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NAS CECIL FIELD, FL
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SUPPLEMENTAL ASSESSMENT LETTER REPORT REVISION 1 FOR NORTH-SOUTH APRON PLUME NAS CECIL FIELD FL

12/3/2003

TETRA TECH NUS INC

**TETRA TECH** NUS, INC.
8640 Philips Highway, Suite 16 • Jacksonville, FL 32256
Tel 904.636.6125 • Fax 904.636.6165 • www.tetratech.com

Document Tracking Number 04JAX0035

December 3, 2003

Project Number N4248

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

Reference: CLEAN III Contract Number N62467-94-D-0888
Contract Task Order Number 0248

Subject: Letter Report, Supplemental Assessment, Revision 1
North-South Apron Plume
Naval Air Station Cecil Field
Jacksonville, Florida

Dear Mr. Grabka:

Tetra Tech NUS, Inc. (TtNUS) has completed a supplemental assessment at the North-South Apron Plume, and we are pleased to submit this revised letter report in accordance with the referenced Contract Task Order for the site. This letter report was prepared for the United States Navy (Navy) Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH) under the Comprehensive Long-term Environmental Action Navy (CLEAN) III Contract Number N62467-94-D-0888.

TtNUS recommended a supplemental assessment at the conclusion of the fourth quarterly groundwater monitoring event, which was completed in February 2002. Subsequently, the Florida Department of Environmental Protection's (FDEP) response letter (Attachment A) agreed with the necessity of a supplemental assessment. The primary objective of the supplemental work was to determine the lateral extent of the groundwater contamination plume associated with the intermediate aquifer zone at this site in order to determine an appropriate future course of action for the site. The guidance document for this report is Chapter 62-770, Florida Administrative Code (FAC). This report summarizes the field operations and analytical results for the subject site. Figure 1 shows the location of the site.

## GROUNDWATER SCREENING

Field operations were performed in general accordance with the TtNUS Comprehensive Quality Assurance Plan Number 980038. In August 2002, TtNUS mobilized to the site with a direct-push technology (DPT) company and, together, collected three shallow zone and eight intermediate zone groundwater samples using stainless steel sample tooling. The samples collected were shipped on ice and under chain of custody to Accutest Laboratories in Orlando, Florida for analysis. These samples were analyzed for the contaminants of concern (COCs) benzene, toluene, ethylbenzene, and total xylenes (BTEX) using United States Environmental Protection Agency (USEPA) Method SW846 8260B.

## INTERMEDIATE WELL INSTALLATION AND SAMPLING

Based on the screening-level data obtained by the DPT work, TtNUS and the Navy agreed on the placement of five additional intermediate zone monitoring wells. During the week of October 7, 2002, the five monitoring wells (CEF-M18-06I through CEF-M18-10I) were installed and developed. The boring logs, well construction diagrams, and certificates of conformance for those wells are included as Attachment B.

Groundwater measurements were collected on October 23, 2002, from one shallow and eight intermediate monitoring wells (CEF-M18-02S and CEF-M18-02I through CEF-M18-09I). After taking water levels, groundwater samples were collected using low flow methods from the five recently installed intermediate monitoring wells (CEF-M18-06I, CEF-M18-07I, CEF-M18-08I, CEF-M18-09I, and CEF-M18-10I). Following collection, the groundwater samples were placed on ice and shipped under chain of custody to Accutest Laboratories for analysis. The samples from the intermediate wells were analyzed for BTEX using USEPA Method SW846 8260B, which agrees with the COC list provided in the FDEP Monitoring Plan Approval Order (Attachment C).

## INTERMEDIATE WELL RESULTS

The depth to water in the monitoring wells ranged from 6.17 to 7.55 feet (ft) below top of casing (btoc). The depth-to-water measurements, along with top-of-casing elevations, were used to calculate groundwater elevations. Table 1 provides the groundwater elevation data. Figure 2 shows the direction of groundwater flow to the southeast in the intermediate zone.

The groundwater elevations from the shallow wells were not used in the calculation of groundwater flow direction. It should be noted, though, that there is only 0.01 ft of difference between the groundwater elevations for CEF-M18-02S and CEF-M18-02I. Since the lithology of the shallow zone and intermediate zones consists primarily of silty fine sands with no known confining units between them (TtNUS, 2001), their nearly identical water elevations [68.65 ft mean sea level (msl) and 68.64 ft msl, respectively] appear to indicate they are hydraulically connected.

The laboratory screening-level data for the DPT samples (both shallow and intermediate) indicate that none of the COCs were detected. The laboratory report for this data is provided as Attachment D.

The analytical results for the monitoring wells from this supplemental assessment are summarized in Table 2, and the laboratory report is provided as Attachment E. Table 2 indicates that the Groundwater Cleanup Target Level (GCTL) for benzene was exceeded in monitoring wells CEF-M18-07I through CEF-M18-10I. The GCTLs for the other COCs were not exceeded in any of the recently installed monitoring wells (CEF-M18-06I through CEF-M18-10I). Table 2 also indicates that the concentrations for the intermediate wells (CEF-M18-02I through CEF-M18-10I) are below the Natural Attenuation Default Source Concentrations (NADSC).

Since only benzene and total xylenes have historically exceeded GCTLs at this site, Figure 3 displays the most recent analytical results for those COCs for both the DPT and permanent monitoring wells. Based on both the DPT screening-level data and the permanent monitoring well data, an approximate extent of the intermediate zone benzene plume is shown.

## DEEP WELL INSTALLATION AND SAMPLING

Based on the analytical results for the groundwater samples collected from the intermediate zone monitoring wells, the FDEP requested in a letter dated May 2003 the installation of deeper monitoring wells to delineate the vertical extent of the intermediate zone plume (Attachment F). During July 2003, the

two deep monitoring wells (CEF-M18-11D and CEF-M18-12D) were installed and developed. The well construction diagrams and certificates of conformance for those wells are included in Attachment G.

Groundwater samples were collected using low flow methods from the two recently installed deep monitoring wells (CEF-M18-11D and CEF-M18-12D). Following collection, the groundwater samples were placed on ice and shipped under chain of custody to Accutest Laboratories for analysis. The samples from the deep wells were analyzed for BTEX using USEPA Method SW846 8260B, which agrees with the COC list provided in the FDEP Monitoring Plan Approval Order.

## DEEP WELL RESULTS

The analytical results for the monitoring wells from this supplemental assessment are summarized in Table 2, and the laboratory report is provided as Attachment H. Table 2 indicates that the GCTL for benzene was exceeded in monitoring well CEF-M18-12D. The GCTLs for the other COCs were not exceeded in the deep monitoring wells. Table 2 also indicates that the benzene concentration for CEF-M18-12D is less than the NADSC. Because only benzene and total xylenes have historically exceeded GCTLs at this site, Figure 4 displays the analytical results for those COCs for the deep monitoring wells as well as the horizontal extent of the benzene plume in the intermediate zone.

## CONCLUSIONS AND RECOMMENDATIONS

As previously indicated, the shallow and intermediate zones appear to be hydraulically connected; therefore, part of this investigation attempted to determine if a shallow zone source exists for the COCs. Previously in the Site Assessment Report (TtNUS, 2001), the analytical data for the shallow zone wells (CEF-M18-01S and CEF-M18-02S) indicated that there was no obvious source for the intermediate zone BTEX contamination. Table 2 displays that data. The DPT data from three shallow locations (DP01, DP06, and DP09) also did not indicate a possible source for the intermediate zone BTEX contamination. The COC concentrations in the groundwater samples collected from the deep monitoring wells were less than the concentrations in the intermediate zone. Therefore, it appears that this contaminant plume is largely isolated to the intermediate zone.

As indicated in the last quarterly monitoring report (TtNUS, 2002), the milestone objectives had not been achieved. According to Chapter 62-770.690 (7)(g), FAC, the next step should be one of the following:

- Perform a supplemental site assessment.
- Perform additional monitoring.
- Prepare a RAP.

Since the supplemental assessment has been performed, the extent of the benzene plume is known, and higher benzene concentrations have been detected, TtNUS recommends performing additional monitoring. Because the contaminant concentrations remain below NADSC values, a RAP is not justified at this time.

The recommended list of monitoring wells, which are also indicated by the shaded tags on Figures 3 and 4, for the new program is as follows:

- CEF-M18-01S [upgradient point-of-compliance (POC) well]
- CEF-M18-02I (source well)
- CEF-M18-05I (downgradient POC well)
- CEF-M18-06I (sidegradient POC well)
- CEF-M18-08I (sidegradient POC well)
- CEF-M18-09I (source well).

- CEF-M18-11D (vertical POC well)
- CEF-M18-12D (vertical POC well)

In accordance with Chapter 62-770.690 (7)(g), FAC, a new set of milestone objectives is herewith provided:

| Benzene Milestone Objectives | | |
|---|---|---|
| **Period** | **CEF-M18-02I** | **CEF-M18-09I** |
| End of Year 1 | 7 µg/L | 13 µg/L |
| End of Year 2 | 6 µg/L | 10 µg/L |
| End of Year 3 | 5 µg/L | 7 µg/L |
| End of Year 4 | 3 µg/L | 4 µg/L |
| End of Year 5 | 1 µg/L | 1 µg/L |
| µg/L = micrograms per liter | | |

| Total Xylenes Milestone Objectives | |
|---|---|
| **Period** | **CEF-M18-02I** |
| End of Year 1 | 139 µg/L |
| End of Year 2 | 109 µg/L |
| End of Year 3 | 79 µg/L |
| End of Year 4 | 49 µg/L |
| End of Year 5 | 20 µg/L |

The benzene concentrations in sidegradient POC well CEF-M18-08I and vertical POC well CEF-M18-12D slightly exceed the GCTL of 1 µg/L with concentrations of 1.4 µg/L and 1.2 µg/L, respectively. For this reason, TtNUS requests a variance for this site to allow use of these wells as POC wells with a benzene action level of 2 µg/L.

If you have any questions with regard to this submittal, please contact me at (813) 806-0202.

Sincerely,

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

Mervin W. Dale, P.G.
Florida Professional Geologist
PG Number 1917

MERVIN W. DALE
LICENSE
NO. 1917
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

PEC/wo

Attachments (14)

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

# TABLES

**Table 1**
**Groundwater Elevation Data**

Supplemental Assessment Letter Report
North-South Apron Plume
Naval Air Station Cecil Field
Jacksonville, Florida

| Monitoring Well Identification | Well Depth (ft, btoc) | Top-of-Casing Elevation (ft, msl) | August 7, 2001 | | November 6, 2001 | | February 14, 2002 | | October 23, 2002 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Depth to Water (ft, btoc) | Water-Level Elevation (ft, msl) | Depth to Water (ft, btoc) | Water-Level Elevation (ft, msl) | Depth to Water (ft, btoc) | Water-Level Elevation (ft, msl) | Depth to Water (ft, btoc) | Water-Level Elevation (ft, msl) |
| CEF-M18-01S | 15 | 75.89 | 5.21 | 70.68 | 6.28 | 69.61 | 6.25 | 69.64 | NM | NM |
| CEF-M18-02S | 15 | 76.02 | 6.30 | 69.72 | 7.61 | 68.41 | 7.41 | 68.61 | 7.37 | 68.65 |
| CEF-M18-02I | 35 | 75.78 | 6.08 | 69.70 | 7.39 | 68.39 | 7.21 | 68.57 | 7.14 | 68.64 |
| CEF-M18-03I | 35 | 75.13 | 5.01 | 70.12 | 6.75 | 68.38 | 6.56 | 68.57 | 6.48 | 68.65 |
| CEF-M18-04I | 35 | 74.66 | 4.55 | 70.11 | 7.20 | 67.46 | 6.91 | 67.75 | 6.87 | 67.79 |
| CEF-M18-05I | 35 | 73.42 | 3.48 | 69.94 | 6.83 | 66.59 | 6.47 | 66.95 | 6.47 | 66.95 |
| CEF-M18-06I | 35 | 76.11 | NE | NE | NE | NE | NE | NE | 7.55 | 68.56 |
| CEF-M18-07I | 35 | 76.26 | NE | NE | NE | NE | NE | NE | 7.45 | 68.81 |
| CEF-M18-08I | 35 | 75.54 | NE | NE | NE | NE | NE | NE | 6.80 | 68.74 |
| CEF-M18-09I | 35 | 74.32 | NE | NE | NE | NE | NE | NE | 6.17 | 68.15 |
| CEF-M18-10I | 35 | 74.98 | NE | NE | NE | NE | NE | NE | NM | NM |

**Notes:**
The 1st quarter's data (May 2001) was removed from this table as a matter of brevity.
The top-of-casing elevation of CEF-M18-2I has been corrected.
NE = This well did not exist at this time.
NM = not measured

**Table 2**
**Summary of BTEX Detections in Groundwater**

Supplemental Assessment Letter Report
North-South Apron Plume
Naval Air Station Cecil Field
Jacksonville, Florida


| **Well** | **CEF-M18-01S** | | | | | **CEF-M18-02I** | | | | | | **FDEP GCTLs** | **NADSC** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | 01/20/00 | 09/14/00 | 11/30/00 | 05/02/01 | 08/07/01 | 01/19/00 | 01/19/00 | 09/14/00 | 05/02/01 | 08/07/01 | 11/06/01 | | |
| **Well Depth (ft bgs)** | 15 | 15 | 15 | 15 | 15 | 35 | 35 | 35 | 35 | 35 | 35 | | |
| | Sample | Sample | Sample | Sample | Sample | Sample | Duplicate | Sample | Sample | Sample | Sample | | |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | | | | |
| Benzene | 1.0 U | 1.0 U | 1.0 U | 1.0 U | NS | **5.3** | **5.3** | **2.5** | **3.8** | **2.8** | **5.6** | 1 | 100 |
| Toluene | 1.0 U | 2.0 U | 2.0 U | 2.0 U | NS | 1.0 U | 1.0 U | 2.0 U | 2.0 U | 2.0 U | 0.68 J | 40 | 400 |
| Ethylbenzene | 1.0 U | 2.0 U | 2.0 U | 2.0 U | NS | 7.2 | 7 | 1.0 U | 0.95 J | 1.0 J | 5.8 | 30 | 300 |
| Xylenes, total | 3.0 U | 6.0 U | 6.0 U | 6.0 U | NS | **68.2** | **67.4** | 3.1 | 12.9 | 7 | **54.4** | 20 | 200 |

| **Well** | **CEF-M18-02I** | | **CEF-M18-02S** | | | **CEF-M18-03I** | | | | | | **FDEP GCTLs** | **NADSC** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | 02/14/02 | 02/14/02 | 03/28/00 | 09/14/00 | 08/07/01 | 09/14/00 | 05/02/01 | 08/07/01 | 11/06/01 | 02/14/02 | | | |
| **Well Depth (ft bgs)** | 35 | 35 | 15 | 15 | 15 | 35 | 35 | 35 | 35 | 35 | | | |
| | Sample | Duplicate | Sample | Sample | Sample | Sample | Sample | Sample | Sample | Sample | | | |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | | | | |
| Benzene | **8.3** | **8.6** | 1.0 U | 1.0 U | NS | **7** | **4.6** | **4.1** | **4** | **3.7** | | 1 | 100 |
| Toluene | 0.89 J | 1 J | 1.0 U | 2.0 U | NS | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | | 40 | 400 |
| Ethylbenzene | 9.4 | 9.5 | 1.0 U | 2.0 U | NS | 4.6 | 1.1 J | 1.7J | 1.8 J | 1.2 J | | 30 | 300 |
| Xylenes, total | **139** | **147** | 3.0 U | 6.0 U | NS | **27.5** | 5.3 J | 10.6 | 11 | 6.6 | | 20 | 200 |

| **Well** | **CEF-M18-04I** | | | | | | | | **CEF-M18-05I** | | | **FDEP GCTLs** | **NADSC** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | 03/28/00 | 03/28/00 | 09/14/00 | 05/02/01 | 08/07/01 | 08/07/01 | 11/06/01 | 02/14/02 | 11/30/00 | 11/30/00 | 05/02/01 | | |
| **Well Depth (ft bgs)** | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | | |
| | Sample | Duplicate | Sample | Sample | Sample | Duplicate | Sample | Sample | Sample | Duplicate | Sample | | |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | | | | |
| Benzene | 1.0 U | 1.0 U | **7.7** | **8.0** | **8.7** | **8.7** | **8.8** | **9.1** | 1.0 U | 1.0 U | 1.0 U | 1 | 100 |
| Toluene | 1.0 U | 1.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 40 | 400 |
| Ethylbenzene | 1.0 U | 1.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 30 | 300 |
| Xylenes, total | 3.0 U | 3.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 6.0 U | 20 | 200 |

See notes at end of table.

**Table 2**
**Summary of BTEX Detections in Groundwater**

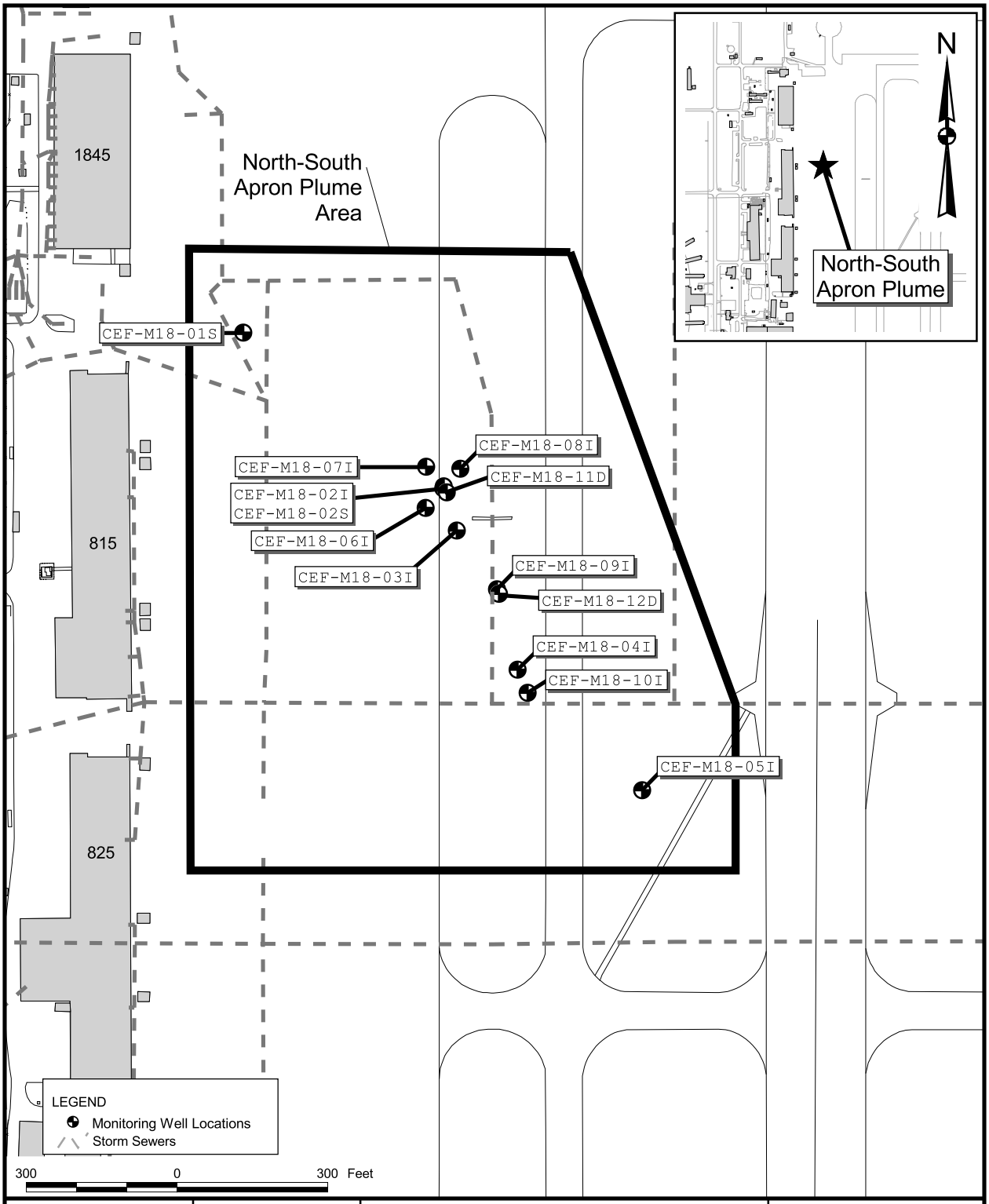
Supplemental Assessment Letter Report
North-South Apron Plume
Naval Air Station Cecil Field
Jacksonville, Florida


| **Well** | **CEF-M18-05I** | | | **CEF-M18-6I-05** | | **CEF-M18-7I-05** | **CEF-M18-8I-05** | **CEF-M18-9I-05** | **FDEP GCTLs** | **NADSC** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sample Date** | 08/07/01 | 11/06/01 | 02/14/02 | 10/23/02 | 10/23/02 | 10/23/02 | 10/23/02 | 10/23/02 | | |
| **Well Depth (ft bgs)** | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | | |
| | Sample | Sample | Sample | Sample | Duplicate | Sample | Sample | Sample | | |
| **Volatile Organic Compounds (µg/L)** | | | | | | | | | | |
| Benzene | 1.0 U | 1.0 U | 1.0 U | 0.72 J | 0.78 J | **1.6** | **1.4** | **14.5** | 1 | 100 |
| Toluene | 2.0 U | 2.0 U | 2.0 U | 2.3 | 2.8 | 1.0 U | 0.8 J | 1.0 U | 40 | 400 |
| Ethylbenzene | 2.0 U | 2.0 U | 2.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 30 | 300 |
| Xylenes, total | 6.0 U | 6.0 U | 6.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 20 | 200 |

| **Well** | **CEF-M18-10I-05** | **CEF-M18-11D-06** | **CEF-M18-12D-06** | | **FDEP GCTLs** | **NADSC** |
|---|---|---|---|---|---|---|
| **Sample Date** | 10/23/02 | 07/11/03 | 07/11/03 | 07/11/03 | | |
| **Well Depth (ft bgs)** | 35 | 60 | 60 | 60 | | |
| | Sample | Sample | Sample | Duplicate | | |
| **Volatile Organic Compounds (µg/L)** | | | | | | |
| Benzene | **9.3** | 1.0 U | **1.2** | **1.1** | 1 | 100 |
| Toluene | 3.8 | 1.0 U | 1.0 U | 1.0 U | 40 | 400 |
| Ethylbenzene | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 30 | 300 |
| Xylenes, total | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 20 | 200 |

**Notes:**
FDEP GCTLs are taken from Chapter 62-777, FAC.
**Bold** indicates concentrations are greater than FDEP criteria.
U = not detected at detection limit shown
J = estimated
NS = not sampled
bgs = below ground surface

# FIGURES

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| CHECKED BY | DATE | | APPROVED BY DATE |
| COST/SCHEDULE-AREA | | | APPROVED BY DATE |
| SCALE AS NOTED | | | DRAWING NO. FIGURE 1 / REV 1 |

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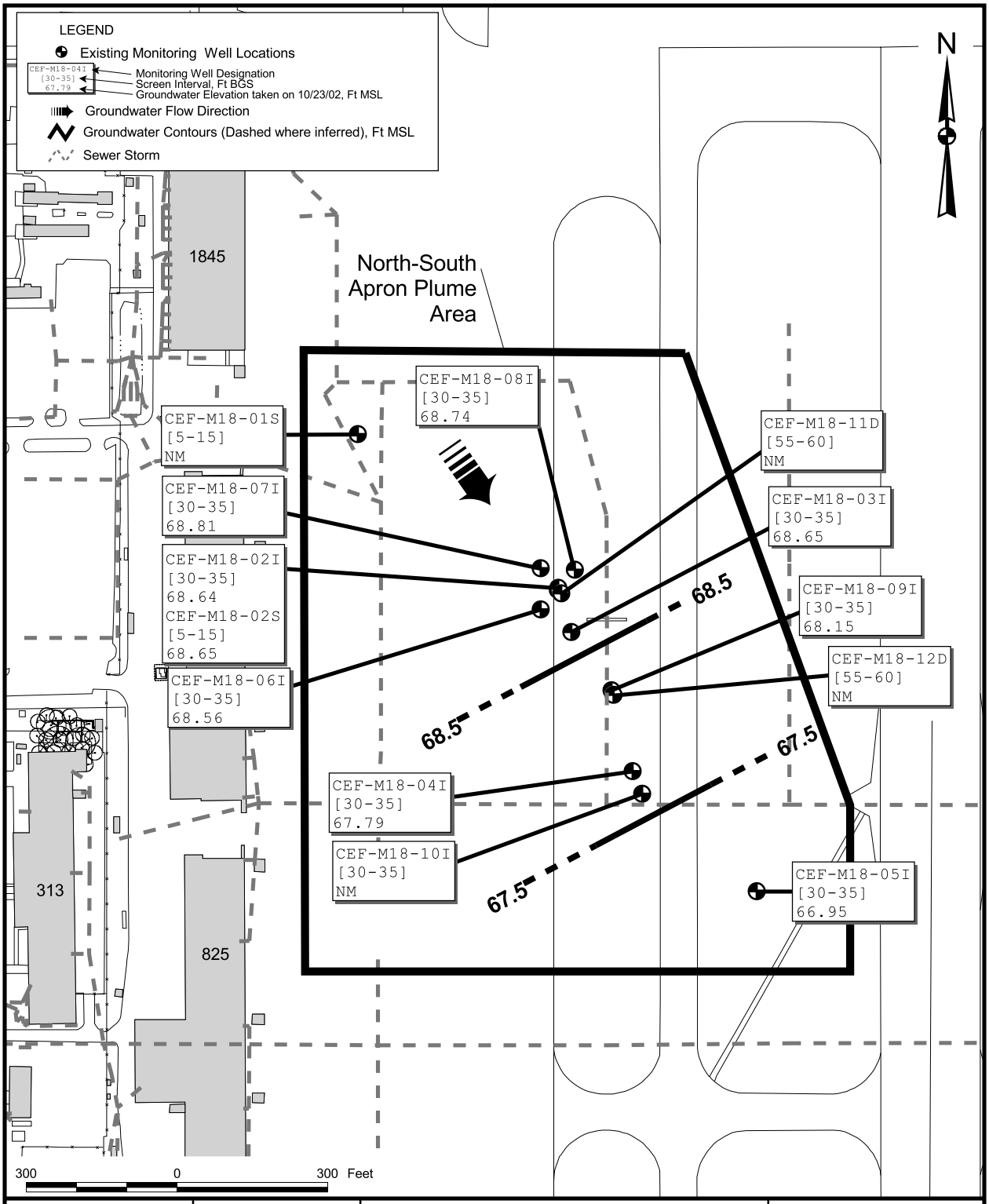


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| CHECKED BY | DATE | | APPROVED BY DATE |
| COST/SCHEDULE-AREA | | | APPROVED BY DATE |
| SCALE AS NOTED | | | DRAWING NO. FIGURE 2 / REV 1 |

