits were applied for LCS/MS/MSD and surrogate.
- In the continuing calibration verification analyzed 01/23/10 07:59, benzo(a)anthracene and chrysene exceeded 20% difference with positive biases of 31.8% and 28.0%. No positive results were detected for these compounds in the associated samples. All other CCV results were within 20% difference.
- Several analytes were detected in method blank 0A20005-BLK1 at concentrations less than ½ the reporting limit. Reported concentrations in the associated samples are qualified with a "V".
- Quantitation signals were manually integrated in order to accurately reflect the peak areas based on the technical judgment of the analyst. A listing of the manual integrations performed and reason for the integration is included with the logs. Before and after "pictures" are available at the laboratory where manual integrations were performed.

I certify that, to the best of my knowledge and based upon my inquiry of those individuals immediately responsible for obtaining the information, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Jade Holliman
Organic Manager

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA57943

Lab File ID: DF1112B1 DFTPP Injection Date: 11/12/09

Instrument ID: BNA4 DFTPP Injection Time: 1524

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	42.1
68	Less than 2.0% of mass 69	0.8 (1.6)1
69	Mass 69 relative abundance	48.6
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	54.8
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.0
275	10.0 - 30.0% of mass 198	21.8
365	Greater than 1.0% of mass 198	2.27
441	Present, but less than mass 443	9.8
442	Greater than 40.0% of mass 198	60.7
443	17.0 - 23.0% of mass 442	12.6 (20.7)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CA0.05PPM	SEQ-CAL2	CAL2	11/12/09	1543
02	CA0.1PPM	SEQ-CAL3	CAL3	11/12/09	1616
03	CA0.25PPM	SEQ-CAL4	CAL4	11/12/09	1650
04	CA0.5PPM	SEQ-CAL5	CAL5	11/12/09	1724
05	CA1PPM	SEQ-CAL6	CAL6	11/12/09	1758
06	CA2PPM	SEQ-CAL7	CAL7	11/12/09	1832
07	CA5PPM	SEQ-CAL8	CAL8	11/12/09	1906
08	CA10PPM	SEQ-CAL9	CAL9	11/12/09	1940
09	CA20PPM	SEQ-CALA	CAL10	11/12/09	2014
10	CA40PPM	SEQ-CALB	CAL11	11/12/09	2048
11	CA50PPM	SEQ-CALC	CAL12	11/12/09	2122
12	ICV5PPM	ICV5PPM	ICV1	11/12/09	2155
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22					

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FORM V SV

FORM 6
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA60637

Instrument ID: BNA4 Calibration Date(s): 11/09/09 11/12/09

Column: FUSED SILICA ID: 0.25 (mm) Calibration Time(s): 1046 2122

RF50: CAL12

COMPOUND	RF50	CURVE	COEFFICENTS A0	A1	%RSD OR R^2
Acenaphthene	0.674	AVRG		0.74579723	3.3
Acenaphthylene	0.920	AVRG		0.99965749	4.5
Anthracene	0.915	AVRG		0.99484542	3.9
Benzo(a)anthracene	0.840	AVRG		0.75815117	9.6
Benzo(b)fluoranthene	1.210	AVRG		1.17686358	5.8
Benzo(k)fluoranthene	0.994	AVRG		1.16945129	7.1
Benzo(g,h,i)perylene	0.878	AVRG		0.86504517	8.2
Benzo(a)pyrene	0.938	AVRG		0.95923504	5.0
Chrysene	0.724	AVRG		0.73241487	6.7
Dibenz(a,h)anthracene	0.866	AVRG		0.76472942	14.4
Fluoranthene	0.970	AVRG		1.03029443	4.0
Fluorene	0.696	AVRG		0.74573736	2.8
Hexachlorobenzene	0.286	AVRG		0.30903327	3.4
Hexachlorobutadiene	0.217	AVRG		0.23753640	4.0
Hexachlorocyclopentadiene	0.131	AVRG		0.12090964	14.0
Indeno(1,2,3-cd)pyrene	0.888	AVRG		0.77150058	14.3
Isophorone	0.634	AVRG		0.62905814	5.8
1-Methylnaphthalene	0.644	AVRG		0.74077824	4.8
2-Methylnaphthalene	0.704	AVRG		0.80094250	4.6
Naphthalene	1.028	AVRG		1.22403293	6.2
N-Nitroso-di-n-propylamine	0.240	AVRG		0.24733956	10.3
Pentachlorophenol	0.174	LINR	0.94236763	0.17808340	0.999
Phenanthrene	0.981	AVRG		1.06434403	3.6
Pyrene	0.976	AVRG		1.03802662	4.1
2-Fluorobiphenyl	0.757	AVRG		0.86559870	4.5
2,4,6-Tribromophenol	0.160	AVRG		0.14864176	14.0
Terphenyl-d14	0.711	AVRG		0.77694300	6.1

FORM VI SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Lab File ID: SEQ-TUN1 DFTPP Injection Date: 01/22/10

Instrument ID: BNA4 DFTPP Injection Time: 0616

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	32.8
68	Less than 2.0% of mass 69	0.6 (1.6)1
69	Mass 69 relative abundance	39.7
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	49.0
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.9
275	10.0 - 30.0% of mass 198	23.1
365	Greater than 1.0% of mass 198	2.48
441	Present, but less than mass 443	12.1
442	Greater than 40.0% of mass 198	75.0
443	17.0 - 23.0% of mass 442	15.2 (20.3)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SEQ-CCV1	SEQ-CCV1	SEQ-CCV1	01/22/10	0644
02	0A20005-BLK1	0A20005-BS1	A20005L1	01/22/10	0731
03	0A20005-BLK1	0A20005-BSD1	A20005L2	01/22/10	0805
04	0A20005-BLK1	0A20005-BLK1	A20005B1	01/22/10	0913
05	CEF-BP-5I-20	1001107-01	0110701	01/22/10	1020
06	CEF-BP-1S-20	1001107-02	0110702	01/22/10	1054
07	CEF-BP-6S-20	1001107-03	0110703	01/22/10	1128
08	CEF-BP-8S-20	1001107-04	0110704	01/22/10	1201
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FORM V SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Instrument ID: BNA4 Calibration Date: 01/22/10 Time: 0644

Lab File ID: SEQ-CCV1 Init. Calib. Date(s): 11/09/09 11/12/09

Init. Calib. Times: 1046 2122

COMPOUND	$\overline{RRF}$	RRF5	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Acenaphthene	0.746	0.733	5.000	4.916		AVRG	-1.7	20.0
Acenaphthylene	1.000	0.948	5.000	4.740		AVRG	-5.2	20.0
Anthracene	0.995	1.066	5.000	5.360		AVRG	7.2	20.0
Benzo(a)anthracene	0.758	0.868	5.000	5.728		AVRG	14.6	20.0
Benzo(b)fluoranthene	1.177	1.188	5.000	5.045		AVRG	0.9	20.0
Benzo(k)fluoranthene	1.169	1.146	5.000	4.898		AVRG	-2.0	20.0
Benzo(g,h,i)perylene	0.865	0.963	5.000	5.566		AVRG	11.3	20.0
Benzo(a)pyrene	0.959	1.000	5.000	5.212		AVRG	4.2	20.0
Chrysene	0.732	0.838	5.000	5.718		AVRG	14.4	20.0
Dibenz(a,h)anthracene	0.764	0.793	5.000	5.183		AVRG	3.7	20.0
Fluoranthene	1.030	1.163	5.000	5.646		AVRG	12.9	20.0
Fluorene	0.746	0.761	5.000	5.104		AVRG	2.1	20.0
Indeno(1,2,3-cd)pyrene	0.771	0.838	5.000	5.434		AVRG	8.7	20.0
1-Methylnaphthalene	0.741	0.717	5.000	4.837		AVRG	-3.2	20.0
2-Methylnaphthalene	0.801	0.803	5.000	5.015		AVRG	0.3	20.0
Naphthalene	1.224	1.188	5.000	4.852		AVRG	-3.0	20.0
Phenanthrene	1.064	1.099	5.000	5.162		AVRG	3.2	20.0
Pyrene	1.038	1.192	5.000	5.741		AVRG	14.8	20.0
2-Fluorobiphenyl	0.865	0.853	5.000	4.929		AVRG	-1.4	
Terphenyl-d14	0.777	0.835	5.000	5.376		AVRG	7.5	

FORM VII SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Lab File ID: SEQ-TUN1 DFTPP Injection Date: 01/23/10

Instrument ID: BNA4 DFTPP Injection Time: 0740

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	33.6
68	Less than 2.0% of mass 69	0.7 (1.7)1
69	Mass 69 relative abundance	40.7
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	50.2
197	Less than 1.0% of mass 198	0.6
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.0
275	10.0 - 30.0% of mass 198	23.3
365	Greater than 1.0% of mass 198	2.31
441	Present, but less than mass 443	11.1
442	Greater than 40.0% of mass 198	69.1
443	17.0 - 23.0% of mass 442	14.2 (20.6)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SEQ-CCV1	SEQ-CCV1	SEQ-CCV1	01/23/10	0759
02	CEF-BP-1S-20	1001107-02DL	0110702D	01/23/10	1014
03					
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FORM V SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Instrument ID: BNA4 Calibration Date: 01/23/10 Time: 0759

Lab File ID: SEQ-CCV1 Init. Calib. Date(s): 11/09/09 11/12/09

Init. Calib. Times: 1046 2122

COMPOUND	$\overline{RRF}$	RRF5	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Acenaphthene	0.746	0.740	5.000	4.960		AVRG	-0.8	20.0
Acenaphthylene	1.000	0.945	5.000	4.726		AVRG	-5.5	20.0
Anthracene	0.995	1.090	5.000	5.478		AVRG	9.6	20.0
Benzo(a)anthracene	0.758	0.999	5.000	6.588		AVRG	31.8	20.0
Benzo(b)fluoranthene	1.177	1.156	5.000	4.914		AVRG	-1.7	20.0
Benzo(k)fluoranthene	1.169	1.170	5.000	5.001		AVRG	0.0	20.0
Benzo(g,h,i)perylene	0.865	0.978	5.000	5.654		AVRG	13.1	20.0
Benzo(a)pyrene	0.959	1.014	5.000	5.287		AVRG	5.7	20.0
Chrysene	0.732	0.937	5.000	6.399		AVRG	28.0	20.0
Dibenz(a,h)anthracene	0.764	0.866	5.000	5.664		AVRG	13.3	20.0
Fluoranthene	1.030	1.194	5.000	5.793		AVRG	15.9	20.0
Fluorene	0.746	0.759	5.000	5.088		AVRG	1.8	20.0
Indeno(1,2,3-cd)pyrene	0.771	0.890	5.000	5.767		AVRG	15.3	20.0
1-Methylnaphthalene	0.741	0.704	5.000	4.750		AVRG	-5.0	20.0
2-Methylnaphthalene	0.801	0.775	5.000	4.839		AVRG	-3.2	20.0
Naphthalene	1.224	1.130	5.000	4.618		AVRG	-7.6	20.0
Phenanthrene	1.064	1.104	5.000	5.186		AVRG	3.7	20.0
Pyrene	1.038	1.225	5.000	5.899		AVRG	18.0	20.0
2-Fluorobiphenyl	0.865	0.816	5.000	4.716		AVRG	-5.7	
Terphenyl-d14	0.777	0.898	5.000	5.780		AVRG	15.6	

FORM VII SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

0A20005-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Lab File ID: A20005B1 Lab Sample ID: 0A20005-BLK1

Instrument ID: BNA4 Date Extracted: 01/20/10

Matrix: (soil/water) WATER Date Analyzed: 01/22/10

Level:(low/med) LOW GPC Cleanup: (Y/N) N Time Analyzed: 0913

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	0A20005-BLK1	0A20005-BS1	A20005L1	01/22/10
02	0A20005-BLK1	0A20005-BSD1	A20005L2	01/22/10
03	CEF-BP-5I-20	1001107-01	0110701	01/22/10
04	CEF-BP-1S-20	1001107-02	0110702	01/22/10
05	CEF-BP-6S-20	1001107-03	0110703	01/22/10
06	CEF-BP-8S-20	1001107-04	0110704	01/22/10
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COMMENTS:

page 1 of 1

FORM IV SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

0A20005-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_001

Matrix: (soil/water) WATER Lab Sample ID: 0A20005-BLK1

Sample wt/vol: 1000 (g/mL) ML Lab File ID: A20005B1

% Moisture: _____ decanted: (Y/N)___ Date Sampled: _____

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/20/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 09:13

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.020	1.0		U
208-96-8	Acenaphthylene	0.020	0.10		U
120-12-7	Anthracene	0.020	0.25		U
56-55-3	Benzo(a)anthracene	0.020	0.10		U
205-99-2	Benzo(b)fluoranthene	0.020	0.10		U
207-08-9	Benzo(k)fluoranthene	0.020	0.10		U
191-24-2	Benzo(g,h,i)perylene	0.020	0.10		U
50-32-8	Benzo(a)pyrene	0.020	0.10		U
218-01-9	Chrysene	0.020	0.10		U
53-70-3	Dibenz(a,h)anthracene	0.020	0.10		U
206-44-0	Fluoranthene	0.020	0.25	0.036	I
86-73-7	Fluorene	0.020	1.0		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.020	0.10		U
90-12-0	1-Methylnaphthalene	0.020	1.0		U
91-57-6	2-Methylnaphthalene	0.020	1.0	0.021	I
91-20-3	Naphthalene	0.020	1.0		U
85-01-8	Phenanthrene	0.020	0.10	0.036	I
129-00-0	Pyrene	0.020	0.25	0.039	I

FORM I SV

Microbac®

158 Starlite Drive, Marietta, OH 45750 • T:740-373-4071 • F:740-373-4835 • http://www.microbac.com

Laboratory Report Number: L10010376

Client: Kim Kostzer, 621 Mainstream Drive, Nashville, TN, 37228

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories.

Review and compilation of your report was completed by Microbac's Sales and Service Team. If you have questions, comments or require further assistance regarding this report, please contact your team member noted in the reviewed box below at 800-373-4071. Team member e-mail addresses also appear here for your convenience.

Kathy Albertson	*Team Chemist/Data Specialist*	kalbertson@microbac.com
Stephanie Mossburg	*Team Chemist/Data Specialist*	smossburg@microbac.com
Tony Long	*Team Chemist/Data Specialist*	tlong@microbac.com
Amanda Fickiesen	*Client Services Specialist*	afickiesen@microbac.com
Annie Brown	*Client Services Specialist*	abrown@microbac.com

This report was reviewed on January 28, 2010.

Stephanie Mossburg

Stephanie Mossburg - Team Chemist/Data Specialist

I certify that all test results meet all of the requirements of the accrediting authority listed below. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

This report was certified on January 28, 2010.

David E. Vandenberg

David Vandenberg - Managing Director

State of origin: Tennessee
Accrediting authority: N/A ID:N/A
QAPP: Microbac OVD
This report contains a total of 38 pages.

Look closer. Go further. Do more.

Microbac Laboratories Inc.
REPORT NARRATIVE

Microbac Login No: L10010376

CHAIN OF CUSTODY: The chain of custody number was 1001107

SHIPMENT CONDITIONS: The chain of custody forms were received sealed in a cooler. The cooler temperature was 2 degrees C.

SAMPLE MANAGEMENT: All samples received were intact.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Approved: 26-JAN-10
Stephanie Mossburg

1000004001

COOLER INSPECTION

Microbac®

Received: 01/22/2010 10:46
Delivery Method: FedEx
Opened By: Jane Thompson
Comments:

Login(s): L10010376

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
7151-C5	G	2.0	3457502211000004975495791339201 2		

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were samples received within EPA hold times?
9	Yes	Were correct perservatives used? (water only)
10	NA	Were pH ranges acceptable? (voa's excluded)
11	NA	Were VOA samples free of headspace (<6mm)?

Discrepancies:

9	Note: Samples preserved with H2So4.	

Look closer. Go further. Do more.

