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

11/17/2003

TETRA TECH NUS INC

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November 17, 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 Contract Number N62467-94-D-0888
Contract Task Order Number 0248

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

Dear Mr. Grabka:

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

**Site History**

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

**Purpose and Goals**

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

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

**Second Quarter Groundwater Sampling Activities**

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

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

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

**Discussion of Groundwater Flow Data**

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

**Discussion of Groundwater Analytical Results**

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

The laboratory analytical results from the second quarter sampling event indicate that ethylbenzene; total xylenes; 1,2,4-trimethylbenezene; and 1,3,5-trimethylbenezene were detected in source monitoring well CEF-BP-1S at concentrations that exceeded their respective GCTLs. The concentrations of all COCs reported for perimeter monitoring wells CEF-BP-2S and CEF-BP-6S were below SLDLs. The laboratory analytical results are summarized in Table 2 and depicted on Figure 3.

A comparison of the baseline analytical results with the first quarter analytical results and the second quarter analytical results indicates a general increase in COC concentrations with a small increase in DO concentration (approximately 0.2 mg/L as observed by flow cell readings or field test kit method) in the source area.

The natural attenuation parameters collected during the second quarter sampling event were compared to general guidelines to determine if aerobic (oxidizing) or anaerobic (reducing) conditions exist at the site. The data suggests that the groundwater in the vicinity of wells CEF-BP-1S is still in a reducing state. However, geochemical changes observed in samples collected in the source area suggest the iSOC® system is making an impact as noted below:

- An overall increase in DO concentrations was indicated by both flow cell and by field kit methods.
- A decrease in methane production (methanogenesis), which is considered the most extreme form of reducing state.
- An increase in hydrogen sulfide indicates a shift from the extreme reducing state of methanogenesis to the next phase of reduction known as sulfate reduction.
- An increase in ferrous iron indicates a shift to another, less reducing condition known as iron reduction.

The groundwater in the vicinity of upgradient well CEF-BP-2S remains in an oxidizing state. Based upon the data, it appears that CEF-BP-6S is still under marginal aerobic conditions. A summary of the natural attenuation parameters is provided in Table 3. Table 4 shows the concentrations of DO in the three injection wells and the select monitoring wells under study.

**Conclusions**

While the increase in concentration of the COCs is of concern, the change in DO concentrations in the source and perimeter wells indicates that the iSOC® system is impacting the groundwater. It also appears

that a geochemical shift from a methanogenic state to the lesser reducing conditions of sulfate and iron reduction may be occurring in the source area, which supports the conclusion that the DO increase is impacting the groundwater. However, additional data is needed to draw definitive conclusions regarding the effectiveness of the treatability study.

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

Sincerely,

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

Mervin W. Dale, P.G.
Florida Professional Geologist
P.G. Number 0001917

PC/mwd

Attachments (10)

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

# TABLES

**Table 1**
**Groundwater Elevation and Monitoring Well Construction Data**

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

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

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

**Table 2**
**Groundwater Analytical Results**

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

| **Sample Location** | | **CEF-BP-1S** | | |
|---|---|---|---|---|
| **Monitoring Well Type** | | Source Well | | |
| **Sample Identification Number** | | CEF-BP-01S-03 | CEF-BP-GW-1S-04 | CEF-BP0GW-01S-05 |
| **Collection Date** | | 10/3/2002 | 1/6/2003 | 4/17/2003 |
| **COCs** | **GCTL[1] (µg/L)** | **Baseline Sampling** | **1st Quarter Event** | **2nd Quarter Event** |
| Ethylbenzene | 30 | **117** | **161** | **198** |
| 1,2,4-Trimethylbenzene | 10 | **262** | **224** | **313** |
| 1,3,5-Trimethylbenzene | 10 | 5U | **71.5** | **143** |
| Total Xylenes | 20 | **658** | **811** | **662** |
| | | | | |
| **Sample Location** | | **CEF-BP-2S** | | |
| **Monitoring Well Type** | | Upgradient Well | | |
| **Sample Identification Number** | | CEF-BP-02S-3A | CEF-BP-GW-2S-04 | CEF-BP-GW-02S-05 |
| **Collection Date** | | 10/3/2002 | 1/6/2003 | 4/17/2003 |
| **COCs** | **GCTL[1] (µg/L)** | **Baseline Sampling** | **1st Quarter Event** | **2nd Quarter Event** |
| Ethylbenzene | 30 | 1U | 1U | 1U |
| 1,2,4-Trimethylbenzene | 10 | 1U | 1U | 1U |
| 1,3,5-Trimethylbenzene | 10 | 1U | 1U | 1U |
| Total Xylenes | 20 | 3U | 3U | 3U |
| | | | | |
| **Sample Location** | | **CEF-BP-6S** | | |
| **Monitoring Well Type** | | Downgradient Well | | |
| **Sample Identification Number** | | CEF-BP-06S-03 | CEF-BP-GW-6S-04 | CEF-BP-GW-06S-05 |
| **Collection Date** | | 9/24/2002 | 1/6/2003 | 4/17/2003 |
| **COCs** | **GCTL[1] (µg/L)** | **Baseline Sampling** | **1st Quarter Event** | **2nd Quarter Event** |
| Ethylbenzene | 30 | 1U | 1U | 1.2 |
| 1,2,4-Trimethylbenzene | 10 | 1U | 1U | 1U |
| 1,3,5-Trimethylbenzene | 10 | 1U | 1U | 1U |
| Total Xylenes | 20 | 3U | 3U | 3U |