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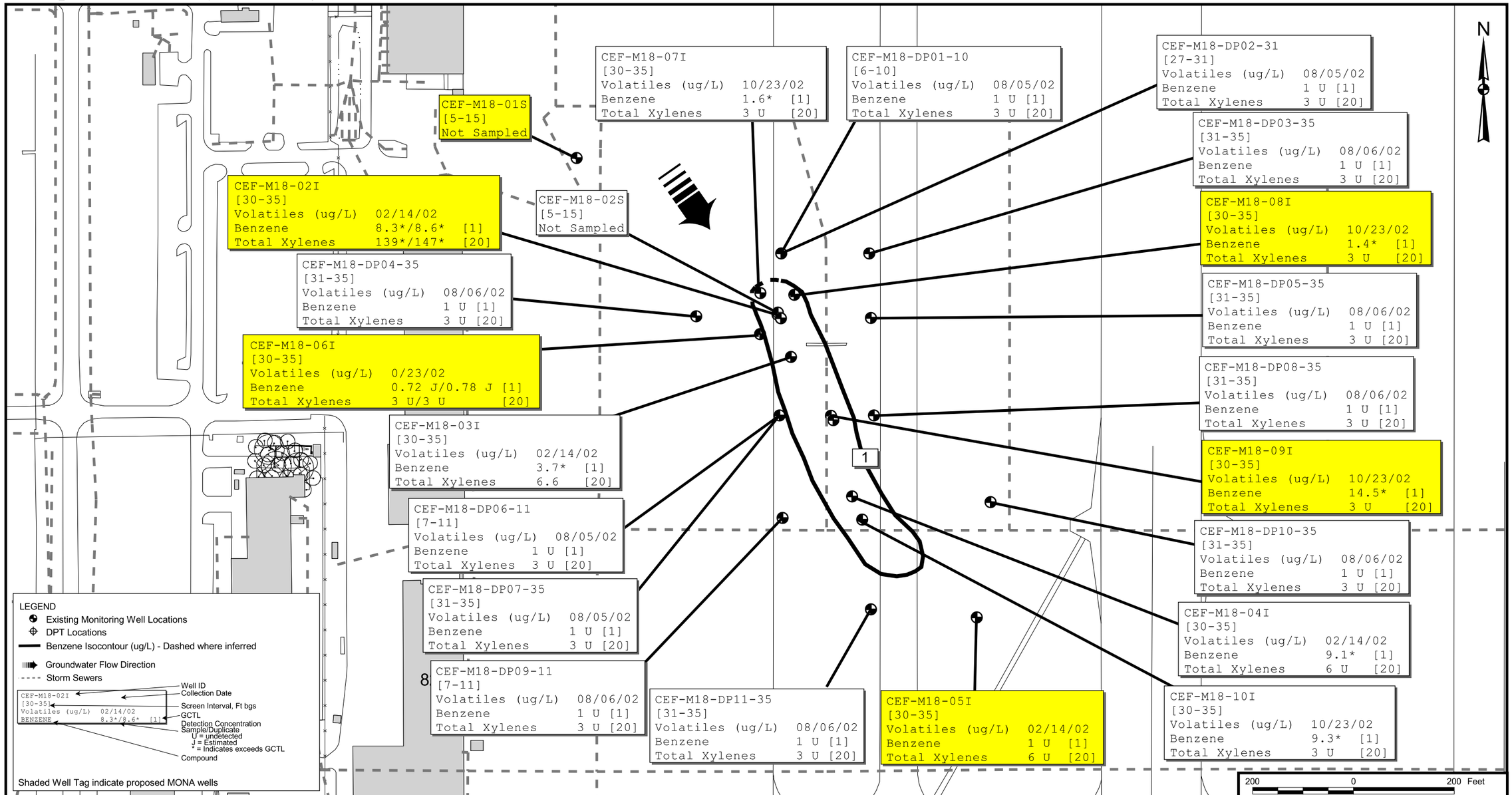


| NO. | DATE | REVISIONS | BY | CHKD | APPD | REFERENCES |
|---|---|---|---|---|---|---|
| | | | | | | |

DRAWN BY MJJ — DATE 15Nov02
CHECKED BY — DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER VOC RESULTS
NORTH-SOUTH APRON PLUME
SUPPLEMENTAL ASSESSMENT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. 4248
APPROVED BY — DATE
APPROVED BY — DATE
DRAWING NO. FIGURE 3
REV. 1

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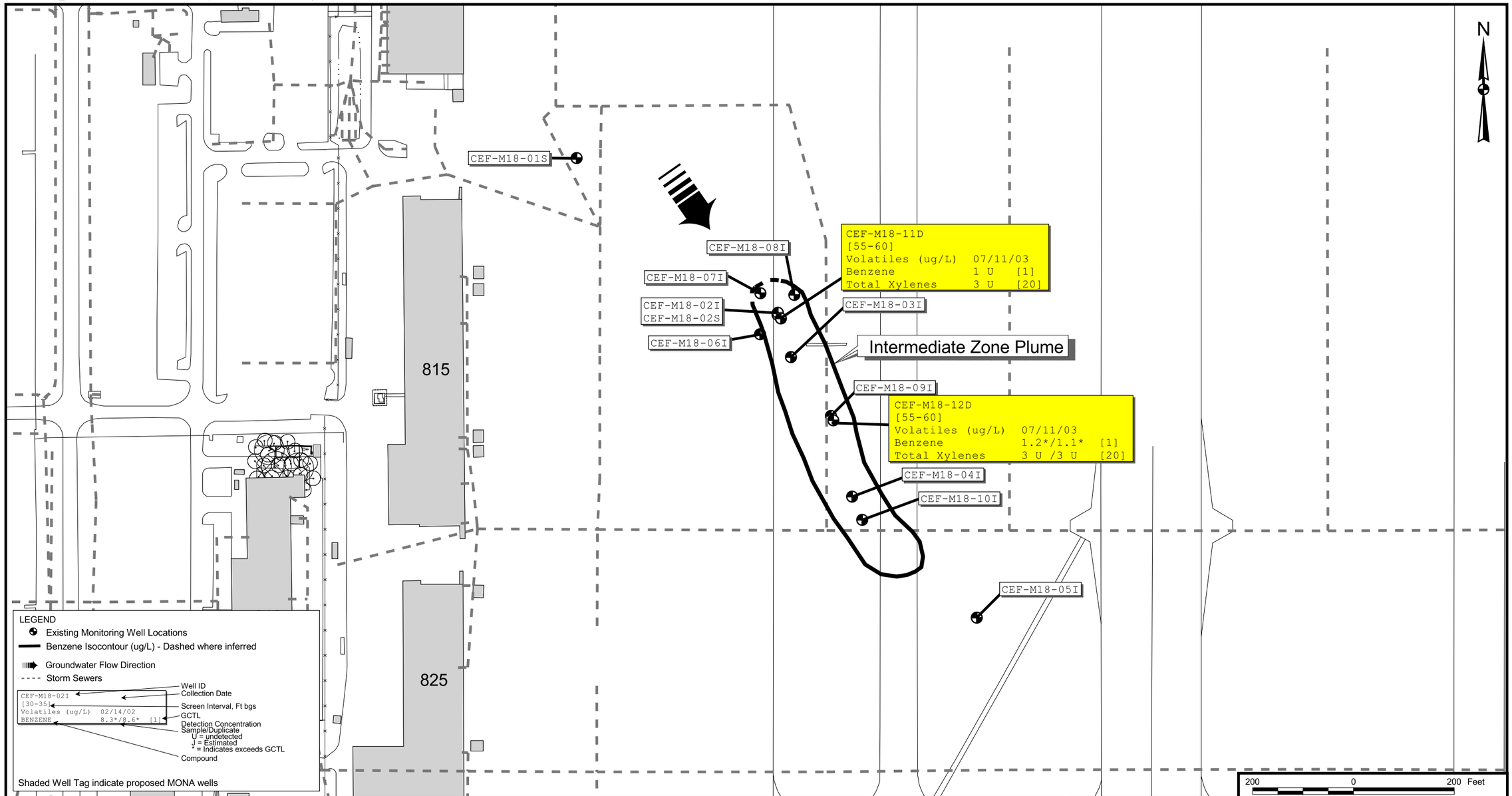


| NO. | DATE | REVISIONS | BY | CHKD | APPD | REFERENCES |
|---|---|---|---|---|---|---|
| | | | | | | |

| | |
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| DRAWN BY MJJ | DATE 15Nov03 |
| CHECKED BY | DATE |
| COST/SCHED-AREA | |
| SCALE AS NOTED | |

DEEP WELL GROUNDWATER VOC RESULTS
NORTH-SOUTH APRON PLUME
SUPPLEMENTAL ASSESSMENT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

| | |
|---|---|
| CONTRACT NO. 4248 | |
| APPROVED BY | DATE |
| APPROVED BY | DATE |
| DRAWING NO. FIGURE 4 | REV. 0 |

**ATTACHMENT A**

**FDEP RESPONSE LETTER**
**RE: GROUNDWATER MONITORING REPORT,**
**ANNUAL/4TH QUARTER, 1ST YEAR (FEBRUARY 2002)**

# Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

May 10, 2002

Mr. Wayne Hansel
Code ES245 (UST RPM)
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: Groundwater Monitoring Report, Annual/4th Quarter, 1st Year (February 2002), North-South Apron Plume, Naval Air Station Cecil Field

Dear Mr. Hansel:

I have completed the review of the Groundwater Monitoring Report, Annual/4th Quarter, 1st Year (February 2002), North-South Apron Plume, Naval Air Station Cecil Field, dated May 3, 2002 (received May 8, 2002), prepared and submitted by Tetra Tech NUS, Inc. The document adequately documents the groundwater monitoring that has been conducted at this site. Because of increasing levels of contaminants in two wells and the failure to attain the year one milestone objectives in those wells, Tetra Tech NUS has recommended that monitoring of the site be suspended while supplemental assessment of the site is undertaken. I concur with the recommendation to conduct supplemental site assessment. So long as the supplemental site assessment is conducted within a reasonable time frame, I also concur that the monitoring required in the Department's March 16, 2001 Natural Attenuation Monitoring Plan Approval Order may be suspended while the assessment is performed.

If I can be of any further assistance with this matter, please contact me at (850) 921-9991.

Sincerely,

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

# ATTACHMENT B

## INTERMEDIATE MONITORING WELL
## BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

DN 4248:4.4:54

Tetra Tech NUS, Inc.

# BORING LOG



PROJECT NAME: NSAP
PROJECT NUMBER: N4248MW0050 225
DRILLING COMPANY: Partridge
DRILLING RIG: DRILL MASTER 400

BORING NUMBER: SB-01
DATE: 10/7/02
GEOLOGIST: Mervin Dale
DRILLER: J. Weatherford

| Sample No. and Type or RQD | Depth (Ft.) or Run No. | Blows / 6" or RQD (%) | Sample Recovery / Sample Length | Lithology Change (Depth/Ft.) or Screened Interval | MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness | Color | Material Classification | USCS * | Remarks | PID/FID Reading (ppm): Sample | Sampler BZ | Borehole** | Driller BZ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-1 | | | | | | Concrete | | | | | | |
| | 1-4 | | | | | brown to BLACK | silty fine Sand | SM | dry | | | 0 | 0 |
| | 4-15 | | | | | | No cuttings - see logbook | | | | | | |
| | 15-35 | | | | | brown | fine silty Sand | SM | SATURATED | | | 0 | 0 |
| | | | | | | | | | | | | | 0 |
| | | | | | | | EOB @ 35.5 ft. bls. | | | | | | |

MWD

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes X No ____ Well I.D. #: CEF-MIB-GT

Tetra Tech NUS, Inc.

# BORING LOG



PROJECT NAME: NSAP
PROJECT NUMBER: N4248MW0050
DRILLING COMPANY: Partridge
DRILLING RIG: DRILLMASTER 400

BORING NUMBER: SB-02
DATE: 10/7/02
GEOLOGIST: Mervin Dale
DRILLER: J. Weatherford

| Sample No. and Type or RQD | Depth (Ft.) or Run No. | Blows / 6" or RQD (%) | Sample Recovery / Sample Length | Lithology Change (Depth/Ft.) or Screened Interval | Soil Density/ Consistency or Rock Hardness | Color | Material Classification | USCS * | Remarks | PID/FID Reading (ppm) Sample | Sampler BZ | Borehole** | Driller BZ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0-1 | | | | | | | Concrete | | | | | | |
| | 1-4 | | | | | dk.brn | fine silty sd. | SM | dry | | | 1.2 | 1.2 |
| | 4-10 | | | | | dk.brn | silty fine sand | SM | ▽ 9ft. b/s. | | | | |
| | 10-30 | | | | | brn | silty fine sand | SM | wet | | | | |
| | 30-35 | | | | | lt.brn | silty fine sand | SM | wet | | | 1.1 | 1.1 MD |
| | | | | | | | EOB @ 35.5ft. b/s | | | | | | |

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 1.0 MD

Converted to Well: Yes X No ____ Well I.D. #: CKF-MW8-7I

Tetra Tech NUS, Inc.

# BORING LOG



PROJECT NAME: NSAP
PROJECT NUMBER: N4248MW0050225
DRILLING COMPANY: Partridge
DRILLING RIG: DrilMaster 400

BORING NUMBER: SB03
DATE: 10/8/02
GEOLOGIST: Mervin Dale
DRILLER: J. Weatherford

| Sample No. and Type or RQD | Depth (Ft.) or Run No. | Blows / 6" or RQD (%) | Sample Recovery / Sample Length | Lithology Change (Depth/Ft.) or Screened Interval | MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness | Color | Material Classification | USCS * | Remarks | PID/FID Reading (ppm): Sample | Sampler BZ | Borehole** | Driller BZ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-2 | | | | grey | brn | silty fine SAND | SM | dry | | | | |
| | 2-3 | | | | lt. | brn | silty fine SAND | SM | dry | | | | |
| | 3-4 | | | | grey | brn | silty fine SAND | SM | dry pine root | | | 0 | 0 |
| | 4-6 | | | | grey | brn | silty fine SAND | SM | moist at 6' b/s. | | | | |
| | 7-10 | | | | red | brn | silty fine SAND | SM | ▽ @ 7' b/s. | | | 0 | 0 |
| | 10-15 | | | | red | brn | silty fine SAND | SM | wet | | | | |
| | 15-20 | | | | red | brn | silty fine SAND | SM | wet | | | | |
| | 20-25 | | | | red | brn | silty fine SAND | SM | wet | | | | |
| | 25-30 | | | | | brn | silty fine SAND | SM | wet | | | | |
| | 30-35 | | | | | brn | silty fine SAND | SM | wet | | | | |
| | | | | | | | EOB @ 35.5 ft. b/s. | | | | | | |

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0

Converted to Well: Yes X No ____ Well I.D. #: CEF-MW8-8I

Tetra Tech NUS, Inc.

# BORING LOG



PROJECT NAME: NSAP
PROJECT NUMBER: N4248MW0050 225
DRILLING COMPANY: Partridge
DRILLING RIG: DrillMaster 400

BORING NUMBER: SB04
DATE: 10/8/02
GEOLOGIST: Mervin Dale
DRILLER: J. Weatherford

| Sample No. and Type or RQD | Depth (Ft.) or Run No. | Blows / 6" or RQD (%) | Sample Recovery / Sample Length | Lithology Change (Depth/Ft.) or Screened Interval | MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness | Color | Material Classification | USCS * | Remarks | PID/FID Reading (ppm): Sample | Sampler BZ | Borehole** | Driller BZ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-1 | | | | brn & blk. fine silty sd. | | | SM | dry | | | 0 | 0 |
| | 1-2 | | | | graybrn fine silty sd. | | | SM | dry | | | 0 | 0 |
| | 2-5 | | | | gray & red silty fine sd. | | | SM | variegated, dry | | | | |
| | 3 | | | | orgbrn silty fine sand | | | SM | | | | | |
| | 3.5 | | | | lt gray silty fine sand | | | SM | | | | | 0 |
| | 4 | | | | lt gray silty fine sand | | | SM | | | | 0 | 0 |
| | 7 | | | | lt brown silty fine sand | | | SM | gentle x-siltin to light brown | | | 0.7 | 0.7 |
| | | | | | | | | | wet (∇~7') | | | | |
| | 7-35 | | | | lt. brn. silty fine sand | | | SM | wet | | | 0.7 | 0.7 |

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 0.0 / 0.7

Converted to Well: Yes X No

Well I.D. #: CEF-M18-9I

Tetra Tech NUS, Inc.

# BORING LOG



PROJECT NAME: NSAP
PROJECT NUMBER: N4248MW0050
DRILLING COMPANY: Partridge
DRILLING RIG: Drilmaster 400

BORING NUMBER: SB05
DATE: 10/8/02
GEOLOGIST: Mervin Dale
DRILLER: J. Weatherford

| Sample No. and Type or RQD | Depth (Ft.) or Run No. | Blows / 6" or RQD (%) | Sample Recovery / Sample Length | Lithology Change (Depth/Ft.) or Screened Interval | MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness | Color | Material Classification | USCS * | Remarks | PID/FID Reading (ppm): Sample | Sampler BZ | Borehole** | Driller BZ** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-2 | | | | DK | BRN | silty fine SAND | SM | dry | | | | |
| | 2-4 | | | | | yellow BRN | silty fine SAND | SM | dry | | | | |
| | 4-5 | | | | | orange | ~~silty~~ clayey SAND | SC | moist | | | | |
| | 5-15 | | | | MOD | LT BRN | silty FINE SAND | SM | ▽ ~ 7 ft. bls. | | | 1 | 1 |
| | 20-25 | | | | | LT. BRN | SILTY FINE SAND | SM | wet | | | 1 | 1.0 |
| | 25-30 | | | | | LT. BRN | SILTY FINE SAND | SM | wet | | | 1 | 1.2 |
| | 30-35.5 | | | | | LT. BRN | SILTY FINE SAND | SM | wet | | | | |
| | | | | | | | EOB @ 35.5 FT. BLS. | | | | | | |

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Remarks:

Drilling Area Background (ppm): 1.0

Converted to Well: Yes X No

Well I.D. #: CEF-MW8-10T

Tetra Tech NUS, Inc.

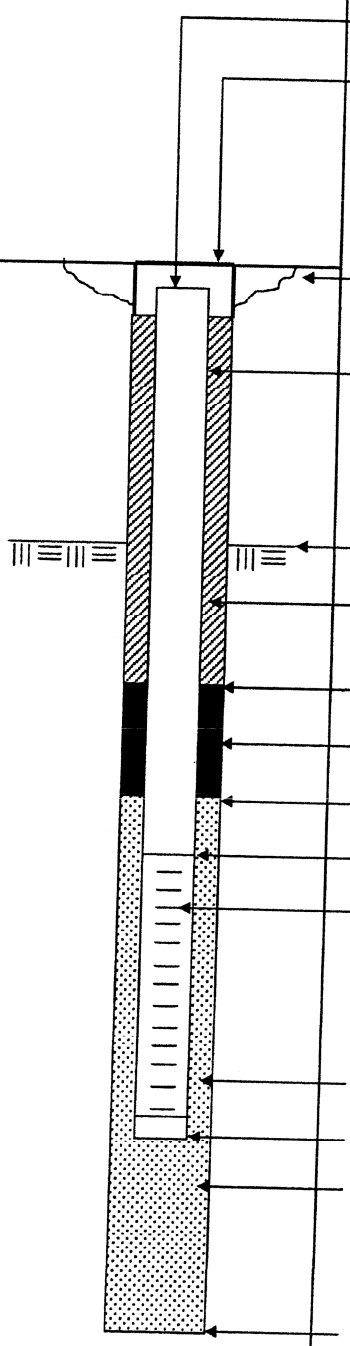
WELL No.: CEF-M18-6I

## MONITORING WELL SHEET

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NAS Cecil Field | DRILLING Co.: | Partridge | BORING No.: | SB-01 |
| PROJECT No.: | 4248 | DRILLER: | Jeff Weatherford | DATE COMPLETED: | 10/7/02 |
| SITE: | NSAP | DRILLING METHOD: | Hollow Stem | NORTHING: | |
| GEOLOGIST: | MERVIN DALE | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 1 2 IN.

Elevation / Height of Top of Surface Casing: 1 0 ft.

I.D. of Surface Casing: MWD 8 inch

Type of Surface Casing: Steel, bolted down w/ nylon skirt

Type of Surface Seal: Quikrete Concrete

I.D. of Riser: 2 inch

Type of Riser: Sch. 40, PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: 1 N/A

Type of Backfill: Type I Portland Cement

Elevation / Depth of Seal: 1 25 ft.

Type of Seal: 30/65 Fine Sand

Elevation / Depth of Top of Filter Pack: 1 28 FT.

Elevation / Depth of Top of Screen: 1 30 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 inch x 5 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Sand

Elevation / Depth of Bottom of Screen: 1 35 FT.

Elevation / Depth of Bottom of Filter Pack: 135.5 FT.

Type of Backfill Below Well: 20/30 Sand

Elevation / Total Depth of Borehole: 135.5 FT.

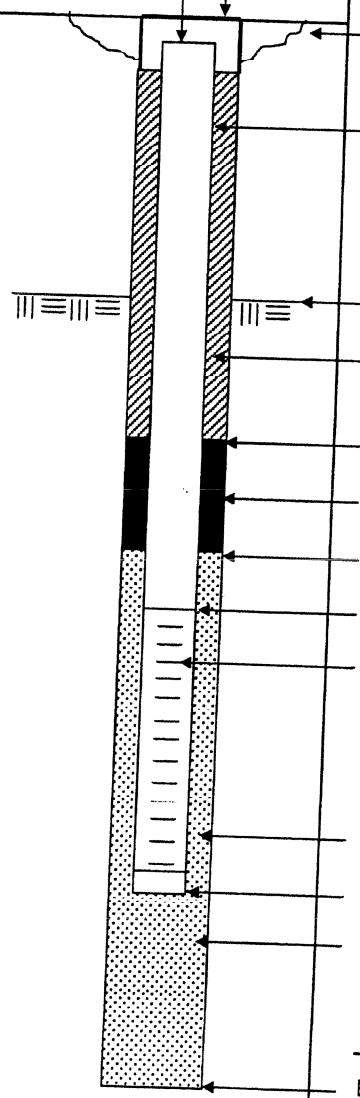
Tetra Tech NUS, Inc.

WELL No.: CEF-M18-7I

## MONITORING WELL SHEET

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NAS Cecil Field | DRILLING Co.: | Partridge | BORING No.: | SB-02 |
| PROJECT No.: | 4248 | DRILLER: | Jeff Heatherford | DATE COMPLETED: | 10/7/02 |
| SITE: | NSAP | DRILLING METHOD: | Hollow Stem | NORTHING: | |
| GEOLOGIST: | MERVIN DALE | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =
Datum:



Elevation / Depth of Top of Riser: 1.21N.

Elevation / Height of Top of Surface Casing: 1.0 FT.

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Steel, boltdown w/ nylon skirt

Type of Surface Seal: Quikrete concrete

I.D. of Riser: 2 inch

Type of Riser: Sch. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Portland Cement Type I

Elevation / Depth of Seal: ~~N/A~~ 25 FT. mud

Type of Seal: 30/65 Fine Sand

Elevation / Depth of Top of Filter Pack: 127.5 FT.

Elevation / Depth of Top of Screen: 130 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 inch x 5 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Sand

Elevation / Depth of Bottom of Screen: 135 FT.

Elevation / Depth of Bottom of Filter Pack: 135.5 FT.

Type of Backfill Below Well: 20/30 Sand

Elevation / Total Depth of Borehole: 135.5 FT.

Tetra Tech NUS, Inc.

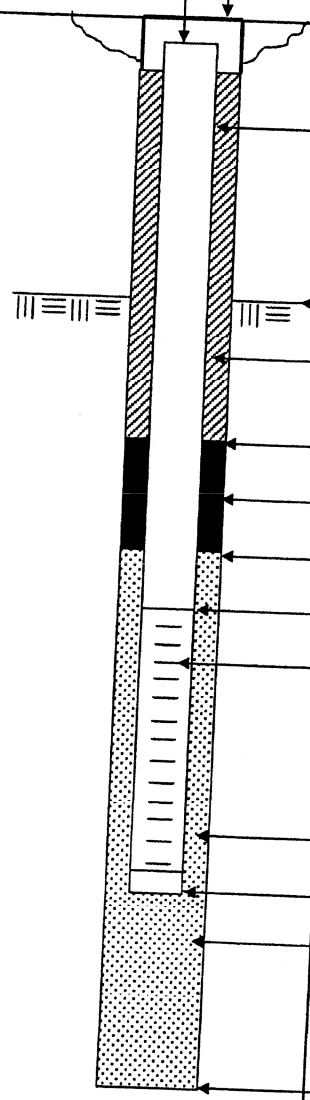
WELL No.: CEF-M18-8I

## MONITORING WELL SHEET

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NAS Cecil Field | DRILLING Co.: | Partridge | BORING No.: | SB03 |
| PROJECT No.: | 4248 | DRILLER: | Jeff Weatherford | DATE COMPLETED: | 10/8/02 |
| SITE: | NSAP | DRILLING METHOD: | Hollow Stem | NORTHING: | |
| GEOLOGIST: | MERVIN DALE | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 12 IN.

Elevation / Height of Top of Surface Casing: 1 IN. AGL ~~0 ft.~~

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Steel, bolt down manhole with nylon skirt

Type of Surface Seal: Quik rete 2'x2'x6" pad Concrete

I.D. of Riser: 2 inch

Type of Riser: Sch. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Type I Portland Cement

Elevation / Depth of Seal: 125 FT.

Type of Seal: 30/65 Fine Sand

Elevation / Depth of Top of Filter Pack: 128 FT.

Elevation / Depth of Top of Screen: 130 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 Inch x 5 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Sand

Elevation / Depth of Bottom of Screen: 135 FT.

Elevation / Depth of Bottom of Filter Pack: 135.5 FT.

Type of Backfill Below Well: 20/30 Sand

Elevation / Total Depth of Borehole: 135.5 FT.