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

LABORATORY REPORT

L10010376

01/28/10 13:45

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

Account Name: Empirical Labs of Tennessee, LLC
621 Mainstream Drive
Suite 270
Nashville, TN 37228
Attention: Kim Kostzer

Project Number: 2719.001
Project:
Site: CECIL FIELDS

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
CEF-BP-5I-201001	L10010376-01	8015MOD	1	22-JAN-10
CEF-BP-1S-20100	L10010376-02	8015MOD	1	22-JAN-10
CEF-BP-6S-20100	L10010376-03	8015MOD	1	22-JAN-10
CEF-BP-8S-20100	L10010376-04	8015MOD	1	22-JAN-10

L1_A_PROD - Modified 03/06/2008
PDF File ID: 1585993
Report generated: 01/28/2010 13:45

Microbac

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 8015MOD

AAB#: WG322327

Login Number: L10010376

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
CEF-BP-5I-201001	01	01/18/10					01/25/10	7	7		01/27/10	2.4	40	
CEF-BP-1S-20100	02	01/18/10					01/25/10	6.9	7		01/27/10	2.4	40	
CEF-BP-6S-20100	03	01/18/10					01/25/10	6.8	7		01/27/10	2.4	40	
CEF-BP-8S-20100	04	01/18/10					01/25/10	6.8	7		01/27/10	2.5	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 1585908
Report generated 01/28/2010 13:16

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HP14 Dataset: 012710
Analyst1: HAV Analyst2: NA
Method: FLA-PRO SOP: GCS03 Rev: 9

Maintenance Log ID: 31704 Syringe Filter Lot#:

Column 1 ID: Column 2 ID: RTX-5

Workgroups: WG322327

Internal STD: NA Surrogate STD: STD37428 Calibration STD STD37470

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	14G24905.R	WG322180-01 PRO @600ppm	1	1	STD37470	01/27/10 12:34
2	14G24906.R	WG322180-02 PRO @400ppm	1	1	STD37470	01/27/10 13:17
3	14G24907.R	WG322180-03 PRO @200ppm	1	1	STD37470	01/27/10 14:00
4	14G24908.R	WG322180-04 PRO @100ppm	1	1	STD37470	01/27/10 14:43
5	14G24909.R	WG322180-05 PRO @50ppm	1	1	STD37470	01/27/10 15:25
6	14G24910.R	WG322180-06 PRO @25ppm	1	1	STD37470	01/27/10 16:08
7	14G24911.R	WG322180-07 ALT PRO @200ppm	1	1	STD37469	01/27/10 16:49
8	14G24912.R	WG321985-01 BLANK	1	1		01/27/10 17:29
9	14G24913.R	WG321985-02 LCS	1	1		01/27/10 18:11
10	14G24914.R	WG321985-03 LCS	1	1		01/27/10 18:53
11	14G24915.R	L10010376-01	1	1		01/27/10 19:35
12	14G24916.R	L10010376-02	1	1		01/27/10 20:17
13	14G24917.R	L10010376-03	1	1		01/27/10 20:59
14	14G24918.R	L10010376-04	1	1		01/27/10 21:41
15	14G24919.R	L10010377-01	1	1		01/27/10 22:23
16	14G24920.R	L10010377-02	1	1		01/27/10 23:05
17	14G24921.R	CH2CL2	1	1		01/27/10 23:47
18	14G24922.R	WG322296-01 PRO CCV @200ppm	1	1	STD37470	01/28/10 00:29
19	14G24923.R	L10010377-03	1	1		01/28/10 01:11
20	14G24924.R	L10010377-04	1	1		01/28/10 01:53
21	14G24925.R	L10010001-02	1	1		01/28/10 02:35
22	14G24926.R	L10010002-02	1	1		01/28/10 03:17
23	14G24927.R	L10010005-02	1	1		01/28/10 03:59
24	14G24928.R	L10010006-02	1	1		01/28/10 04:41
25	14G24929.R	PRO SPK	1	1		01/28/10 05:23
26	14G24930.R	CH2CL2	1	1		01/28/10 06:05
27	14G24931.R	WG322296-02 PRO CCV @200ppm	1	1	STD37470	01/28/10 06:47

Comments

Seq.	Rerun	Dil.	Reason	Analytes
8				
	Sample had a low surr. n-triacontane-d62 rec.			
9				
	Sample had a low surr. n-triacontane-d62 rec.			
10				

Page: 1 Approved: 28-JAN-10

Microbac

Microbac Laboratories Inc.

INITIAL CALIBRATION SUMMARY

Login Number: L10010376
Analytical Method: 8015MOD
ICAL Workgroup: WG322180

Instrument ID: HP14
Initial Calibration Date: 27-JAN-10 16:08
Column ID: R

Analyte		AVG RF	% RSD	LINEAR (R^2	QUAD(R^2)
Petroleum Range		1294000	13.4		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 1585942
Report generated 01/28/2010 13:17

Microbac

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L10010376 Run Date: 01/27/2010 Sample ID: WG322180-07
Instrument ID: HP14 Run Time: 16:49 Method: 8015MOD
File ID: 14G24911.R Analyst: HAV QC Key: STD
ICal Workgroup: WG322180 Cal ID: HP14 - 27-JAN-10

Analyte		Expected	Found	Units	RF	%D	UCL	Q
TRPH-Florida PRO		3400000	3120000	ug/L	1190000	8.20	25	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 1585943
Report generated 01/28/2010 13:17

Microbac

Microbac Laboratories Inc.
CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L10010376
Run Date: 01/28/2010
Sample ID: WG322296-01
Instrument ID: HP14
Run Time: 00:29
Method: 8015MOD
File ID: 14G24922.R
Analyst: HAV
QC Key: STD
Workgroup (AAB#): WG322327
Cal ID: HP14 - 27-JAN-10
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
TRPH-Florida PRO		3400000	3710000	ug/L	1410000	9.10	25	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 1585945
Report generated 01/28/2010 13:17

Microbac

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number: L10010376
Blank File ID: 14G24912.R
Prep Date: 01/25/10 10:26
Analyzed Date: 01/27/10 17:29
Analyst: HAV

Work Group: WG322327
Blank Sample ID: WG321985-01
Instrument ID: HP14
Method: 8015MOD

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG321985-02	14G24913.R	01/27/10 18:11	01
LCS2	WG321985-03	14G24914.R	01/27/10 18:53	01
CEF-BP-5I-201001	L10010376-01	14G24915.R	01/27/10 19:35	01
CEF-BP-1S-20100	L10010376-02	14G24916.R	01/27/10 20:17	01
CEF-BP-6S-20100	L10010376-03	14G24917.R	01/27/10 20:59	01
CEF-BP-8S-20100	L10010376-04	14G24918.R	01/27/10 21:41	01

Report Name: BLANK_SUMMARY
PDF File ID: 1585909
Report generated 01/28/2010 13:16

Microbac

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L10010376 Prep Date: 01/25/10 10:26 Sample ID: WG321985-01
Instrument ID: HP14 Run Date: 01/27/10 17:29 Prep Method: 3510C
File ID: 14G24912.R Analyst: HAV Method: 8015MOD
Workgroup (AAB#): WG322327 Matrix: Water Units: ug/L
Contract #: Cal ID: HP14-27-JAN-10

Analytes	MDL	RL	Concentration	Dilution	Qualifier
TRPH-Florida PRO	250	500	250	1	U

Surrogates	% Recovery	Surrogate Limits	Qualifier
o-Terphenyl	85.7	82 - 142	PASS
n-triacontane-d62	20.2	42 - 193	FAIL

MDL Method Detection Limit
RL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > RL

Report Name: BLANK
PDF ID: 1585910
28-JAN-2010 13:16

Microbac

INORGANIC CASE NARRATIVE
TETRA TECH NUS
SDG# CTOJM09CF_001
Work Order # 1001107
January, 2010

Empirical Laboratories ID	Client ID
1001107-01	CEF-BP-5I-20100118
1001107-02	CEF-BP-1S-20100118
1001107-03	CEF-BP-6S-20100118

I certify that, based upon my inquiry of those individuals immediately responsible for obtaining the information and to the best of my knowledge, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Betty DeVille

Betty DeVille
Inorganic Lab Manager

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody included with this data package.

I. HOLDING TIMES

A. **Sample Preparation:** All holding times were met.

B. **Sample Analysis:** All holding times were met .

II. METHODS

US EPA Methods For Chemical Analysis of Water and Wastes, method 300.0 was used to analyze nitrogen, nitrite (as N) and nitrogen, nitrate (as N) and sulfate. Standard Methods 19th Edition Method SM2320B was used to analyze total alkalinity (as CaCO3) and method SM4500-SCF was used to analyze sulfide. Note: The "U" flag indicates that the sample concentration is reported down to the laboratory MDL. The "J" flag indicates that the analyte result is between the laboratory reporting limit and the laboratory MDL. All methods performed according to EPA guidelines and Empirical Laboratories Standard Operating Procedures.

Note: For all samples analyzed by method 300.0 all samples and analytes were manually integrated for one of the following reasons:
(A) The peak was manually integrated as it was not integrated in the original chromatogram.
(B) The peak was manually integrated due to resolution or coelution issues in the original chromatogram.
(C) The peak was manually integrated to correct the baseline from the original chromatogram.

(D) The peak was manually integrated to identify the correct peak as the incorrect peak was identified in the original chromatogram.
(E) The peak was manually integrated to include the entire peak as the original chromatogram only integrated part of the peak.
All raw data is labeled with the letter applicable to why the peak was manually integrated. Please find a copy of the un-integrated data and the integrated data included in the level IV data package.

III. PREPARATION

All methods performed according to EPA guidelines and Empirical Laboratories Standard Operating Procedures.

IV. ANALYSIS

A. **Calibration:** All calibration criteria were met.

B. **Blanks:** All blank criteria were met.

C. **Spikes:** All matrix spikes quality control criteria were met.

D. **Duplicates:** All duplicate quality control criteria were met.

E. **Samples:** All sample analysis proceeded normally.

F. **Laboratory Control Samples:** All percent recovery quality control criteria were met.

ANALYSIS SEQUENCE SUMMARY
E300.0

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Cecil Field (BP Wells)
Sequence:	0A02009	Instrument:	WC-IC
Calibration:	9358004		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Initial Cal Check	0A02009-ICV1	011910-002	01/19/10 13:08
Blank	0A19012-BLK1	011910-003	01/19/10 13:26
~~Instrument RL Check~~	~~0A02009-CRL1~~	~~011910-004~~	~~01/19/10 13:43~~ SMC 1/25/10
Instrument RL Check	0A02009-CRL2	011910-005	01/19/10 14:01
LCS	0A19012-BS1	011910-006	01/19/10 14:18
CEF-BP-5I-20100118	1001107-01	011910-007	01/19/10 14:35
CEF-BP-5I-20100118	0A19012-MS1	011910-008	01/19/10 14:53
CEF-BP-5I-20100118	0A19012-MSD1	011910-009	01/19/10 15:10
CEF-BP-5I-20100118	0A19012-DUP1	011910-010	01/19/10 15:28
CEF-BP-1S-20100118	1001107-02	011910-011	01/19/10 15:45
CEF-BP-6S-20100118	1001107-03	011910-012	01/19/10 16:02
~~Instrument RL Check~~	0A02009-CRL3	011910-015	~~01/19/10 16:55~~ SMC 1/25/10
Instrument RL Check	0A02009-CRL4	011910-016	01/19/10 17:12
Calibration Check	0A02009-CCV1	011910-017	01/19/10 17:30
Calibration Blank	0A02009-CCB1	011910-018	01/19/10 17:47

ANALYSIS SEQUENCE SUMMARY
E300.0

Laboratory:	Empirical Laboratories, LLC	SDG:	CTOJM09CF_001
Client:	Tetra Tech NUS, Inc. (T010)	Project:	Cecil Field (BP Wells)
Sequence:	9L35811	Instrument:	WC-IC
Calibration:	9358004		

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Blank	9L23009-BLK1	122309-011	12/23/09 13:13
LCS	9L23009-BS1	122309-017	12/23/09 14:57
Cal Standard	9L35811-CAL1	122309-031	12/23/09 19:01
Cal Standard	9L35811-CAL2	122309-032	12/23/09 19:19
Cal Standard	9L35811-CAL3	122309-033	12/23/09 19:36
Cal Standard	9L35811-CAL4	122309-034	12/23/09 19:53
Cal Standard	9L35811-CAL5	122309-035	12/23/09 20:11
Cal Standard	9L35811-CAL6	122309-036	12/23/09 20:28
Cal Standard	9L35811-CAL7	122309-037	12/23/09 20:46
Cal Standard	9L35811-CAL8	122309-038	12/23/09 21:03

INITIAL AND CONTINUING CALIBRATION CHECK

E300.0

Laboratory: Empirical Laboratories, LLC
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: WC-IC

SDG: CTOJM09CF_001
Project: Cecil Field (BP Wells)
Calibration: 9358004
Sequence: 0A02009

Lab Sample ID	Analyte	True	Found	%R	Units	Control Limit
0A02009-ICV1	Nitrate as N	2.500	2.452	98.1	mg/L	+/- 10.00%
	Nitrite as N	2.500	2.626	105	mg/L	+/- 10.00%
	Sulfate as SO4	25.00	23.82	95.3	mg/L	+/- 10.00%
0A02009-CCV1	Nitrate as N	2.500	2.610	104	mg/L	+/- 10.00%
	Nitrite as N	2.500	2.693	108	mg/L	+/- 10.00%
	Sulfate as SO4	25.00	25.35	101	mg/L	+/- 10.00%

BLANKS
E300.0

Laboratory: Empirical Laboratories, LLC
SDG: CTOJM09CF_001
Client: Tetra Tech NUS, Inc. (T010)
Instrument ID: WC-IC
Project: Cecil Field (BP Wells)
Sequence: 0A02009
Calibration: 9358004

Lab Sample ID	Analyte	Found	MDL	MRL	Units	C	Method
0A19012-BLK1	Nitrate as N	0.0540	0.0330	~~0.100~~ 0.25	mg/L	J	E300.0
	Nitrite as N	0.00	0.0330	0.100	mg/L	U	E300.0
	Sulfate as SO4	0.321	0.330	1.00	mg/L	U	E300.0
0A02009-CCB1	Nitrate as N	0.00	0.0330	~~0.100~~ 0.25	mg/L	U	E300.0
	Nitrite as N	0.00	0.0330	0.100	mg/L	U	E300.0
	Sulfate as SO4	0.229	0.330	1.00	mg/L	U	E300.0

SMO 1/25/10

Anions by IC - Quality Control

Analyte	Result	MDL	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0A02009											
Instrument RL Check				Prepared & Analyzed: 01/19/2010							
Nitrite as N	0.1190			mg/L	0.1000		119	75-125			
Sulfate as SO4	1.193			mg/L	1.000		119	75-125			
Instrument RL Check				Prepared & Analyzed: 01/19/2010							
Nitrate as N	0.2840			mg/L	0.2500		114	75-125			

Classical Chemistry Parameters - Quality Control

Analyte	Result	MDL	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0A19015											
Blank			Prepared & Analyzed: 01/19/2010								
Alkalinity, Total (as CACO3)	ND	1.00	1.00	mg/L							U
Batch 0A21010											
Blank			Prepared & Analyzed: 01/21/2010								
Sulfide	ND	0.800	2.40	mg/L							U

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC
SDG: CTOJM09CF_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Cecil Field (BP Wells)
Matrix: Water
Instrument:

Analyte	MDL	MRL	Units	Method
Alkalinity, Total (as CACO3)	1.00	1.00	mg/L	SM2320B
Sulfide	0.800	2.40	mg/L	SM4500S2CF

METHOD DETECTION AND REPORTING LIMITS

Laboratory: Empirical Laboratories, LLC
SDG: CTOJM09CF_001
Client: Tetra Tech NUS, Inc. (T010)
Project: Cecil Field (BP Wells)
Matrix: Water
Instrument: WC-IC

Analyte	MDL	MRL	Units	Method
Bromide	0.0420	0.125	mg/L	E300.0
Chloride	0.170	0.500	mg/L	E300.0
Fluoride	0.0330	0.100	mg/L	E300.0
Nitrate as N	0.0330	~~0.100~~ 0.25	mg/L	E300.0
Nitrite as N	0.0330	0.100	mg/L	E300.0
Sulfate as SO4	0.330	1.00	mg/L	E300.0

BLD 1/25/10

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**R. SIMCIK**	**DATE:**	**FEBRUARY 25, 2010**
FROM:	**JOSEPH KALINYAK**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – VOC/PAH/PET**
NAS CECIL FIELD, CTO JM09
SDG CTOJM09CF_002

SAMPLES: 5 / Aqueous / VOC

CEF-BP-4S-20100119	CEF-BP-7S-20100119	CEF-BP-9S-20100119
CEF-BP-DUP01-20100119	Trip Blank	

4 / Aqueous / PAH / PET

CEF-BP-4S-20100119	CEF-BP-7S-20100119	CEF-BP-9S-20100119
CEF-BP-DUP01-20100119		

OVERVIEW

The sample set for CTO JM09 NAS Cecil Field, SDG CTOJM09CF_002 consists of five (5) aqueous environmental samples including one (1) trip blank. Five samples were analyzed for an abbreviated target list of volatile organic compounds (VOCs) and four (4) samples were analyzed additionally for poly-aromatic hydrocarbons and petroleum extractables (PET). There was one field duplicate pair associated with this sample delivery group (SDG); CEF-BP-DUP01-20100119 / CEF-BP-7S-20100119.

The samples were collected by TetraTech NUS on January 19, 2010 and analyzed by Empirical Laboratories, LLC. The analyses were conducted in accordance with SW-846 Methods 8260B, 8270C, and Florida-Pro analysis and reporting protocols.