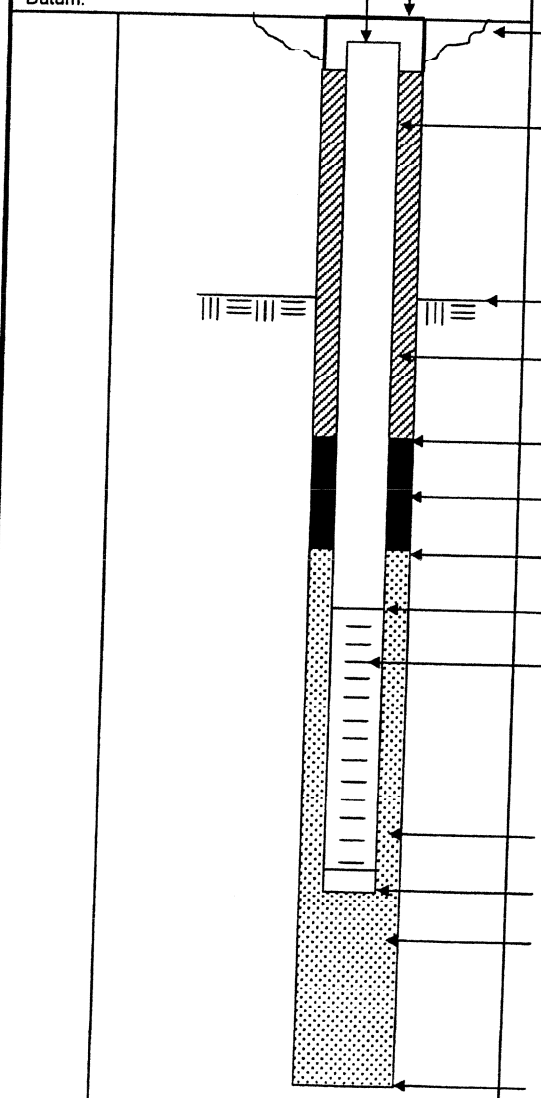
Tetra Tech NUS, Inc.

WELL No.: CEF-M18-9I

## MONITORING WELL SHEET

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NAS Cecil Field | DRILLING Co.: | Partridge | BORING No.: | SB-04 |
| PROJECT No.: | 4248 | DRILLER: | J. Weatherford | DATE COMPLETED: | 10/8/02 |
| SITE: | NSAP | DRILLING METHOD: | Hollow Stem | NORTHING: | |
| GEOLOGIST: | MERVIN DALE | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =
Datum:



| | |
|---|---|
| Elevation / Depth of Top of Riser: | 12 IN. |
| Elevation / Height of Top of Surface Casing: | 1 IN. ~~10 FT.~~ MD |
| I.D. of Surface Casing: | 8 inch |
| Type of Surface Casing: | Steel, boltdown manhole w/ nylon skirt |
| Type of Surface Seal: | Quikcrete concrete |
| I.D. of Riser: | 2 inch |
| Type of Riser: | Sch. 40 PVC |
| Borehole Diameter: | 8 inch |
| Elevation / Depth Top of Rock: | NA |
| Type of Backfill: | Type I Portland cement |
| Elevation / Depth of Seal: | 124 FT. |
| Type of Seal: | 30/65 Fine Sand |
| Elevation / Depth of Top of Filter Pack: | 127'9" |
| Elevation / Depth of Top of Screen: | 130 FT. |
| Type of Screen: | Sch. 40 PVC |
| Slot Size x Length: | 0.010 IN. X 5 FT. |
| I.D. of Screen: | 2 inch |
| Type of Filter Pack: | 20/30 Sand |
| Elevation / Depth of Bottom of Screen: | 135 FT. |
| Elevation / Depth of Bottom of Filter Pack: | 135.5 FT. |
| Type of Backfill Below Well: | 20/30 Sand |
| Elevation / Total Depth of Borehole: | 135.5 FT. |

Tetra Tech NUS, Inc.

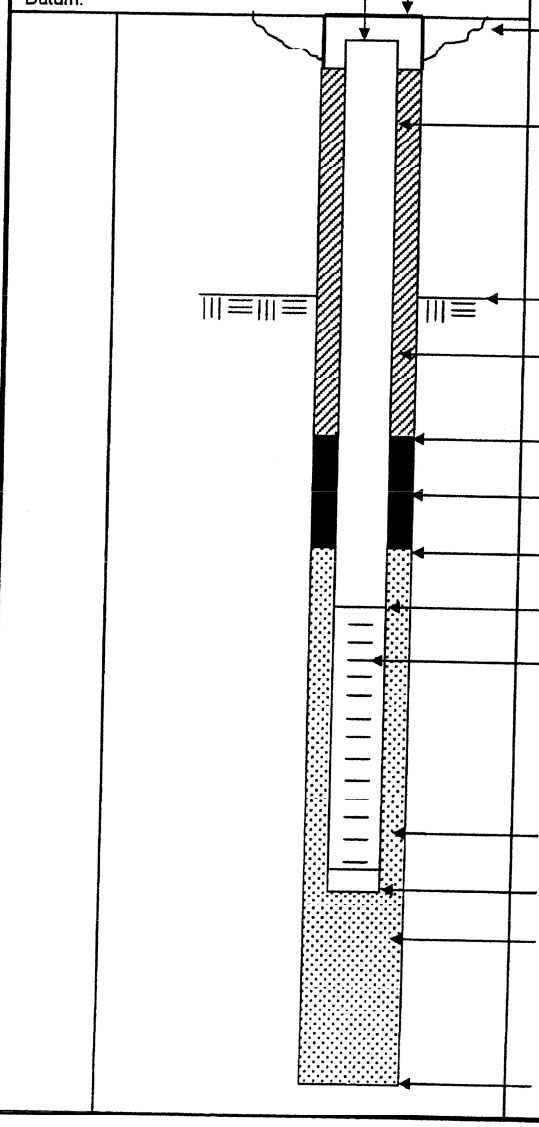
WELL No.: CEF-MIB-10I

## MONITORING WELL SHEET

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NAS Cecil Field | DRILLING Co.: | Partridge | BORING No.: | SB-05 |
| PROJECT No.: | 4248 | DRILLER: | Jeff Weatherford | DATE COMPLETED: | 10/8/02 |
| SITE: | NSAP | DRILLING METHOD. | Hollow Stem | NORTHING: | |
| GEOLOGIST: | MERVIN DALE | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =

Datum:



Elevation / Depth of Top of Riser: 12 IN.

Elevation / Height of Top of Surface Casing: 11 IN.

I.D. of Surface Casing: 8 inch

Type of Surface Casing: Steel, boltdown with nylon skirt

Type of Surface Seal: Quikrete concrete 2'x2'x6" pad

I.D. of Riser: 2 inch

Type of Riser: Sch. 40 PVC

Borehole Diameter: 8 inch

Elevation / Depth Top of Rock: N/A

Type of Backfill: Type I portland cement

Elevation / Depth of Seal: 125 FT.

Type of Seal: 30/65 Fine Sand

Elevation / Depth of Top of Filter Pack: 127'10"

Elevation / Depth of Top of Screen: 130 FT.

Type of Screen: Sch. 40 PVC

Slot Size x Length: 0.010 IN x 5 FT.

I.D. of Screen: 2 inch

Type of Filter Pack: 20/30 Sand

Elevation / Depth of Bottom of Screen: 135 FT.

Elevation / Depth of Bottom of Filter Pack: 135.5 FT.

Type of Backfill Below Well: 20/30 Sand

Elevation / Total Depth of Borehole: 135.5 FT.

DN4248:4.4.35

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-6I
Site Name: NORTH-SOUTH APRON PLUME (NSAP)
Date Installed: 10/7/02
Project Name: NSAP SUPPLEMENTAL ASSE

Site Geologist: MERVIN DALE
Drilling Company: PARTRIDGE DRILLING
Driller: JEFF Weatherford
Project Number: N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Well Screen | Sch. 40 PVC, 2" DIAM, 0.010" slots | Atlantic Drilling Supply, JAX, FL | NO |
| End Cap | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Drilling Fluid | None | | |
| Drilling Fluid Additives | None | | |
| Backfill Material | None | | |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal Fine Sand | 30/65 Fine Sand | STANDARD SAND, JAX, FL | NO |
| Annular Grout | Type I Portland Cement * | Lehigh Allentown, PA | NO |
| Surface Cement | Quikrete | Quikrete Co. Atlanta, GA | NO |
| Protective Casing | 8 inch bolt down manhole, Steel with nylon skirt | Atlantic Drilling Supply, JAX, FL | NO |
| ~~Paint~~ MWD | | | |
| ~~Rod Lubricant~~ MWD | | | |
| ~~Compressor Oil~~ MWD | | | |
| GROUT ADDITIVE | QUIKGEL High Yield Bentonite | BAROID Drilling Fluid Houston, TX | NO |
| | | | |

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

CTO 248, 4.4

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-7I
Site Name: NORTH-SOUTH APRON PLUME (NSAP)
Date Installed: 10/7/02
Project Name: NSAP SUPPLEMENTAL ASSE

Site Geologist: MERVIN DALE
Drilling Company: PARTRIDGE DRILLING
Driller: JEFF Weatherford
Project Number: N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Well Screen | Sch. 40 PVC, 2" DIAM, 0.010" slots | Atlantic Drilling Supply, JAX, FL | NO |
| End Cap | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Drilling Fluid | None | | |
| Drilling Fluid Additives | None | | |
| Backfill Material | None | | |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal, Fine Sand | 30/65 Fine Sand | STANDARD SAND, JAX, FL | NO |
| Annular Grout | Type I Portland Cement * | Lehigh Allentown, PA | NO |
| Surface Cement | Quikrete | Quikrete Co. Atlanta, GA | NO |
| Protective Casing | 8 inch bolt down manhole, Steel with nylon skirt | Atlantic Drilling Supply, JAX, FL | NO |
| ~~Paint~~ MWD | | | |
| ~~Rod Lubricant~~ MWD | | | |
| ~~Compressor Oil~~ MWD | | | |
| GROUT ADDITIVE | QUIKGEL High Yield Bentonite | BAROID Drilling Fluid Houston, TX | NO |
| | | | |

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-8I
Site Name: NORTH-SOUTH APRON PLUME (NSAP)
Date Installed: 10/8/02
Project Name: NSAP SUPPLEMENTAL ASSE

Site Geologist: MERVIN DALE
Drilling Company: PARTRIDGE DRILLING
Driller: JEFF Weatherford
Project Number: N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Well Screen | Sch. 40 PVC, 2" DIAM, 0.010" slots | Atlantic Drilling Supply, JAX, FL | NO |
| End Cap | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Drilling Fluid | None | | |
| Drilling Fluid Additives | None | | |
| Backfill Material | None | | |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal Fine Sand | 30/65 Fine Sand | STANDARD SAND, JAX, FL | NO |
| Annular Grout | Type I Portland Cement * | Lehigh Allentown, PA | NO |
| Surface Cement | Quikrete | Quikrete Co. Atlanta, GA | NO |
| Protective Casing | 8 inch bolt down manhole, Steel with nylon skirt | Atlantic Drilling Supply, JAX, FL | NO |
| ~~Paint~~ MWD | | | |
| ~~Rod Lubricant~~ MWD | | | |
| ~~Compressor Oil~~ MWD | | | |
| GROUT ADDITIVE | QUIKGEL High Yield Bentonite | BAROID Drilling Fluid Houston, TX | NO |
| | | | |

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-9I
Site Name: NORTH-SOUTH APRON PLUME (NSAP)
Date Installed: 10/8/02
Project Name: NSAP SUPPLEMENTAL ASSE

Site Geologist: MERVIN DALE
Drilling Company: PARTRIDGE DRILLING
Driller: JEFF Weatherford
Project Number: N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Well Screen | Sch. 40 PVC, 2" DIAM. 0.010" slots | Atlantic Drilling Supply, JAX, FL | NO |
| End Cap | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Drilling Fluid | None | | |
| Drilling Fluid Additives | None | | |
| Backfill Material | None | | |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal, Fine Sand | 30/65 Fine Sand | STANDARD SAND, JAX, FL | NO |
| Annular Grout | Type I Portland Cement * | Lehigh Allentown, PA | NO |
| Surface Cement | Quikrete | Quikrete Co. Atlanta, GA | NO |
| Protective Casing | 8 inch bolt down manhole, Steel with nylon skirt | Atlantic Drilling Supply, JAX, FL | NO |
| ~~Paint~~ MWD | | | |
| ~~Rod Lubricant~~ MWD | | | |
| ~~Compressor Oil~~ MWD | | | |
| GROUT ADDITIVE | QUIKGEL High Yield Bentonite | BAROID Drilling Fluid, Houston, TX | NO |
| | | | |

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-10I
Site Name: NORTH-SOUTH APRON PLUME (NSAP)
Date Installed: 10/8/02
Project Name: NSAP SUPPLEMENTAL ASSE

Site Geologist: MERVIN DALE
Drilling Company: PARTRIDGE DRILLING
Driller: JEFF Weatherford
Project Number: N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Well Screen | Sch. 40 PVC, 2" DIAM, 0.010" slots | Atlantic Drilling Supply, JAX, FL | NO |
| End Cap | Sch. 40 PVC, 2" DIAM. | Atlantic Drilling Supply, JAX, FL | NO |
| Drilling Fluid | None | | |
| Drilling Fluid Additives | None | | |
| Backfill Material | None | | |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal, Fine Sand | 30/65 Fine Sand | STANDARD SAND, JAX, FL | NO |
| Annular Grout | Type I Portland Cement * | Lehigh ALLENTOWN, PA | NO |
| Surface Cement | Quikrete | Quikrete Co. ATLANTA, GA | NO |
| Protective Casing | 8 inch bolt down manhole, Steel with nylon skirt | Atlantic Drilling Supply, JAX, FL | NO |
| ~~Paint~~ MWD | | | |
| ~~Rod Lubricant~~ MWD | | | |
| ~~Compressor Oil~~ MWD | | | |
| GROUT ADDITIVE | QUIKGEL High Yield Bentonite | BAROID Drilling Fluid, Houston, TX | NO |
| | | | |

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Mervin W. Dale

# ATTACHMENT C

# FDEP MONITORING PLAN APPROVAL ORDER

M.Ole

# Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

March 16, 2001

Mr. Nick Ugolini
Code 1843 (UST RPM)
Southern Division
Naval Facilities Engineering Command
Post Office Box 190010
North Charleston, South Carolina 29419-9010

RE: Site Assessment Report, North-South Apron Plume, Naval Air Station Cecil Field, Jacksonville, Florida

Dear Mr. Ugolini:

I have completed the review of the Site Assessment Report (SAR) and Monitoring Only Proposal (MOP) for the North-South Apron Plume, Naval Air Station Cecil Field, dated February 2001 (received March 1, 2001), prepared and submitted by Tetra Tech NUS, Inc. The SAR provides adequate evidence that natural attenuation at this site will reduce contaminant concentrations to below groundwater cleanup target levels in five years. I have attached a Monitoring Only Plan Approval Order signed by Douglas A. Jones specifying the actions to be taken in monitoring the site.

I also recommend that monitoring well CEF-M18-01S be resampled and analyzed for VOCs during the first quarter of monitoring to verify that the chlorinated hydrocarbons detected in September 2000, but not in January or November 2000, have not reappeared.

If I can be of any further assistance with this matter, please contact me at (850) 488-3693.

RECEIVED
APR 17 2001
TETRA TECH NUS
JACKSONVILLE FL

Sincerely,

David P. Crabka
Remedial Project Manager

cc: Scott Glass, Southern Division
Debbie Vaughn-Wright, USEPA Region 4

Mark Speranza, TetraTech NUS, Pittsburgh
Sam Ross, CH2M Hill Constructors, Inc.
Mike Fitzsimmons, FDEP Northeast District

TJB _____ JJC _____ ESN _____

# Department of
# Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

March 16, 2001

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

Mr. Nick Ugolini
Code 1843 (UST RPM)
Southern Division
Naval Facilities Engineering Command
Post Office Box 190010
North Charleston, South Carolina 29419-9010

Subject: Natural Attenuation Monitoring Plan Approval Order
North-South Apron Plume
Cecil Field Naval Air Station
Jacksonville, Duval County

Dear Mr. Ugolini:

The Bureau of Waste Cleanup has completed the review of the Site Assessment Report and Natural Attenuation Monitoring Plan dated February 2001 (received March 1, 2001), submitted for the petroleum product discharge discovered at this site. Pursuant to Rule 62-770.690, Florida Administrative Code (F.A.C.), the Department of Environmental Protection (Department) approves the Natural Attenuation Monitoring Plan . Pursuant to Rule 62-770.690(7), F.A.C., you are required to complete the monitoring program outlined below. The first sampling event should be performed within 60 days of receipt of this Natural Attenuation Monitoring Plan Approval Order (Order). Water-level measurements should be made immediately prior to each sampling event. The analytical results (laboratory report), chain of custody, cumulative summary table of the analytical results, site map(s) illustrating the most recent analytical results, and the water-level elevation information (cumulative summary table and most recent flow interpretation map), should be submitted to the Department within 60 days of sample collection.

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

| Monitoring Wells | Contaminants of Concern | Frequency | Duration |
|---|---|---|---|
| CEF-M18-02I, CEF-M18-03I, CEF-M18-04I, CEF-M18-05I | BTEX | Quarterly | Five years |

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

The following are the "milestone" objectives that will be used for annual evaluation of remediation progress by natural attenuation. An explanation of the progress relative to these milestone objectives, and the need for corrective action (if applicable), should be provided in the annual evaluation:

| | CEF-M18-02I | CEF-M18-03I | CEF-M18-04I |
|---|---|---|---|
| Benzene | | | |
| End of year 1 | 5 µg/l | 5 µg/l | 5 µg/l |
| End of year 2 | 4 µg/l | 4 µg/l | 4 µg/l |
| End of year 5 | <1 µg/l | <1 µg/l | <1 µg/l |
| Xylenes | | | |
| End of year 1 | 65 µg/l | 65 µg/l | 65 µg/l |
| End of year 2 | 55 µg/l | 55 µg/l | 55 µg/l |
| End of year 5 | <20 µg/l | <20 µg/l | <20 µg/l |

If concentrations of contaminants of concern in any of the designated wells increase above the action levels listed below, the well or wells must be resampled no later than 30 days after the initial positive results are known. If the results of the resampling confirm the initial sampling results, then a proposal must be submitted to the Department, as described in Rule 62-770.690(7)(f), F.A.C.

Contaminated wells:
CEF-M18-02I, CEF-M18-03I and CEF-M18-04I: 100 µg/l Benzene; 200 µg/l Total Xylenes

Perimeter well (temporary point of compliance):
CEF-M18-04I: 1 µg/l Benzene; 20 µg/l Total Xylenes

If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are met at the end of the monitoring period, a Site Rehabilitation Completion Report, summarizing the monitoring program and containing documentation supporting the opinion that the cleanup objectives have been achieved, should be submitted as required in Rule 62-770.690(8, F.A.C. If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are not met following five years of

monitoring, then a report summarizing the monitoring program should be submitted, including a proposal as described in Rule 62-770.690(7)(g), F.A.C.

Legal Issues

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

Persons affected by this Order have the following options:

If you choose to accept the above decision by the Department about the Site Assessment Report you do not have to do anything. This Order is final and effective as of the date on the top of the first page of this Order.

If you disagree with the decision, you may do one of the following:

(1) File a petition for administrative hearing with the Department's Office of General Counsel within 21 days of receipt of this Order; or

(2) File a request for an extension of time to file a petition for hearing with the Department's Office of General Counsel within 21 days of receipt of this Order. Such a request should be made if you wish to meet with the Department in an attempt to informally resolve any disputes without first filing a petition for hearing.

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

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

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

How to File a Petition for Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative hearing under Sections 120.569 and 120.57, F.S. The petition must contain the

information set forth below and must be filed (received) in the Department's Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Commanding Officer, Southern Division Naval Facilities Engineering Command , shall mail a copy of the petition to Commanding Officer, Southern Division Naval Facilities Engineering Command at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Section 120.54(5)(b)4.a., F.S. (1998, Supp.), and Rule 28-106.201, F.A.C., a petition for administrative hearing shall contain the following information:

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

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

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The

notice of appeal must be filed within 30 days after this Order is filed with the clerk of the Department (see below).

Questions

Any questions regarding the Department's review of your Site Assessment Report should be directed to David P. Grabka at (850) 488-3693. Questions regarding legal issues should be referred to the Department's Office of General Counsel at (850) 488-9314. Contact with any of the above does not constitute a petition for administrative hearing or request for an extension of time to file a petition for administrative hearing.

Sincerely,

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

DAJ/dpg

cc: Mike Fitzsimmons, FDEP Northeast District Office
Scott Glass, Southern Division
Debbie Vaughn-Wright, USEPA Region 4
Mark Speranza, Tetra Tech NUS, Pittsburgh
Sam Ross, CH2M Hill Constructors, Inc.
File

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

Minnie L Morrison 3/21/01

Clerk Date
(or Deputy Clerk)

Mr. Nick Ugolini
North-South Apron Plume
Cecil Field Naval Air Station

## P.G. CERTIFICATION

SAR/MOP for North-South Apron Plume

I hereby certify that in my professional judgement, the components of this Site Assessment Report and Monitoring Only Plan for the North-South Apron Plume, Cecil Field Naval Air Station, Jacksonville, Florida, satisfy the requirements set forth in Chapter 62-770, F.A.C., and that the geological interpretations in this report provide reasonable assurances of achieving the Assessment objectives stated in Chapter 62-770, F.A.C.

____ I personally completed this review.

X This review was conducted by David P. Grabka working under my supervision.

TIMOTHY J. BAHR
LICENSE
NO. 1209
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Timothy J. Bahr, P.G.
Professional Geologist Supervisor
Technical Review Section

3/16/01
Date

# ATTACHMENT D

## GROUNDWATER ANALYTICAL REPORT
## FOR DPT PHASE OF WORK

Southeast ACCUTEST Laboratories

12/27/02

# Technical Report for

Tetra Tech, NUS

NAS Cecil Field-CTO-248

N4248 WR46(SS)

Accutest Job Number: F14132

Report to:

Tetra Tech, NUS

dalem@ttnus.com

ATTN: Merv Dale

Total number of pages in report: 26

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

Harry Behzadi, Ph.D.
Laboratory Director

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

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

# Sample Summary

Tetra Tech, NUS

Job No: F14132

NAS Cecil Field-CTO-248
Project No: N4248 WR46(SS)

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| F14132-1 | 08/05/02 | 14:40 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP01-10 |
| F14132-2 | 08/05/02 | 15:25 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP02-31 |
| F14132-3 | 08/05/02 | 16:15 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP06-11 |
| F14132-4 | 08/05/02 | 16:40 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP07-35 |
| F14132-5 | 08/06/02 | 09:00 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP04-35 |
| F14132-6 | 08/06/02 | 09:35 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP09-11 |
| F14132-7 | 08/06/02 | 10:10 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP11-35 |
| F14132-8 | 08/06/02 | 10:50 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP08-35 |
| F14132-9 | 08/06/02 | 11:25 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP05-35 |
| F14132-10 | 08/06/02 | 12:05 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP03-35 |
| F14132-11 | 08/06/02 | 13:00 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DP10-35 |
| F14132-12 | 08/06/02 | 00:00 | MD | 08/07/02 | AQ | Ground Water | CEF-M18-DU01 |

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP01-10 | | |
| Lab Sample ID: | F14132-1 | Date Sampled: | 08/05/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017488.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 104% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 99% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 95% | | 80-120% |

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP02-31 | | |
| Lab Sample ID: | F14132-2 | Date Sampled: | 08/05/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017489.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 105% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 98% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 91% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP06-11 | | |
| Lab Sample ID: | F14132-3 | Date Sampled: | 08/05/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017490.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 105% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 104% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 98% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 92% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP07-35 | | |
| Lab Sample ID: | F14132-4 | Date Sampled: | 08/05/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017491.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 96% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 93% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP04-35 | | |
| Lab Sample ID: | F14132-5 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017492.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 103% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 96% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP09-11 | | |
| Lab Sample ID: | F14132-6 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017493.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 108% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 103% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 92% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP11-35 | | |
| Lab Sample ID: | F14132-7 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017494.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 102% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 105% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 97% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 95% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP08-35 | | |
| Lab Sample ID: | F14132-8 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017495.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 111% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 100% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 93% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP05-35 | | |
| Lab Sample ID: | F14132-9 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017496.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 108% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 97% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP03-35 | | |
| Lab Sample ID: | F14132-10 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017497.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 111% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 98% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DP10-35 | | |
| Lab Sample ID: | F14132-11 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017498.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 112% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 98% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 88% | | 80-120% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DU01 | | |
| Lab Sample ID: | F14132-12 | Date Sampled: | 08/06/02 |
| Matrix: | AQ - Ground Water | Date Received: | 08/07/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | G0017499.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 113% | | 80-120% |
| 2037-26-5 | Toluene-D8 | 100% | | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 91% | | 80-120% |

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

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

# GC/MS Volatiles

## QC Data Summaries

Includes the following where applicable:

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

# Blank Spike Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VG571-BS | G0017482.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |

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

F14132-1, F14132-2, F14132-3, F14132-4, F14132-5, F14132-6, F14132-7, F14132-8, F14132-9, F14132-10, F14132-11, F14132-12

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 25 | 25.2 | 101 | 75-125 |
| 100-41-4 | Ethylbenzene | 25 | 23.0 | 92 | 68-135 |
| 108-88-3 | Toluene | 25 | 25.7 | 103 | 75-125 |
| 1330-20-7 | Xylene (total) | 75 | 72.3 | 96 | 75-125 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 101% | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | 80-120% |
| 2037-26-5 | Toluene-D8 | 104% | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 99% | 80-120% |

# Method Blank Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VG571-MB | G0017481.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |

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

F14132-1, F14132-2, F14132-3, F14132-4, F14132-5, F14132-6, F14132-7, F14132-8, F14132-9, F14132-10, F14132-11, F14132-12

| CAS No. | Compound | Result | RL | Units | Q |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 2.0 | ug/l | |
| 108-88-3 | Toluene | ND | 2.0 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 6.0 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 99% | 80-120% |
| 2037-26-5 | Toluene-D8 | 97% | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 91% | 80-120% |

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F14074-8MS | G0017486.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| F14074-8MSD | G0017487.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |
| F14074-8 | G0017485.D | 1 | 08/13/02 | KW | n/a | n/a | VG571 |

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

F14132-1, F14132-2, F14132-3, F14132-4, F14132-5, F14132-6, F14132-7, F14132-8, F14132-9, F14132-10, F14132-11, F14132-12

| CAS No. | Compound | F14074-8 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | 25 | 26.7 | 107 | 27.0 | 108 | 1 | 75-125/15 |
| 100-41-4 | Ethylbenzene | ND | | 25 | 22.5 | 90 | 21.7 | 87 | 4 | 75-125/15 |
| 108-88-3 | Toluene | ND | | 25 | 28.6 | 114 | 25.6 | 102 | 11 | 75-125/15 |
| 1330-20-7 | Xylene (total) | ND | | 75 | 68.9 | 92 | 63.1 | 84 | 9 | 75-125/15 |

| CAS No. | Surrogate Recoveries | MS | MSD | F14074-8 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 103% | 105% | 105% | 80-120% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 100% | 103% | 106% | 80-120% |
| 2037-26-5 | Toluene-D8 | 113% | 106% | 95% | 80-120% |
| 460-00-4 | 4-Bromofluorobenzene | 85% | 92% | 92% | 80-120% |

# Instrument Performance Check (BFB)



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG571-BFB
Lab File ID: G0017478.D
Instrument ID: GCMSG
Injection Date: 08/13/02
Injection Time: 10:26

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 20731 | 17.4 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 52749 | 44.2 | | Pass |
| 95 | Base peak, 100% relative abundance | 119453 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 9651 | 8.1 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.0 | (0.0) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 117339 | 98.2 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 8762 | 7.3 | (7.5) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 117411 | 98.3 | (100.1) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 8156 | 6.8 | (6.9) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VG571-CC565 | G0017479.D | 08/13/02 | 10:53 | 00:27 | Continuing cal 40 |
| VG571-MB | G0017481.D | 08/13/02 | 11:54 | 01:28 | Method Blank |
| VG571-BS | G0017482.D | 08/13/02 | 12:25 | 01:59 | Blank Spike |
| ZZZZZZ | G0017483.D | 08/13/02 | 12:56 | 02:30 | (unrelated sample) |
| ZZZZZZ | G0017484.D | 08/13/02 | 13:26 | 03:00 | (unrelated sample) |
| F14074-8 | G0017485.D | 08/13/02 | 13:57 | 03:31 | (used for QC only; not part of job F14132) |
| F14074-8MS | G0017486.D | 08/13/02 | 14:28 | 04:02 | Matrix Spike |
| F14074-8MSD | G0017487.D | 08/13/02 | 14:59 | 04:33 | Matrix Spike Duplicate |
| F14132-1 | G0017488.D | 08/13/02 | 15:30 | 05:04 | CEF-M18-DP01-10 |
| F14132-2 | G0017489.D | 08/13/02 | 16:01 | 05:35 | CEF-M18-DP02-31 |
| F14132-3 | G0017490.D | 08/13/02 | 16:32 | 06:06 | CEF-M18-DP06-11 |
| F14132-4 | G0017491.D | 08/13/02 | 17:02 | 06:36 | CEF-M18-DP07-35 |
| F14132-5 | G0017492.D | 08/13/02 | 17:33 | 07:07 | CEF-M18-DP04-35 |
| F14132-6 | G0017493.D | 08/13/02 | 18:04 | 07:38 | CEF-M18-DP09-11 |
| F14132-7 | G0017494.D | 08/13/02 | 18:35 | 08:09 | CEF-M18-DP11-35 |
| F14132-8 | G0017495.D | 08/13/02 | 19:06 | 08:40 | CEF-M18-DP08-35 |
| F14132-9 | G0017496.D | 08/13/02 | 19:37 | 09:11 | CEF-M18-DP05-35 |
| F14132-10 | G0017497.D | 08/13/02 | 20:07 | 09:41 | CEF-M18-DP03-35 |
| F14132-11 | G0017498.D | 08/13/02 | 20:38 | 10:12 | CEF-M18-DP10-35 |
| F14132-12 | G0017499.D | 08/13/02 | 21:09 | 10:43 | CEF-M18-DU01 |
| ZZZZZZ | G0017500.D | 08/13/02 | 21:40 | 11:14 | (unrelated sample) |

# Instrument Performance Check (BFB)



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VG565-BFB | Injection Date: | 08/05/02 |
| Lab File ID: | G0017314.D | Injection Time: | 14:05 |
| Instrument ID: | GCMSG | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 12441 | 18.3 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 29479 | 43.4 | | Pass |
| 95 | Base peak, 100% relative abundance | 67870 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 4076 | 6.0 | | Pass |
| 173 | Less than 2.0% of mass 174 | 99 | 0.15 | (0.15) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 65266 | 96.2 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 5415 | 8.0 | (8.3) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 65841 | 97.0 | (100.9) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4519 | 6.7 | (6.9) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VG565-IC565 | G0017316.D | 08/05/02 | 15:04 | 00:59 | Initial cal 1 |
| VG565-IC565 | G0017317.D | 08/05/02 | 15:35 | 01:30 | Initial cal 5 |
| VG565-IC565 | G0017318.D | 08/05/02 | 16:06 | 02:01 | Initial cal 20 |
| VG565-ICC565 | G0017319.D | 08/05/02 | 16:37 | 02:32 | Initial cal 40 |
| VG565-IC565 | G0017320.D | 08/05/02 | 17:09 | 03:04 | Initial cal 70 |
| VG565-IC565 | G0017321.D | 08/05/02 | 17:40 | 03:35 | Initial cal 100 |

# Volatile Internal Standard Area Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VG571-CC565 | Injection Date: | 08/13/02 |
| Lab File ID: | G0017479.D | Injection Time: | 10:53 |
| Instrument ID: | GCMSG | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT |
|---|---|---|---|---|---|---|
| Check Std | 2058923 | 7.81 | 1430086 | 12.90 | 604611 | 17.31 |
| Upper Limit [a] | 4117846 | 8.31 | 2860172 | 13.40 | 1209222 | 17.81 |
| Lower Limit [b] | 1029462 | 7.31 | 715043 | 12.40 | 302306 | 16.81 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT |
|---|---|---|---|---|---|---|
| VG571-MB | 1767275 | 7.82 | 1296413 | 12.90 | 896430 | 17.31 |
| VG571-BS | 1865542 | 7.82 | 1217326 | 12.89 | 719948 | 17.30 |
| ZZZZZZ | 1813068 | 7.82 | 1252277 | 12.90 | 830991 | 17.31 |
| ZZZZZZ | 1707081 | 7.82 | 1168748 | 12.90 | 802498 | 17.31 |
| F14074-8 | 1778648 | 7.82 | 1274565 | 12.90 | 874150 | 17.31 |
| F14074-8MS | 1770928 | 7.82 | 965565 | 12.90 | 609473 | 17.31 |
| F14074-8MSD | 1646358 | 7.82 | 1072508 | 12.90 | 610302 | 17.31 |
| F14132-1 | 1784739 | 7.82 | 1243503 | 12.90 | 846551 | 17.31 |
| F14132-2 | 1760323 | 7.83 | 1158078 | 12.90 | 785674 | 17.31 |
| F14132-3 | 1846518 | 7.84 | 1243199 | 12.91 | 828716 | 17.32 |
| F14132-4 | 1744945 | 7.82 | 1247899 | 12.90 | 831346 | 17.31 |
| F14132-5 | 1843964 | 7.81 | 1396980 | 12.89 | 918581 | 17.30 |
| F14132-6 | 1846062 | 7.82 | 1302214 | 12.90 | 911135 | 17.31 |
| F14132-7 | 1638093 | 7.81 | 1235920 | 12.89 | 771065 | 17.30 |
| F14132-8 | 1793866 | 7.82 | 1324714 | 12.90 | 849379 | 17.30 |
| F14132-9 | 1809909 | 7.81 | 1326295 | 12.89 | 834357 | 17.30 |
| F14132-10 | 1851182 | 7.82 | 1330537 | 12.89 | 860522 | 17.31 |
| F14132-11 | 1748539 | 7.82 | 1162741 | 12.90 | 818687 | 17.32 |
| F14132-12 | 1791162 | 7.83 | 1158314 | 12.90 | 792649 | 17.31 |
| ZZZZZZ | 1698488 | 7.81 | 1097376 | 12.89 | 624787 | 17.30 |

IS 1 = Fluorobenzene
IS 2 = Chlorobenzene-D5
IS 3 = 1,4-Dichlorobenzene-d4

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

# Volatile Surrogate Recovery Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Method: SW846 8260B Matrix: AQ

Samples and QC shown here apply to the above method

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| F14132-1 | G0017488.D | 106.0 | 104.0 | 99.0 | 95.0 |
| F14132-2 | G0017489.D | 104.0 | 105.0 | 98.0 | 91.0 |
| F14132-3 | G0017490.D | 105.0 | 104.0 | 98.0 | 92.0 |
| F14132-4 | G0017491.D | 107.0 | 107.0 | 96.0 | 93.0 |
| F14132-5 | G0017492.D | 103.0 | 107.0 | 96.0 | 96.0 |
| F14132-6 | G0017493.D | 104.0 | 108.0 | 103.0 | 92.0 |
| F14132-7 | G0017494.D | 102.0 | 105.0 | 97.0 | 95.0 |
| F14132-8 | G0017495.D | 106.0 | 111.0 | 100.0 | 93.0 |
| F14132-9 | G0017496.D | 104.0 | 108.0 | 97.0 | 96.0 |
| F14132-10 | G0017497.D | 104.0 | 111.0 | 98.0 | 96.0 |
| F14132-11 | G0017498.D | 106.0 | 112.0 | 98.0 | 88.0 |
| F14132-12 | G0017499.D | 107.0 | 113.0 | 100.0 | 91.0 |
| F14074-8MS | G0017486.D | 103.0 | 100.0 | 113.0 | 85.0 |
| F14074-8MSD | G0017487.D | 105.0 | 103.0 | 106.0 | 92.0 |
| VG571-BS | G0017482.D | 101.0 | 96.0 | 104.0 | 99.0 |
| VG571-MB | G0017481.D | 104.0 | 99.0 | 97.0 | 91.0 |

| Surrogate Compounds | Recovery Limits |
|---|---|
| S1 = Dibromofluoromethane | 80-120% |
| S2 = 1,2-Dichloroethane-D4 | 80-120% |
| S3 = Toluene-D8 | 80-120% |
| S4 = 4-Bromofluorobenzene | 80-120% |

# Initial Calibration Summary

Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG565-ICC565
Lab FileID: G0017319.D

Response Factor Report MSVOA1

Method : C:\HPCHEM\1\METHODS\624.M (RTE Integrator)
Title : SW-846 Method 5030B/8260B & EPA 624
Last Update : Tue Aug 06 08:35:16 2002
Response via : Initial Calibration

Calibration Files
1 =G0017316.D 2 =G0017317.D 3 =G0017318.D
4 =G0017319.D 5 =G0017320.D 6 =G0017321.D

| | | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) | I | Fluorobenzene | ---------- | ---------- | ---------- | ISTD | ---------- | ---------- | ---------- | |
| 2) | | Dichlorodifluoromet | 0.295 | 0.268 | 0.247 | 0.250 | 0.244 | 0.248 | 0.258 | 7.64 |
| 3) | P | Chloromethane | 0.439 | 0.419 | 0.401 | 0.414 | 0.406 | 0.417 | 0.416 | 3.12 |
| 4) | C | Vinyl Chloride | 0.376 | 0.323 | 0.311 | 0.329 | 0.305 | 0.311 | 0.326 | 7.96 |
| 5) | | Bromomethane | | 0.168 | 0.170 | 0.167 | 0.156 | 0.140 | 0.160 | 7.65 |
| 6) | | Chloroethane | 0.207 | 0.207 | 0.183 | 0.177 | 0.155 | 0.154 | 0.180 | 12.98 |
| 7) | | Trichlorofluorometh | 0.466 | 0.447 | 0.414 | 0.401 | 0.385 | 0.393 | 0.418 | 7.67 |
| 8) | | Acrolein | | 0.044 | 0.042 | 0.039 | 0.038 | 0.039 | 0.040 | 6.77 |
| 9) | C | 1,1-Dichloroethene | 0.350 | 0.418 | 0.389 | 0.394 | 0.373 | 0.391 | 0.386 | 5.90 |
| 10) | | Freon 113 | | 0.222 | 0.224 | 0.202 | 0.190 | 0.191 | 0.206 | 7.89 |
| 11) | | Acetone | | 0.114 | 0.114 | 0.102 | 0.097 | 0.103 | 0.106 | 7.14 |
| 12) | | Iodomethane | 0.327 | 0.165 | 0.149 | 0.118 | 0.111 | 0.117 | 0.164 | 49.98 |
| 13) | | Carbon Disulfide | | 0.730 | 0.723 | 0.708 | 0.672 | 0.688 | 0.704 | 3.42 |
| 14) | | Methyl acetate | 0.306 | 0.266 | 0.276 | 0.258 | 0.248 | 0.265 | 0.270 | 7.40 |
| 15) | | Methylene Chloride | 0.462 | 0.415 | 0.404 | 0.408 | 0.401 | 0.412 | 0.417 | 5.46 |
| 16) | | Tert Butyl Alcohol | | 0.020 | 0.023 | 0.020 | 0.021 | 0.023 | 0.021 | 6.43 |
| 17) | | trans-1,2-Dichloroe | 0.456 | 0.418 | 0.414 | 0.395 | 0.378 | 0.388 | 0.408 | 6.81 |
| 18) | | Acrylonitrile | 0.144 | 0.140 | 0.131 | 0.122 | 0.122 | 0.125 | 0.131 | 7.22 |
| 19) | | Methyl Tert Butyl E | | 0.438 | 0.443 | 0.402 | 0.379 | 0.429 | 0.418 | 6.46 |
| 20) | | Hexane | 0.345 | 0.296 | 0.324 | 0.309 | 0.307 | 0.317 | 0.316 | 5.33 |
| 21) | P | 1,1-Dichloroethane | 0.542 | 0.481 | 0.470 | 0.459 | 0.432 | 0.451 | 0.472 | 8.03 |
| 22) | | Vinyl acetate | | 0.910 | 0.882 | 0.893 | 0.878 | 0.953 | 0.903 | 3.39 |
| 23) | | Di-isopropyl ether | 0.971 | 0.879 | 0.894 | 0.898 | 0.871 | 0.926 | 0.906 | 4.07 |
| 24) | | ETBE | | 0.324 | 0.320 | 0.302 | 0.293 | 0.349 | 0.318 | 6.88 |
| 25) | | 2,2-Dichloropropane | 0.300 | 0.262 | 0.276 | 0.244 | 0.256 | 0.263 | 0.267 | 7.12 |
| 26) | | cis-1,2-Dichloroeth | 0.338 | 0.278 | 0.305 | 0.285 | 0.268 | 0.275 | 0.292 | 8.93 |
| 27) | | 2-Butanone | | 0.143 | 0.156 | 0.134 | 0.138 | 0.149 | 0.144 | 6.11 |
| 28) | | Bromochloromethane | 0.198 | 0.176 | 0.172 | 0.168 | 0.156 | 0.164 | 0.172 | 8.30 |
| 29) | | Tetrahydrofuran | | 0.107 | 0.104 | 0.095 | 0.102 | 0.112 | 0.104 | 6.16 |
| 30) | C | Chloroform | 0.525 | 0.475 | 0.478 | 0.473 | 0.442 | 0.458 | 0.475 | 5.85 |
| 31) | | 1,1,1-Trichloroetha | 0.362 | 0.350 | 0.381 | 0.356 | 0.355 | 0.363 | 0.361 | 3.00 |
| 32) | S | Dibromofluoromethan | 0.296 | 0.291 | 0.307 | 0.289 | 0.297 | 0.290 | 0.295 | 2.26 |
| 33) | | Cyclohexane | 0.438 | 0.475 | 0.460 | 0.460 | 0.462 | 0.465 | 0.460 | 2.66 |
| 34) | | 1,1-Dichloropropene | 0.256 | 0.306 | 0.327 | 0.322 | 0.312 | 0.327 | 0.308 | 8.78 |
| 35) | | Carbon Tetrachlorid | | 0.206 | 0.212 | 0.191 | 0.200 | 0.201 | 0.202 | 3.79 |
| 36) | S | 1,2-Dichloroethane- | 0.357 | 0.348 | 0.340 | 0.324 | 0.305 | 0.309 | 0.331 | 6.48 |
| 37) | | Benzene | 0.998 | 0.910 | 0.941 | 0.933 | 0.871 | 0.901 | 0.926 | 4.68 |
| 38) | | 1,2-Dichloroethane | | 0.417 | 0.411 | 0.398 | 0.369 | 0.377 | 0.394 | 5.27 |
| 39) | | TAME | | 0.284 | 0.288 | 0.267 | 0.248 | 0.292 | 0.276 | 6.56 |
| 40) | | Trichloroethene | 0.314 | 0.309 | 0.297 | 0.297 | 0.285 | 0.294 | 0.299 | 3.60 |
| 41) | | Methylcyclohexane | 0.320 | 0.333 | 0.357 | 0.345 | 0.360 | 0.363 | 0.346 | 4.96 |
| 42) | C | 1,2-Dichloropropane | 0.284 | 0.273 | 0.279 | 0.267 | 0.246 | 0.247 | 0.266 | 6.09 |
| 43) | | Dibromomethane | | 0.150 | 0.161 | 0.147 | 0.132 | 0.134 | 0.145 | 8.40 |
| 44) | | 1,4-Dioxane | | 0.003 | 0.003 | 0.003 | 0.003 | 0.004 | 0.003 | 11.93 |
| 45) | | Bromodichloromethan | 0.261 | 0.284 | 0.302 | 0.297 | 0.285 | 0.303 | 0.289 | 5.50 |
| 46) | | 2-Nitropropane | 0.075 | 0.069 | 0.087 | 0.077 | 0.086 | 0.093 | 0.081 | 11.12 |

Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG565-ICC565
Lab FileID: G0017319.D

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 47) | | 2-Chloroethyl vinyl | 0.035 | 0.032 | 0.033 | 0.034 | 0.035 | 0.042 | 0.035 | 10.44 |
| 48) | | 4-Methyl-2-pentanon | 0.339 | 0.282 | 0.313 | 0.289 | 0.295 | 0.306 | 0.304 | 6.78 |
| 49) | | cis-1,3-Dichloropro | 0.176 | 0.193 | 0.205 | 0.208 | 0.199 | 0.220 | 0.200 | 7.39 |
| 50) | I | Chlorobenzene-d5 | ----------ISTD---------- | | | | | | | |
| 51) | S | Toluene-d8 | 1.251 | 1.218 | 1.242 | 1.278 | 1.199 | 1.242 | 1.238 | 2.21 |
| 52) | C | Toluene | | 1.262 | 1.280 | 1.310 | 1.212 | 1.292 | 1.271 | 2.94 |
| 53) | | trans-1,3-Dichlorop | | 0.202 | 0.232 | 0.250 | 0.220 | 0.260 | 0.233 | 9.90 |
| 54) | | 1,1,2-Trichloroetha | | 0.308 | 0.297 | 0.301 | 0.267 | 0.286 | 0.292 | 5.45 |
| 55) | | Tetrachloroethene | 0.556 | 0.529 | 0.527 | 0.562 | 0.501 | 0.524 | 0.533 | 4.23 |
| 56) | | 2-hexanone | | 0.254 | 0.293 | 0.277 | 0.267 | 0.294 | 0.277 | 6.26 |
| 57) | | 1,3-Dichloropropane | 0.437 | 0.445 | 0.425 | 0.413 | 0.346 | 0.377 | 0.407 | 9.39 |
| 58) | | Dibromochloromethan | 0.245 | 0.234 | 0.264 | 0.280 | 0.253 | 0.290 | 0.261 | 8.08 |
| 59) | | 1,2-Dibromoethane | 0.177 | 0.178 | 0.142 | 0.117 | 0.077 | 0.090 | 0.130 | 32.91 |
| 60) | | 1-Chlorohexane | 0.549 | 0.391 | 0.339 | 0.320 | 0.267 | 0.274 | 0.357 | 29.25 |
| 61) | P | Chlorobenzene | | 0.937 | 0.916 | 0.935 | 0.857 | 0.898 | 0.908 | 3.64 |
| 62) | | 1,1,1,2-Tetrachloro | 0.271 | 0.286 | 0.323 | 0.312 | 0.287 | 0.298 | 0.296 | 6.40 |
| 63) | C | Ethylbenzene | 1.386 | 1.218 | 1.241 | 1.217 | 1.155 | 1.190 | 1.235 | 6.46 |
| 64) | | m,p-Xylene | 1.125 | 0.982 | 1.021 | 1.006 | 0.921 | 0.961 | 1.003 | 6.94 |
| 65) | | o-Xylene | 1.167 | 1.064 | 1.073 | 1.079 | 0.971 | 1.060 | 1.069 | 5.84 |
| 66) | | Styrene | 0.779 | 0.826 | 0.800 | 0.813 | 0.736 | 0.790 | 0.791 | 3.99 |
| 67) | P | Bromoform | 0.159 | 0.148 | 0.174 | 0.185 | 0.173 | 0.201 | 0.173 | 10.86 |
| 68) | I | 1,4-Dichlorobenzene-d | ----------ISTD---------- | | | | | | | |
| 69) | | Isopropylbenzene | 1.534 | 1.661 | 1.812 | 1.819 | 1.747 | 1.855 | 1.738 | 6.96 |
| 70) | | Cyclohexanone | | 0.018 | 0.018 | 0.017 | 0.019 | 0.023 | 0.019 | 12.63 |
| 71) | S | 4-Bromofluorobenzen | 0.873 | 0.824 | 0.860 | 0.881 | 0.930 | 0.994 | 0.894 | 6.70 |
| 72) | | Bromobenzene | 0.885 | 0.693 | 0.717 | 0.756 | 0.765 | 0.853 | 0.778 | 9.76 |
| 73) | P | 1,1,2,2-Tetrachloro | 0.724 | 0.685 | 0.697 | 0.694 | 0.721 | 0.765 | 0.714 | 4.11 |
| 74) | | 1,2,3-Trichloroprop | | 0.232 | 0.218 | 0.192 | 0.166 | 0.171 | 0.196 | 14.66 |
| 75) | | trans-1,4-Dichloro- | | 0.035 | 0.053 | 0.053 | 0.051 | 0.053 | 0.049 | 15.79 |
| 76) | | n-Propylbenzene | 2.343 | 2.228 | 2.231 | 2.184 | 2.066 | 2.157 | 2.202 | 4.18 |
| 77) | | 2-Chlorotoluene | 1.541 | 1.459 | 1.555 | 1.554 | 1.568 | 1.667 | 1.557 | 4.27 |
| 78) | | 4-Chlorotoluene | 2.208 | 1.841 | 1.843 | 1.846 | 1.734 | 1.868 | 1.890 | 8.62 |
| 79) | | 1,3,5-Trimethylbenz | 1.924 | 1.663 | 1.911 | 1.965 | 1.857 | 1.950 | 1.878 | 5.96 |
| 80) | | sec-Butylbenzene | 1.850 | 1.923 | 2.073 | 2.060 | 1.915 | 1.930 | 1.959 | 4.52 |
| 81) | | 1,3-Dichlorobenzene | | 1.295 | 1.306 | 1.300 | 1.259 | 1.362 | 1.304 | 2.85 |
| 82) | | 4-Isopropyltoluene | 1.730 | 1.697 | 1.889 | 1.891 | 1.763 | 1.792 | 1.794 | 4.53 |
| 83) | | 1,4-Dichlorobenzene | | 1.363 | 1.325 | 1.304 | 1.275 | 1.358 | 1.325 | 2.80 |
| 84) | | tert-Butylbenzene | 1.130 | 1.004 | 1.124 | 1.142 | 1.124 | 1.127 | 1.108 | 4.68 |
| 85) | | n-Butylbenzene | 1.574 | 1.348 | 1.683 | 1.775 | 1.604 | 1.675 | 1.610 | 9.09 |
| 86) | | 1,2-Dichlorobenzene | 1.381 | 1.308 | 1.259 | 1.323 | 1.241 | 1.346 | 1.310 | 4.03 |
| 87) | | 1,2,4-Trimethylbenz | 1.732 | 1.779 | 1.989 | 2.069 | 1.920 | 2.042 | 1.922 | 7.25 |
| 88) | | 1,2-Dibromo-3-Chlor | 0.109 | 0.096 | 0.107 | 0.106 | 0.095 | 0.100 | 0.102 | 5.74 |
| 89) | | 1,2,4-Trichlorobenz | 1.321 | 1.074 | 1.153 | 1.306 | 1.203 | 1.330 | 1.231 | 8.52 |
| 90) | | Hexachlorobutadiene | | 0.498 | 0.510 | 0.495 | 0.504 | 0.528 | 0.507 | 2.56 |
| 91) | | Naphthalene | 2.026 | 1.567 | 2.019 | 2.230 | 2.151 | 2.423 | 2.069 | 13.90 |
| 92) | | 1,2,3-Trichlorobenz | 1.210 | 0.977 | 1.081 | 1.198 | 1.118 | 1.239 | 1.137 | 8.65 |

Average % RSD = 7.7

(#) = Out of Range

624.M Wed Aug 07 08:32:44 2002 RP1

# Continuing Calibration Summary



Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG571-CC565
Lab FileID: G0017479.D

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\081302\G0017479.D  Vial: 1
Acq On : 13 Aug 2002 10:53 am  Operator: KarenW
Sample : CC565-40  Inst : MSVOA1
Misc : ms1656,vg571,,,,,  Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\HPCHEM\1\METHODS\624.M (RTE Integrator)
Title : SW-846 Method 5030B/8260B & EPA 624
Last Update : Tue Aug 06 08:35:16 2002
Response via : Multiple Level Calibration

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

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | I | Fluorobenzene | 1.000 | 1.000 | 0.0 | 122 | -0.02 |
| 2 | | Dichlorodifluoromethane | 0.258 | 0.216 | 16.3 | 105 | 0.00 |
| 3 | P | Chloromethane | 0.416 | 0.342 | 17.8 | 100 | 0.01 |
| 4 | C | Vinyl Chloride | 0.326 | 0.286 | 12.3 | 106 | 0.01 |
| 5 | | Bromomethane | 0.160 | 0.167 | -4.4 | 122 | 0.01 |
| 6 | | Chloroethane | 0.180 | 0.163 | 9.4 | 112 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.418 | 0.359 | 14.1 | 109 | 0.00 |
| 8 | | Acrolein | 0.040 | 0.036 | 10.0 | 111 | 0.00 |
| 9 | C | 1,1-Dichloroethene | 0.386 | 0.404 | -4.7 | 125 | 0.00 |
| 10 | | Freon 113 | 0.206 | 0.209 | -1.5 | 126 | 0.00 |
| 11 | | Acetone | 0.106 | 0.109 | -2.8 | 130 | 0.00 |
| 12 | | Iodomethane | 0.164 | 0.096 | 41.5# | 99 | 0.00 |
| 13 | | Carbon Disulfide | 0.704 | 0.717 | -1.8 | 123 | 0.00 |
| 14 | | Methyl acetate | 0.270 | 0.267 | 1.1 | 126 | 0.00 |
| 15 | | Methylene Chloride | 0.417 | 0.415 | 0.5 | 124 | 0.00 |
| 16 | | Tert Butyl Alcohol | 0.021 | 0.022 | -4.8 | 129 | 0.00 |
| 17 | | trans-1,2-Dichloroethene | 0.408 | 0.390 | 4.4 | 120 | 0.00 |
| 18 | | Acrylonitrile | 0.131 | 0.121 | 7.6 | 121 | 0.00 |
| 19 | | Methyl Tert Butyl Ether | 0.418 | 0.490 | -17.2 | 148 | 0.00 |
| 20 | | Hexane | 0.316 | 0.318 | -0.6 | 125 | 0.00 |
| 21 | P | 1,1-Dichloroethane | 0.472 | 0.492 | -4.2 | 130 | 0.00 |
| 22 | | Vinyl acetate | 0.903 | 0.872 | 3.4 | 119 | -0.02 |
| 23 | | Di-isopropyl ether | 0.906 | 0.910 | -0.4 | 123 | -0.02 |
| 24 | | ETBE | 0.318 | 0.369 | -16.0 | 149 | 0.00 |
| 25 | | 2,2-Dichloropropane | 0.267 | 0.288 | -7.9 | 143 | -0.02 |
| 26 | | cis-1,2-Dichloroethene | 0.292 | 0.306 | -4.8 | 130 | -0.02 |
| 27 | | 2-Butanone | 0.144 | 0.147 | -2.1 | 133 | 0.00 |
| 28 | | Bromochloromethane | 0.172 | 0.173 | -0.6 | 125 | -0.02 |
| 29 | | Tetrahydrofuran | 0.104 | 0.104 | 0.0 | 133 | 0.00 |
| 30 | C | Chloroform | 0.475 | 0.502 | -5.7 | 129 | -0.02 |
| 31 | | 1,1,1-Trichloroethane | 0.361 | 0.380 | -5.3 | 130 | 0.00 |
| 32 | S | Dibromofluoromethane | 0.295 | 0.297 | -0.7 | 125 | 0.00 |
| 33 | | Cyclohexane | 0.460 | 0.454 | 1.3 | 120 | 0.00 |
| 34 | | 1,1-Dichloropropene | 0.308 | 0.333 | -8.1 | 126 | 0.00 |
| 35 | | Carbon Tetrachloride | 0.202 | 0.195 | 3.5 | 124 | 0.00 |
| 36 | S | 1,2-Dichloroethane-d4 | 0.331 | 0.310 | 6.3 | 117 | -0.02 |
| 37 | | Benzene | 0.926 | 0.973 | -5.1 | 127 | 0.00 |
| 38 | | 1,2-Dichloroethane | 0.394 | 0.384 | 2.5 | 118 | 0.00 |
| 39 | | TAME | 0.276 | 0.307 | -11.2 | 140 | 0.00 |
| 40 | | Trichloroethene | 0.299 | 0.310 | -3.7 | 127 | 0.00 |
| 41 | | Methylcyclohexane | 0.346 | 0.353 | -2.0 | 124 | 0.00 |
| 42 | C | 1,2-Dichloropropane | 0.266 | 0.275 | -3.4 | 126 | -0.02 |