The data contained in this SDG were validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Initial/Continuing Calibrations
• Laboratory Method Blank Results
* • Field Duplicate Imprecision
* • Detection Limits

The symbol (*) indicates that quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified Analytical results are presented in Appendix A. Results as reported by the laboratory are presented in Appendix B.

The text of this report is formatted to address only gross non-compliances resulting in the rejection of data and the elimination of false positives.

Volatiles

The following contaminant was detected in the method blank at the following maximum concentration:

Analyte	Maximum Conc. (µg/l)	Action Level (µg/l)
Naphthalene [1]	0.22	1.10

(1) Maximum concentration detected in the method blank 0A26011-BLK1 affecting all samples.

An action level of five times the maximum contaminant level was established to evaluate samples for laboratory contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. All affected samples had non-detected results and were not qualified as a result of method blank contamination.

PAH

The following contaminants were detected in the method blank 0A21007-BLK1 at the following maximum concentration:

Analyte	Maximum Conc. (µg/l)	Action Level (µg/l)
Benzo(a)anthracene	0.078	0.390
Benzo(b)fluoranthene	0.099	0.495
Benzo(k)fluoranthene	0.047	0.235
Benzo(a)pyrene	0.083	0.415
Chrysene	0.095	0.475
Fluoranthene	0.10	0.50
Indeno(1,2,3-cd)pyrene	0.065	0.325
Phenanthrene	0.049	0.245
Pyrene	0.10	0.50

An action level of five times the maximum contaminant level was established to evaluate samples for laboratory contamination. Sample aliquot and dilution factors, if applicable, were taken into consideration when evaluating for blank contamination. Positive results for these compounds reported at concentrations below the action level were qualified as non-detected, (U), as a result of blank contamination.

PET

No data validation issues were noted for this limited review.

Notes

Positive results reported below the reporting limit (RL) but greater than the method detection limit (MDL) for the organic analyses were qualified estimated, (J).

Naphthalene was reported by the laboratory in both the VOC and PAH fractions. The PAH fraction naphthalene result was chosen to be reported and included in the electronic database.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Sample data was qualified due to method blank contamination in both the VOC blank and the PAH blank.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the Department of Defense (DoD) document entitled "Quality Systems Manual (QSM) for Environmental Laboratories" (January 2006).

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

TetraTech NUS
Joseph Kalinyak
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Value Qualifier Key (Val Qual)

J – Positive result is considered estimated, "J", as a result of technical non-compliances.

UJ – Non-detected result is considered estimated, "UJ", as a result of technical non-compliances.

U - Value is a non-detect as reported by the laboratory.

UR – Non-detected result is considered rejected, (UR), as a result of technical non-compliances.

DATA QUALIFICATION CODE (QUAL CODE)

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's r < 0.995 / ICP PDS Recovery Noncompliance
K = ICP Interference - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient r < 0.995
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 02267	NSAMPLE	CEF-BP-4S-20100119			CEF-BP-7S-20100119			CEF-BP-9S-20100119			CEF-BP-DUP01-20100119		
SDG: CTOJM09CF_002	LAB_ID	1001136-04			1001136-02			1001136-03			1001136-01		
FRACTION: OV	SAMP_DATE	1/19/2010			1/19/2010			1/19/2010			1/19/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF										CEF-BP-7S-20100119		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1,2,4-TRIMETHYLBENZENE		0.14	U		0.14	U		0.14	U		0.14	U	
1,3,5-TRIMETHYLBENZENE		0.1	U		0.1	U		0.1	U		0.1	U	
BENZENE		0.12	U		0.12	U		0.12	U		0.12	U	
ETHYLBENZENE		0.1	U		0.1	U		0.1	U		0.1	U	
ISOPROPYLBENZENE		0.11	U		0.11	U		0.11	U		0.11	U	
TOLUENE		0.14	U		0.14	U		0.14	U		0.14	U	
TOTAL XYLENES		0.21	U		0.21	U		0.21	U		0.21	U	

PROJ_NO: 02267	NSAMPLE	Trip Blank		
SDG: CTOJM09CF_002	LAB_ID	1001136-05		
FRACTION: OV	SAMP_DATE	1/19/2010		
MEDIA: WATER	QC_TYPE	NM		
	UNITS	UG/L		
	PCT_SOLIDS	0.0		
	DUP_OF			
PARAMETER		RESULT	VQL	QLCD
1,2,4-TRIMETHYLBENZENE		0.14	U	
1,3,5-TRIMETHYLBENZENE		0.1	U	
BENZENE		0.12	U	
ETHYLBENZENE		0.1	U	
ISOPROPYLBENZENE		0.11	U	
TOLUENE		0.14	U	
TOTAL XYLENES		0.21	U	

PROJ_NO: 02267	NSAMPLE	CEF-BP-4S-20100119			CEF-BP-7S-20100119			CEF-BP-9S-20100119			CEF-BP-DUP01-20100119		
SDG: CTOJM09CF_002	LAB_ID	1001136-04			1001136-02			1001136-03			1001136-01		
FRACTION: PAH	SAMP_DATE	1/19/2010			1/19/2010			1/19/2010			1/19/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF										CEF-BP-7S-20100119		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
1-METHYLNAPHTHALENE		0.018	U		0.03	J	P	0.035	J	P	0.018	U	
2-METHYLNAPHTHALENE		0.018	U		0.035	J	P	0.038	J	P	0.018	U	
ACENAPHTHENE		0.018	U		0.018	U		0.05	J	P	0.018	U	
ACENAPHTHYLENE		0.018	U		0.018	U		0.042	J	P	0.018	U	
ANTHRACENE		0.026	J	P	0.026	J	P	0.057	J	P	0.018	U	
BENZO(A)ANTHRACENE		0.092	U	A	0.092	U	A	0.092	U	A	0.018	U	
BENZO(A)PYRENE		0.092	U	A	0.018	U		0.092	U	A	0.018	U	
BENZO(B)FLUORANTHENE		0.092	U	A	0.018	U		0.092	U	A	0.018	U	
BENZO(G,H,I)PERYLENE		0.018	U		0.018	U		0.018	U		0.018	U	
BENZO(K)FLUORANTHENE		0.092	U	A	0.018	U		0.092	U	A	0.018	U	
CHRYSENE		0.092	U	A	0.092	U	A	0.092	U	A	0.018	U	
DIBENZO(A,H)ANTHRACENE		0.018	U		0.018	U		0.018	U		0.018	U	
FLUORANTHENE		0.23	U	A	0.23	U	A	0.23	U	A	0.018	U	
FLUORENE		0.018	U		0.018	U		0.056	J	P	0.018	U	
INDENO(1,2,3-CD)PYRENE		0.018	U		0.018	U		0.018	U		0.018	U	
NAPHTHALENE		0.018	U		0.028	J	P	0.034	J	P	0.018	U	
PHENANTHRENE		0.092	U	A	0.092	U	A	0.092	U	A	0.018	U	
PYRENE		0.23	U	A	0.23	U	A	0.23	U	A	0.23	U	A

PROJ_NO: 02267	NSAMPLE	CEF-BP-4S-20100119			CEF-BP-7S-20100119			CEF-BP-9S-20100119			CEF-BP-DUP01-20100119		
SDG: CTOJM09CF_002	LAB_ID	L10010377-04			L10010377-02			L10010377-03			L10010377-01		
FRACTION: PET	SAMP_DATE	1/19/2010			1/19/2010			1/19/2010			1/19/2010		
MEDIA: WATER	QC_TYPE	NM			NM			NM			NM		
	UNITS	UG/L			UG/L			UG/L			UG/L		
	PCT_SOLIDS	0.0			0.0			0.0			0.0		
	DUP_OF										CEF-BP-7S-20100119		
PARAMETER		RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD	RESULT	VQL	QLCD
TOTAL PETROLEUM HYDROCARBONS		235	U		235	U		235	U		235	U	

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-4S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-04

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0113604

Level: (low/med) LOW Date Sampled: 01/19/10 14:25

% Moisture: not dec. _____ Date Analyzed: 01/25/10 19:21

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0		U
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-7S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0113602

Level: (low/med) LOW Date Sampled: 01/19/10 12:40

% Moisture: not dec. _____ Date Analyzed: 01/25/10 18:23

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0		U
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-9S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0113603

Level: (low/med) LOW Date Sampled: 01/19/10 13:55

% Moisture: not dec. _____ Date Analyzed: 01/25/10 18:52

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0		U
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-DU
P01-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0113601

Level: (low/med) LOW Date Sampled: 01/19/10 :

% Moisture: not dec. _____ Date Analyzed: 01/25/10 17:53

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0		U
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

TRIP BLANK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-05

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: 0113605

Level: (low/med) LOW Date Sampled: 01/19/10 :

% Moisture: not dec. _____ Date Analyzed: 01/25/10 19:51

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0		U
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-4S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-04

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0113604

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/19/10 14:25

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/21/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 17:05

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92		U
208-96-8	Acenaphthylene	0.018	0.092		U
120-12-7	Anthracene	0.018	0.23	0.026	I
56-55-3	Benzo(a)anthracene	0.018	0.092	0.051	IV
205-99-2	Benzo(b)fluoranthene	0.018	0.092	0.042	IV
207-08-9	Benzo(k)fluoranthene	0.018	0.092	0.022	IV
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092	0.030	IV
218-01-9	Chrysene	0.018	0.092	0.056	IV
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.11	IV
86-73-7	Fluorene	0.018	0.92		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92		U
91-57-6	2-Methylnaphthalene	0.018	0.92		U
91-20-3	Naphthalene	0.018	0.92		U
85-01-8	Phenanthrene	0.018	0.092	0.060	IV
129-00-0	Pyrene	0.018	0.23	0.094	IV

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-7S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-02

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0113602

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/19/10 12:40

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/21/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 15:58

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92		U
208-96-8	Acenaphthylene	0.018	0.092		U
120-12-7	Anthracene	0.018	0.23	0.026	I
56-55-3	Benzo(a)anthracene	0.018	0.092	0.026	IV
205-99-2	Benzo(b)fluoranthene	0.018	0.092		U
207-08-9	Benzo(k)fluoranthene	0.018	0.092		U
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092	0.024	IV
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.028	IV
86-73-7	Fluorene	0.018	0.92		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92	0.030	I
91-57-6	2-Methylnaphthalene	0.018	0.92	0.035	I
91-20-3	Naphthalene	0.018	0.92	0.028	I
85-01-8	Phenanthrene	0.018	0.092	0.031	IV
129-00-0	Pyrene	0.018	0.23	0.030	IV

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-9S
-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-03

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0113603

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/19/10 13:55

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/21/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 16:31

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92	0.050	I
208-96-8	Acenaphthylene	0.018	0.092	0.042	I
120-12-7	Anthracene	0.018	0.23	0.057	I
56-55-3	Benzo(a)anthracene	0.018	0.092	0.055	IV
205-99-2	Benzo(b)fluoranthene	0.018	0.092	0.040	IV
207-08-9	Benzo(k)fluoranthene	0.018	0.092	0.040	IV
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092	0.040	IV
218-01-9	Chrysene	0.018	0.092	0.058	IV
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23	0.062	IV
86-73-7	Fluorene	0.018	0.92	0.056	I
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92	0.035	I
91-57-6	2-Methylnaphthalene	0.018	0.92	0.038	I
91-20-3	Naphthalene	0.018	0.92	0.034	I
85-01-8	Phenanthrene	0.018	0.092	0.066	IV
129-00-0	Pyrene	0.018	0.23	0.060	IV

FORM I SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

CEF-BP-DU
P01-20100119

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 1001136-01

Sample wt/vol: 1080 (g/mL) ML Lab File ID: 0113601

% Moisture: _____ decanted: (Y/N)___ Date Sampled: 01/19/10 :

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/21/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 15:24

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.018	0.92		U
208-96-8	Acenaphthylene	0.018	0.092		U
120-12-7	Anthracene	0.018	0.23		U
56-55-3	Benzo(a)anthracene	0.018	0.092		U
205-99-2	Benzo(b)fluoranthene	0.018	0.092		U
207-08-9	Benzo(k)fluoranthene	0.018	0.092		U
191-24-2	Benzo(g,h,i)perylene	0.018	0.092		U
50-32-8	Benzo(a)pyrene	0.018	0.092		U
218-01-9	Chrysene	0.018	0.092		U
53-70-3	Dibenz(a,h)anthracene	0.018	0.092		U
206-44-0	Fluoranthene	0.018	0.23		U
86-73-7	Fluorene	0.018	0.92		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.018	0.092		U
90-12-0	1-Methylnaphthalene	0.018	0.92		U
91-57-6	2-Methylnaphthalene	0.018	0.92		U
91-20-3	Naphthalene	0.018	0.92		U
85-01-8	Phenanthrene	0.018	0.092		U
129-00-0	Pyrene	0.018	0.23	0.019	IV

FORM I SV

Report Number: L10010377
Report Date : January 28, 2010

Sample Number: L10010377-04
Client ID: CEF-BP-4S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/19/2010 14:25
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 15:25
Run Date: 01/28/2010 01:53
File ID: 14G24924.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	83.1	82	142	
n-triacontane-d62	38.6	42	193	*

U Not detected at or above adjusted sample detection limit
* Surrogate or spike compound out of range

Microbac

Report Number: L10010377
Report Date : January 28, 2010

Sample Number: L10010377-02
Client ID: CEF-BP-7S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/19/2010 12:40
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 16:08
Run Date: 01/27/2010 23:05
File ID: 14G24920.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	95.6	82	142	
n-triacontane-d62	32.2	42	193	*

U Not detected at or above adjusted sample detection limit
* Surrogate or spike compound out of range

Microbac

Report Number: L10010377
Report Date : January 28, 2010

Sample Number: L10010377-03
Client ID: CEF-BP-9S-20100
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/19/2010 13:55
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 14:43
Run Date: 01/28/2010 01:11
File ID: 14G24923.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	110	82	142	
n-triacontane-d62	56.2	42	193	

U Not detected at or above adjusted sample detection limit

Microbac

Report Number: L10010377
Report Date : January 28, 2010

Sample Number: L10010377-01
Client ID: CEF-BP-DUP01-20
Matrix: Water
Workgroup Number: WG322327
Collect Date: 01/19/2010 00:01
Sample Tag: 01

PrePrep Method: NONE
Prep Method: 3510C
Analytical Method: 8015MOD
Analyst: HAV
Dilution: 1
Units: ug/L

Instrument: HP14
Prep Date: 01/25/2010 10:26
Cal Date: 01/27/2010 16:08
Run Date: 01/27/2010 22:23
File ID: 14G24919.R

Analyte	CAS. Number	Result	Qual	RL	MDL
TRPH-Florida PRO			U	469	235

Surrogate	% Recovery	Lower	Upper	Qual
o-Terphenyl	99.3	82	142	
n-triacontane-d62	36.5	42	193	*

U Not detected at or above adjusted sample detection limit
* Surrogate or spike compound out of range

Microbac

APPENDIX C

SUPPORT DOCUMENTATION

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER № 2014 | PAGE ___ OF ___

PROJECT NO: 112G02267	FACILITY: NAS Cecil Field BP Walk	PROJECT MANAGER: Rob Simcik	PHONE NUMBER	LABORATORY NAME AND CONTACT: Empirical Laboratories
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER: Kara Wimble	PHONE NUMBER: 904 636 6125	ADDRESS: 601 Mainstream Drive Suite 270
		CARRIER/WAYBILL NUMBER: FEDEX Airbill 8643 5142 1527		CITY, STATE: Nashville, TN 37228

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G G G

PRESERVATIVE USED: HCl — H2SO4

TYPE OF ANALYSIS: BTEX VOCs 8260B; PAHs 1-methylnaphthalene 8270SIM; TRPH FL-PRO

DATE YEAR 2010	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	BTEX VOCs 8260B	PAHs 1-methylnaphthalene 8270SIM	TRPH FL-PRO					COMMENTS
1/19	0000	CEF-BP-DUP01-20100119				GW	G	7	X	X	X					Cool to 4° C -01
1/19	1210	CEF-BP-7S-20100119				GW	G	7	X	X	X					-02
1/19	1355	CEF-BP-9S-20100119				GW	G	7	X	X	X					-03
1/19	1425	CEF-BP-4S-20100119				GW	G	7	X	X	X					-04
		Trip blank						2	X							-05