# Continuing Calibration Summary

Job Number: F14132
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VG571-CC565
Lab FileID: G0017479.D

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 43 | | Dibromomethane | 0.145 | 0.145 | 0.0 | 120 | 0.00 |
| 44 | | 1,4-Dioxane | 0.003 | 0.004 | -33.3# | 127 | -0.02 |
| 45 | | Bromodichloromethane | 0.289 | 0.305 | -5.5 | 125 | 0.00 |
| 46 | | 2-Nitropropane | 0.081 | 0.079 | 2.5 | 125 | 0.00 |
| 47 | | 2-Chloroethyl vinyl ether | 0.035 | 0.029 | 17.1 | 106 | -0.02 |
| 48 | | 4-Methyl-2-pentanone | 0.304 | 0.290 | 4.6 | 122 | -0.02 |
| 49 | | cis-1,3-Dichloropropene | 0.200 | 0.167 | 16.5 | 98 | -0.02 |
| 50 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 122 | 0.00 |
| 51 | S | Toluene-d8 | 1.238 | 1.250 | -1.0 | 119 | 0.00 |
| 52 | C | Toluene | 1.271 | 1.359 | -6.9 | 126 | 0.00 |
| 53 | | trans-1,3-Dichloropropene | 0.233 | 0.176 | 24.5# | 86 | 0.00 |
| 54 | | 1,1,2-Trichloroethane | 0.292 | 0.311 | -6.5 | 126 | -0.02 |
| 55 | | Tetrachloroethene | 0.533 | 0.556 | -4.3 | 121 | -0.02 |
| 56 | | 2-hexanone | 0.277 | 0.274 | 1.1 | 121 | 0.00 |
| 57 | | 1,3-Dichloropropane | 0.407 | 0.385 | 5.4 | 114 | 0.00 |
| 58 | | Dibromochloromethane | 0.261 | 0.270 | -3.4 | 118 | 0.00 |
| 59 | | 1,2-Dibromoethane | 0.130 | 0.080 | 38.5# | 83 | 0.00 |
| 60 | | 1-Chlorohexane | 0.357 | 0.266 | 25.5# | 101 | 0.00 |
| 61 | P | Chlorobenzene | 0.908 | 0.935 | -3.0 | 122 | -0.02 |
| 62 | | 1,1,1,2-Tetrachloroethane | 0.296 | 0.300 | -1.4 | 117 | 0.00 |
| 63 | C | Ethylbenzene | 1.235 | 1.119 | 9.4 | 112 | 0.00 |
| 64 | | m,p-Xylene | 1.003 | 0.896 | 10.7 | 109 | 0.00 |
| 65 | | o-Xylene | 1.069 | 0.923 | 13.7 | 104 | 0.00 |
| 66 | | Styrene | 0.791 | 0.709 | 10.4 | 106 | -0.02 |
| 67 | P | Bromoform | 0.173 | 0.140 | 19.1 | 92 | -0.02 |
| 68 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 84 | 0.00 |
| 69 | | Isopropylbenzene | 1.738 | 1.801 | -3.6 | 83 | -0.02 |
| 70 | | Cyclohexanone | 0.019 | 0.018 | 5.3 | 91 | -0.02 |
| 71 | S | 4-Bromofluorobenzene | 0.894 | 0.895 | -0.1 | 85 | 0.00 |
| 72 | | Bromobenzene | 0.778 | 0.831 | -6.8 | 92 | 0.00 |
| 73 | P | 1,1,2,2-Tetrachloroethane | 0.714 | 0.805 | -12.7 | 97 | 0.00 |
| 74 | | 1,2,3-Trichloropropane | 0.196 | 0.205 | -4.6 | 90 | 0.00 |
| 75 | | trans-1,4-Dichloro-2-Butene | 0.049 | 0.027 | 44.9# | 43# | -0.02 |
| 76 | | n-Propylbenzene | 2.202 | 2.232 | -1.4 | 86 | -0.02 |
| 77 | | 2-Chlorotoluene | 1.557 | 1.618 | -3.9 | 87 | -0.02 |
| 78 | | 4-Chlorotoluene | 1.890 | 1.895 | -0.3 | 86 | -0.02 |
| 79 | | 1,3,5-Trimethylbenzene | 1.878 | 2.046 | -8.9 | 87 | 0.00 |
| 80 | | sec-Butylbenzene | 1.959 | 2.080 | -6.2 | 85 | -0.02 |
| 81 | | 1,3-Dichlorobenzene | 1.304 | 1.367 | -4.8 | 88 | 0.00 |
| 82 | | 4-Isopropyltoluene | 1.794 | 1.924 | -7.2 | 85 | 0.00 |
| 83 | | 1,4-Dichlorobenzene | 1.325 | 1.374 | -3.7 | 88 | -0.02 |
| 84 | | tert-Butylbenzene | 1.108 | 1.169 | -5.5 | 86 | 0.00 |
| 85 | | n-Butylbenzene | 1.610 | 1.842 | -14.4 | 87 | -0.02 |
| 86 | | 1,2-Dichlorobenzene | 1.310 | 1.327 | -1.3 | 84 | 0.00 |
| 87 | | 1,2,4-Trimethylbenzene | 1.922 | 2.181 | -13.5 | 88 | -0.02 |
| 88 | | 1,2-Dibromo-3-Chloropropane | 0.102 | 0.085 | 16.7 | 67 | 0.00 |
| 89 | | 1,2,4-Trichlorobenzene | 1.231 | 1.416 | -15.0 | 91 | 0.00 |
| 90 | | Hexachlorobutadiene | 0.507 | 0.486 | 4.1 | 82 | -0.02 |
| 91 | | Naphthalene | 2.069 | 2.597 | -25.5# | 98 | 0.00 |
| 92 | | 1,2,3-Trichlorobenzene | 1.137 | 1.284 | -12.9 | 90 | 0.00 |

Average % D = 8.5

(#) = Out of Range SPCC's out = 0 CCC's out = 0
G0017319.D 624.M Wed Aug 14 10:12:14 2002 RP1

TETRA TECH NUS, INC. CHAIN OF CUSTODY NUMBER M18-010602 PAGE 1 OF 1

NAS CECIL FIELD

| PROJECT NO. | SITE NAME | PROJECT MANAGER AND PHONE NUMBER | LABORATORY NAME AND CONTACT |
|---|---|---|---|
| N4248 | NSAP | PAUL CALLIGAN 813 806 0202 | ACCUTEST Sue Bell |
| SAMPLERS (SIGNATURE) | | FIELD OPERATIONS LEADER AND PHONE NUMBER | ADDRESS |
| Jamie Knight, Charles Jones | | MEEN DARE 904 281 0400 | 4405 Vineland Rd C-15 |
| | | CARRIER/WAYBILL NUMBER | CITY, STATE |
| | | LAB Courier | ORLANDO, FL 32811 |

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCl

TYPE OF ANALYSIS: BTEX * SW8260B or 8021B

| | DATE YEAR 2002 | TIME | SAMPLE ID | MATRIX | GRAB (G) COMP (C) | No. OF CONTAINERS | BTEX * SW8260B or 8021B | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8/5 | 1440 | CEF-M18-DP01-10 | GW | G | 3 | 3 | | | | | | | Cool to 4°C |
| 2 | 8/5 | 1525 | CEF-M18-DP02-31 | GW | G | 3 | 3 | | | | | | | |
| 3 | 8/5 | 1615 | CEF-M18-DP06-11 | GW | G | 3 | 3 | | | | | | | *Screening |
| 4 | 8/5 | 1640 | CEF-M18-DP07-35 | GW | G | 3 | 3 | | | | | | | level - See |
| 5 | 8/6 | 0900 | CEF-M18-DP04-35 | GW | G | 3 | 3 | | | | | | | work release. |
| 6 | 8/6 | 0935 | CEF-M18-DP09-11 | GW | G | 3 | 3 | | | | | | | |
| 7 | 8/6 | 1010 | CEF-M18-DP11-35 | GW | G | 3 | 3 | | | | | | | N4248 - |
| 8 | 8/6 | 1050 | CEF-M18-DP08-35 | GW | G | 3 | 3 | | | | | | | WR41 (SS) |
| 9 | 8/6 | 1125 | CEF-M18-DP05-35 | GW | G | 3 | 3 | | | | | | | |
| 10 | 8/6 | 1205 | CEF-M18-DP03-35 | GW | G | 3 | 3 | | | | | | | |
| 11 | 8/6 | 1300 | CEF-M18-DP10-35 | GW | G | 3 | 3 | | | | | | | |
| 12 | 8/6 | 0000 | CEF-M18-DU01 | GW | G | 3 | 3 | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1. RELINQUISHED BY: Allen W. Dale | DATE 8/6/02 | TIME 1657 | 1. RECEIVED BY: [illegible] | DATE 8/6/02 | TIME 16:57 |
| 2. RELINQUISHED BY: | DATE | TIME | 2. RECEIVED BY: Miranda Gangi | DATE 8/7/02 | TIME ~~900~~ 700 |
| 3. RELINQUISHED BY: | DATE | TIME | 3. RECEIVED BY: | DATE | TIME MPS 8/7/02 |

COMMENTS

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

3/99
FORM NO. TtNUS-001

# ATTACHMENT E

## GROUNDWATER ANALYTICAL REPORT FOR INTERMEDIATE WELLS

Southeast ACCUTEST Laboratories

12/27/02

# Technical Report for

Tetra Tech, NUS

NAS Cecil Field-CTO-248

N4248-WR61

Accutest Job Number: F15161

Report to:

Tetra Tech, NUS

dalem@ttnus.com

ATTN: Merv Dale

Total number of pages in report: 21

ACCREDITED IN ACCORDANCE WITH nelac

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

Harry Behzadi, Ph.D.
Laboratory Director

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

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# Sample Summary

Tetra Tech, NUS

Job No: F15161

NAS Cecil Field-CTO-248
Project No: N4248-WR61

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| F15161-1 | 10/23/02 | 13:40 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-7I-05 |
| F15161-2 | 10/23/02 | 14:20 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-6I-05 |
| F15161-3 | 10/23/02 | 15:35 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-8I-05 |
| F15161-4 | 10/23/02 | 16:10 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-9I-05 |
| F15161-5 | 10/23/02 | 17:15 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-10I-05 |
| F15161-6 | 10/23/02 | 00:00 | MD | 10/25/02 | AQ | Ground Water | CEF-M18-DU01-05 |

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-7I-05 | | |
| Lab Sample ID: | F15161-1 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013016.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 1.6 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 98% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-6I-05 | | |
| Lab Sample ID: | F15161-2 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013017.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.72 | 1.0 | 0.50 | ug/l | J |
| 108-88-3 | Toluene | 2.3 | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 97% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 96% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-8I-05 | | |
| Lab Sample ID: | F15161-3 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013018.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 1.4 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | 0.80 | 1.0 | 0.50 | ug/l | J |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 105% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 94% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-9I-05 | | |
| Lab Sample ID: | F15161-4 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013019.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 14.5 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 97% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-10I-05 | | |
| Lab Sample ID: | F15161-5 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013020.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 9.3 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | 3.8 | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 105% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 99% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 99% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DU01-05 | | |
| Lab Sample ID: | F15161-6 | Date Sampled: | 10/23/02 |
| Matrix: | AQ - Ground Water | Date Received: | 10/25/02 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | C0013021.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 0.78 | 1.0 | 0.50 | ug/l | J |
| 108-88-3 | Toluene | 2.8 | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 100% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 98% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 99% | | 84-117% |

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

# GC/MS Volatiles

## QC Data Summaries

Includes the following where applicable:

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

# Blank Spike Summary



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VC573-BS | C0013008.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |

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

F15161-1, F15161-2, F15161-3, F15161-4, F15161-5, F15161-6

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 25 | 28.2 | 113 | 76-123 |
| 100-41-4 | Ethylbenzene | 25 | 25.7 | 103 | 76-117 |
| 108-88-3 | Toluene | 25 | 26.3 | 105 | 76-118 |
| 1330-20-7 | Xylene (total) | 75 | 78.2 | 104 | 78-120 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 108% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | 78-125% |
| 2037-26-5 | Toluene-D8 | 92% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 96% | 84-117% |

# Method Blank Summary



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VC573-MB | C0013009.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |

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

F15161-1, F15161-2, F15161-3, F15161-4, F15161-5, F15161-6

| CAS No. | Compound | Result | RL | Units | Q |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 2.0 | ug/l | |
| 108-88-3 | Toluene | ND | 2.0 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 6.0 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 108% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 97% | 78-125% |
| 2037-26-5 | Toluene-D8 | 98% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 101% | 84-117% |

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F15161-4MS | C0013022.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| F15161-4MSD | C0013023.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |
| F15161-4 | C0013019.D | 1 | 11/05/02 | JG | n/a | n/a | VC573 |

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

F15161-1, F15161-2, F15161-3, F15161-4, F15161-5, F15161-6

| CAS No. | Compound | F15161-4 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 14.5 | | 25 | 44.5 | 120 | 43.0 | 114 | 3 | 71-127/8 |
| 100-41-4 | Ethylbenzene | ND | | 25 | 25.9 | 104 | 25.4 | 102 | 2 | 72-119/7 |
| 108-88-3 | Toluene | ND | | 25 | 25.8 | 103 | 25.8 | 103 | 0 | 73-119/10 |
| 1330-20-7 | Xylene (total) | ND | | 75 | 77.6 | 103 | 78.0 | 104 | 1 | 73-123/8 |

| CAS No. | Surrogate Recoveries | MS | MSD | F15161-4 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | 107% | 104% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 96% | 96% | 96% | 78-125% |
| 2037-26-5 | Toluene-D8 | 91% | 91% | 97% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 93% | 94% | 97% | 84-117% |

# Instrument Performance Check (BFB)



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VC573-BFB | Injection Date: | 11/05/02 |
| Lab File ID: | C0013005.D | Injection Time: | 09:57 |
| Instrument ID: | GCMSC | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 4167 | 15.2 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 13717 | 50.1 | | Pass |
| 95 | Base peak, 100% relative abundance | 27400 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 1490 | 5.4 | | Pass |
| 173 | Less than 2.0% of mass 174 | 226 | 0.82 | (0.97) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 23384 | 85.3 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 1412 | 5.2 | (6.0) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 22480 | 82.0 | (96.1) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 1445 | 5.3 | (6.4) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VC573-CC561 | C0013007.D | 11/05/02 | 10:57 | 01:00 | Continuing cal 40PPB |
| VC573-BS | C0013008.D | 11/05/02 | 11:26 | 01:29 | Blank Spike |
| VC573-MB | C0013009.D | 11/05/02 | 11:54 | 01:57 | Method Blank |
| ZZZZZZ | C0013010.D | 11/05/02 | 12:23 | 02:26 | (unrelated sample) |
| ZZZZZZ | C0013011.D | 11/05/02 | 12:52 | 02:55 | (unrelated sample) |
| ZZZZZZ | C0013012.D | 11/05/02 | 13:20 | 03:23 | (unrelated sample) |
| ZZZZZZ | C0013013.D | 11/05/02 | 13:48 | 03:51 | (unrelated sample) |
| ZZZZZZ | C0013014.D | 11/05/02 | 14:16 | 04:19 | (unrelated sample) |
| ZZZZZZ | C0013015.D | 11/05/02 | 14:45 | 04:48 | (unrelated sample) |
| F15161-1 | C0013016.D | 11/05/02 | 15:13 | 05:16 | CEF-M18-7I-05 |
| F15161-2 | C0013017.D | 11/05/02 | 15:41 | 05:44 | CEF-M18-6I-05 |
| F15161-3 | C0013018.D | 11/05/02 | 16:10 | 06:13 | CEF-M18-8I-05 |
| F15161-4 | C0013019.D | 11/05/02 | 16:38 | 06:41 | CEF-M18-9I-05 |
| F15161-5 | C0013020.D | 11/05/02 | 17:06 | 07:09 | CEF-M18-10I-05 |
| F15161-6 | C0013021.D | 11/05/02 | 17:35 | 07:38 | CEF-M18-DU01-05 |
| F15161-4MS | C0013022.D | 11/05/02 | 18:03 | 08:06 | Matrix Spike |
| F15161-4MSD | C0013023.D | 11/05/02 | 18:31 | 08:34 | Matrix Spike Duplicate |
| ZZZZZZ | C0013024.D | 11/05/02 | 18:59 | 09:02 | (unrelated sample) |
| ZZZZZZ | C0013025.D | 11/05/02 | 19:27 | 09:30 | (unrelated sample) |
| ZZZZZZ | C0013026.D | 11/05/02 | 19:56 | 09:59 | (unrelated sample) |
| ZZZZZZ | C0013027.D | 11/05/02 | 20:24 | 10:27 | (unrelated sample) |
| ZZZZZZ | C0013028.D | 11/05/02 | 20:52 | 10:55 | (unrelated sample) |
| ZZZZZZ | C0013029.D | 11/05/02 | 21:20 | 11:23 | (unrelated sample) |
| ZZZZZZ | C0013030.D | 11/05/02 | 21:48 | 11:51 | (unrelated sample) |

# Instrument Performance Check (BFB)



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VC561-BFB | Injection Date: | 10/21/02 |
| Lab File ID: | C0012688.D | Injection Time: | 16:18 |
| Instrument ID: | GCMSC | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 6369 | 20.7 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 16271 | 52.8 | | Pass |
| 95 | Base peak, 100% relative abundance | 30792 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 2220 | 7.2 | | Pass |
| 173 | Less than 2.0% of mass 174 | 323 | 1.0 | (1.1) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 30392 | 98.7 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 1930 | 6.3 | (6.4) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 28992 | 94.2 | (95.4) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 2048 | 6.7 | (7.1) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VC561-IC561 | C0012694.D | 10/21/02 | 19:11 | 02:53 | Initial cal 1PPB |
| VC561-IC561 | C0012695.D | 10/21/02 | 19:39 | 03:21 | Initial cal 5PPB |
| VC561-IC561 | C0012696.D | 10/21/02 | 20:07 | 03:49 | Initial cal 20PPB |
| VC561-ICC561 | C0012697.D | 10/21/02 | 20:35 | 04:17 | Initial cal 40PPB |
| VC561-IC561 | C0012698.D | 10/21/02 | 21:03 | 04:45 | Initial cal 70PPB |
| VC561-IC561 | C0012699.D | 10/21/02 | 21:31 | 05:13 | Initial cal 100PPB |

# Volatile Internal Standard Area Summary



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VC573-CC561 | Injection Date: | 11/05/02 |
| Lab File ID: | C0013007.D | Injection Time: | 10:57 |
| Instrument ID: | GCMSC | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| Check Std | 1281244 | 10.73 | 1052884 | 14.01 | 619594 | 16.55 | 51158 | 7.87 |
| Upper Limit [a] | 2562488 | 11.23 | 2105768 | 14.51 | 1239188 | 17.05 | 102316 | 8.37 |
| Lower Limit [b] | 640622 | 10.23 | 526442 | 13.51 | 309797 | 16.05 | 25579 | 7.37 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| VC573-BS | 1332546 | 10.73 | 1069385 | 14.01 | 621566 | 16.55 | 56782 | 7.87 |
| VC573-MB | 1249626 | 10.73 | 926357 | 14.01 | 493585 | 16.55 | 44542 | 7.88 |
| ZZZZZZ | 1192467 | 10.73 | 884075 | 14.01 | 460452 | 16.55 | 38940 | 7.88 |
| ZZZZZZ | 1110857 | 10.73 | 827946 | 14.01 | 431113 | 16.56 | 36701 | 7.88 |
| ZZZZZZ | 1130090 | 10.73 | 882364 | 14.01 | 495588 | 16.55 | 35428 | 7.87 |
| ZZZZZZ | 1168715 | 10.74 | 876636 | 14.01 | 488079 | 16.55 | 43332 | 7.89 |
| ZZZZZZ | 1160809 | 10.73 | 871801 | 14.01 | 451078 | 16.55 | 41500 | 7.89 |
| ZZZZZZ | 1138898 | 10.73 | 862711 | 14.01 | 445775 | 16.55 | 38365 | 7.88 |
| F15161-1 | 1092158 | 10.73 | 816797 | 14.01 | 449300 | 16.55 | 37244 | 7.88 |
| F15161-2 | 1093243 | 10.74 | 825222 | 14.01 | 449197 | 16.55 | 36395 | 7.89 |
| F15161-3 | 1112570 | 10.73 | 830330 | 14.01 | 461627 | 16.56 | 33257 | 7.88 |
| F15161-4 | 1122156 | 10.73 | 829523 | 14.01 | 448655 | 16.55 | 34907 | 7.87 |
| F15161-5 | 1073633 | 10.73 | 799172 | 14.01 | 425530 | 16.55 | 36298 | 7.88 |
| F15161-6 | 1085437 | 10.73 | 806224 | 14.01 | 434044 | 16.55 | 34272 | 7.88 |
| F15161-4MS | 1156408 | 10.74 | 947687 | 14.01 | 577656 | 16.55 | 43079 | 7.88 |
| F15161-4MSD | 1217146 | 10.74 | 994316 | 14.01 | 595294 | 16.55 | 47876 | 7.87 |
| ZZZZZZ | 1170528 | 10.73 | 877100 | 14.01 | 464757 | 16.55 | 41517 | 7.88 |
| ZZZZZZ | 1148717 | 10.73 | 851126 | 14.01 | 441797 | 16.55 | 37279 | 7.88 |
| ZZZZZZ | 1082664 | 10.73 | 829731 | 14.01 | 485388 | 16.56 | 36042 | 7.87 |
| ZZZZZZ | 1275633 | 10.74 | 994782 | 14.01 | 558605 | 16.55 | 49212 | 7.88 |
| ZZZZZZ | 1249678 | 10.74 | 939921 | 14.01 | 495977 | 16.55 | 47198 | 7.88 |
| ZZZZZZ | 1127301 | 10.73 | 853501 | 14.01 | 455516 | 16.55 | 43625 | 7.87 |
| ZZZZZZ | 1111213 | 10.74 | 835266 | 14.01 | 438641 | 16.55 | 42148 | 7.87 |

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

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

# Volatile Surrogate Recovery Summary



Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Method: SW846 8260B Matrix: AQ

Samples and QC shown here apply to the above method

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| F15161-1 | C0013016.D | 104.0 | 98.0 | 97.0 | 96.0 |
| F15161-2 | C0013017.D | 107.0 | 97.0 | 96.0 | 96.0 |
| F15161-3 | C0013018.D | 105.0 | 101.0 | 97.0 | 94.0 |
| F15161-4 | C0013019.D | 104.0 | 96.0 | 97.0 | 97.0 |
| F15161-5 | C0013020.D | 105.0 | 99.0 | 97.0 | 99.0 |
| F15161-6 | C0013021.D | 106.0 | 100.0 | 98.0 | 99.0 |
| F15161-4MS | C0013022.D | 104.0 | 96.0 | 91.0 | 93.0 |
| F15161-4MSD | C0013023.D | 107.0 | 96.0 | 91.0 | 94.0 |
| VC573-BS | C0013008.D | 108.0 | 96.0 | 92.0 | 96.0 |
| VC573-MB | C0013009.D | 108.0 | 97.0 | 98.0 | 101.0 |

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

# Initial Calibration Summary

Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VC561-ICC561
Lab FileID: C0012697.D

Response Factor Report MSVOA5

Method : C:\MSDCHEM\2\METHODS\8260A.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Tue Oct 22 14:57:24 2002
Response via : Initial Calibration

Calibration Files
1 =C0012694.D 2 =C0012695.D 3 =C0012696.D
4 =C0012697.D 5 =C0012698.D 6 =C0012699.D

| | | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) | I | Fluorobenzene | ----------ISTD---------- | | | | | | | |
| 2) | | Dichlorodifluoromet | 0.178 | 0.240 | 0.235 | 0.241 | 0.254 | 0.238 | 0.231 | 11.61 |
| 3) | P | Chloromethane | 0.400 | 0.393 | 0.398 | 0.390 | 0.389 | 0.356 | 0.387 | 4.17 |
| 4) | C | Vinyl Chloride | 0.384 | 0.406 | 0.382 | 0.381 | 0.393 | 0.362 | 0.385 | 3.83 |
| 5) | | Bromomethane | 0.338 | 0.302 | 0.278 | 0.275 | 0.275 | 0.252 | 0.287 | 10.38 |
| 6) | | Chloroethane | 0.217 | 0.216 | 0.210 | 0.208 | 0.221 | 0.202 | 0.212 | 3.20 |
| 7) | | Trichlorofluorometh | 0.317 | 0.368 | 0.373 | 0.383 | 0.420 | 0.412 | 0.379 | 9.74 |
| 8) | | Ethyl ether | 0.136 | 0.153 | 0.165 | 0.169 | 0.173 | 0.171 | 0.161 | 8.92 |
| 9) | C | 1,1-Dichloroethene | 0.236 | 0.304 | 0.322 | 0.339 | 0.369 | 0.343 | 0.319 | 14.40 |
| 10) | | Freon 113 | 0.166 | 0.195 | 0.188 | 0.183 | 0.205 | 0.194 | 0.189 | 7.10 |
| 11) | | Acetone | 0.059 | 0.053 | 0.052 | 0.053 | 0.054 | 0.052 | 0.054 | 5.14 |
| 12) | | Iodomethane | 0.224 | 0.269 | 0.278 | 0.301 | 0.326 | 0.320 | 0.286 | 13.27 |
| 13) | | Methyl Acetate | 0.138 | 0.144 | 0.148 | 0.149 | 0.155 | 0.149 | 0.147 | 3.85 |
| 14) | | Carbon Disulfide | 0.645 | 0.729 | 0.727 | 0.733 | 0.763 | 0.699 | 0.716 | 5.61 |
| 15) | | Hexane | 0.117 | 0.154 | 0.215 | 0.222 | 0.234 | 0.233 | 0.196 | 24.98 |
| 16) | | Methylene Chloride | 0.276 | 0.380 | 0.351 | 0.354 | 0.356 | 0.330 | 0.341 | 10.47 |
| 17) | | trans-1,2-Dichloroe | 0.245 | 0.291 | 0.328 | 0.323 | 0.331 | 0.323 | 0.307 | 10.89 |
| 18) | | Acrylonitrile | 0.052 | 0.064 | 0.069 | 0.071 | 0.071 | 0.069 | 0.066 | 11.16 |
| 19) | | Methyl Tert Butyl E | | 0.385 | 0.499 | 0.526 | 0.555 | 0.553 | 0.504 | 13.93 |
| 20) | P | 1,1-Dichloroethane | 0.389 | 0.409 | 0.433 | 0.427 | 0.428 | 0.415 | 0.417 | 3.85 |
| 21) | | Vinyl acetate | | 0.427 | 0.492 | 0.511 | 0.533 | 0.524 | 0.497 | 8.50 |
| 22) | | Di-isopropyl ether | | 0.571 | 0.740 | 0.765 | 0.795 | 0.781 | 0.731 | 12.50 |
| 23) | | ETBE | 0.279 | 0.399 | 0.554 | 0.601 | 0.642 | 0.643 | 0.520 | 28.62 |
| 24) | | 2,2-Dichloropropane | 0.159 | 0.198 | 0.219 | 0.214 | 0.219 | 0.212 | 0.204 | 11.34 |
| 25) | | cis-1,2-Dichloroeth | 0.164 | 0.208 | 0.231 | 0.243 | 0.254 | 0.246 | 0.224 | 14.98 |
| 26) | | 2-Butanone | 0.061 | 0.069 | 0.077 | 0.084 | 0.087 | 0.084 | 0.077 | 13.20 |
| 27) | | Bromochloromethane | 0.100 | 0.105 | 0.105 | 0.105 | 0.108 | 0.108 | 0.105 | 2.90 |
| 28) | C | Chloroform | 0.417 | 0.423 | 0.414 | 0.415 | 0.432 | 0.419 | 0.420 | 1.62 |
| 29) | | Tetrahydrofuran | 0.026 | 0.034 | 0.042 | 0.046 | 0.053 | 0.052 | 0.042 | 25.15 |
| 30) | | 1,1,1-Trichloroetha | 0.274 | 0.302 | 0.315 | 0.311 | 0.331 | 0.327 | 0.310 | 6.63 |
| 31) | | Cyclohexane | | 0.235 | 0.320 | 0.327 | 0.350 | 0.343 | 0.315 | 14.73 |
| 32) | S | Dibromofluoromethan | 0.241 | 0.240 | 0.240 | 0.239 | 0.243 | 0.246 | 0.241 | 1.11 |
| 33) | | 1,1-Dichloropropene | | 0.245 | 0.293 | 0.292 | 0.304 | 0.297 | 0.286 | 8.17 |
| 34) | | Carbon Tetrachlorid | 0.201 | 0.246 | 0.264 | 0.265 | 0.292 | 0.292 | 0.260 | 12.99 |
| 35) | S | 1,2-Dichloroethane- | 0.282 | 0.278 | 0.281 | 0.278 | 0.278 | 0.268 | 0.278 | 1.78 |
| 36) | | Benzene | 0.804 | 0.927 | 0.972 | 0.963 | 0.979 | 0.953 | 0.933 | 7.04 |
| 37) | | TAME | | 0.428 | 0.525 | 0.554 | 0.596 | 0.597 | 0.540 | 12.86 |
| 38) | | 1,2-Dichloroethane | 0.371 | 0.332 | 0.317 | 0.308 | 0.319 | 0.309 | 0.326 | 7.33 |
| 39) | | Trichloroethene | 0.184 | 0.183 | 0.208 | 0.216 | 0.233 | 0.228 | 0.209 | 10.20 |
| 40) | | Methylcyclohexane | 0.123 | 0.194 | 0.274 | 0.288 | 0.304 | 0.305 | 0.248 | 29.81 |
| 41) | C | 1,2-Dichloropropane | 0.208 | 0.240 | 0.256 | 0.252 | 0.250 | 0.246 | 0.242 | 7.34 |
| 42) | | Dibromomethane | 0.153 | 0.145 | 0.145 | 0.144 | 0.149 | 0.145 | 0.147 | 2.39 |
| 43) | | Bromodichloromethan | 0.276 | 0.283 | 0.313 | 0.318 | 0.322 | 0.318 | 0.305 | 6.57 |
| 44) | | 2-Nitropropane | 0.037 | 0.040 | 0.047 | 0.049 | 0.053 | 0.052 | 0.046 | 14.12 |
| 45) | | 2-Chloroethyl vinyl | 0.017 | 0.036 | 0.052 | 0.056 | 0.060 | 0.058 | 0.047 | 36.08 |
| 46) | | 4-Methyl-2-pentanon | | 0.173 | 0.201 | 0.203 | 0.210 | 0.205 | 0.198 | 7.34 |

Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VC561-ICC561
Lab FileID: C0012697.D

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 47) | | cis-1,3-Dichloropro | 0.179 | 0.253 | 0.342 | 0.370 | 0.386 | 0.386 | 0.319 | 26.60 |
| 48) | I | Chlorobenzene-d5 | ----------ISTD---------- | | | | | | | |
| 49) | S | Toluene-d8 | 1.329 | 1.301 | 1.284 | 1.272 | 1.270 | 1.268 | 1.288 | 1.83 |
| 50) | C | Toluene | 1.149 | 1.304 | 1.358 | 1.359 | 1.377 | 1.352 | 1.316 | 6.51 |
| 51) | | trans-1,3-Dichlorop | | 0.343 | 0.419 | 0.451 | 0.477 | 0.469 | 0.432 | 12.63 |
| 52) | | 1,1,2-Trichloroetha | 0.239 | 0.228 | 0.243 | 0.236 | 0.238 | 0.230 | 0.236 | 2.43 |
| 53) | | Tetrachloroethene | 0.252 | 0.302 | 0.329 | 0.314 | 0.332 | 0.333 | 0.310 | 10.01 |
| 54) | | 2-hexanone | | 0.139 | 0.177 | 0.186 | 0.192 | 0.187 | 0.176 | 12.01 |
| 55) | | 1,3-Dichloropropane | 0.406 | 0.482 | 0.503 | 0.491 | 0.498 | 0.478 | 0.476 | 7.47 |
| 56) | | Dibromochloromethan | 0.218 | 0.244 | 0.267 | 0.279 | 0.289 | 0.294 | 0.265 | 11.07 |
| 57) | | 1,2-Dibromoethane | 0.215 | 0.233 | 0.245 | 0.258 | 0.266 | 0.268 | 0.247 | 8.34 |
| 58) | | 1-Chlorohexane | 0.090 | 0.187 | 0.344 | 0.366 | 0.404 | 0.402 | 0.299 | 43.50 |
| 59) | P | Chlorobenzene | 0.865 | 0.886 | 0.879 | 0.874 | 0.901 | 0.893 | 0.883 | 1.48 |
| 60) | | 1,1,1,2-Tetrachloro | 0.261 | 0.311 | 0.309 | 0.318 | 0.330 | 0.332 | 0.310 | 8.25 |
| 61) | C | Ethylbenzene | | 1.251 | 1.486 | 1.531 | 1.569 | 1.563 | 1.480 | 8.91 |
| 62) | | m,p-Xylene | | 0.968 | 1.188 | 1.188 | 1.219 | 1.232 | 1.159 | 9.36 |
| 63) | | o-Xylene | | 0.874 | 1.195 | 1.244 | 1.278 | 1.283 | 1.175 | 14.63 |
| 64) | | Styrene | 0.277 | 0.546 | 0.860 | 0.956 | 1.000 | 1.007 | 0.774 | 38.54 |
| 65) | P | Bromoform | | 0.152 | 0.177 | 0.194 | 0.209 | 0.210 | 0.189 | 12.89 |
| 66) | I | 1,4-Dichlorobenzene-d | ----------ISTD---------- | | | | | | | |
| 67) | | Isopropylbenzene | 0.796 | 1.292 | 2.047 | 2.157 | 2.317 | 2.346 | 1.826 | 34.78 |
| 68) | S | 4-Bromofluorobenzen | 0.860 | 0.858 | 0.856 | 0.860 | 0.874 | 0.868 | 0.863 | 0.80 |
| 69) | | Bromobenzene | 0.506 | 0.618 | 0.710 | 0.710 | 0.739 | 0.752 | 0.673 | 13.98 |
| 70) | P | 1,1,2,2-Tetrachloro | 0.596 | 0.639 | 0.642 | 0.617 | 0.630 | 0.607 | 0.622 | 2.93 |
| 71) | | trans-1,4-Dichloro- | | 0.011 | 0.046 | 0.068 | 0.090 | 0.095 | 0.062 | 55.71 |
| 72) | | 1,2,3-Trichloroprop | 0.142 | 0.146 | 0.155 | 0.157 | 0.164 | 0.162 | 0.155 | 5.64 |
| 73) | | n-Propylbenzene | | 2.349 | 3.054 | 3.063 | 3.195 | 3.207 | 2.974 | 11.99 |
| 74) | | 2-Chlorotoluene | | 1.780 | 2.121 | 2.125 | 2.178 | 2.195 | 2.080 | 8.20 |
| 75) | | 4-Chlorotoluene | | 1.448 | 1.874 | 1.865 | 1.949 | 1.939 | 1.815 | 11.49 |
| 76) | | 1,3,5-Trimethylbenz | 0.898 | 1.404 | 1.933 | 1.993 | 2.096 | 2.107 | 1.739 | 28.00 |
| 77) | | Benzyl chloride | 0.387 | 0.569 | 0.845 | 0.958 | 1.079 | 1.050 | 0.815 | 34.26 |
| 78) | | sec-Butylbenzene | 0.883 | 1.495 | 2.172 | 2.213 | 2.362 | 2.359 | 1.914 | 31.30 |
| 79) | | 1,3-Dichlorobenzene | 0.920 | 1.129 | 1.274 | 1.278 | 1.327 | 1.314 | 1.207 | 13.03 |
| 80) | | 4-Isopropyltoluene | 0.578 | 1.139 | 1.731 | 1.785 | 1.903 | 1.898 | 1.506 | 35.59 |
| 81) | | 1,4-Dichlorobenzene | 0.920 | 1.340 | 1.383 | 1.344 | 1.392 | 1.389 | 1.295 | 14.27 |
| 82) | | tert-Butylbenzene | 0.495 | 0.718 | 1.073 | 1.097 | 1.163 | 1.166 | 0.952 | 29.32 |
| 83) | | n-Butylbenzene | 0.704 | 1.260 | 1.774 | 1.850 | 1.947 | 1.896 | 1.572 | 31.36 |
| 84) | | 1,2-Dichlorobenzene | 0.897 | 1.102 | 1.219 | 1.236 | 1.266 | 1.279 | 1.167 | 12.52 |
| 85) | | 1,2,4-Trimethylbenz | | 1.557 | 2.078 | 2.084 | 2.150 | 2.162 | 2.006 | 12.66 |
| 86) | | 1,2-Dibromo-3-Chlor | 0.065 | 0.080 | 0.088 | 0.089 | 0.097 | 0.091 | 0.085 | 13.04 |
| 87) | | 1,2,4-Trichlorobenz | 0.374 | 0.497 | 0.621 | 0.693 | 0.771 | 0.795 | 0.625 | 26.20 |
| 88) | | Hexachlorobutadiene | 0.293 | 0.306 | 0.290 | 0.283 | 0.313 | 0.318 | 0.300 | 4.66 |
| 89) | | Naphthalene | 0.534 | 0.713 | 1.125 | 1.325 | 1.544 | 1.566 | 1.135 | 37.98 |
| 90) | | 1,2,3-Trichlorobenz | 0.363 | 0.451 | 0.562 | 0.614 | 0.673 | 0.684 | 0.558 | 22.94 |
| 91) | I | Tert Butyl alcohol-d1 | ----------ISTD---------- | | | | | | | |
| 92) | | Acrolein | 2.429 | 2.632 | 2.968 | 2.847 | 3.237 | 3.187 | 2.883 | 10.92 |
| 93) | | Tert-Butyl Alcohol | 1.373 | 1.549 | 1.748 | 1.769 | 1.883 | 1.800 | 1.687 | 11.22 |
| 94) | | 1,4-Dioxane | | 0.082 | 0.196 | 0.221 | 0.229 | 0.219 | 0.189 | 32.32 |
| 95) | | Cyclohexanone | 1.413 | 0.298 | 0.599 | 0.601 | 0.669 | 0.632 | 0.702 | 53.12 |

Average % RSD = 14.5

(#) = Out of Range

8260A.M Wed Oct 23 19:36:11 2002 RPT1

# Continuing Calibration Summary

Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VC573-CC561
Lab FileID: C0013007.D

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\2\DATA\110502\C0013007.D  Vial: 1
Acq On : 5 Nov 2002 10:57 am  Operator: JuanG
Sample : CC561-40ppb  Inst : MSVOA5
Misc : ms1860,vc573,,,,,  Multiplr: 1.00
MS Integration Params: Rteint.p

Method : C:\MSDCHEM\2\METHODS\8260A.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Tue Oct 22 14:57:24 2002
Response via : Multiple Level Calibration

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

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | I | Fluorobenzene | 1.000 | 1.000 | 0.0 | 102 | 0.00 |
| 2 | | Dichlorodifluoromethane | 0.231 | 0.275 | -19.0 | 116 | 0.00 |
| 3 | P | Chloromethane | 0.387 | 0.401 | -3.6 | 105 | 0.00 |
| 4 | C | Vinyl Chloride | 0.385 | 0.369 | 4.2 | 98 | 0.00 |
| 5 | | Bromomethane | 0.287 | 0.274 | 4.5 | 101 | 0.00 |
| 6 | | Chloroethane | 0.212 | 0.220 | -3.8 | 107 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.379 | 0.498 | -31.4# | 132 | 0.00 |
| 8 | | Ethyl ether | 0.161 | 0.171 | -6.2 | 103 | 0.00 |
| 9 | C | 1,1-Dichloroethene | 0.319 | 0.349 | -9.4 | 105 | 0.00 |
| 10 | | Freon 113 | 0.189 | 0.214 | -13.2 | 119 | 0.00 |
| 11 | | Acetone | 0.054 | 0.052 | 3.7 | 101 | 0.00 |
| 12 | | Iodomethane | 0.286 | 0.328 | -14.7 | 111 | 0.00 |
| 13 | | Methyl Acetate | 0.147 | 0.146 | 0.7 | 100 | 0.00 |
| 14 | | Carbon Disulfide | 0.716 | 0.750 | -4.7 | 104 | 0.00 |
| 15 | | Hexane | 0.196 | 0.214 | -9.2 | 98 | 0.00 |
| 16 | | Methylene Chloride | 0.341 | 0.354 | -3.8 | 102 | 0.00 |
| 17 | | trans-1,2-Dichloroethene | 0.307 | 0.324 | -5.5 | 102 | 0.00 |
| 18 | | Acrylonitrile | 0.066 | 0.071 | -7.6 | 102 | 0.00 |
| 19 | | Methyl Tert Butyl Ether | 0.504 | 0.517 | -2.6 | 100 | 0.00 |
| 20 | P | 1,1-Dichloroethane | 0.417 | 0.402 | 3.6 | 96 | 0.00 |
| 21 | | Vinyl acetate | 0.497 | 0.504 | -1.4 | 100 | 0.00 |
| 22 | | Di-isopropyl ether | 0.731 | 0.744 | -1.8 | 99 | 0.00 |
| 23 | | ETBE | 0.520 | 0.554 | -6.5 | 94 | 0.00 |
| 24 | | 2,2-Dichloropropane | 0.204 | 0.211 | -3.4 | 100 | 0.00 |
| 25 | | cis-1,2-Dichloroethene | 0.224 | 0.249 | -11.2 | 104 | 0.00 |
| 26 | | 2-Butanone | 0.077 | 0.083 | -7.8 | 101 | 0.00 |
| 27 | | Bromochloromethane | 0.105 | 0.118 | -12.4 | 114 | 0.00 |
| 28 | C | Chloroform | 0.420 | 0.422 | -0.5 | 103 | 0.00 |
| 29 | | Tetrahydrofuran | 0.042 | 0.046 | -9.5 | 103 | 0.00 |
| 30 | | 1,1,1-Trichloroethane | 0.310 | 0.330 | -6.5 | 108 | 0.00 |
| 31 | | Cyclohexane | 0.315 | 0.333 | -5.7 | 104 | 0.00 |
| 32 | S | Dibromofluoromethane | 0.241 | 0.261 | -8.3 | 111 | 0.00 |
| 33 | | 1,1-Dichloropropene | 0.286 | 0.284 | 0.7 | 99 | 0.00 |
| 34 | | Carbon Tetrachloride | 0.260 | 0.298 | -14.6 | 114 | 0.00 |
| 35 | S | 1,2-Dichloroethane-d4 | 0.278 | 0.259 | 6.8 | 95 | 0.00 |
| 36 | | Benzene | 0.933 | 0.956 | -2.5 | 101 | 0.00 |
| 37 | | TAME | 0.540 | 0.548 | -1.5 | 101 | 0.00 |
| 38 | | 1,2-Dichloroethane | 0.326 | 0.314 | 3.7 | 104 | 0.00 |
| 39 | | Trichloroethene | 0.209 | 0.229 | -9.6 | 108 | 0.00 |
| 40 | | Methylcyclohexane | 0.248 | 0.297 | -19.8 | 105 | 0.00 |
| 41 | C | 1,2-Dichloropropane | 0.242 | 0.242 | 0.0 | 98 | 0.00 |
| 42 | | Dibromomethane | 0.147 | 0.159 | -8.2 | 112 | 0.00 |

Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VC573-CC561
Lab FileID: C0013007.D

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 43 | | Bromodichloromethane | 0.305 | 0.333 | -9.2 | 107 | 0.00 |
| 44 | | 2-Nitropropane | 0.046 | 0.052 | -13.0 | 110 | 0.00 |
| 45 | | 2-Chloroethyl vinyl ether | 0.047 | 0.071 | -51.1# | 129 | 0.00 |
| 46 | | 4-Methyl-2-pentanone | 0.198 | 0.209 | -5.6 | 105 | 0.00 |
| 47 | | cis-1,3-Dichloropropene | 0.319 | 0.375 | -17.6 | 103 | 0.00 |
| 48 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 112 | 0.00 |
| 49 | S | Toluene-d8 | 1.288 | 1.189 | 7.7 | 105 | 0.00 |
| 50 | C | Toluene | 1.316 | 1.269 | 3.6 | 105 | 0.00 |
| 51 | | trans-1,3-Dichloropropene | 0.432 | 0.418 | 3.2 | 104 | 0.00 |
| 52 | | 1,1,2-Trichloroethane | 0.236 | 0.223 | 5.5 | 106 | 0.00 |
| 53 | | Tetrachloroethene | 0.310 | 0.331 | -6.8 | 118 | 0.00 |
| 54 | | 2-hexanone | 0.176 | 0.175 | 0.6 | 105 | 0.00 |
| 55 | | 1,3-Dichloropropane | 0.476 | 0.461 | 3.2 | 105 | 0.00 |
| 56 | | Dibromochloromethane | 0.265 | 0.297 | -12.1 | 119 | 0.00 |
| 57 | | 1,2-Dibromoethane | 0.247 | 0.260 | -5.3 | 113 | 0.00 |
| 58 | | 1-Chlorohexane | 0.299 | 0.355 | -18.7 | 109 | 0.00 |
| 59 | P | Chlorobenzene | 0.883 | 0.892 | -1.0 | 114 | 0.00 |
| 60 | | 1,1,1,2-Tetrachloroethane | 0.310 | 0.317 | -2.3 | 112 | 0.00 |
| 61 | C | Ethylbenzene | 1.480 | 1.429 | 3.4 | 105 | 0.00 |
| 62 | | m,p-Xylene | 1.159 | 1.103 | 4.8 | 104 | 0.00 |
| 63 | | o-Xylene | 1.175 | 1.154 | 1.8 | 104 | 0.00 |
| 64 | | Styrene | 0.774 | 0.912 | -17.8 | 107 | 0.00 |
| 65 | P | Bromoform | 0.189 | 0.197 | -4.2 | 114 | 0.00 |
| 66 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 111 | 0.00 |
| 67 | | Isopropylbenzene | 1.826 | 2.101 | -15.1 | 109 | 0.00 |
| 68 | S | 4-Bromofluorobenzene | 0.863 | 0.831 | 3.7 | 108 | 0.00 |
| 69 | | Bromobenzene | 0.673 | 0.686 | -1.9 | 108 | 0.00 |
| 70 | P | 1,1,2,2-Tetrachloroethane | 0.622 | 0.600 | 3.5 | 108 | 0.00 |
| 71 | | trans-1,4-Dichloro-2-butene | 0.062 | 0.084 | -35.5# | 138 | 0.00 |
| 72 | | 1,2,3-Trichloropropane | 0.155 | 0.166 | -7.1 | 117 | 0.00 |
| 73 | | n-Propylbenzene | 2.974 | 2.899 | 2.5 | 105 | 0.00 |
| 74 | | 2-Chlorotoluene | 2.080 | 1.988 | 4.4 | 104 | 0.00 |
| 75 | | 4-Chlorotoluene | 1.815 | 1.796 | 1.0 | 107 | 0.00 |
| 76 | | 1,3,5-Trimethylbenzene | 1.739 | 1.924 | -10.6 | 108 | 0.00 |
| 77 | | Benzyl chloride | 0.815 | 0.991 | -21.6# | 115 | 0.00 |
| 78 | | sec-Butylbenzene | 1.914 | 2.192 | -14.5 | 110 | 0.00 |
| 79 | | 1,3-Dichlorobenzene | 1.207 | 1.285 | -6.5 | 112 | 0.00 |
| 80 | | 4-Isopropyltoluene | 1.506 | 1.815 | -20.5# | 113 | 0.00 |
| 81 | | 1,4-Dichlorobenzene | 1.295 | 1.369 | -5.7 | 114 | 0.00 |
| 82 | | tert-Butylbenzene | 0.952 | 1.057 | -11.0 | 107 | 0.00 |
| 83 | | n-Butylbenzene | 1.572 | 1.805 | -14.8 | 109 | 0.00 |
| 84 | | 1,2-Dichlorobenzene | 1.167 | 1.257 | -7.7 | 113 | 0.00 |
| 85 | | 1,2,4-Trimethylbenzene | 2.006 | 2.048 | -2.1 | 110 | 0.00 |
| 86 | | 1,2-Dibromo-3-Chloropropane | 0.085 | 0.088 | -3.5 | 111 | 0.00 |
| 87 | | 1,2,4-Trichlorobenzene | 0.625 | 0.715 | -14.4 | 115 | 0.00 |
| 88 | | Hexachlorobutadiene | 0.300 | 0.293 | 2.3 | 115 | 0.00 |
| 89 | | Naphthalene | 1.135 | 1.468 | -29.3# | 123 | 0.00 |
| 90 | | 1,2,3-Trichlorobenzene | 0.558 | 0.647 | -15.9 | 118 | 0.00 |
| 91 | I | Tert Butyl alcohol-d10 | 1.000 | 1.000 | 0.0 | 102 | 0.00 |
| 92 | | Acrolein | 2.883 | 2.784 | 3.4 | 99 | 0.00 |
| 93 | | Tert-Butyl Alcohol | 1.687 | 1.724 | -2.2 | 99 | 0.00 |
| 94 | | 1,4-Dioxane | 0.189 | 0.223 | -18.0 | 103 | -0.01 |
| 95 | | Cyclohexanone | 0.702 | 0.624 | 11.1 | 106 | 0.00 |

Average % D = 8.6

# Continuing Calibration Summary

Job Number: F15161
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VC573-CC561
Lab FileID: C0013007.D

```
(#) = Out of Range                SPCC's out = 0  CCC's out = 0
 C0012697.D 8260A.M          Wed Nov 06 11:27:21 2002   RPT1
```

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 0353 | PAGE 1 OF 1

HSI61

| | | | | |
|---|---|---|---|---|
| PROJECT NO: N4248 | FACILITY: CECIL FIELD NSAP | PROJECT MANAGER: PAUL CALLIGAN | PHONE NUMBER: 813 8060202 | LABORATORY NAME AND CONTACT: Accutest Sue Bell |
| SAMPLERS (SIGNATURE): MWDale for C. Mott/P. Leverette | | FIELD OPERATIONS LEADER: Mell Dane | PHONE NUMBER: 904 636 6125 | ADDRESS: 4405 Vineland Rd C-15 |
| | | CARRIER/WAYBILL NUMBER: Fedex 8371 1005 7620 | | CITY, STATE: ORLANDO FL 32811 |

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCl

TYPE OF ANALYSIS: BTEX SW8260B

| | DATE YEAR 2002 | 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 | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10/23 | 1340 | CEF-M18-7I-05 | | | | GW | G | 3 | 3 | | | | | | | | Cool to 4°C |
| 2 | 10/23 | 1420 | CEF-M18-6I-05 | | | | GW | G | 3 | 3 | | | | | | | | |
| 3 | 10/23 | 1535 | CEF-M18-8I-05 | | | | GW | G | 3 | 3 | | | | | | | | N4248 WR 61 |
| 4 | 10/23 | 1610 | CEF-M18-9I-05 * | | | | GW | G | 9 | 9 | | | | | | | | |
| 5 | 10/23 | 1715 | CEF-M18-10I-05 | | | | GW | G | 3 | 3 | | | | | | | | * use for MS/MSD |
| 6 | 10/23 | 0000 | CEF-M18-DU01-05 | | | | GW | G | 3 | 3 | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1. RELINQUISHED BY: Mawin W. Dale | DATE: 10/24/02 | TIME: 1900 | 1. RECEIVED BY: Fed ex | DATE: 10/24/02 | TIME |
| 2. RELINQUISHED BY: FedEx | DATE: 10/25/02 | TIME: 0915 | 2. RECEIVED BY: Sue Bell | DATE: 10/25/02 | TIME: 0915 |
| 3. RELINQUISHED BY | DATE | TIME | 3. RECEIVED BY | DATE | TIME |

COMMENTS: 4.0

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

4/02R
FORM NO. TtNUS-001

**ATTACHMENT F**

**FDEP LETTER DATED MAY 2003**
**RE: LETTER REPORT, SUPPLEMENTAL ASSESSMENT**

# Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

May 2, 2003

Mr. Wayne Hansel
Code ES245 (UST RPM)
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: Letter Report, Supplemental Assessment, North-South Apron Plume, Naval Air Station Cecil Field

Dear Mr. Hansel:

I have completed the review of the Letter Report, Supplemental Assessment, North-South Apron Plume, Naval Air Station Cecil Field, dated January 14, 2003 (received January 15, 2003), prepared and submitted by Tetra Tech NUS, Inc. The Letter Report was prepared due to the failure of groundwater contaminant concentrations to achieve the milestone objectives in the Department's March 16, 2001 Natural Attenuation Monitoring Plan Approval Order. The Letter Report adequately delineates the benzene plume in the intermediate zone, 30 to 35 feet below land surface. However, I cannot concur with the recommendation to again place the site into monitoring only for natural attenuation at this time. Relooking at past assessments conducted at this site, it appears groundwater contamination has not been vertically delineated into deeper zones of the surficial aquifer. Vertical migration of petroleum contaminant plumes into deeper portions of the surficial aquifer has been demonstrated at the North Fuel Farm site. Monitoring wells should be installed within the plume in order to vertically delineate the contaminant plume. Also, water level measurements should be collected from monitoring wells located in the shallow, intermediate and deep portions of the surficial aquifer in order to determine if there are vertical hydraulic gradients that could induce migration of contaminants into deeper portions of the surficial aquifer.