1001136

1. RELINQUISHED BY	DATE 1/19/10	TIME 1830	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE 1/20/10	TIME 09:00

COMMENTS Please note 7 day turnaround

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

4/02R
FORM NO. TtNUS-001

CTOJM09CF_002 Volatiles

HOLDTIME

SDG CTOJM09CF_

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
OV	%	CEF-BP-7S-20100119	1001136-02	NM	01/19/2010	01/25/2010	01/25/2010	6.238 19444	0	6.238 19444
OV	%	CEF-BP-9S-20100119	1001136-03	NM	01/19/2010	01/25/2010	01/25/2010	6.206 25000	0	6.206 25000
OV	%	CEF-BP-DUP01-20100119	1001136-01	NM	01/19/2010	01/25/2010	01/25/2010	6.745 13888	0	6.745 13888
OV	%	Trip Blank	1001136-05	NM	01/19/2010	01/25/2010	01/25/2010	6.827 08333	0	6.827 08333
OV	%	CEF-BP-4S-20100119	1001136-04	NM	01/19/2010	01/25/2010	01/25/2010	6.205 55555	0	6.205 55555
OV	UG/L	Trip Blank	1001136-05	NM	01/19/2010	01/25/2010	01/25/2010	6.827 08333	0	6.827 08333
OV	UG/L	CEF-BP-4S-20100119	1001136-04	NM	01/19/2010	01/25/2010	01/25/2010	6.205 55555	0	6.205 55555
OV	UG/L	CEF-BP-7S-20100119	1001136-02	NM	01/19/2010	01/25/2010	01/25/2010	6.238 19444	0	6.238 19444
OV	UG/L	CEF-BP-9S-20100119	1001136-03	NM	01/19/2010	01/25/2010	01/25/2010	6.206 25000	0	6.206 25000
OV	UG/L	CEF-BP-DUP01-20100119	1001136-01	NM	01/19/2010	01/25/2010	01/25/2010	6.745 13888	0	6.745 13888
SIM	%	CEF-BP-7S-20100119	1001136-02	NM	01/19/2010	01/21/2010	01/22/2010	2.027 77777	1.109 72222	3.137 49999
SIM	%	CEF-BP-9S-20100119	1001136-03	NM	01/19/2010	01/21/2010	01/22/2010	1.975 69444	1.132 63888	3.108 33333
SIM	%	CEF-BP-DUP01-20100119	1001136-01	NM	01/19/2010	01/21/2010	01/22/2010	2.555 55555	1.086 11111	3.641 66666
SIM	%	CEF-BP-4S-20100119	1001136-04	NM	01/19/2010	01/21/2010	01/22/2010	1.954 86111	1.156 25	3.111 11111
SIM	UG/L	CEF-BP-4S-20100119	1001136-04	NM	01/19/2010	01/21/2010	01/22/2010	1.954 86111	1.156 25	3.111 11111

SORT	UNITS	NSAMPLE	LAB_ID	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	SMP_EXTR	EXTR_ANL	SMP_ANL
SIM	UG/L	CEF-BP-7S-20100119	1001136-02	NM	01/19/2010	01/21/2010	01/22/2010	2.027 77777	1.109 72222	3.137 49999
SIM	UG/L	CEF-BP-9S-20100119	1001136-03	NM	01/19/2010	01/21/2010	01/22/2010	1.975 69444	1.132 63888	3.108 33333
SIM	UG/L	CEF-BP-DUP01-20100119	1001136-01	NM	01/19/2010	01/21/2010	01/22/2010	2.555 55555	1.086 11111	3.641 66666
TPH	UG/L	CEF-BP-DUP01-20100119	L10010377-01	NM	01/19/2010	01/25/2010	01/27/2010	6.434 02777	2.497 91666	8.931 94444
TPH	UG/L	CEF-BP-4S-20100119	L10010377-04	NM	01/19/2010	01/25/2010	01/28/2010	5.834 02777	2.643 75000	8.477 77777
TPH	UG/L	CEF-BP-7S-20100119	L10010377-02	NM	01/19/2010	01/25/2010	01/27/2010	5.906 94444	2.527 08333	8.434 02777
TPH	UG/L	CEF-BP-9S-20100119	L10010377-03	NM	01/19/2010	01/25/2010	01/28/2010	5.854 86111	2.614 58333	8.469 44444

ORGANIC CASE NARRATIVE
Tetra Tech NUS, Inc./Nas Cecil Field (BP Wells) JM09
SDG: CTOJM09CF_002

Sampled	Received	Lab ID	Client ID
1/19/2010	1/20/2010	1001136-01	CEF-BP-DUP01-20100119
1/19/2010	1/20/2010	1001136-02	CEF-BP-7S-20100119
1/19/2010	1/20/2010	1001136-03	CEF-BP-9S-20100119
1/19/2010	1/20/2010	1001136-04	CEF-BP-4S-20100119
1/19/2010	1/20/2010	1001136-05	Trip Blank

Volatiles

Method: The samples were analyzed by USEPA SW-846 Methods 5030B/8260B (purge and trap then capillary column GC/MS) for waters upon receipt to the laboratory in satisfactory condition.

Comments: The volatile analyses for these samples were satisfactorily completed within sample holding times and met the corresponding specifications with the following note/exceptions:

- Samples were analyzed for an abbreviated target list of benzene, ethylbenzene, isopropylbenzene, naphthalene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene and xylene (total).
- Naphthalene was detected at a concentration less then ½ the quantitation limit in the method blank. Reported concentrations in the associated samples are qualified with a "V".
- Quantitation signals were manually integrated in order to accurately reflect the peak areas based on the technical judgment of the analyst. A listing of the manual integrations performed and reason for the integration is included with the logs. Before and after "pictures" are available at the laboratory where manual integrations were performed.

I certify that, to the best of my knowledge and based upon my inquiry of those individuals immediately responsible for obtaining the information, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Christine Granato for

Jade Holliman
Organic Manager

ANALYTICAL REPORT TERMS AND QUALIFIERS (ORGANIC)

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix.

EQL: The estimated quantitation limit (EQL), also known as the reporting limit (RL), is defined as the estimated concentration above which quantitative results can be obtained with a specific degree of confidence. Empirical Laboratories defines the EQL to be at or near the lowest standard of the calibration curve.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the MDL.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

I: The presence of an "I" to the right of an analytical result indicates that the reported result is estimated. The data pass the identification criteria indicating that the compound is present, but the calculated result is less than the EQL/RL.

L: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with a "L". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

V: The presence of a "V" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

J1: The reported analyte concentration may have a low bias as the CCV exceeded the limit on the low side.

J2: The reported analyte concentration may have a high bias as the CCV exceeded the limit on the high side.

M: The presence of an "M" to the right of an analytical result indicates that the sample matrix interfered with the quantitation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

I: The presence of an "I" to the right of an analytical result that the presence of a qualitative interference could have caused a false positive or over estimation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 1001136 Number of Coolers: 1 of 2

Client: Tetra Tech NUS Project: Nas Cecil Field BIP wells

Date/Time Received: **01/20/10 09:00** Date cooler(s) opened: 01/20/10

Opened By (print): **WILLIAM SCHWAB** (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive?: FedEx UPS DHL Hand Delivered

EL Courier Other: _____

If applicable, enter airbill number here: 1527

2. Were custody seals on outside of cooler(s)? ..... Yes No

How many: 2 Seal date: 1/19/10 Seal Initials: ?

3. Were custody seals unbroken and intact at the date and time of arrival? ..... Yes No N/A
4. Were custody papers sealed in a plastic bag included in the sample cooler? ..... Yes No N/A
5. Were custody papers filled out properly (ink, signed, etc.)? ..... Yes No N/A
6. Did you sign custody papers in the appropriate place for acceptance? ..... Yes No N/A
7. Was project identifiable from custody papers? ..... Yes No N/A
8. If required, was enough ice present in the cooler(s)? ..... Yes No N/A

Type of Coolant: WET DRY BLUE NONE Temperature of Samples upon Receipt: 0.4°C

Dates samples were logged-in: **01/20/10**

9. Initial this form to acknowledge login of sample(s): (Name): Will Schwab (Initial): WS
10. Were all bottle lids intact and sealed tightly? ..... Yes No N/A
11. Did all bottles arrive unbroken? ..... Yes No N/A
12. Was all required bottle label information complete? ..... Yes No N/A
13. Did all bottle labels agree with custody papers? ..... Yes No N/A
14. Were correct containers used for the analyses indicated? ..... Yes No N/A
15. Were preservative levels correct in all applicable sample containers? ..... Yes No N/A
16. Was residual chlorine present in any applicable sample containers? ..... Yes No N/A
17. Was sufficient amount of sample sent for the analyses required? ..... Yes No N/A
18. Was headspace present in any included VOA vials? ..... Yes No N/A

pH<2 for all FL-PIO samples

If Non-Conformance issues were present, list by sample ID: _____

_____ CAR#: _____

Housed Trip Blank

EMPIRICAL LABORATORIES
COOLER RECEIPT FORM

LIMS Number: 1001136 Number of Coolers: 2 of 2

Client: Tetra Tech NUS Project: Nas Cecil Field BIP wells

Date/Time Received: **01/20/10 09:00** Date cooler(s) opened: **01/20/10**

Opened By (print): **WILLIAM SCHWAB** (signature): [signature]

Circle response below as appropriate

1. How did the samples arrive?: FedEx UPS DHL Hand Delivered

EL Courier Other: _____

If applicable, enter airbill number here: 6328

2. Were custody seals on outside of cooler(s)? ..... Yes No

How many: 2 Seal date: 1/19/10 Seal Initials: ?

3. Were custody seals unbroken and intact at the date and time of arrival? ..... Yes No N/A
4. Were custody papers sealed in a plastic bag included in the sample cooler? ..... Yes No N/A
5. Were custody papers filled out properly (ink, signed, etc.)? ..... Yes No N/A
6. Did you sign custody papers in the appropriate place for acceptance? ..... Yes No N/A
7. Was project identifiable from custody papers? ..... Yes No N/A
8. If required, was enough ice present in the cooler(s)? ..... Yes No N/A

Type of Coolant: WET DRY BLUE NONE Temperature of Samples upon Receipt: 1.2°C

Dates samples were logged-in: ~~01/20/10~~

9. Initial this form to acknowledge login of sample(s): (Name): _____ (Initial): _____
10. Were all bottle lids intact and sealed tightly? ..... Yes No N/A
11. Did all bottles arrive unbroken? ..... Yes No N/A
12. Was all required bottle label information complete? ..... Yes No N/A
13. Did all bottle labels agree with custody papers? ..... Yes No N/A
14. Were correct containers used for the analyses indicated? ..... Yes No N/A
15. Were preservative levels correct in all applicable sample containers? ..... Yes No N/A
16. Was residual chlorine present in any applicable sample containers? ..... Yes No N/A
17. Was sufficient amount of sample sent for the analyses required? ..... Yes No N/A
18. Was headspace present in any included VOA vials? ..... Yes No N/A

If Non-Conformance issues were present, list by sample ID: _____

_____ CAR#: _____

See page 1 of 2

Sample Delivery Group Assignment Form

CLIENT: Tetra Tech NUS, Inc. (T010)
PROJECT NAME: Cecil Field (BP Wells)
SDG #: CTOJM09CF_002
MATRIX: Water

QC LEVEL: EDD/III
Report Due: 2/4/2010
Client Sample Count: 7

Sample Type	Sampled	Received	Lab ID	Client ID	FLPRO	SW8260B	SW8270C
Field Duplicate	1/19/2010	1/20/2010	1001136-01	CEF-BP-DUP01-20100119	X	X	X
Client Sample	1/19/2010	1/20/2010	1001136-02	CEF-BP-7S-20100119	X	X	X
Client Sample	1/19/2010	1/20/2010	1001136-03	CEF-BP-9S-20100119	X	X	X
Client Sample	1/19/2010	1/20/2010	1001136-04	CEF-BP-4S-20100119	X	X	X
Trip Blank	1/19/2010	1/20/2010	1001136-05	Trip Blank		X	
Field Duplicate	1/20/2010	1/21/2010	1001141-01	CEF-815-DUP01-20100120		X	
Client Sample	1/20/2010	1/21/2010	1001141-02	CEF-815-01S-20100120		X	
Client Sample	1/20/2010	1/21/2010	1001141-03	CEF-815-05S-20100120		X	
Client Sample	1/20/2010	1/21/2010	1001141-04	CEF-NG-12S-20100120		X	
Client Sample	1/20/2010	1/21/2010	1001141-05	CEF-059-028-15-20100120		X	
Trip Blank	1/20/2010	1/21/2010	1001141-06	Trip Blank		X	

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA84517

Lab File ID: SEQ-TUN1 BFB Injection Date: 01/24/10

Instrument ID: VOA4 BFB Injection Time: 0858

GC Column: DB-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	23.2
75	30.0 - 60.0% of mass 95	50.6
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.2
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	64.3
175	5.0 - 9.0% of mass 174	5.1 (8.0)1
176	95.0 - 101.0% of mass 174	61.1 (95.1)1
177	5.0 - 9.0% of mass 176	4.5 (7.3)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V4STD0.5PPB	SEQ-CAL2	SEQ-CAL2	01/24/10	1025
02	V4STD1.0PPB	SEQ-CAL3	SEQ-CAL3	01/24/10	1055
03	V4STD2.0PPB	SEQ-CAL4	SEQ-CAL4	01/24/10	1124
04	V4STD10PPB	SEQ-CAL5	SEQ-CAL5	01/24/10	1154
05	V4STD20PPB	SEQ-CAL6	SEQ-CAL6	01/24/10	1223
06	V4STD50PPB	SEQ-CAL7	SEQ-CAL7	01/24/10	1252
07	V4BLK0124LCS	SEQ-ICV1	SEQ-ICV1	01/24/10	1322
08	V4STD100PPB	SEQ-CAL8	SEQ-CAL8	01/24/10	1351
09	V4STD200PPB	SEQ-CAL9	SEQ-CAL9	01/24/10	1421
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
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FORM V VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: ~~SDGA56295~~

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
Acetone	AVRG		8.045e-002		12.3
Acrolein	LINR	0.31840920	4.819e-002		0.999
Acrylonitrile	AVRG		8.36e-002		4.9
tert-Amyl Methyl Ether	AVRG		0.66401721		8.2
Benzene	AVRG		0.97053342		4.7
Bromobenzene	AVRG		0.63652492		3.5
Bromochloromethane	AVRG		0.12368124		8.2
Bromodichloromethane	AVRG		0.35661933		3.4
Bromoform	AVRG		0.33804057		4.2
Bromomethane	AVRG		0.22043599		5.3
2-Butanone	LINR	4.5e-002	0.11426293		0.998
~~t-Butyl alcohol~~	AVRG		~~1.969e-002~~		5.8
n-Butylbenzene	AVRG		1.76250298		4.3
sec-Butylbenzene	AVRG		2.17055135		4.5
tert-Butylbenzene	AVRG		1.33019028		5.3
Carbon disulfide	AVRG		0.82566870		2.4
Carbon tetrachloride	AVRG		0.28076864		3.4
Chlorobenzene	AVRG		1.27368042		6.2
Chloroethane	AVRG		0.21067206		3.6
2-Chloroethyl vinyl ether	AVRG		0.14485279		7.7
Chloroform	AVRG		0.49402965		12.4
Chloromethane	AVRG		0.30164077		10.0
1-Chlorohexane	AVRG		1.32411368		8.8
2-Chlorotoluene	AVRG		1.79210247		4.6
4-Chlorotoluene	AVRG		1.92777329		4.9
Cyclohexane	AVRG		0.36085028		2.3
Dibromochloromethane	AVRG		0.48975124		4.0
1,2-Dibromo-3-chloropropane	AVRG		0.11714269		12.3
1,2-Dibromoethane	AVRG		0.49581636		5.2
Dibromomethane	AVRG		0.18908237		2.7
1,2-Dichlorobenzene	AVRG		1.04944764		2.8
1,3-Dichlorobenzene	AVRG		1.11325773		3.0
1,4-Dichlorobenzene	AVRG		1.18422715		4.2
Dichlorodifluoromethane	AVRG		0.27685095		3.2
1,1-Dichloroethane	AVRG		0.44938146		2.5
1,2-Dichloroethane	AVRG		0.32889673		3.2
1,1-Dichloroethene	AVRG		0.23171664		5.2