If further assessment indicates that contamination does not exist in deeper zones of the surficial aquifer or contaminant concentrations are at levels that would indicate that monitoring only for natural attenuation would be an acceptable remedy, a

revised monitoring plan should be submitted with a report containing the information requested above.

If I can be of any further assistance with this matter, please contact me at (850) 245-8997.

Sincerely,

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

cc: Brian Cheary, FDEP Northeast District Office
Debbie Vaughn-Wright, USEPA, Region 4
Paul Calligan, Tetra Tech NUS, Tallahassee

TJB JJC ESN

*Printed on recycled paper.*

# ATTACHMENT G

## DEEP MONITORING WELLS
## WELL CONSTRUCTION DIAGRAMS

Tetra Tech NUS, Inc.

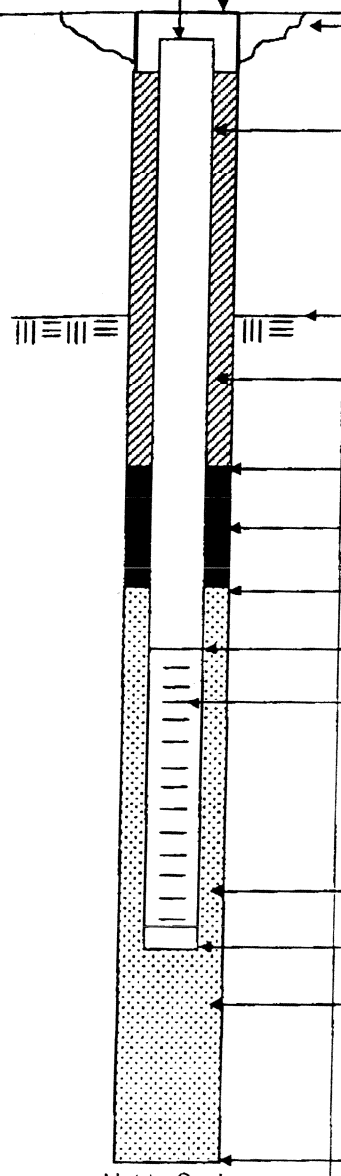
WELL No MW-11D

# MONITORING WELL SHEET (SINGLE-CASED)

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | NSAD, Supp. Assessment | DRILLING Co. | Pro Sonic | BORING No.: | CEF-MIB-11D |
| PROJECT No.: | N4248 | DRILLER: | D. Mitchell | DATE COMPLETED: | 7/1/03 |
| SITE: | N-S. Apron | DRILLING METHOD: | Roto Sonic | NORTHING: | |
| GEOLOGIST: | S. McGuire | DEV. METHOD: | Submersible | EASTING: | |

Ground Elevation =

Datum:



Not to Scale

| | |
|---|---|
| Elevation / Depth of Top of Riser: | 1 2" |
| Elevation / Height of Top of Surface Casing: | 1 0" |
| I.D. of Surface Casing: | 8" |
| Type of Surface Casing: | Steel, bolt down |
| Type of Surface Seal: | QUIKREETE concrete |
| I.D. of Riser: | 2" |
| Type of Riser: | PVC |
| Borehole Diameter: | 6" |
| Elevation / Depth Top of Rock: | N/A |
| Type of Backfill: | Portland Type I cement |
| Elevation / Depth of Seal: | 1 50' |
| Type of Seal: | 30/65 Sand |
| Elevation / Depth of Top of Filter Pack: | 1 53' |
| Elevation / Depth of Top of Screen: | 1 55' |
| Type of Screen: | PVC |
| Slot Size x Length: | .010 x 5' |
| I.D. of Screen: | 2" |
| Type of Filter Pack: | 20/30 sand |
| Elevation / Depth of Bottom of Screen: | 1 60.0' |
| Elevation / Depth of Bottom of Filter Pack: | 1 60.5' |
| Type of Backfill Below Well: | 20/30 sand |
| Elevation / Total Depth of Borehole: | 160.5' |

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-MIB-11D
Site Name: SAM ~~NORTH FUEL FARM~~ N-S Apron
Date Installed: 7/1/03
Project Name: SARA INVESTIGATION

Site Geologist: SCOTT McGuire
Drilling Company: PROSONIC
Driller: SAM ~~Charles Wilson~~ Danny Mitchell
Project Number: SAM ~~A3996~~ N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, Flush Thread, 2" x 10' | MONOFLEX / ADS | NO |
| Well Screen | Sch. 40 PVC, Flush Thread, 2" x 10', 0.010" slots | MONOFLEX / ADS | NO |
| End Cap | Sch. 40 PVC, | MONOFLEX / ADS | NO |
| Drilling Fluid | POTABLE WATER | CECIL WATER SUPPLY (LOCAL Hydrant) | NO |
| Drilling Fluid Additives | None | — | — |
| Backfill Material | None | — | — |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal, Fine Sand | 30/65 Sand | Standard Sand, JAX, FL | NO |
| Annular Grout | Type I PORTLAND Cement * | TARMAC, MEDLEY, FL | NO |
| Surface Cement | QUIKRETE | QUIKRETE CO., ATLANTA, GA | NO |
| Protective Casing | 8" Steel Lockdown Flush mt. | ADS, JACKSONVILLE, FL | NO |
| Paint | NONE | — | — |
| Rod Lubricant | None | — | — |
| Compressor Oil | None | — | — |
| | | | |
| * Annular Grout Add. | QUIK GEL (Hi Yield Bentonite) | BAROID DRILLING, Houston, TX | NO |

ADS = Atlantic Drilling Supply

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Scott R. McGuire

NOV 10 2003 9:17 P.08

Tetra Tech NUS, Inc.

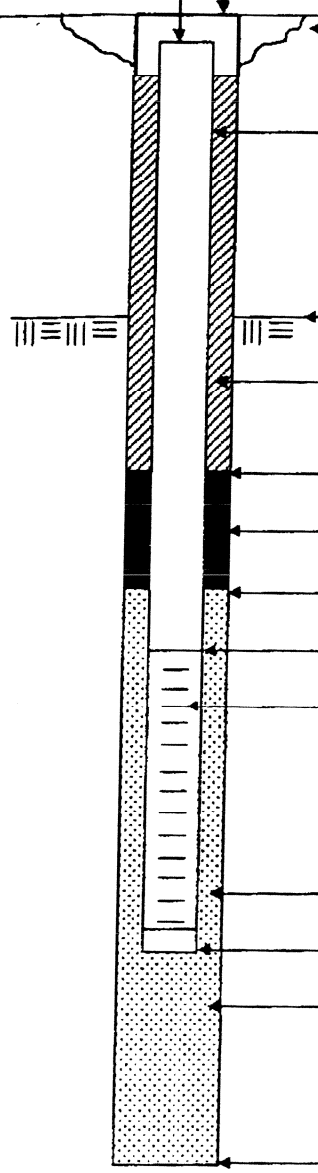
WELL No.: MW-12D

## MONITORING WELL SHEET (SINGLE-CASED)

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | | DRILLING Co.: | Pro Sonic | BORING No.: | CEF-MIB-12D |
| PROJECT No.: | N4248 | DRILLER: | D. Mitchell | DATE COMPLETED: | 7/1/03 |
| SITE: | N-S Apron | DRILLING METHOD: | Roto Sonic | NORTHING: | |
| GEOLOGIST: | S. McGuire | DEV. METHOD: | | EASTING: | |

Ground Elevation =

Datum:



Not to Scale

| | | |
|---|---|---|
| Elevation / Depth of Top of Riser: | | / |
| Elevation / Height of Top of Surface Casing: | | / |
| I.D. of Surface Casing: | 8" | |
| Type of Surface Casing: | Steel | |
| Type of Surface Seal: | | |
| I.D. of Riser: | 2" | |
| Type of Riser: | PVC | |
| Borehole Diameter: | 6" | |
| Elevation / Depth Top of Rock: | | / |
| Type of Backfill: | Portland Type I cement | |
| Elevation / Depth of Seal: | | / 50' |
| Type of Seal: | 30/65 Sand | |
| Elevation / Depth of Top of Filter Pack: | | / 53' |
| Elevation / Depth of Top of Screen: | | / 55' |
| Type of Screen: | PVC | |
| Slot Size x Length: | .010 x 5' | |
| I.D. of Screen: | 2" | |
| Type of Filter Pack: | 20/30 sand | |
| Elevation / Depth of Bottom of Screen: | | / 60' |
| Elevation / Depth of Bottom of Filter Pack: | | / 60.5' |
| Type of Backfill Below Well: | 20/30 sand | |
| Elevation / Total Depth of Borehole: | | / 60.5' |

# MONITORING WELL MATERIALS
# CERTIFICATE OF CONFORMANCE

Well Designation: CEF-M18-12D
Site Name: ~~NORTH FUEL FARM~~ N-S Apron
Date Installed: 7/1/03
Project Name: SARA INVESTIGATION

Site Geologist: SCOTT McGuire
Drilling Company: PROSONIC
Driller: ~~Charles Wilson~~ Danny Mitchell
Project Number: ~~A3996~~ N4248

| Material | Brand/Description | Source/Supplier | Sample Collected ? |
|---|---|---|---|
| Well Casing | Sch. 40 PVC, Flush Thread, 2" x 10' | MONOFLEX / ADS | NO |
| Well Screen | Sch. 40 PVC, Flush Thread, 2" x 10', 0.010" slots | MONOFLEX / ADS | NO |
| End Cap | Sch. 40 PVC, | MONOFLEX / ADS | NO |
| Drilling Fluid | POTABLE WATER | CECIL WATER SUPPLY (LOCAL Hydrant) | NO |
| Drilling Fluid Additives | None | — | — |
| Backfill Material | None | — | — |
| Annular Filter Pack | 20/30 Sand | Standard Sand, JAX, FL | NO |
| ~~Bentonite~~ Seal, Fine Sand | 30/65 Sand | Standard Sand, JAX, FL | NO |
| Annular Grout | Type I PORTLAND Cement * | TARMAC, MEDLEY, FL | NO |
| Surface Cement | QUIKRETE | QUIKRETE CO., ATLANTA, GA. | NO |
| Protective Casing | 8 IN. bolt down steel, flush mt. | ADS, JAX, FL. | NO |
| Paint | None | — | — |
| Rod Lubricant | None | — | — |
| Compressor Oil | None | — | — |
| | | | |
| * Annular Grout Add. | QUIKGEL (Hi Yield Bentonite) | BAROID DRILLING, Houston, TX | NO |

ADS = Atlantic Drilling Supply

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist: Scott R. McGuire

# ATTACHMENT H

## GROUNDWATER ANALYTICAL REPORT FOR DEEP MONITORING WELLS

Southeast ACCUTEST Laboratories

07/15/03

# Technical Report for

## Tetra Tech, NUS

NAS Cecil Field-CTO-248

N4248-N3996-WR359

Accutest Job Number: F18541

Report to:

Total number of pages in report: 19

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

Harry Behzadi, Ph.D.
Laboratory Director

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

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# Sample Summary

Tetra Tech, NUS

Job No: F18541

NAS Cecil Field-CTO-248
Project No: N4248-N3996-WR359

| Sample Number | Collected Date | Time | By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|---|
| F18541-1 | 07/11/03 | 09:35 | MD | 07/11/03 | AQ | Ground Water | CEF-M18-11D-06 |
| F18541-2 | 07/11/03 | 10:30 | MD | 07/11/03 | AQ | Ground Water | CEF-M18-12D-06 |
| F18541-3 | 07/11/03 | 00:00 | MD | 07/11/03 | AQ | Ground Water | CEF-M18-DUP1-06 |

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# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-11D-06 | | |
| Lab Sample ID: | F18541-1 | Date Sampled: | 07/11/03 |
| Matrix: | AQ - Ground Water | Date Received: | 07/11/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B016432.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics, MTBE

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.50 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 104% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 99% | | 84-117% |

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

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

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# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-12D-06 | | |
| Lab Sample ID: | F18541-2 | Date Sampled: | 07/11/03 |
| Matrix: | AQ - Ground Water | Date Received: | 07/11/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B016433.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics, MTBE

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 1.2 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.50 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 101% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 105% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 100% | | 84-117% |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-M18-DUP1-06 | | |
| Lab Sample ID: | F18541-3 | Date Sampled: | 07/11/03 |
| Matrix: | AQ - Ground Water | Date Received: | 07/11/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B016434.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |
| Run #2 | | | | | | | |

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

Purgeable Aromatics, MTBE

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | 1.1 | 1.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.50 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 105% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 105% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 105% | | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 101% | | 84-117% |

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

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

# GC/MS Volatiles

## QC Data Summaries

Includes the following where applicable:

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

# Blank Spike Summary



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB728-BS | B016422.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |

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

F18541-1, F18541-2, F18541-3

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 71-43-2 | Benzene | 25 | 22.4 | 90 | 76-123 |
| 100-41-4 | Ethylbenzene | 25 | 25.0 | 100 | 76-117 |
| 1634-04-4 | Methyl Tert Butyl Ether | 25 | 25.9 | 104 | 68-125 |
| 108-88-3 | Toluene | 25 | 24.0 | 96 | 76-118 |
| 1330-20-7 | Xylene (total) | 75 | 76.9 | 103 | 78-120 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 120% | 78-125% |
| 2037-26-5 | Toluene-D8 | 104% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 97% | 84-117% |

# Method Blank Summary



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB728-MB | B016423.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |

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

F18541-1, F18541-2, F18541-3

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.50 | ug/l | |
| 100-41-4 | Ethylbenzene | ND | 2.0 | 0.50 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 2.0 | 0.50 | ug/l | |
| 108-88-3 | Toluene | ND | 2.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 6.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 109% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 115% | 78-125% |
| 2037-26-5 | Toluene-D8 | 106% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 104% | 84-117% |

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F18521-1MS | B016430.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |
| F18521-1MSD | B016431.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |
| F18521-1 | B016427.D | 1 | 07/14/03 | KW | n/a | n/a | VB728 |

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

F18541-1, F18541-2, F18541-3

| CAS No. | Compound | F18521-1 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 71-43-2 | Benzene | ND | | 25 | 22.6 | 90 | 21.9 | 88 | 3 | 71-127/8 |
| 100-41-4 | Ethylbenzene | ND | | 25 | 25.1 | 100 | 23.8 | 95 | 5 | 72-119/7 |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | | 25 | 25.2 | 101 | 25.3 | 101 | 0 | 65-125/12 |
| 108-88-3 | Toluene | ND | | 25 | 25.6 | 102 | 23.9 | 96 | 7 | 73-119/10 |
| 1330-20-7 | Xylene (total) | ND | | 75 | 78.3 | 104 | 74.8 | 100 | 5 | 73-123/8 |

| CAS No. | Surrogate Recoveries | MS | MSD | F18521-1 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 104% | 102% | 111% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 108% | 107% | 116% | 78-125% |
| 2037-26-5 | Toluene-D8 | 105% | 104% | 109% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 94% | 93% | 111% | 84-117% |

# Instrument Performance Check (BFB)



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB728-BFB
Lab File ID: B016419.D
Instrument ID: GCMSB
Injection Date: 07/14/03
Injection Time: 09:44

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 32192 | 28.4 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 59605 | 52.6 | | Pass |
| 95 | Base peak, 100% relative abundance | 113357 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 7539 | 6.7 | | Pass |
| 173 | Less than 2.0% of mass 174 | 575 | 0.51 | (0.57) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 101629 | 89.7 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 6831 | 6.0 | (6.7) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 98576 | 87.0 | (97.0) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 6848 | 6.0 | (6.9) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VB728-CC722 | B016421.D | 07/14/03 | 10:37 | 00:53 | Continuing cal 40 |
| VB728-BS | B016422.D | 07/14/03 | 11:04 | 01:20 | Blank Spike |
| VB728-MB | B016423.D | 07/14/03 | 11:31 | 01:47 | Method Blank |
| ZZZZZZ | B016424.D | 07/14/03 | 11:59 | 02:15 | (unrelated sample) |
| ZZZZZZ | B016425.D | 07/14/03 | 12:26 | 02:42 | (unrelated sample) |
| ZZZZZZ | B016426.D | 07/14/03 | 12:53 | 03:09 | (unrelated sample) |
| F18521-1 | B016427.D | 07/14/03 | 13:20 | 03:36 | (used for QC only; not part of job F18541) |
| F18521-1MS | B016430.D | 07/14/03 | 14:41 | 04:57 | Matrix Spike |
| F18521-1MSD | B016431.D | 07/14/03 | 15:08 | 05:24 | Matrix Spike Duplicate |
| F18541-1 | B016432.D | 07/14/03 | 15:35 | 05:51 | CEF-M18-11D-06 |
| F18541-2 | B016433.D | 07/14/03 | 16:02 | 06:18 | CEF-M18-12D-06 |
| F18541-3 | B016434.D | 07/14/03 | 16:29 | 06:45 | CEF-M18-DUP1-06 |
| ZZZZZZ | B016435.D | 07/14/03 | 16:56 | 07:12 | (unrelated sample) |
| ZZZZZZ | B016436.D | 07/14/03 | 17:23 | 07:39 | (unrelated sample) |
| ZZZZZZ | B016437.D | 07/14/03 | 17:49 | 08:05 | (unrelated sample) |
| ZZZZZZ | B016439.D | 07/14/03 | 18:43 | 08:59 | (unrelated sample) |

# Instrument Performance Check (BFB)



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VB722-BFB | Injection Date: | 07/07/03 |
| Lab File ID: | B016275.D | Injection Time: | 08:42 |
| Instrument ID: | GCMSB | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 20389 | 28.7 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 33568 | 47.3 | | Pass |
| 95 | Base peak, 100% relative abundance | 70944 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 5018 | 7.1 | | Pass |
| 173 | Less than 2.0% of mass 174 | 152 | 0.21 | (0.24) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 62069 | 87.5 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 4316 | 6.1 | (7.0) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 61082 | 86.1 | (98.4) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4175 | 5.9 | (6.8) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VB722-IC722 | B016276.D | 07/07/03 | 09:07 | 00:25 | Initial cal 1 |
| VB722-IC722 | B016277.D | 07/07/03 | 09:34 | 00:52 | Initial cal 5 |
| VB722-IC722 | B016278.D | 07/07/03 | 10:01 | 01:19 | Initial cal 20 |
| VB722-ICC722 | B016279.D | 07/07/03 | 10:28 | 01:46 | Initial cal 40 |
| VB722-IC722 | B016280.D | 07/07/03 | 10:55 | 02:13 | Initial cal 70 |
| VB722-IC722 | B016281.D | 07/07/03 | 11:22 | 02:40 | Initial cal 100 |

# Volatile Internal Standard Area Summary



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VB728-CC722 | Injection Date: | 07/14/03 |
| Lab File ID: | B016421.D | Injection Time: | 10:37 |
| Instrument ID: | GCMSB | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| Check Std | 1794138 | 9.56 | 1440600 | 12.78 | 794912 | 15.32 | 151377 | 6.87 |
| Upper Limit [a] | 3588276 | 10.06 | 2881200 | 13.28 | 1589824 | 15.82 | 302754 | 7.37 |
| Lower Limit [b] | 897069 | 9.06 | 720300 | 12.28 | 397456 | 14.82 | 75689 | 6.37 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| VB728-BS | 1823809 | 9.56 | 1478539 | 12.78 | 790843 | 15.32 | 154788 | 6.87 |
| VB728-MB | 1741351 | 9.56 | 1334445 | 12.78 | 624194 | 15.32 | 136998 | 6.88 |
| ZZZZZZ | 1623604 | 9.56 | 1242339 | 12.78 | 578616 | 15.32 | 182554 | 6.89 |
| ZZZZZZ | 1563163 | 9.56 | 1171347 | 12.78 | 526860 | 15.32 | 118764 | 6.89 |
| ZZZZZZ | 1532368 | 9.56 | 1120702 | 12.78 | 507313 | 15.32 | 119995 | 6.89 |
| F18521-1 | 1508638 | 9.56 | 1099634 | 12.78 | 482192 | 15.32 | 114875 | 6.89 |
| F18521-1MS | 2833878 | 9.56 | 2257396 | 12.78 | 1200416 | 15.32 | 224954 | 6.87 |
| F18521-1MSD | 2793074 | 9.56 | 2246982 | 12.78 | 1232360 | 15.32 | 225257 | 6.88 |
| F18541-1 | 2645906 | 9.56 | 2048138 | 12.78 | 972605 | 15.32 | 201714 | 6.89 |
| F18541-2 | 2246084 | 9.56 | 1727479 | 12.78 | 829151 | 15.32 | 164473 | 6.89 |
| F18541-3 | 1935353 | 9.56 | 1487858 | 12.78 | 686203 | 15.32 | 146390 | 6.89 |
| ZZZZZZ | 1857426 | 9.56 | 1519988 | 12.78 | 783625 | 15.32 | 143651 | 6.87 |
| ZZZZZZ | 1919800 | 9.56 | 1722489 | 12.78 | 988357 | 15.32 | 133022 | 6.88 |
| ZZZZZZ | 2652169 | 9.56 | 2125115 | 12.78 | 1097301 | 15.32 | 192181 | 6.88 |
| ZZZZZZ | 2656530 | 9.56 | 2121357 | 12.78 | 1116502 | 15.32 | 185189 | 6.88 |

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

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

# Volatile Surrogate Recovery Summary



Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Method: SW846 8260B Matrix: AQ

Samples and QC shown here apply to the above method

| Lab Sample ID | Lab File ID | S1 | S2 | S3 | S4 |
|---|---|---|---|---|---|
| F18541-1 | B016432.D | 104.0 | 101.0 | 104.0 | 99.0 |
| F18541-2 | B016433.D | 104.0 | 101.0 | 105.0 | 100.0 |
| F18541-3 | B016434.D | 105.0 | 105.0 | 105.0 | 101.0 |
| F18521-1MS | B016430.D | 104.0 | 108.0 | 105.0 | 94.0 |
| F18521-1MSD | B016431.D | 102.0 | 107.0 | 104.0 | 93.0 |
| VB728-BS | B016422.D | 107.0 | 120.0 | 104.0 | 97.0 |
| VB728-MB | B016423.D | 109.0 | 115.0 | 106.0 | 104.0 |

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

# Initial Calibration Summary

Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB722-ICC722
Lab FileID: B016279.D

Response Factor Report MSVOA4

Method : C:\MSDCHEM\1\METHODS\82600707.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Tue Jul 08 14:31:40 2003
Response via : Initial Calibration