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
cis-1,2-Dichloroethene	AVRG		0.28794578		8.8
trans-1,2-Dichloroethene	AVRG		0.27223266		6.3
1,2-Dichloroethene(total)	AVRG		0.28008922		7.5
1,2-Dichloropropane	AVRG		0.25691259		2.9
1,3-Dichloropropane	AVRG		0.79778535		9.3
2,2-Dichloropropane	AVRG		0.32975234		2.5
1,1-Dichloropropene	AVRG		0.33052490		3.9
cis-1,3-Dichloropropene	AVRG		0.40324455		5.4
trans-1,3-Dichloropropene	AVRG		0.71205848		6.0
Ethylbenzene	AVRG		2.27145943		10.4
Ethyl methacrylate	AVRG		0.57384790		7.8
Hexachlorobutadiene	AVRG		0.22281289		13.2
2-Hexanone	AVRG		0.33490503		8.5
Iodomethane	AVRG		0.29716862		13.1
Isopropylbenzene	AVRG		1.66225986		8.1
p-Isopropyltoluene	AVRG		1.68543455		4.2
Methyl acetate	AVRG		0.21432643		4.7
Methyl cyclohexane	AVRG		0.30337606		3.9
Methylene chloride	2ORDR	1.2e-003	3.17159164	0.15148929	0.999
Methyl methacrylate	AVRG		0.21067464		11.3
4-Methyl-2-pentanone	AVRG		0.23619626		7.3
MTBE	AVRG		0.62991925		4.8
Naphthalene	AVRG		1.02029208		14.2
n-Propylbenzene	AVRG		2.79626793		6.0
Styrene	AVRG		1.32592810		8.0
1,1,1,2-Tetrachloroethane	AVRG		0.42687239		4.0
1,1,2,2-Tetrachloroethane	AVRG		0.68729012		5.2
Tetrachloroethene	AVRG		0.46647028		2.3
Tetrahydrofuran	AVRG		6.607e-002		4.6
Toluene	AVRG		1.21890974		9.0
1,2,3-Trichlorobenzene	AVRG		0.50215555		10.4
1,2,4-Trichlorobenzene	AVRG		0.60103612		9.3
1,1,1-Trichloroethane	AVRG		0.36137563		4.0
1,1,2-Trichloroethane	AVRG		0.41319071		7.1
Trichloroethene	AVRG		0.25655253		3.5
Trichlorotrifluoroethane	AVRG		0.24843815		2.5
Trichlorofluoromethane	AVRG		0.38968945		2.5

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

COMPOUND	CURVE	COEFFICENTS A0	A1	A2	%RSD OR R^2
1,2,3-Trichloropropane	AVRG		0.14928166		7.6
1,2,4-Trimethylbenzene	AVRG		1.83968811		3.6
1,3,5-Trimethylbenzene	AVRG		1.83397772		2.4
Vinyl acetate	AVRG		0.29536008		12.2
Vinyl chloride	AVRG		0.21786248		5.2
m,p-Xylene	AVRG		1.74894851		14.7
Xylene(total)	AVRG		5.28299303		13.0
Di-isopropyl ether	AVRG		0.96487666		3.2
ETBE	AVRG		0.73407612		3.0
Dibromofluoromethane	AVRG		0.29790008		1.6
1,2-Dichloroethane-d4	AVRG		6.527e-002		3.9
Toluene-d8	AVRG		2.03319965		5.0
Bromofluorobenzene	AVRG		0.85432460		7.9

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF0.25: V4STD01 RF0.5: SEQ-CAL2 RF1: SEQ-CAL3
RF2: SEQ-CAL4 RF10: SEQ-CAL5

COMPOUND	RF0.25	RF0.5	RF1	RF2	RF10
Acetone			0.102	0.074	0.078
Acrolein		0.036	0.027	0.030	0.036
Acrylonitrile		0.076	0.085	0.079	0.089
tert-Amyl Methyl Ether				0.771	0.656
Benzene		1.054	0.954	0.970	0.984
Bromobenzene		0.600	0.631	0.640	0.629
Bromochloromethane		0.129	0.100	0.119	0.127
Bromodichloromethane		0.369	0.356	0.333	0.353
Bromoform		0.328	0.318	0.323	0.336
Bromomethane		0.211	0.210	0.207	0.214
2-Butanone			0.058	0.080	0.114
t-Butyl alcohol				0.018	0.019
n-Butylbenzene		1.772	1.737	1.767	1.839
sec-Butylbenzene		2.141	2.126	2.132	2.303
tert-Butylbenzene		1.233	1.298	1.265	1.338
Carbon disulfide		0.823	0.806	0.796	0.829
Carbon tetrachloride		0.293	0.269	0.275	0.270
Chlorobenzene		1.290	1.298	1.330	1.329
Chloroethane		0.221	0.205	0.210	0.219
2-Chloroethyl vinyl ether		0.132	0.132	0.132	0.154
Chloroform		0.621	0.547	0.485	0.477
Chloromethane		0.370	0.310	0.308	0.291
1-Chlorohexane		1.510	1.421	1.309	1.317
2-Chlorotoluene		1.878	1.907	1.694	1.828
4-Chlorotoluene		1.963	1.954	1.986	1.949
Cyclohexane		0.354	0.351	0.353	0.359
Dibromochloromethane		0.500	0.497	0.464	0.498
1,2-Dibromo-3-chloropropane			0.094	0.107	0.112
1,2-Dibromoethane		0.473	0.500	0.482	0.522
Dibromomethane		0.199	0.190	0.184	0.190
1,2-Dichlorobenzene		1.010	1.059	1.026	1.063
1,3-Dichlorobenzene		1.101	1.105	1.068	1.135
1,4-Dichlorobenzene		1.223	1.170	1.264	1.185
Dichlorodifluoromethane		0.282	0.271	0.262	0.287
1,1-Dichloroethane		0.462	0.462	0.449	0.448
1,2-Dichloroethane		0.333	0.327	0.333	0.340
1,1-Dichloroethene		0.259	0.221	0.220	0.231

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF0.25: V4STD01 RF0.5: SEQ-CAL2 RF1: SEQ-CAL3
RF2: SEQ-CAL4 RF10: SEQ-CAL5

COMPOUND	RF0.25	RF0.5	RF1	RF2	RF10
cis-1,2-Dichloroethene		0.347	0.295	0.286	0.277
trans-1,2-Dichloroethene		0.313	0.276	0.262	0.265
1,2-Dichloroethene(total)		0.330	0.285	0.274	0.271
1,2-Dichloropropane		0.252	0.248	0.258	0.265
1,3-Dichloropropane		0.803	0.844	0.840	0.856
2,2-Dichloropropane		0.335	0.327	0.340	0.338
1,1-Dichloropropene		0.341	0.308	0.318	0.331
cis-1,3-Dichloropropene		0.413	0.371	0.378	0.406
trans-1,3-Dichloropropene		0.752	0.712	0.673	0.737
Ethylbenzene		2.463	2.410	2.370	2.386
Ethyl methacrylate		0.525	0.538	0.564	0.606
Hexachlorobutadiene		0.197	0.183	0.204	0.216
2-Hexanone		0.329	0.317	0.328	0.354
Iodomethane		0.261	0.237	0.268	0.290
Isopropylbenzene		1.790	1.654	1.660	1.764
p-Isopropyltoluene		1.818	1.656	1.617	1.673
Methyl acetate			0.227	0.227	0.216
Methyl cyclohexane		0.296	0.293	0.283	0.308
Methylene chloride				0.454	0.340
Methyl methacrylate		0.184	0.192	0.175	0.216
4-Methyl-2-pentanone		0.225	0.210	0.216	0.249
MTBE		0.683	0.613	0.580	0.619
Naphthalene		0.805	0.889	0.910	0.998
n-Propylbenzene		2.804	2.896	2.787	2.903
Styrene		1.330	1.246	1.252	1.419
1,1,1,2-Tetrachloroethane		0.400	0.420	0.420	0.435
1,1,2,2-Tetrachloroethane		0.729	0.711	0.700	0.718
Tetrachloroethene		0.464	0.481	0.463	0.469
Tetrahydrofuran			0.072	0.062	0.066
Toluene		1.302	1.293	1.283	1.244
1,2,3-Trichlorobenzene		0.437	0.456	0.468	0.482
1,2,4-Trichlorobenzene		0.561	0.556	0.544	0.572
1,1,1-Trichloroethane		0.368	0.393	0.347	0.354
1,1,2-Trichloroethane		0.440	0.416	0.433	0.432
Trichloroethene		0.242	0.251	0.257	0.251
Trichlorotrifluoroethane		0.253	0.261	0.243	0.250
Trichlorofluoromethane		0.376	0.405	0.383	0.401

FORM VI VOA

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Lab Name: EMPIRICAL LABS Contract:

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Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF0.25: V4STD01 RF0.5: SEQ-CAL2 RF1: SEQ-CAL3
RF2: SEQ-CAL4 RF10: SEQ-CAL5

COMPOUND	RF0.25	RF0.5	RF1	RF2	RF10
1,2,3-Trichloropropane		0.136	0.160	0.143	0.163
1,2,4-Trimethylbenzene		1.856	1.765	1.811	1.900
1,3,5-Trimethylbenzene		1.856	1.817	1.808	1.886
Vinyl acetate			0.245	0.242	0.309
Vinyl chloride		0.238	0.220	0.219	0.226
m,p-Xylene		2.106	1.915	1.809	1.808
Xylene(total)		6.112	5.751	5.462	5.508
Di-isopropyl ether		0.968	0.964	0.929	0.986
ETBE		0.742	0.690	0.713	0.743
Dibromofluoromethane		0.306	0.298	0.301	0.299
1,2-Dichloroethane-d4		0.069	0.065	0.066	0.064
Toluene-d8		2.126	2.120	2.105	2.079
Bromofluorobenzene		0.907	0.880	0.871	0.885

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF20: SEQ-CAL6 RF50: SEQ-CAL7 RF100: SEQ-CAL8
RF200: SEQ-CAL9

COMPOUND	RF20	RF50	RF100	RF200
Acetone	0.077	0.077	0.080	0.075
Acrolein	0.039	0.043	0.047	0.048
Acrylonitrile	0.087	0.084	0.085	0.083
tert-Amyl Methyl Ether	0.662	0.630	0.631	0.634
Benzene	0.992	0.963	0.955	0.891
Bromobenzene	0.625	0.676	0.655	0.636
Bromochloromethane	0.127	0.128	0.131	0.126
Bromodichloromethane	0.358	0.362	0.372	0.350
Bromoform	0.350	0.358	0.352	0.340
Bromomethane	0.224	0.229	0.238	0.232
2-Butanone	0.101	0.107	0.120	0.112
t-Butyl alcohol	0.020	0.019	0.021	0.021
n-Butylbenzene	1.797	1.854	1.720	1.614
sec-Butylbenzene	2.278	2.246	2.134	2.004
tert-Butylbenzene	1.357	1.459	1.381	1.310
Carbon disulfide	0.821	0.835	0.863	0.832
Carbon tetrachloride	0.280	0.279	0.293	0.287
Chlorobenzene	1.326	1.299	1.217	1.101
Chloroethane	0.214	0.209	0.210	0.198
2-Chloroethyl vinyl ether	0.152	0.159	0.151	0.146
Chloroform	0.472	0.463	0.459	0.428
Chloromethane	0.290	0.279	0.280	0.284
1-Chlorohexane	1.349	1.325	1.249	1.113
2-Chlorotoluene	1.766	1.817	1.776	1.670
4-Chlorotoluene	2.007	1.991	1.847	1.725
Cyclohexane	0.373	0.371	0.366	0.359
Dibromochloromethane	0.511	0.506	0.485	0.456
1,2-Dibromo-3-chloropropane	0.116	0.126	0.131	0.134
1,2-Dibromoethane	0.532	0.510	0.491	0.455
Dibromomethane	0.187	0.185	0.194	0.184
1,2-Dichlorobenzene	1.064	1.099	1.055	1.019
1,3-Dichlorobenzene	1.180	1.122	1.107	1.087
1,4-Dichlorobenzene	1.179	1.203	1.155	1.094
Dichlorodifluoromethane	0.288	0.277	0.277	0.270
1,1-Dichloroethane	0.452	0.436	0.454	0.431
1,2-Dichloroethane	0.330	0.322	0.337	0.307
1,1-Dichloroethene	0.229	0.227	0.236	0.231

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF20: SEQ-CAL6 RF50: SEQ-CAL7 RF100: SEQ-CAL8
RF200: SEQ-CAL9

COMPOUND	RF20	RF50	RF100	RF200
cis-1,2-Dichloroethene	0.273	0.274	0.283	0.268
trans-1,2-Dichloroethene	0.264	0.261	0.272	0.264
1,2-Dichloroethene(total)	0.268	0.268	0.278	0.266
1,2-Dichloropropane	0.263	0.259	0.264	0.246
1,3-Dichloropropane	0.852	0.822	0.709	0.656
2,2-Dichloropropane	0.330	0.329	0.325	0.314
1,1-Dichloropropene	0.336	0.343	0.342	0.325
cis-1,3-Dichloropropene	0.417	0.422	0.432	0.386
trans-1,3-Dichloropropene	0.747	0.749	0.692	0.633
Ethylbenzene	2.389	2.316	2.067	1.770
Ethyl methacrylate	0.634	0.628	0.576	0.521
Hexachlorobutadiene	0.217	0.247	0.251	0.267
2-Hexanone	0.376	0.363	0.327	0.286
Iodomethane	0.321	0.326	0.346	0.330
Isopropylbenzene	1.745	1.738	1.565	1.383
p-Isopropyltoluene	1.740	1.710	1.669	1.600
Methyl acetate	0.207	0.202	0.214	0.206
Methyl cyclohexane	0.307	0.316	0.318	0.307
Methylene chloride	0.309	0.285	0.308	0.288
Methyl methacrylate	0.221	0.231	0.242	0.225
4-Methyl-2-pentanone	0.250	0.252	0.253	0.235
MTBE	0.624	0.624	0.656	0.640
Naphthalene	1.040	1.143	1.200	1.176
n-Propylbenzene	2.868	2.973	2.708	2.430
Styrene	1.458	1.440	1.300	1.162
1,1,1,2-Tetrachloroethane	0.444	0.448	0.438	0.410
1,1,2,2-Tetrachloroethane	0.699	0.664	0.649	0.629
Tetrachloroethene	0.475	0.475	0.455	0.448
Tetrahydrofuran	0.066	0.063	0.067	0.066
Toluene	1.279	1.255	1.091	1.004
1,2,3-Trichlorobenzene	0.493	0.535	0.573	0.572
1,2,4-Trichlorobenzene	0.585	0.630	0.664	0.697
1,1,1-Trichloroethane	0.355	0.350	0.366	0.357
1,1,2-Trichloroethane	0.431	0.412	0.388	0.353
Trichloroethene	0.260	0.261	0.273	0.257
Trichlorotrifluoroethane	0.246	0.243	0.245	0.246
Trichlorofluoromethane	0.391	0.390	0.387	0.384

FORM VI VOA

FORM 6
VOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: ELABN Case No.: NA SAS No.: NA SDG No.: SDGA56295

Instrument ID: VOA4 Calibration Date(s): 11/13/09 01/24/10

Column: DB-VRX ID: 0.25 (mm) Calibration Time(s): 1121 1421

LAB FILE ID: RF20: SEQ-CAL6 RF50: SEQ-CAL7 RF100: SEQ-CAL8
RF200: SEQ-CAL9

COMPOUND	RF20	RF50	RF100	RF200
1,2,3-Trichloropropane	0.157	0.158	0.141	0.136
1,2,4-Trimethylbenzene	1.897	1.927	1.818	1.743
1,3,5-Trimethylbenzene	1.844	1.875	1.839	1.745
Vinyl acetate	0.316	0.317	0.328	0.311
Vinyl chloride	0.216	0.212	0.211	0.200
m,p-Xylene	1.846	1.744	1.483	1.281
Xylene(total)	5.628	5.264	4.556	3.982
Di-isopropyl ether	1.004	0.997	0.952	0.920
ETBE	0.739	0.750	0.759	0.735
Dibromofluoromethane	0.291	0.291	0.300	0.296
1,2-Dichloroethane-d4	0.065	0.062	0.068	0.063
Toluene-d8	2.044	2.020	1.932	1.839
Bromofluorobenzene	0.897	0.892	0.786	0.716

FORM VI VOA

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID: SEQ-TUN1 BFB Injection Date: 01/25/10

Instrument ID: VOA4 BFB Injection Time: 1032

GC Column: DB-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	25.6
75	30.0 - 60.0% of mass 95	48.8
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.7
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	51.4
175	5.0 - 9.0% of mass 174	4.6 (8.8)1
176	95.0 - 101.0% of mass 174	49.7 (96.6)1
177	5.0 - 9.0% of mass 176	4.1 (8.2)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SEQ-CCV1	SEQ-CCV1	SEQ-CCV1	01/25/10	1102
02	0A26011-BLK1	0A26011-BS1	V4LCS01	01/25/10	1131
03	0A26011-BLK1	0A26011-BLK1	V4BLK01	01/25/10	1259
04	CEF-BP-DUP01	1001136-01	0113601	01/25/10	1753
05	CEF-BP-7S-20	1001136-02	0113602	01/25/10	1823
06	CEF-BP-9S-20	1001136-03	0113603	01/25/10	1852
07	CEF-BP-4S-20	1001136-04	0113604	01/25/10	1921
08	TRIP BLANK	1001136-05	0113605	01/25/10	1951
09	0A26011-BLK1	0A26011-BSD1	V4LCSD01	01/25/10	2148
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FORM V VOA

FORM 7
VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Instrument ID: VOA4 Calibration Date: 01/25/10 Time: 1102

Lab File ID: SEQ-CCV1 Init. Calib. Date(s): 03/05/08 01/24/10

Heated Purge: (Y/N) N Init. Calib. Times: 0908 1421

GC Column: DB-VRX ID: 0.25 (mm)

COMPOUND	$\overline{RRF}$	RRF100	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Benzene	0.970	0.954	100.0	98.36		AVRG	-1.6	20.0
Ethylbenzene	2.271	2.033	100.0	89.51		AVRG	-10.5	20.0
Isopropylbenzene	1.662	1.580	100.0	95.03		AVRG	-5.0	20.0
Naphthalene	1.020	1.239	100.0	121.4		AVRG	21.4	20.0
Toluene	1.219	1.082	100.0	88.74		AVRG	-11.2	20.0
1,2,4-Trimethylbenzene	1.840	1.878	100.0	102.1		AVRG	2.1	20.0
1,3,5-Trimethylbenzene	1.834	1.850	100.0	100.9		AVRG	0.9	20.0
Xylene(total)	5.283	4.536	300.0	257.5		AVRG	-14.1	20.0
Dibromofluoromethane	0.298	0.295	30.00	29.75		AVRG	-0.8	
1,2-Dichloroethane-d4	0.065	0.066	30.00	30.35		AVRG	1.2	
Toluene-d8	2.033	1.811	30.00	26.72		AVRG	-10.9	
Bromofluorobenzene	0.854	0.772	30.00	27.11		AVRG	-9.6	

FORM VII VOA

FORM 4
VOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

0A26011-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID: V4BLK01 Lab Sample ID: 0A26011-BLK1

Date Analyzed: 01/25/10 Time Analyzed: 1259

Column: DB-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

Instrument ID: VOA4

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	0A26011-BLK1	0A26011-BS1	V4LCS01	1131
02	CEF-BP-DUP01	1001136-01	0113601	1753
03	CEF-BP-7S-20	1001136-02	0113602	1823
04	CEF-BP-9S-20	1001136-03	0113603	1852
05	CEF-BP-4S-20	1001136-04	0113604	1921
06	TRIP BLANK	1001136-05	0113605	1951
07	0A26011-BLK1	0A26011-BSD1	V4LCSD01	2148
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COMMENTS:

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FORM IV VOA

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

0A26011-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 0A26011-BLK1

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V4BLK01

Level: (low/med) LOW Date Sampled: _____

% Moisture: not dec. _____ Date Analyzed: 01/25/10 12:59

GC Column: DB-VRX ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
71-43-2	Benzene	0.12	1.0		U
100-41-4	Ethylbenzene	0.10	1.0		U
98-82-8	Isopropylbenzene	0.11	0.80		U
91-20-3	Naphthalene	0.12	1.0	0.22	I
108-88-3	Toluene	0.14	1.0		U
95-63-6	1,2,4-Trimethylbenzene	0.14	1.0		U
108-67-8	1,3,5-Trimethylbenzene	0.10	1.0		U
1330-20-7	Xylene(total)	0.21	1.0		U

FORM I VOA

FORM 2
WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

	CLIENT SAMPLE NO.	SMC1 (DFM) #	SMC2 (DCE) #	SMC3 (TOL) #	SMC4 (BFB) #	TOT OUT
01	0A26011-BLK1	99	100	101	100	0
02	0A26011-BLK1	100	100	106	105	0
03	CEF-BP-DUP01	99	101	106	106	0
04	CEF-BP-7S-20	101	102	103	105	0
05	CEF-BP-9S-20	100	100	105	103	0
06	CEF-BP-4S-20	102	103	103	104	0
07	TRIP BLANK	100	102	99	104	0
08	0A26011-BLK1	99	96	88	102	0
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		EL QC LIMITS	SPIKE CONC (ug/L)
SMC1 (DFM)	= Dibromofluoromethane	(85-120)	30
SMC2 (DCE)	= 1,2-Dichloroethane-d4	(80-135)	30
SMC3 (TOL)	= Toluene-d8	(85-115)	30
SMC4 (BFB)	= Bromofluorobenzene	(85-120)	30

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate results reported from a diluted analysis

FORM 3
WATER VOLATILE LAB CONTROL SAMPLE

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix Spike - Client Sample No.: 0A26011-BLK1

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Benzene	50.00	0.0000	47.62	95	80-120
Ethylbenzene	50.00	0.0000	50.03	100	75-125
Isopropylbenzene	50.00	0.0000	57.78	116	75-125
Naphthalene	50.00	0.2172	60.87	121	55-140
Toluene	50.00	0.0000	49.39	99	75-120
1,2,4-Trimethylbenzene	50.00	0.0000	51.10	102	75-130
1,3,5-Trimethylbenzene	50.00	0.0000	49.44	99	75-130
Xylene(total)	150.0	0.0000	141.0	94	75-130

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Benzene	50.00	47.86	96	0	30	80-120
Ethylbenzene	50.00	47.72	95	5	30	75-125
Isopropylbenzene	50.00	57.44	115	0	30	75-125
Naphthalene	50.00	56.93	113	7	30	55-140
Toluene	50.00	46.83	94	5	30	75-120
1,2,4-Trimethylbenzene	50.00	50.70	101	1	30	75-130
1,3,5-Trimethylbenzene	50.00	48.71	97	1	30	75-130
Xylene(total)	150.0	143.2	95	2	30	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 8 outside limits
Spike Recovery: 0 out of 16 outside limits

COMMENTS: _____

FORM III VOA

FORM 8
VOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID (Standard): SEQ-CCV1 Date Analyzed: 01/25/10

Instrument ID: VOA4 Time Analyzed: 1102

GC Column: DB-VRX ID: 0.25 (mm) Heated Purge: (Y/N) N

		IS1 (FLB) AREA #	RT #	IS2 (CBZ) AREA #	RT #	IS3 (DCB) AREA #	RT #
	12 HOUR STD	1251189	13.84	674294	17.14	519717	19.18
	UPPER LIMIT	2502378	14.34	1348588	17.64	1039434	19.68
	LOWER LIMIT	625595	13.34	337147	16.64	259859	18.68
	CLIENT SAMPLE NO.						
01	0A26011-BLK1	1355728	13.84	649003	17.13	532100	19.18
02	0A26011-BLK1	1276906	13.84	566514	17.13	491537	19.17
03	CEF-BP-DUP01	1345888	13.83	593675	17.12	502563	19.16
04	CEF-BP-7S-20	1267032	13.83	579615	17.12	497500	19.16
05	CEF-BP-9S-20	1241143	13.83	570790	17.12	495394	19.16
06	CEF-BP-4S-20	1213718	13.82	564022	17.12	497570	19.16
07	TRIP BLANK	1200155	13.82	555470	17.12	482468	19.16
08	0A26011-BLK1	1154866	13.82	574233	17.12	475722	19.16
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IS1 (FLB) = Fluorobenzene
IS2 (CBZ) = Chlorobenzene-d5
IS3 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

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FORM VIII VOA

ORGANIC CASE NARRATIVE
Tetra Tech NUS, Inc./Nas Cecil Field (BP Wells) JM09
SDG: CTOJM09CF_002

Sampled	Received	Lab ID	Client ID
1/19/2010	1/20/2010	1001136-01	CEF-BP-DUP01-20100119
1/19/2010	1/20/2010	1001136-02	CEF-BP-7S-20100119
1/19/2010	1/20/2010	1001136-03	CEF-BP-9S-20100119
1/19/2010	1/20/2010	1001136-04	CEF-BP-4S-20100119

Low Concentration Semi-Volatiles

Method: The samples were extracted/analyzed for a client specified analyte list by USEPA SW-846 Methods 3510C/8270C (separatory funnel extraction then capillary column GC/MS) for waters upon receipt to the laboratory in satisfactory condition.
Comments: The volatile analyses for these samples were satisfactorily completed within sample holding times and met the corresponding specifications with the following note/exceptions:

- Note: These samples were analyzed for full-scan, low-concentration PAHs by employing a combination of sensitivity enhancing techniques in the extraction and analysis processes. AFCEE 4.02 Table 7.2.3.1-2 limits were applied for LCS/MS/MSD and surrogate.
- Several analytes were detected in method blank 0A21007-BLK1 at concentrations less than ½ the reporting limit. Reported concentrations in the associated samples are qualified with a "V".
- Quantitation signals were manually integrated in order to accurately reflect the peak areas based on the technical judgment of the analyst. A listing of the manual integrations performed and reason for the integration is included with the logs. Before and after "pictures" are available at the laboratory where manual integrations were performed.

I certify that, to the best of my knowledge and based upon my inquiry of those individuals immediately responsible for obtaining the information, the data package is in compliance with the terms and conditions of the contract, both technically and for completeness, with the exception of the conditions detailed in the case narrative, as verified by the following signature.

Jade Holliman
Organic Manager

ANALYTICAL REPORT TERMS AND QUALIFIERS (ORGANIC)

MDL: The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero. The MDL is determined from analysis of a sample containing the analyte in a given matrix.

EQL: The estimated quantitation limit (EQL), also known as the reporting limit (RL), is defined as the estimated concentration above which quantitative results can be obtained with a specific degree of confidence. Empirical Laboratories defines the EQL to be at or near the lowest standard of the calibration curve.

U: The presence of a "U" indicates that the analyte was analyzed for but was not detected or the concentration of the analyte quantitated below the MDL.

D: When a sample (or sample extract) is rerun diluted because one of the compound concentrations exceeded the highest concentration range for the standard curve, all of the values obtained in the dilution run will be flagged with a "D".

I: The presence of an "I" to the right of an analytical result indicates that the reported result is estimated. The data pass the identification criteria indicating that the compound is present, but the calculated result is less than the EQL/RL.

L: The concentration for any compound found which exceeds the highest concentration level on the standard curve for that compound will be flagged with a "L". Usually the sample will be rerun at a dilution to quantitate the flagged compound.

V: The presence of a "V" to the right of an analytical value indicates that this compound was also detected in the method blank and the data should be interpreted with caution. One should consider the possibility that the correct sample result might be less than the reported result and, perhaps, zero.

J1: The reported analyte concentration may have a low bias as the CCV exceeded the limit on the low side.

J2: The reported analyte concentration may have a high bias as the CCV exceeded the limit on the high side.

M: The presence of an "M" to the right of an analytical result indicates that the sample matrix interfered with the quantitation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

I: The presence of an "I" to the right of an analytical result that the presence of a qualitative interference could have caused a false positive or over estimation of the analyte. In GC and HPLC, results are reported from the column with the lower concentration.

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA57943

Lab File ID: DF1112B1 DFTPP Injection Date: 11/12/09

Instrument ID: BNA4 DFTPP Injection Time: 1524

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	42.1
68	Less than 2.0% of mass 69	0.8 (1.6)1
69	Mass 69 relative abundance	48.6
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	54.8
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.0
275	10.0 - 30.0% of mass 198	21.8
365	Greater than 1.0% of mass 198	2.27
441	Present, but less than mass 443	9.8
442	Greater than 40.0% of mass 198	60.7
443	17.0 - 23.0% of mass 442	12.6 (20.7)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	CA0.05PPM	SEQ-CAL2	CAL2	11/12/09	1543
02	CA0.1PPM	SEQ-CAL3	CAL3	11/12/09	1616
03	CA0.25PPM	SEQ-CAL4	CAL4	11/12/09	1650
04	CA0.5PPM	SEQ-CAL5	CAL5	11/12/09	1724
05	CA1PPM	SEQ-CAL6	CAL6	11/12/09	1758
06	CA2PPM	SEQ-CAL7	CAL7	11/12/09	1832
07	CA5PPM	SEQ-CAL8	CAL8	11/12/09	1906
08	CA10PPM	SEQ-CAL9	CAL9	11/12/09	1940
09	CA20PPM	SEQ-CALA	CAL10	11/12/09	2014
10	CA40PPM	SEQ-CALB	CAL11	11/12/09	2048
11	CA50PPM	SEQ-CALC	CAL12	11/12/09	2122
12	ICV5PPM	ICV5PPM	ICV1	11/12/09	2155
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FORM V SV

SEMIVOLATILE INITIAL CALIBRATION VERIFICATION

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA60637

Instrument ID: BNA4 Calibration Date: 11/12/09 Time: 2155

Lab File ID: ICV1 Init. Calib. Date(s): 11/09/09 11/12/09

Init. Calib. Times: 1046 2122

COMPOUND	$\overline{RRF}$	RRF5	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Acenaphthene	0.746	0.759	5.000	5.088		AVRG	1.8	25.0
Acenaphthylene	1.000	0.930	5.000	4.650		AVRG	-7.0	25.0
Anthracene	0.995	1.056	5.000	5.306		AVRG	6.1	25.0
Benzo(a)anthracene	0.758	0.870	5.000	5.736		AVRG	14.7	25.0
Benzo(b)fluoranthene	1.177	1.245	5.000	5.289		AVRG	5.8	25.0
Benzo(k)fluoranthene	1.169	1.273	5.000	5.441		AVRG	8.8	25.0
Benzo(g,h,i)perylene	0.865	0.855	5.000	4.944		AVRG	-1.1	25.0
Benzo(a)pyrene	0.959	0.994	5.000	5.183		AVRG	3.7	25.0
Chrysene	0.732	0.847	5.000	5.780		AVRG	15.6	25.0
Dibenz(a,h)anthracene	0.764	0.792	5.000	5.176		AVRG	3.5	25.0
Fluoranthene	1.030	1.128	5.000	5.472		AVRG	9.4	25.0
Fluorene	0.746	0.773	5.000	5.185		AVRG	3.7	25.0
Hexachlorobenzene	0.309	0.314	5.000	5.073		AVRG	1.4	25.0
Hexachlorobutadiene	0.237	0.257	5.000	5.402		AVRG	8.0	25.0
Hexachlorocyclopentadiene	0.121	0.145	5.000	6.013	0.050	AVRG	20.2	25.0
Indeno(1,2,3-cd)pyrene	0.771	0.793	5.000	5.140		AVRG	2.8	25.0
Isophorone	0.629	0.757	5.000	6.019		AVRG	20.4	25.0
1-Methylnaphthalene	0.741	0.665	5.000	4.490		AVRG	-10.2	25.0
2-Methylnaphthalene	0.801	0.761	5.000	4.750		AVRG	-5.0	25.0
Naphthalene	1.224	1.190	5.000	4.862		AVRG	-2.8	25.0
N-Nitroso-di-n-propylamine	0.247	0.287	5.000	5.808	0.050	AVRG	16.2	25.0
Pentachlorophenol	0.131	0.138	5.000	4.823		LINR	-3.5	25.0
Phenanthrene	1.064	1.096	5.000	5.149		AVRG	3.0	25.0
Pyrene	1.038	1.146	5.000	5.519		AVRG	10.4	25.0

ICV SV

FORM 6
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA60637

Instrument ID: BNA4 Calibration Date(s): 11/09/09 11/12/09

Column: FUSED SILICA ID: 0.25 (mm) Calibration Time(s): 1046 2122

LAB FILE ID: RF0.05: CAL2 RF0.1: CAL3 RF0.25: CAL4
RF0.5: CAL5 RF1: CAL6

COMPOUND	RF0.05	RF0.1	RF0.25	RF0.5	RF1
Acenaphthene	0.754	0.750	0.769	0.757	0.737
Acenaphthylene	0.961	0.951	0.991	0.995	0.984
Anthracene	1.002	0.958	1.010	1.017	0.986
Benzo(a)anthracene	0.716	0.652	0.669	0.731	0.714
Benzo(b)fluoranthene	1.130	1.074	1.127	1.142	1.115
Benzo(k)fluoranthene	1.255	1.209	1.177	1.185	1.159
Benzo(g,h,i)perylene	0.845	0.781	0.776	0.858	0.812
Benzo(a)pyrene	0.918	0.928	0.917	0.952	0.908
Chrysene	0.682	0.660	0.680	0.763	0.722
Dibenz(a,h)anthracene	0.665	0.628	0.640	0.720	0.703
Fluoranthene	1.064	0.989	1.020	1.034	1.019
Fluorene	0.748	0.732	0.758	0.751	0.733
Hexachlorobenzene	0.308	0.310	0.321	0.324	0.306
Hexachlorobutadiene	0.225	0.238	0.240	0.240	0.234
Hexachlorocyclopentadiene			0.092	0.108	0.106
Indeno(1,2,3-cd)pyrene	0.642	0.680	0.650	0.715	0.695
Isophorone	0.562	0.613	0.614	0.613	0.604
1-Methylnaphthalene	0.765	0.764	0.783	0.748	0.738
2-Methylnaphthalene	0.836	0.781	0.840	0.802	0.796
Naphthalene	1.348	1.226	1.262	1.262	1.214
N-Nitroso-di-n-propylamine	0.187	0.214	0.263	0.246	0.251
Pentachlorophenol				0.067	0.080
Phenanthrene	1.110	1.049	1.102	1.089	1.054
Pyrene	1.024	1.010	1.044	1.053	1.023
2-Fluorobiphenyl	0.840	0.872	0.901	0.890	0.874
2,4,6-Tribromophenol			0.112	0.126	0.133
Terphenyl-d14	0.801	0.792	0.839	0.848	0.737