Calibration Files
1 =B016276.D 2 =B016277.D 3 =B016278.D
4 =B016279.D 5 =B016280.D 6 =B016281.D

| | | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) | I | Fluorobenzene | ----------ISTD---------- | | | | | | | |
| 2) | | Dichlorodifluoromet | 0.284 | 0.277 | 0.312 | 0.280 | 0.281 | 0.278 | 0.285 | 4.70 |
| 3) | P | Chloromethane | 0.863 | 0.709 | 0.759 | 0.735 | 0.714 | 0.719 | 0.750 | 7.80 |
| 4) | C | Vinyl Chloride | 0.522 | 0.463 | 0.502 | 0.476 | 0.482 | 0.493 | 0.490 | 4.22 |
| 5) | | Bromomethane | 0.277 | 0.227 | 0.251 | 0.231 | 0.228 | 0.233 | 0.241 | 8.04 |
| 6) | | Chloroethane | 0.252 | 0.224 | 0.238 | 0.237 | 0.222 | 0.227 | 0.233 | 4.81 |
| 7) | | Trichlorofluorometh | 0.416 | 0.333 | 0.385 | 0.359 | 0.387 | 0.388 | 0.378 | 7.48 |
| 8) | | Ethyl Ether | 0.565 | 0.611 | 0.608 | 0.584 | 0.589 | 0.576 | 0.589 | 3.06 |
| 9) | | 1,2-Dichloro-1,1,2- | 0.399 | 0.375 | 0.396 | 0.338 | 0.340 | 0.314 | 0.360 | 9.72 |
| 10) | | Acrolein | 0.041 | 0.039 | 0.033 | 0.031 | 0.031 | 0.032 | 0.035 | 12.82 |
| 11) | | Freon 113 | 0.331 | 0.316 | 0.300 | 0.261 | 0.266 | 0.243 | 0.286 | 12.05 |
| 12) | C | 1,1-Dichloroethene | 0.680 | 0.676 | 0.594 | 0.540 | 0.586 | 0.559 | 0.606 | 9.78 |
| 13) | | Acetone | 0.266 | 0.178 | 0.126 | 0.122 | 0.125 | 0.122 | 0.157 | 37.03 |
| | | ----- Linear regression ----- Coefficient = 0.9997 | | | | | | | | |
| | | Response Ratio = 0.01699 + 0.12083 *A | | | | | | | | |
| 14) | | Iodomethane | 0.481 | 0.419 | 0.392 | 0.392 | 0.401 | 0.410 | 0.416 | 8.10 |
| 15) | | Carbon Disulfide | 0.964 | 0.872 | 0.841 | 0.802 | 0.808 | 0.794 | 0.847 | 7.58 |
| 16) | | Methyl acetate | 0.280 | 0.278 | 0.279 | 0.275 | 0.275 | 0.290 | 0.280 | 2.01 |
| 17) | | Methylene Chloride | 0.761 | 0.690 | 0.629 | 0.602 | 0.599 | 0.601 | 0.647 | 10.15 |
| 18) | | Methyl Tert Butyl E | 0.499 | 0.529 | 0.557 | 0.566 | 0.585 | 0.598 | 0.556 | 6.60 |
| 19) | | trans-1,2-Dichloroe | 0.492 | 0.507 | 0.486 | 0.480 | 0.483 | 0.488 | 0.489 | 1.94 |
| 20) | | Acrylonitrile | 0.095 | 0.144 | 0.136 | 0.124 | 0.124 | 0.132 | 0.126 | 13.39 |
| 21) | | Hexane | 0.407 | 0.412 | 0.431 | 0.396 | 0.412 | 0.404 | 0.410 | 2.82 |
| 22) | | Di-isopropyl ether | 1.209 | 1.343 | 1.461 | 1.476 | 1.506 | 1.531 | 1.421 | 8.61 |
| 23) | | Vinyl acetate | 0.757 | 0.936 | 0.969 | 0.951 | 0.910 | 0.957 | 0.913 | 8.66 |
| 24) | P | 1,1-Dichloroethane | 0.646 | 0.617 | 0.588 | 0.574 | 0.571 | 0.581 | 0.596 | 4.98 |
| 25) | | ETBE | 0.726 | 0.833 | 0.906 | 0.936 | 0.953 | 0.969 | 0.887 | 10.42 |
| 26) | | 2-Butanone | 0.159 | 0.166 | 0.175 | 0.177 | 0.180 | 0.189 | 0.174 | 6.20 |
| 27) | | 2,2-Dichloropropane | 0.283 | 0.285 | 0.282 | 0.270 | 0.266 | 0.256 | 0.273 | 4.23 |
| 28) | | cis-1,2-Dichloroeth | 0.285 | 0.275 | 0.288 | 0.286 | 0.286 | 0.288 | 0.285 | 1.66 |
| 29) | | Bromochloromethane | 0.130 | 0.139 | 0.136 | 0.135 | 0.138 | 0.142 | 0.136 | 2.96 |
| 30) | | Tetrahydrofuran | | 0.106 | 0.104 | 0.105 | 0.107 | 0.115 | 0.107 | 4.16 |
| 31) | C | Chloroform | 0.507 | 0.494 | 0.483 | 0.473 | 0.475 | 0.469 | 0.484 | 3.02 |
| 32) | S | Dibromofluoromethan | 0.282 | 0.275 | 0.277 | 0.282 | 0.277 | 0.279 | 0.279 | 0.99 |
| 33) | | 1,1,1-Trichloroetha | 0.436 | 0.407 | 0.401 | 0.388 | 0.388 | 0.385 | 0.401 | 4.78 |
| 34) | | Cyclohexane | 0.481 | 0.526 | 0.586 | 0.556 | 0.596 | 0.576 | 0.554 | 7.79 |
| 35) | | Carbon Tetrachlorid | 0.356 | 0.360 | 0.365 | 0.360 | 0.372 | 0.373 | 0.364 | 1.91 |
| 36) | | 1,1-Dichloropropene | 0.291 | 0.313 | 0.333 | 0.333 | 0.339 | 0.331 | 0.323 | 5.64 |
| 37) | S | 1,2-Dichloroethane- | 0.332 | 0.339 | 0.344 | 0.344 | 0.346 | 0.353 | 0.343 | 2.05 |
| 38) | | TAME | 0.528 | 0.606 | 0.645 | 0.670 | 0.694 | 0.702 | 0.641 | 10.21 |
| 39) | | Benzene | 1.270 | 1.109 | 1.094 | 1.069 | 1.078 | 1.055 | 1.113 | 7.14 |
| 40) | | 1,2-Dichloroethane | 0.465 | 0.444 | 0.453 | 0.441 | 0.436 | 0.436 | 0.446 | 2.55 |
| 41) | | Trichloroethene | 0.280 | 0.249 | 0.264 | 0.269 | 0.286 | 0.282 | 0.272 | 5.11 |
| 42) | | Methylcyclohexane | 0.275 | 0.311 | 0.365 | 0.345 | 0.366 | 0.357 | 0.337 | 10.87 |
| 43) | C | 1,2-Dichloropropane | 0.317 | 0.339 | 0.338 | 0.339 | 0.339 | 0.337 | 0.335 | 2.68 |

Job Number: F18541 Sample: VB722-ICC722
Account: TETRPAPT Tetra Tech, NUS Lab FileID: B016279.D
Project: NAS Cecil Field-CTO-248

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 44) | | Dibromomethane | 0.176 | 0.176 | 0.176 | 0.179 | 0.181 | 0.183 | 0.178 | 1.69 |
| 45) | | Bromodichloromethan | 0.364 | 0.367 | 0.359 | 0.363 | 0.374 | 0.375 | 0.367 | 1.69 |
| 46) | | 2-Chloroethyl vinyl | | 0.166 | 0.191 | 0.197 | 0.202 | 0.214 | 0.194 | 9.21 |
| 47) | | 2-Nitropropane | 0.093 | 0.099 | 0.107 | 0.109 | 0.110 | 0.114 | 0.106 | 7.39 |
| 48) | | cis-1,3-Dichloropro | 0.348 | 0.401 | 0.428 | 0.448 | 0.455 | 0.453 | 0.422 | 9.85 |
| 49) | | 4-Methyl-2-pentanon | | 0.359 | 0.396 | 0.398 | 0.416 | 0.439 | 0.402 | 7.33 |
| 50) | I | Chlorobenzene-d5 | ----------ISTD---------- | | | | | | | |
| 51) | S | Toluene-d8 | 1.214 | 1.221 | 1.204 | 1.198 | 1.189 | 1.154 | 1.197 | 1.98 |
| 52) | C | Toluene | | 1.459 | 1.413 | 1.410 | 1.423 | 1.385 | 1.418 | 1.90 |
| 53) | | trans-1,3-Dichlorop | 0.372 | 0.439 | 0.472 | 0.497 | 0.504 | 0.496 | 0.463 | 10.98 |
| 54) | | 1,1,2-Trichloroetha | 0.253 | 0.272 | 0.263 | 0.257 | 0.257 | 0.251 | 0.259 | 2.89 |
| 55) | | Tetrachloroethene | 0.342 | 0.344 | 0.339 | 0.334 | 0.347 | 0.354 | 0.343 | 1.98 |
| 56) | | 2-hexanone | | 0.282 | 0.335 | 0.340 | 0.350 | 0.361 | 0.334 | 9.22 |
| 57) | | 1,3-Dichloropropane | 0.509 | 0.528 | 0.522 | 0.519 | 0.515 | 0.495 | 0.515 | 2.23 |
| 58) | | Dibromochloromethan | 0.306 | 0.341 | 0.336 | 0.346 | 0.362 | 0.371 | 0.344 | 6.57 |
| 59) | | 1,2-Dibromoethane | 0.271 | 0.293 | 0.290 | 0.303 | 0.310 | 0.313 | 0.297 | 5.19 |
| 60) | | 1-Chlorohexane | | 0.339 | 0.414 | 0.421 | 0.442 | 0.432 | 0.410 | 9.92 |
| 61) | P | Chlorobenzene | 1.015 | 0.997 | 0.954 | 0.953 | 0.974 | 0.965 | 0.976 | 2.54 |
| 62) | C | Ethylbenzene | 1.453 | 1.567 | 1.557 | 1.594 | 1.621 | 1.597 | 1.565 | 3.79 |
| 63) | | 1,1,1,2-Tetrachloro | 0.366 | 0.354 | 0.351 | 0.362 | 0.372 | 0.375 | 0.363 | 2.63 |
| 64) | | m,p-Xylene | 1.016 | 1.173 | 1.219 | 1.240 | 1.285 | 1.303 | 1.206 | 8.64 |
| 65) | | o-Xylene | | 1.113 | 1.236 | 1.285 | 1.318 | 1.332 | 1.257 | 7.05 |
| 66) | | Styrene | | 0.844 | 0.944 | 0.994 | 1.033 | 1.049 | 0.973 | 8.49 |
| 67) | P | Bromoform | | 0.212 | 0.225 | 0.238 | 0.245 | 0.264 | 0.237 | 8.39 |
| 68) | I | 1,4-Dichlorobenzene-d | ----------ISTD---------- | | | | | | | |
| 69) | | Isopropylbenzene | 2.058 | 2.453 | 2.639 | 2.665 | 2.606 | 2.609 | 2.505 | 9.23 |
| 70) | | Cyclohexanone | 0.054 | 0.034 | 0.024 | 0.022 | 0.023 | 0.024 | 0.030 | 40.90 |
| | | ----- Linear regression ----- Coefficient = 0.9973 | | | | | | | | |
| | | Response Ratio = 0.00146 + 0.02362 *A | | | | | | | | |
| 71) | S | 4-Bromofluorobenzen | 0.990 | 0.991 | 0.940 | 0.962 | 0.904 | 0.901 | 0.948 | 4.22 |
| 72) | P | 1,1,2,2-Tetrachloro | 0.835 | 0.806 | 0.779 | 0.759 | 0.693 | 0.694 | 0.761 | 7.62 |
| 73) | | trans-1,4-Dichloro- | 0.257 | 0.316 | 0.324 | 0.336 | 0.337 | 0.354 | 0.321 | 10.55 |
| 74) | | n-Propylbenzene | 3.001 | 3.591 | 3.729 | 3.781 | 3.658 | 3.694 | 3.576 | 8.07 |
| 75) | | Bromobenzene | 0.807 | 0.835 | 0.793 | 0.809 | 0.800 | 0.822 | 0.811 | 1.86 |
| 76) | | 1,2,3-Trichloroprop | 0.231 | 0.221 | 0.206 | 0.206 | 0.201 | 0.206 | 0.212 | 5.53 |
| 77) | | 1,3,5-Trimethylbenz | 1.665 | 2.158 | 2.296 | 2.361 | 2.335 | 2.393 | 2.201 | 12.50 |
| 78) | | 2-Chlorotoluene | 2.170 | 2.557 | 2.499 | 2.526 | 2.436 | 2.492 | 2.447 | 5.78 |
| 79) | | 4-Chlorotoluene | 1.816 | 2.104 | 2.174 | 2.220 | 2.156 | 2.154 | 2.104 | 6.93 |
| 80) | | tert-Butylbenzene | 1.057 | 1.225 | 1.380 | 1.388 | 1.367 | 1.373 | 1.298 | 10.26 |
| 81) | | 1,2,4-Trimethylbenz | 1.700 | 2.226 | 2.330 | 2.409 | 2.360 | 2.396 | 2.237 | 12.13 |
| 82) | | sec-Butylbenzene | 1.991 | 2.576 | 2.814 | 2.834 | 2.795 | 2.779 | 2.632 | 12.44 |
| 83) | | 4-Isopropyltoluene | | 2.058 | 2.243 | 2.291 | 2.296 | 2.340 | 2.246 | 4.92 |
| 84) | | 1,3-Dichlorobenzene | 1.317 | 1.472 | 1.438 | 1.459 | 1.445 | 1.480 | 1.435 | 4.20 |
| 85) | | 1,4-Dichlorobenzene | 1.317 | 1.591 | 1.529 | 1.525 | 1.509 | 1.539 | 1.502 | 6.32 |
| 86) | | Benzyl Chloride | 1.197 | 1.223 | 1.346 | 1.377 | 1.363 | 1.369 | 1.312 | 6.14 |
| 87) | | n-Butylbenzene | 1.655 | 2.099 | 2.278 | 2.305 | 2.299 | 2.273 | 2.151 | 11.85 |
| 88) | | 1,2-Dichlorobenzene | 1.469 | 1.426 | 1.399 | 1.433 | 1.442 | 1.470 | 1.440 | 1.87 |
| 89) | | 1,2-Dibromo-3-Chlor | 0.132 | 0.116 | 0.109 | 0.110 | 0.110 | 0.115 | 0.115 | 7.47 |
| 90) | | 1,2,4-Trichlorobenz | 0.809 | 0.773 | 0.818 | 0.854 | 0.859 | 0.920 | 0.839 | 6.03 |
| 91) | | Hexachlorobutadiene | 0.407 | 0.361 | 0.358 | 0.353 | 0.350 | 0.362 | 0.365 | 5.77 |
| 92) | | Naphthalene | 1.469 | 1.464 | 1.717 | 1.834 | 1.867 | 1.987 | 1.723 | 12.57 |
| 93) | | 1,2,3-Trichlorobenz | 0.670 | 0.673 | 0.739 | 0.769 | 0.774 | 0.823 | 0.741 | 8.17 |
| 94) | I | Tert Butyl alcohol-d1 | ----------ISTD---------- | | | | | | | |
| 95) | | Tert-Butyl Alcohol | 2.075 | 2.115 | 2.019 | 2.081 | 2.021 | 2.195 | 2.084 | 3.16 |
| 96) | | 1,4-Dioxane | | 0.151 | 0.168 | 0.184 | 0.189 | 0.200 | 0.178 | 10.81 |

# Initial Calibration Summary

Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB722-ICC722
Lab FileID: B016279.D

(#) = Out of Range

82600707.M Tue Jul 08 14:43:03 2003 RPT1

# Continuing Calibration Summary

Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB728-CC722
Lab FileID: B016421.D

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\071403\B016421.D  Vial: 1
Acq On : 14 Jul 2003 10:37 am  Operator: Karenw
Sample : CC722-40  Inst : MSVOA4
Misc : ms2390,vb728,,,,,  Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\82600707.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Tue Jul 08 14:31:40 2003
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | I | Fluorobenzene | 1.000 | 1.000 | 0.0 | 163 | 0.00 |
| 2 | | Dichlorodifluoromethane | 0.285 | 0.185 | 35.1# | 108 | 0.00 |
| 3 | P | Chloromethane | 0.750 | 0.490 | 34.7# | 109 | 0.00 |
| 4 | C | Vinyl Chloride | 0.490 | 0.414 | 15.5 | 142 | 0.00 |
| 5 | | Bromomethane | 0.241 | 0.256 | -6.2 | 181 | 0.00 |
| 6 | | Chloroethane | 0.233 | 0.241 | -3.4 | 167 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.378 | 0.534 | -41.3# | 243# | 0.00 |
| 8 | | Ethyl Ether | 0.589 | 0.640 | -8.7 | 179 | 0.00 |
| 9 | | 1,2-Dichloro-1,1,2-trifluor | 0.360 | 0.427 | -18.6 | 206# | 0.00 |
| 10 | | Acrolein | 0.035 | 0.028 | 20.0# | 145 | 0.00 |
| 11 | | Freon 113 | 0.286 | 0.318 | -11.2 | 199 | 0.00 |
| 12 | C | 1,1-Dichloroethene | 0.606 | 0.544 | 10.2 | 165 | 0.00 |
| 13 | | Acetone | 0.157 | 0.099 | 36.9# | 132 | 0.00 |
| 14 | | Iodomethane | 0.416 | 0.421 | -1.2 | 175 | 0.00 |
| 15 | | Carbon Disulfide | 0.847 | 0.753 | 11.1 | 154 | 0.00 |
| 16 | | Methyl acetate | 0.280 | 0.240 | 14.3 | 143 | 0.00 |
| 17 | | Methylene Chloride | 0.647 | 0.556 | 14.1 | 151 | 0.00 |
| 18 | | Methyl Tert Butyl Ether | 0.556 | 0.626 | -12.6 | 181 | 0.00 |
| 19 | | trans-1,2-Dichloroethene | 0.489 | 0.454 | 7.2 | 155 | 0.00 |
| 20 | | Acrylonitrile | 0.126 | 0.091 | 27.8# | 119 | 0.00 |
| 21 | | Hexane | 0.410 | 0.379 | 7.6 | 156 | 0.00 |
| 22 | | Di-isopropyl ether | 1.421 | 1.335 | 6.1 | 148 | 0.00 |
| 23 | | Vinyl acetate | 0.913 | 0.814 | 10.8 | 140 | 0.00 |
| 24 | P | 1,1-Dichloroethane | 0.596 | 0.564 | 5.4 | 161 | 0.00 |
| 25 | | ETBE | 0.887 | 0.914 | -3.0 | 160 | 0.00 |
| 26 | | 2-Butanone | 0.174 | 0.139 | 20.1# | 129 | 0.00 |
| 27 | | 2,2-Dichloropropane | 0.273 | 0.314 | -15.0 | 190 | 0.00 |
| 28 | | cis-1,2-Dichloroethene | 0.285 | 0.268 | 6.0 | 153 | 0.00 |
| 29 | | Bromochloromethane | 0.136 | 0.132 | 2.9 | 160 | 0.00 |
| 30 | | Tetrahydrofuran | 0.107 | 0.086 | 19.6 | 134 | 0.00 |
| 31 | C | Chloroform | 0.484 | 0.494 | -2.1 | 171 | 0.00 |
| 32 | S | Dibromofluoromethane | 0.279 | 0.300 | -7.5 | 174 | 0.00 |
| 33 | | 1,1,1-Trichloroethane | 0.401 | 0.449 | -12.0 | 189 | 0.00 |
| 34 | | Cyclohexane | 0.554 | 0.516 | 6.9 | 152 | 0.00 |
| 35 | | Carbon Tetrachloride | 0.364 | 0.433 | -19.0 | 197 | 0.00 |
| 36 | | 1,1-Dichloropropene | 0.323 | 0.331 | -2.5 | 162 | 0.00 |
| 37 | S | 1,2-Dichloroethane-d4 | 0.343 | 0.406 | -18.4 | 193 | 0.00 |
| 38 | | TAME | 0.641 | 0.670 | -4.5 | 163 | 0.00 |
| 39 | | Benzene | 1.113 | 0.994 | 10.7 | 152 | 0.00 |
| 40 | | 1,2-Dichloroethane | 0.446 | 0.483 | -8.3 | 179 | 0.00 |
| 41 | | Trichloroethene | 0.272 | 0.251 | 7.7 | 153 | 0.00 |
| 42 | | Methylcyclohexane | 0.337 | 0.345 | -2.4 | 163 | 0.00 |

Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB728-CC722
Lab FileID: B016421.D

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 43 | C | 1,2-Dichloropropane | 0.335 | 0.297 | 11.3 | 143 | 0.00 |
| 44 | | Dibromomethane | 0.178 | 0.171 | 3.9 | 156 | 0.00 |
| 45 | | Bromodichloromethane | 0.367 | 0.377 | -2.7 | 170 | 0.00 |
| 46 | | 2-Chloroethyl vinyl ether | 0.194 | 0.157 | 19.1 | 130 | 0.00 |
| 47 | | 2-Nitropropane | 0.106 | 0.112 | -5.7 | 167 | 0.00 |
| 48 | | cis-1,3-Dichloropropene | 0.422 | 0.426 | -0.9 | 155 | 0.00 |
| 49 | | 4-Methyl-2-pentanone | 0.402 | 0.337 | 16.2 | 138 | 0.00 |
| 50 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 163 | 0.00 |
| 51 | S | Toluene-d8 | 1.197 | 1.253 | -4.7 | 170 | 0.00 |
| 52 | C | Toluene | 1.418 | 1.356 | 4.4 | 156 | 0.00 |
| 53 | | trans-1,3-Dichloropropene | 0.463 | 0.492 | -6.3 | 161 | 0.00 |
| 54 | | 1,1,2-Trichloroethane | 0.259 | 0.233 | 10.0 | 148 | 0.00 |
| 55 | | Tetrachloroethene | 0.343 | 0.360 | -5.0 | 175 | 0.00 |
| 56 | | 2-hexanone | 0.334 | 0.271 | 18.9 | 130 | 0.00 |
| 57 | | 1,3-Dichloropropane | 0.515 | 0.489 | 5.0 | 153 | 0.00 |
| 58 | | Dibromochloromethane | 0.344 | 0.367 | -6.7 | 173 | 0.00 |
| 59 | | 1,2-Dibromoethane | 0.297 | 0.278 | 6.4 | 149 | 0.00 |
| 60 | | 1-Chlorohexane | 0.410 | 0.394 | 3.9 | 152 | 0.00 |
| 61 | P | Chlorobenzene | 0.976 | 0.936 | 4.1 | 160 | 0.00 |
| 62 | C | Ethylbenzene | 1.565 | 1.564 | 0.1 | 159 | 0.00 |
| 63 | | 1,1,1,2-Tetrachloroethane | 0.363 | 0.383 | -5.5 | 172 | 0.00 |
| 64 | | m,p-Xylene | 1.206 | 1.262 | -4.6 | 166 | 0.00 |
| 65 | | o-Xylene | 1.257 | 1.282 | -2.0 | 162 | 0.00 |
| 66 | | Styrene | 0.973 | 0.947 | 2.7 | 155 | 0.00 |
| 67 | P | Bromoform | 0.237 | 0.257 | -8.4 | 175 | 0.00 |
| 68 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 175 | 0.00 |
| 69 | | Isopropylbenzene | 2.505 | 2.510 | -0.2 | 165 | 0.00 |
| 70 | | Cyclohexanone | 0.030 | 0.016 | 46.7# | 125 | 0.00 |
| 71 | S | 4-Bromofluorobenzene | 0.948 | 0.915 | 3.5 | 167 | 0.00 |
| 72 | P | 1,1,2,2-Tetrachloroethane | 0.761 | 0.627 | 17.6 | 145 | 0.00 |
| 73 | | trans-1,4-Dichloro-2-Butene | 0.321 | 0.271 | 15.6 | 141 | 0.00 |
| 74 | | n-Propylbenzene | 3.576 | 3.444 | 3.7 | 160 | 0.00 |
| 75 | | Bromobenzene | 0.811 | 0.800 | 1.4 | 173 | 0.00 |
| 76 | | 1,2,3-Trichloropropane | 0.212 | 0.189 | 10.8 | 160 | 0.00 |
| 77 | | 1,3,5-Trimethylbenzene | 2.201 | 2.270 | -3.1 | 168 | 0.00 |
| 78 | | 2-Chlorotoluene | 2.447 | 2.404 | 1.8 | 167 | 0.00 |
| 79 | | 4-Chlorotoluene | 2.104 | 2.032 | 3.4 | 160 | 0.00 |
| 80 | | tert-Butylbenzene | 1.298 | 1.388 | -6.9 | 175 | 0.00 |
| 81 | | 1,2,4-Trimethylbenzene | 2.237 | 2.269 | -1.4 | 165 | 0.00 |
| 82 | | sec-Butylbenzene | 2.632 | 2.639 | -0.3 | 163 | 0.00 |
| 83 | | 4-Isopropyltoluene | 2.246 | 2.197 | 2.2 | 168 | 0.00 |
| 84 | | 1,3-Dichlorobenzene | 1.435 | 1.408 | 1.9 | 169 | 0.00 |
| 85 | | 1,4-Dichlorobenzene | 1.502 | 1.436 | 4.4 | 165 | 0.00 |
| 86 | | Benzyl Chloride | 1.312 | 1.172 | 10.7 | 149 | 0.00 |
| 87 | | n-Butylbenzene | 2.151 | 2.082 | 3.2 | 158 | 0.00 |
| 88 | | 1,2-Dichlorobenzene | 1.440 | 1.355 | 5.9 | 166 | 0.00 |
| 89 | | 1,2-Dibromo-3-Chloropropane | 0.115 | 0.097 | 15.7 | 155 | 0.00 |
| 90 | | 1,2,4-Trichlorobenzene | 0.839 | 0.778 | 7.3 | 160 | 0.00 |
| 91 | | Hexachlorobutadiene | 0.365 | 0.390 | -6.8 | 193 | 0.00 |
| 92 | | Naphthalene | 1.723 | 1.436 | 16.7 | 137 | 0.00 |
| 93 | | 1,2,3-Trichlorobenzene | 0.741 | 0.690 | 6.9 | 157 | 0.00 |
| 94 | I | Tert Butyl alcohol-d10 | 1.000 | 1.000 | 0.0 | 247# | 0.00 |
| 95 | | Tert-Butyl Alcohol | 2.084 | 1.299 | 37.7# | 154 | 0.00 |
| 96 | | 1,4-Dioxane | 0.178 | 0.108 | 39.3# | 145 | 0.00 |

Average % D = 10.5

# Continuing Calibration Summary

Job Number: F18541
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB728-CC722
Lab FileID: B016421.D

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(#) = Out of Range SPCC's out = 0 CCC's out = 0
B016279.D 82600707.M Tue Jul 15 09:13:37 2003 RPT1

TETRA TECH NUS, INC.

CHAIN OF CUSTODY | NUMBER 2326 F18541 PAGE 1 OF 1

| PROJECT NO: | FACILITY: | PROJECT MANAGER | PHONE NUMBER | LABORATORY NAME AND CONTACT: |
|---|---|---|---|---|
| N4248 CTO 248 | NSAP, NASCF | PAUL CALLIGAN | 813 806 0202 | ACCUTEST Sue Bell |
| SAMPLERS/(SIGNATURE) | | FIELD OPERATIONS LEADER | PHONE NUMBER | ADDRESS |
| M. W. Dale FOR S.M. | | M. DALE | 904 636 6125 | 4405 Vineland Rd. C-15 |
| | | CARRIER/WAYBILL NUMBER | | CITY, STATE |
| | | Fedex 826 885 162828 | | ORLANDO, FL 32811 |

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

CONTAINER TYPE PLASTIC (P) or GLASS (G): G
PRESERVATIVE USED: HCL

TYPE OF ANALYSIS: BTEX 8260B

| | DATE YEAR 2003 | TIME | SAMPLE ID | LOCATION ID | TOP DEPTH (FT) | BOTTOM DEPTH (FT) | MATRIX (GW, SO, SW, SD, QC, ETC.) | COLLECTION METHOD GRAP (G) COMP (C) | No. OF CONTAINERS | BTEX | | | | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 7/11 | 0935 | CEF-M18-11D-06 | | | | GW | G | 3 | 3 | | | | | | | | Cool to 4°C |
| 2 | 7/11 | 1030 | CEF-M18-12D-06 | | | | GW | G | 3 | 3 | | | | | | | | |
| 3. | 7/11 | 0000 | CEF-M18-DUPI-06 | | | | GW | G | 3 | 3 | | | | | | | | N3996-WR359 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. RELINQUISHED BY: M. W. Dale | DATE: 7/11/03 | TIME: 1600 | 1. RECEIVED BY: FedEx Accutest courier | DATE: 7/11/03 | TIME |
| 2. RELINQUISHED BY: Accutest courier | DATE: 07/11/03 | TIME: 1740 | 2. RECEIVED BY: [illegible] | DATE: 07/11/03 | TIME: 0730 |
| 3. RELINQUISHED BY | DATE | TIME | 3. RECEIVED BY | DATE | TIME |

COMMENTS: 9.0°C.

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

4/02R
FORM NO. TtNUS-001