FORM VI SV

FORM 6
SEMIVOLATILE ORGANICS INITIAL CALIBRATION DATA

Lab Name: EMPIRICAL LABS Contract:

Lab Code: EL Case No.: NA SAS No.: NA SDG No.: SDGA60637

Instrument ID: BNA4 Calibration Date(s): 11/09/09 11/12/09

Column: FUSED SILICA ID: 0.25 (mm) Calibration Time(s): 1046 2122

LAB FILE ID: RF2: CAL7 RF5: CAL8 RF10: CAL9
RF20: CAL10 RF40: CAL11

COMPOUND	RF2	RF5	RF10	RF20	RF40
Acenaphthene	0.746	0.758	0.756	0.748	0.754
Acenaphthylene	1.002	1.056	1.062	1.032	1.043
Anthracene	1.008	1.057	1.039	0.981	0.970
Benzo(a)anthracene	0.742	0.830	0.817	0.752	0.875
Benzo(b)fluoranthene	1.156	1.266	1.271	1.183	1.270
Benzo(k)fluoranthene	1.168	1.288	1.226	1.139	1.062
Benzo(g,h,i)perylene	0.795	0.903	0.977	0.936	0.954
Benzo(a)pyrene	0.936	1.028	1.049	0.990	0.986
Chrysene	0.741	0.813	0.787	0.704	0.778
Dibenz(a,h)anthracene	0.683	0.820	0.878	0.889	0.918
Fluoranthene	1.047	1.100	1.090	0.990	1.011
Fluorene	0.741	0.777	0.761	0.748	0.757
Hexachlorobenzene	0.304	0.320	0.311	0.303	0.305
Hexachlorobutadiene	0.238	0.240	0.243	0.244	0.253
Hexachlorocyclopentadiene	0.116	0.128	0.127	0.137	0.144
Indeno(1,2,3-cd)pyrene	0.700	0.810	0.892	0.878	0.936
Isophorone	0.617	0.648	0.651	0.658	0.705
1-Methylnaphthalene	0.737	0.759	0.742	0.730	0.739
2-Methylnaphthalene	0.795	0.826	0.814	0.807	0.808
Naphthalene	1.218	1.248	1.234	1.211	1.214
N-Nitroso-di-n-propylamine	0.260	0.264	0.261	0.263	0.272
Pentachlorophenol	0.101	0.136	0.151	0.162	0.178
Phenanthrene	1.069	1.103	1.084	1.039	1.028
Pyrene	1.053	1.118	1.100	0.989	1.029
2-Fluorobiphenyl	0.882	0.881	0.877	0.868	0.878
2,4,6-Tribromophenol	0.145	0.161	0.166	0.167	0.169
Terphenyl-d14	0.758	0.802	0.799	0.715	0.743

FORM VI SV

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID: SEQ-TUN1 DFTPP Injection Date: 01/22/10

Instrument ID: BNA4 DFTPP Injection Time: 0616

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	32.8
68	Less than 2.0% of mass 69	0.6 (1.6)1
69	Mass 69 relative abundance	39.7
70	Less than 2.0% of mass 69	0.2 (0.5)1
127	40.0 - 60.0% of mass 198	49.0
197	Less than 1.0% of mass 198	0.5
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	6.9
275	10.0 - 30.0% of mass 198	23.1
365	Greater than 1.0% of mass 198	2.48
441	Present, but less than mass 443	12.1
442	Greater than 40.0% of mass 198	75.0
443	17.0 - 23.0% of mass 442	15.2 (20.3)2

1-Value is % mass 69 2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	SEQ-CCV1	SEQ-CCV1	SEQ-CCV1	01/22/10	0644
02	0A21007-BLK1	0A21007-BS1	A21007L1	01/22/10	1235
03	0A21007-BLK1	0A21007-BSD1	A21007L2	01/22/10	1309
04	0A21007-BLK1	0A21007-BLK1	A21007B1	01/22/10	1416
05	CEF-BP-DUP01	1001136-01	0113601	01/22/10	1524
06	CEF-BP-7S-20	1001136-02	0113602	01/22/10	1558
07	CEF-BP-9S-20	1001136-03	0113603	01/22/10	1631
08	CEF-BP-4S-20	1001136-04	0113604	01/22/10	1705
09					
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page 1 of 1

FORM V SV

FORM 7
SEMIVOLATILE CONTINUING CALIBRATION CHECK

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Instrument ID: BNA4 Calibration Date: 01/22/10 Time: 0644

Lab File ID: SEQ-CCV1 Init. Calib. Date(s): 11/09/09 11/12/09

Init. Calib. Times: 1046 2122

COMPOUND	$\overline{RRF}$	RRF5	CURVE AMOUNT	CCAL AMOUNT	MIN RRF	CURVE	%D	MAX %D
Acenaphthene	0.746	0.733	5.000	4.916		AVRG	-1.7	20.0
Acenaphthylene	1.000	0.948	5.000	4.740		AVRG	-5.2	20.0
Anthracene	0.995	1.066	5.000	5.360		AVRG	7.2	20.0
Benzo(a)anthracene	0.758	0.868	5.000	5.728		AVRG	14.6	20.0
Benzo(b)fluoranthene	1.177	1.188	5.000	5.045		AVRG	0.9	20.0
Benzo(k)fluoranthene	1.169	1.146	5.000	4.898		AVRG	-2.0	20.0
Benzo(g,h,i)perylene	0.865	0.963	5.000	5.566		AVRG	11.3	20.0
Benzo(a)pyrene	0.959	1.000	5.000	5.212		AVRG	4.2	20.0
Chrysene	0.732	0.838	5.000	5.718		AVRG	14.4	20.0
Dibenz(a,h)anthracene	0.764	0.793	5.000	5.183		AVRG	3.7	20.0
Fluoranthene	1.030	1.163	5.000	5.646		AVRG	12.9	20.0
Fluorene	0.746	0.761	5.000	5.104		AVRG	2.1	20.0
Indeno(1,2,3-cd)pyrene	0.771	0.838	5.000	5.434		AVRG	8.7	20.0
1-Methylnaphthalene	0.741	0.717	5.000	4.837		AVRG	-3.2	20.0
2-Methylnaphthalene	0.801	0.803	5.000	5.015		AVRG	0.3	20.0
Naphthalene	1.224	1.188	5.000	4.852		AVRG	-3.0	20.0
Phenanthrene	1.064	1.099	5.000	5.162		AVRG	3.2	20.0
Pyrene	1.038	1.192	5.000	5.741		AVRG	14.8	20.0
2-Fluorobiphenyl	0.865	0.853	5.000	4.929		AVRG	-1.4	
Terphenyl-d14	0.777	0.835	5.000	5.376		AVRG	7.5	

FORM VII SV

FORM 4
SEMIVOLATILE METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

0A21007-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID: A21007B1 Lab Sample ID: 0A21007-BLK1

Instrument ID: BNA4 Date Extracted: 01/21/10

Matrix: (soil/water) WATER Date Analyzed: 01/22/10

Level:(low/med) LOW GPC Cleanup: (Y/N) N Time Analyzed: 1416

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	0A21007-BLK1	0A21007-BS1	A21007L1	01/22/10
02	0A21007-BLK1	0A21007-BSD1	A21007L2	01/22/10
03	CEF-BP-DUP01	1001136-01	0113601	01/22/10
04	CEF-BP-7S-20	1001136-02	0113602	01/22/10
05	CEF-BP-9S-20	1001136-03	0113603	01/22/10
06	CEF-BP-4S-20	1001136-04	0113604	01/22/10
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COMMENTS:

page 1 of 1

FORM IV SV

FORM 1
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

0A21007-BLK1

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix: (soil/water) WATER Lab Sample ID: 0A21007-BLK1

Sample wt/vol: 1000 (g/mL) ML Lab File ID: A21007B1

% Moisture: _____ decanted: (Y/N)___ Date Sampled: _____

Extraction: (SepF/Cont/Sonc/Soxh) SEPF Date Extracted:01/21/10

Concentrated Extract Volume: 1000.0(uL) Date Analyzed: 01/22/10 14:16

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: NA

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND	MDL	RL	CONC	Q
83-32-9	Acenaphthene	0.020	1.0		U
208-96-8	Acenaphthylene	0.020	0.10		U
120-12-7	Anthracene	0.020	0.25		U
56-55-3	Benzo(a)anthracene	0.020	0.10	0.078	I
205-99-2	Benzo(b)fluoranthene	0.020	0.10	0.099	I
207-08-9	Benzo(k)fluoranthene	0.020	0.10	0.047	I
191-24-2	Benzo(g,h,i)perylene	0.020	0.10		U
50-32-8	Benzo(a)pyrene	0.020	0.10	0.083	I
218-01-9	Chrysene	0.020	0.10	0.095	I
53-70-3	Dibenz(a,h)anthracene	0.020	0.10		U
206-44-0	Fluoranthene	0.020	0.25	0.10	I
86-73-7	Fluorene	0.020	1.0		U
193-39-5	Indeno(1,2,3-cd)pyrene	0.020	0.10	0.065	I
90-12-0	1-Methylnaphthalene	0.020	1.0		U
91-57-6	2-Methylnaphthalene	0.020	1.0		U
91-20-3	Naphthalene	0.020	1.0		U
85-01-8	Phenanthrene	0.020	0.10	0.049	I
129-00-0	Pyrene	0.020	0.25	0.10	I

FORM I SV

FORM 2
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

	CLIENT SAMPLE NO.	S1 (FBP) #	S2 (TPH) #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	0A21007-BLK1	74	89							0
02	0A21007-BLK1	70	87							0
03	0A21007-BLK1	73	94							0
04	CEF-BP-DUP01	71	78							0
05	CEF-BP-7S-20	73	73							0
06	CEF-BP-9S-20	72	59							0
07	CEF-BP-4S-20	66	72							0
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	EL QC LIMITS	SPIKE CONC (UG/L)
S1 (FBP) = 2-Fluorobiphenyl	(34-167)	50
S2 (TPH) = Terphenyl-d14	(34-167)	50

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate results reported from a diluted analysis

page 1 of 1 FORM II SV

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix Spike - Client Sample No.: 0A21007-BLK1

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (UG/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Acenaphthene	1.000	0.0000	0.9354	94	41-132
Acenaphthylene	1.000	0.0000	0.9554	96	43-140
Anthracene	1.000	0.0000	1.008	101	50-139
Benzo(a)anthracene	1.000	0.07833	1.076	100	58-141
Benzo(b)fluoranthene	1.000	0.09894	0.9287	83	42-156
Benzo(k)fluoranthene	1.000	0.04700	0.9390	89	49-165
Benzo(g,h,i)perylene	1.000	0.0000	1.125	112	12-171
Benzo(a)pyrene	1.000	0.08278	0.8631	78	31-142
Chrysene	1.000	0.09473	1.126	103	51-155
Dibenz(a,h)anthracene	1.000	0.0000	0.9884	99	28-153
Fluoranthene	1.000	0.1027	1.103	100	47-158
Fluorene	1.000	0.0000	0.9889	99	40-140
Indeno(1,2,3-cd)pyrene	1.000	0.06502	1.048	98	20-167
1-Methylnaphthalene	1.000	0.0000	0.8664	87	35-131
2-Methylnaphthalene	1.000	0.0000	0.8783	88	36-121
Naphthalene	1.000	0.0000	0.8919	89	39-125
Phenanthrene	1.000	0.04882	1.006	96	46-144
Pyrene	1.000	0.1051	1.131	102	39-158

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS: _____

FORM 3
WATER SEMIVOLATILE LAB CONTROL SAMPLE

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Matrix Spike - Client Sample No.: 0A21007-BLK1

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Acenaphthene	1.000	0.9019	90	4	40	41-132
Acenaphthylene	1.000	0.9140	91	4	40	43-140
Anthracene	1.000	1.025	102	2	40	50-139
Benzo(a)anthracene	1.000	1.171	109	8	40	58-141
Benzo(b)fluoranthene	1.000	0.9434	84	2	40	42-156
Benzo(k)fluoranthene	1.000	0.9617	91	2	40	49-165
Benzo(g,h,i)perylene	1.000	1.081	108	4	40	12-171
Benzo(a)pyrene	1.000	0.8899	81	3	40	31-142
Chrysene	1.000	1.205	111	7	40	51-155
Dibenz(a,h)anthracene	1.000	0.9598	96	3	40	28-153
Fluoranthene	1.000	1.132	103	2	40	47-158
Fluorene	1.000	0.9640	96	2	40	40-140
Indeno(1,2,3-cd)pyrene	1.000	1.023	96	2	40	20-167
1-Methylnaphthalene	1.000	0.8281	83	4	40	35-131
2-Methylnaphthalene	1.000	0.8078	81	8	40	36-121
Naphthalene	1.000	0.8191	82	8	40	39-125
Phenanthrene	1.000	1.011	96	0	40	46-144
Pyrene	1.000	1.161	106	3	40	39-158

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 18 outside limits
Spike Recovery: 0 out of 36 outside limits

COMMENTS: _____

FORM 8
SEMIVOLATILE INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: EMPIRICAL LABS Contract: TETRATECH

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: CTOJM09CF_002

Lab File ID (Standard): SEQ-CCV1 Date Analyzed: 01/22/10

Instrument ID: BNA4 Time Analyzed: 0644

		IS1(PHN) AREA #	RT #	IS2(PRY) AREA #	RT #	AREA #	RT #
	12 HOUR STD	183717	13.09	121723	24.88		
	UPPER LIMIT	367434	13.59	243446	25.38		
	LOWER LIMIT	91859	12.59	60862	24.38		
	CLIENT SAMPLE NO.						
01	0A21007-BLK1	185076	13.09	125609	24.88		
02	0A21007-BLK1	188383	13.09	138553	24.88		
03	0A21007-BLK1	191306	13.09	128112	24.88		
04	CEF-BP-DUP01	200732	13.09	129264	24.87		
05	CEF-BP-7S-20	189939	13.09	122633	24.87		
06	CEF-BP-9S-20	181035	13.09	128910	24.87		
07	CEF-BP-4S-20	199451	13.09	144895	24.87		
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IS1 (PHN) = Phenanthrene-d10
IS2 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

page 1 of 1

FORM VIII SV

LABORATORY REPORT

L10010377

01/28/10 13:44

Submitted By

Microbac Laboratories Inc.
158 Starlite Drive
Marietta , OH 45750
(740) 373 - 4071

For

PET

Account Name: Empirical Labs of Tennessee, LLC
621 Mainstream Drive
Suite 270
Nashville, TN 37228
Attention: Kim Kostzer

Project Number: 2719.001
Project:
Site: CECIL FIELDS

Sample Analysis Summary

Client ID	Lab ID	Method	Dilution	Date Received
CEF-BP-DUP01-20	L10010377-01	8015MOD	1	22-JAN-10
CEF-BP-7S-20100	L10010377-02	8015MOD	1	22-JAN-10
CEF-BP-9S-20100	L10010377-03	8015MOD	1	22-JAN-10
CEF-BP-4S-20100	L10010377-04	8015MOD	1	22-JAN-10

Microbac Laboratories Inc.
GC PRO RANGE ORGANICS

Microbac Login No: L10010377

METHOD

Preparation: SW- 846 3550B(Soils) 3510C(Waters)

Analysis: SW-846 8015

HOLDING TIMES

Sample Preparation: All holding times were met

Sample Analysis: All holding times were met

PREPARATION

Sample preparation proceeded normally.

CALIBRATION

Initial Calibration: For all compounds which yielded a %RSD greater than 20 %, linear or higher order equations were applied. All acceptance criteria were met.

Alternate Source Standards: All acceptance criteria were met.

Continuing Calibration: All acceptance criteria were met.

BATCH QA/QC

Method Blank: The blank associated with sample yielded a recovery for surrogate n-triacontane-d62 that was below the acceptance limit. All other acceptance criteria were met.

Laboratory Control Sample: The LCS/LCS DUP associated with sample yielded recoveries for surrogate n-triacontane-d62 that were below the acceptance limit. All other acceptance criteria were met.

Matrix Spike: There were no MS/MSD results associated with this sample delivery group, due to insufficient volume of sample. The laboratory included an LCS and LCS duplicate in the preparation batch in lieu of the NELAC prescribed MS/MSD. Microbac recommends site specific MS/MSD samples to avoid possible data qualification.

SAMPLES

Samples: All acceptance criteria were met.

Surrogates: Samples 01, 02 and 04 yielded % recovery for n-triacontane-d62 that were below the acceptance limits. There was insufficient sample volume for re-extraction. All other acceptance criteria were met.

Manual Integration Reason Codes

Microbac laboratory management has identified four general cases with valid reasons supporting the use of manual integration techniques.

Reason #1: Data System Fails to Select Correct Peak

In some cases the chromatography system selects and integrates the "wrong peak". In this case the analyst must correct the selection and force the system to integrate the proper peak. Other times the system may miss the peak completely.

Reason #2: Data System Splits the Peak Incorrectly or Integrates a False Peak as a Rider Peak.

This phenomena is common at low concentrations where the signal:noise ratio is low. A single compound (peak) is incorrectly split into multiple peaks or integrated as a main peak with one or more rider peaks resulting in low area counts for the target compound.

Reason #3: Improperly Integrated Isomers and/or coeluting compounds.

This system often fails to distinguish coeluting compounds and or isomers. The integration areas and concentrations are wrong, and they must be corrected by manual integration. Prime examples are benzo(k)fluoranthene and benzo(b)fluoranthene which are often unresolved and integrated improperly when both are present at low concentrations in standards or samples.

Reason #4: System Establishes Incorrect Baseline

There are numerous situations in chromatography where the system establishes the baseline incorrectly. Some baseline errors will be obvious to the analyst and should be corrected via manual procedures.

Reason #5: Miscellaneous

Other situations involving integration errors may require in-depth review and technical judgment. These cases should be brought to the attention of the laboratory management. If the form of manual integration is not clearly covered by these four cases, then review and approval by the Laboratory Director or the QA/QC Supervisor will be required.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and Microbac Laboratories Inc., both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as verified by the following signature.

Analyst: HAV

Approved: 28-JAN-10
Michael Cochran

2.1.1.2 QC Summary Data

Microbac Laboratories Inc.

HOLDING TIMES

EQUIVALENT TO AFCEE FORM 9

Analytical Method:8015MOD

AAB#:WG322327

Login Number:L10010377

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
CEF-BP-DUP01-20	01	01/19/10					01/25/10	6.4	7		01/27/10	2.5	40	
CEF-BP-7S-20100	02	01/19/10					01/25/10	5.9	7		01/27/10	2.5	40	
CEF-BP-9S-20100	03	01/19/10					01/25/10	5.9	7		01/28/10	2.6	40	
CEF-BP-4S-20100	04	01/19/10					01/25/10	5.8	7		01/28/10	2.6	40	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID:1585913
Report generated 01/28/2010 13:18

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: HP14 Dataset: 012710
Analyst1: HAV Analyst2: NA
Method: FLA-PRO SOP: GCS03 Rev: 9

Maintenance Log ID: 31704 Syringe Filter Lot#:

Column 1 ID: Column 2 ID: RTX-5

Workgroups: WG322327

Internal STD: NA Surrogate STD: STD37428 Calibration STD STD37470

Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	14G24905.R	WG322180-01 PRO @600ppm	1	1	STD37470	01/27/10 12:34
2	14G24906.R	WG322180-02 PRO @400ppm	1	1	STD37470	01/27/10 13:17
3	14G24907.R	WG322180-03 PRO @200ppm	1	1	STD37470	01/27/10 14:00
4	14G24908.R	WG322180-04 PRO @100ppm	1	1	STD37470	01/27/10 14:43
5	14G24909.R	WG322180-05 PRO @50ppm	1	1	STD37470	01/27/10 15:25
6	14G24910.R	WG322180-06 PRO @25ppm	1	1	STD37470	01/27/10 16:08
7	14G24911.R	WG322180-07 ALT PRO @200ppm	1	1	STD37469	01/27/10 16:49
8	14G24912.R	WG321985-01 BLANK	1	1		01/27/10 17:29
9	14G24913.R	WG321985-02 LCS	1	1		01/27/10 18:11
10	14G24914.R	WG321985-03 LCS	1	1		01/27/10 18:53
11	14G24915.R	L10010376-01	1	1		01/27/10 19:35
12	14G24916.R	L10010376-02	1	1		01/27/10 20:17
13	14G24917.R	L10010376-03	1	1		01/27/10 20:59
14	14G24918.R	L10010376-04	1	1		01/27/10 21:41
15	14G24919.R	L10010377-01	1	1		01/27/10 22:23
16	14G24920.R	L10010377-02	1	1		01/27/10 23:05
17	14G24921.R	CH2CL2	1	1		01/27/10 23:47
18	14G24922.R	WG322296-01 PRO CCV @200ppm	1	1	STD37470	01/28/10 00:29
19	14G24923.R	L10010377-03	1	1		01/28/10 01:11
20	14G24924.R	L10010377-04	1	1		01/28/10 01:53
21	14G24925.R	L10010001-02	1	1		01/28/10 02:35
22	14G24926.R	L10010002-02	1	1		01/28/10 03:17
23	14G24927.R	L10010005-02	1	1		01/28/10 03:59
24	14G24928.R	L10010006-02	1	1		01/28/10 04:41
25	14G24929.R	PRO SPK	1	1		01/28/10 05:23
26	14G24930.R	CH2CL2	1	1		01/28/10 06:05
27	14G24931.R	WG322296-02 PRO CCV @200ppm	1	1	STD37470	01/28/10 06:47

Comments

Seq.	Rerun	Dil.	Reason	Analytes
8				
	Sample had a low surr. n-triacontane-d62 rec.			
9				
	Sample had a low surr. n-triacontane-d62 rec.			
10				

Page: 1 Approved: 28-JAN-10

Microbac

Microbac Laboratories Inc.

INITIAL CALIBRATION SUMMARY

Login Number:L10010377
Analytical Method:8015MOD
ICAL Workgroup:WG322180

Instrument ID:HP14
Initial Calibration Date:27-JAN-10 16:08
Column ID:R

Analyte	AVG RF	% RSD	LINEAR (R^2	QUAD(R^2)
Petroleum Range	1294000	13.4		

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 1585946
Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L10010377

Analytical Method:8015MOD

Instrument ID:HP14

Initial Calibration Date:27-JAN-10 16:08

Column ID:R

Analyte	WG322180-01			WG322180-02			WG322180-03		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Petroleum Range	10200	11474084400	1125000	6800	8241169890	1212000	3400	4092058890	1204000

INT_CAL - Modified 03/06/2008
PDF File ID: 1585946
Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

INITIAL CALIBRATION DATA

Login Number:L10010377

Analytical Method:8015MOD

Instrument ID:HP14

Initial Calibration Date:27-JAN-10 16:08

Column ID:R

Analyte	WG322180-04			WG322180-05			WG322180-06		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Petroleum Range	1700	2121948010	1248000	850	1367504240	1609000	425	582010978	1369000

INT_CAL - Modified 03/06/2008

PDF File ID:1585946

Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

ALTERNATE SOURCE CALIBRATION REPORT

Login Number:L10010377
Instrument ID:HP14
File ID:14G24911.R
ICal Workgroup:WG322180

Run Date:01/27/2010
Run Time:16:49
Analyst:HAV
Cal ID: HP14 - 27-JAN-10

Sample ID:WG322180-07
Method:8015MOD
QC Key:STD

Analyte	Expected	Found	Units	RF	%D	UCL	Q
TRPH-Florida PRO	3400000	3120000	ug/L	1190000	8.20	25	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID:1585947
Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number:L10010377
Instrument ID:HP14
File ID:14G24922.R
Workgroup (AAB#):WG322327
Matrix:WATER

Run Date:01/28/2010
Run Time:00:29
Analyst:HAV
Cal ID: HP14 - 27-JAN-10

Sample ID:WG322296-01
Method:8015MOD
QC Key:STD

Analyte	Expected	Found	UNITS	RF	%D	UCL	Q
TRPH-Florida PRO	3400000	3710000	ug/L	1410000	9.10	25	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID:1585948
Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number:L10010377
Instrument ID:HP14
File ID:14G24931.R
Workgroup (AAB#):WG322327
Matrix:WATER

Run Date:01/28/2010
Run Time:06:47
Analyst:HAV
Cal ID: HP14 - 27-JAN-10

Sample ID:WG322296-02
Method:8015MOD
QC Key:STD

Analyte	Expected	Found	UNITS	RF	%D	UCL	Q
TRPH-Florida PRO	3400000	3200000	ug/L	1220000	5.98	25	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 1585948
Report generated 01/28/2010 13:20

Microbac

Microbac Laboratories Inc.

METHOD BLANK SUMMARY

Login Number:L10010377
Blank File ID:14G24912.R
Prep Date:01/25/10 10:26
Analyzed Date:01/27/10 17:29
Analyst:HAV

Work Group:WG322327
Blank Sample ID:WG321985-01
Instrument ID:HP14
Method:8015MOD

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
LCS	WG321985-02	14G24913.R	01/27/10 18:11	01
LCS2	WG321985-03	14G24914.R	01/27/10 18:53	01
CEF-BP-DUP01-20	L10010377-01	14G24919.R	01/27/10 22:23	01
CEF-BP-7S-20100	L10010377-02	14G24920.R	01/27/10 23:05	01
CEF-BP-9S-20100	L10010377-03	14G24923.R	01/28/10 01:11	01
CEF-BP-4S-20100	L10010377-04	14G24924.R	01/28/10 01:53	01

Report Name: BLANK_SUMMARY
PDF File ID: 1585914
Report generated 01/28/2010 13:18

Microbac

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L10010377 Prep Date:01/25/10 10:26 Sample ID:WG321985-01
Instrument ID:HP14 Run Date:01/27/10 17:29 Prep Method:3510C
File ID:14G24912.R Analyst:HAV Method:8015MOD
Workgroup (AAB#):WG322327 Matrix:Water Units:ug/L
Contract #: Cal ID: HP14-27-JAN-10

Analytes	MDL	RL	Concentration	Dilution	Qualifier
TRPH-Florida PRO	250	500	250	1	U

Surrogates	% Recovery	Surrogate Limits			Qualifier
o-Terphenyl	85.7	82	-	142	PASS
n-triacontane-d62	20.2	42	-	193	FAIL

MDL Method Detection Limit
RL Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > RL

Report Name:BLANK
PDF ID: 1585915
28-JAN-2010 13:18

Microbac

3.0 Attachments

B 33545

SUBCONTRACT ORDER

Empirical Laboratories, LLC

1001136

PO: 10-0070

SENDING LABORATORY:

Empirical Laboratories, LLC
621 Mainstream Drive, Suite 270
Nashville, TN 37228
Phone: 615.345.1115
Fax: 615.846.5426
Project Manager: Kim Kostzer

RECEIVING LABORATORY:

Microbac - Kemron Enviromental Services (SUB021)
158 Starlite Drive
Marietta, OH 45750
Phone :(800) 373-4071
Fax: (000) 000-0000

Attn: Stephanie Massburg

Project: Cecil Field (BP wells)

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: CEF-BP-DUP01-2(				
Reference No: 1001136-01	**Water**	**Sampled:01/19/2010 00:00**		
SGC_FLPRO_3510C	01/26/2010 14:00	01/25/2010 23:00		
Containers Supplied:				
Sample ID: CEF-BP-7S-20100				
Reference No: 1001136-02	**Water**	**Sampled:01/19/2010 12:40**		
SGC_FLPRO_3510C	01/26/2010 14:00	01/26/2010 11:40		
Containers Supplied:				
Sample ID: CEF-BP-9S-20100				
Reference No: 1001136-03	**Water**	**Sampled:01/19/2010 13:55**		
SGC_FLPRO_3510C	01/26/2010 14:00	01/26/2010 12:55		
Containers Supplied:				
Sample ID: CEF-BP-4S-20100				
Reference No: 1001136-04	**Water**	**Sampled:01/19/2010 14:25**		
SGC_FLPRO_3510C	01/26/2010 14:00	01/26/2010 13:25		
Containers Supplied:				

Released By — Date 1/21/10 13:39 — Received

Released By — Date — Received

Microbac OVD
Received: 01/22/2010 10:46
By: JANE THOMPSON

221000004015

Page 1 of 1

1000004015

COOLER INSPECTION

Microbac®

Received: 01/22/2010 10:46
Delivery Method: FedEx
Opened By: Jane Thompson
Comments:

Login(s): L10010377

Cooler(s)

Cooler #	Temp Gun	Temp	Tracking #	COC #	Comments
7151-C5	G	2.0	3457502211000004975495791339201 2		

1	Yes	Were shipping coolers sealed?
2	Yes	Were custody seals intact?
3	Yes	Were cooler temperatures in range of 0-6?
4	Yes	Was ice present?
5	Yes	Were COC's received/information complete/signed and dated?
6	Yes	Were sample containers and labels intact and match COC?
7	Yes	Were the correct containers and volumes received?
8	Yes	Were samples received within EPA hold times?
9	Yes	Were correct perservatives used? (water only)
10	NA	Were pH ranges acceptable? (voa's excluded)
11	NA	Were VOA samples free of headspace (<6mm)?

Discrepancies:

9	Note: Samples preserved with H2So4.	

Microbac - Ohio Valley Division
158 Starlite Drive
Marietta, OH 45750
Tel: (740)373-4071 Fax: (740)373-4835

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L10010377
Account: 2719
Project: 2719.001
Samples: 4
Due Date: 27-JAN-2010

Samplenum	Container ID	Products
L10010377-01	650358	FLA-PRO

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	22-JAN-2010 14:37	JKT	
2	PREP	W1	EXT	25-JAN-2010 07:28	CEB	RLK
3	DISP	EXT	DISP	25-JAN-2010 16:27	RB	RB
4	ANALYZ*	EXT	SEMI	28-JAN-2010 11:22	HAV	CEB

Sample extract/digestate

Samplenum	Container ID	Products
L10010377-02	650359	FLA-PRO

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	22-JAN-2010 14:37	JKT	
2	PREP	W1	EXT	25-JAN-2010 07:28	CEB	RLK
3	DISP	EXT	DISP	25-JAN-2010 16:27	RB	RB
4	ANALYZ*	EXT	SEMI	28-JAN-2010 11:22	HAV	CEB

Sample extract/digestate

Samplenum	Container ID	Products
L10010377-03	650360	FLA-PRO

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	22-JAN-2010 14:37	JKT	
2	PREP	W1	EXT	25-JAN-2010 07:28	CEB	RLK
3	DISP	EXT	DISP	25-JAN-2010 16:27	RB	RB
4	ANALYZ*	EXT	SEMI	28-JAN-2010 11:22	HAV	CEB

Sample extract/digestate

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L10010377
Account: 2719
Project: 2719.001
Samples: 4
Due Date: 27-JAN-2010

Samplenum	Container ID	Products
L10010377-04	650361	FLA-PRO

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish
1	LOGIN	COOLER	W1	22-JAN-2010 14:37	JKT	
2	PREP	W1	EXT	25-JAN-2010 07:28	CEB	RLK
3	DISP	EXT	DISP	25-JAN-2010 16:27	RB	RB
4	ANALYZ*	EXT	SEMI	28-JAN-2010 11:22	HAV	CEB

Sample extract/digestate

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac

Example DRO Calculations

1.0 Calculating the Response Factor (RF) from the initial calibration (ICAL) data:

$$RF = \frac{A_s}{C_s}$$

where:	Example:
A_s = Area of the compound being measured in the standard	10000
C_s = concentration of the compound being measured ($\mu g/L$)	100
	RF = 100

2.0 Calculating the concentration (C) of a compound in water using data from prep log and quantitation report:

$$C = \frac{(A_x)(V_f)(D)}{(RF)(V_i)}(1000)$$

where:	Example:
A_x = Area of the compound being measured	10000
V_f = Final volume of sample extract (mL) (prep log)	1
D = Dilution factor for sample as a multiplier (10X = 10)	1
RF = Response factor from ICAL calculated above	100
V_i = Initial volume of sample (ml) (prep log)	1000
	C ($\mu g/l$) = 0.1

3.0 Calculating the concentration (C) of a compound in soil using data from prep log and quantitation report:

$$C = \frac{(A_x)(V_f)(D)}{(RF)(W_i)}(1000)$$

where:	Example:
A_x = Area of the compound being measured	10000
V_f = Final volume of sample extract (mL) (prep log)	1
D = Dilution factor for sample as a multiplier (10X = 10)	1
RF = Response factor from ICAL calculated above	100
W_i = Initial weight of sample (g) (prep log)	25
	C ($\mu g/kg$) = 4

NAS CECIL FIELD
WATER DATA
CTOJM09CF_002

FRACTION	CHEMICAL	CEF-BP-DUP01-20100119	UNITS	CEF-BP-7S-20100119	RPD	D
PAH	1-METHYLNAPHTHALENE	ND	UG/L	0.03 J	200.00	0.03
PAH	2-METHYLNAPHTHALENE	ND	UG/L	0.035 J	200.00	0.04
PAH	ANTHRACENE	ND	UG/L	0.026 J	200.00	0.03
PAH	NAPHTHALENE	ND	UG/L	0.028 J	200.00	0.03

N/A
<2X
R.L.

Current RPD Quality Control Limit: 30 %.
Shaded cells indicate RPDs that exceed the applicable quality control limit.