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

**Table 3**
**Natural Attenuation Analytical Results**

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

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

**Notes:**
S.U. = standard units
NTU = nephelometric turbidity units
mV = millivolt
mS/cm = millisiemens per centimeter
°C = degrees celsius
U = value shown adjacent to this letter is the reporting limit concentration.

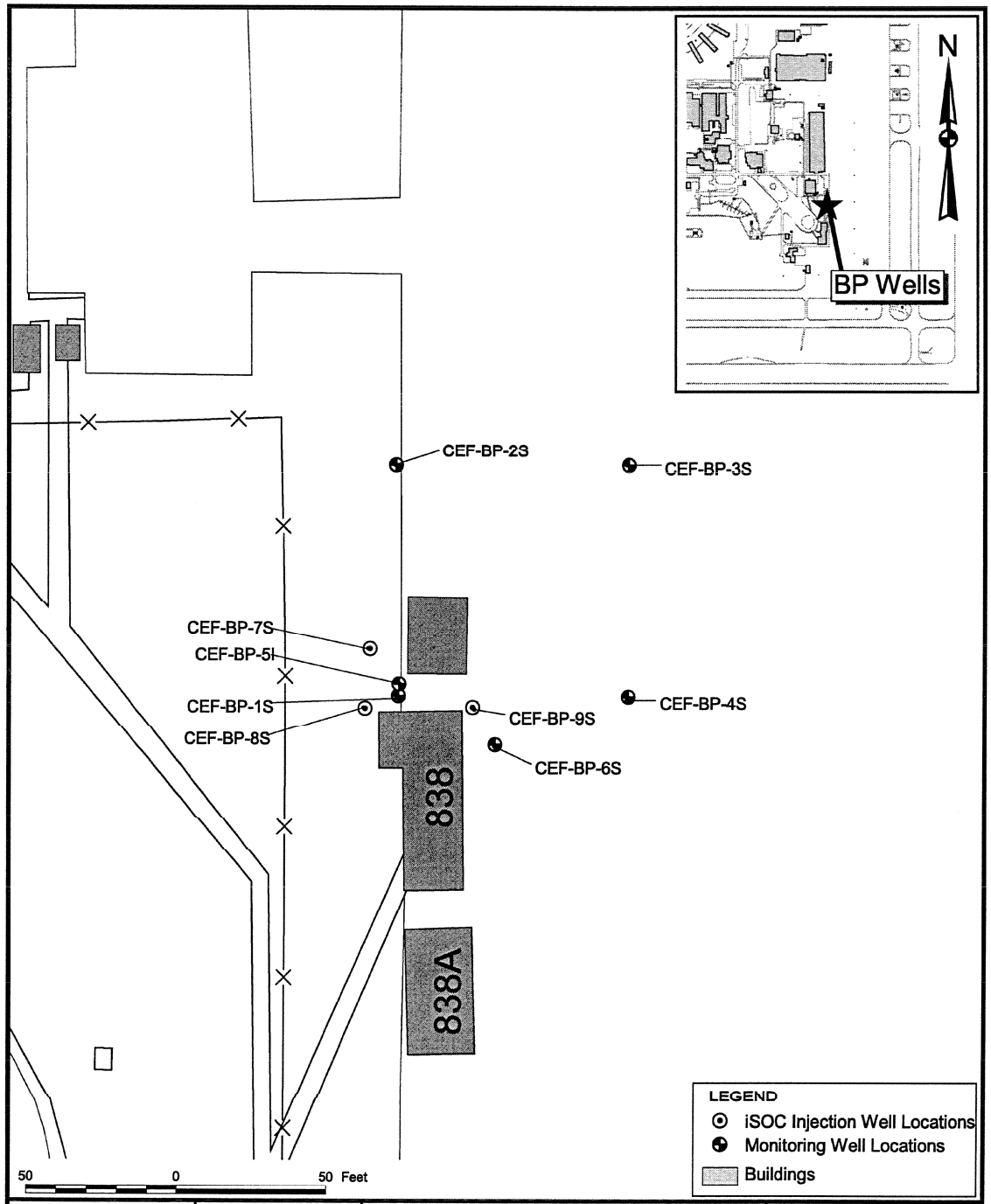
**Table 4**
**DO Concentrations in Injection Wells and Select Monitoring Wells**

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

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

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

# FIGURES




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

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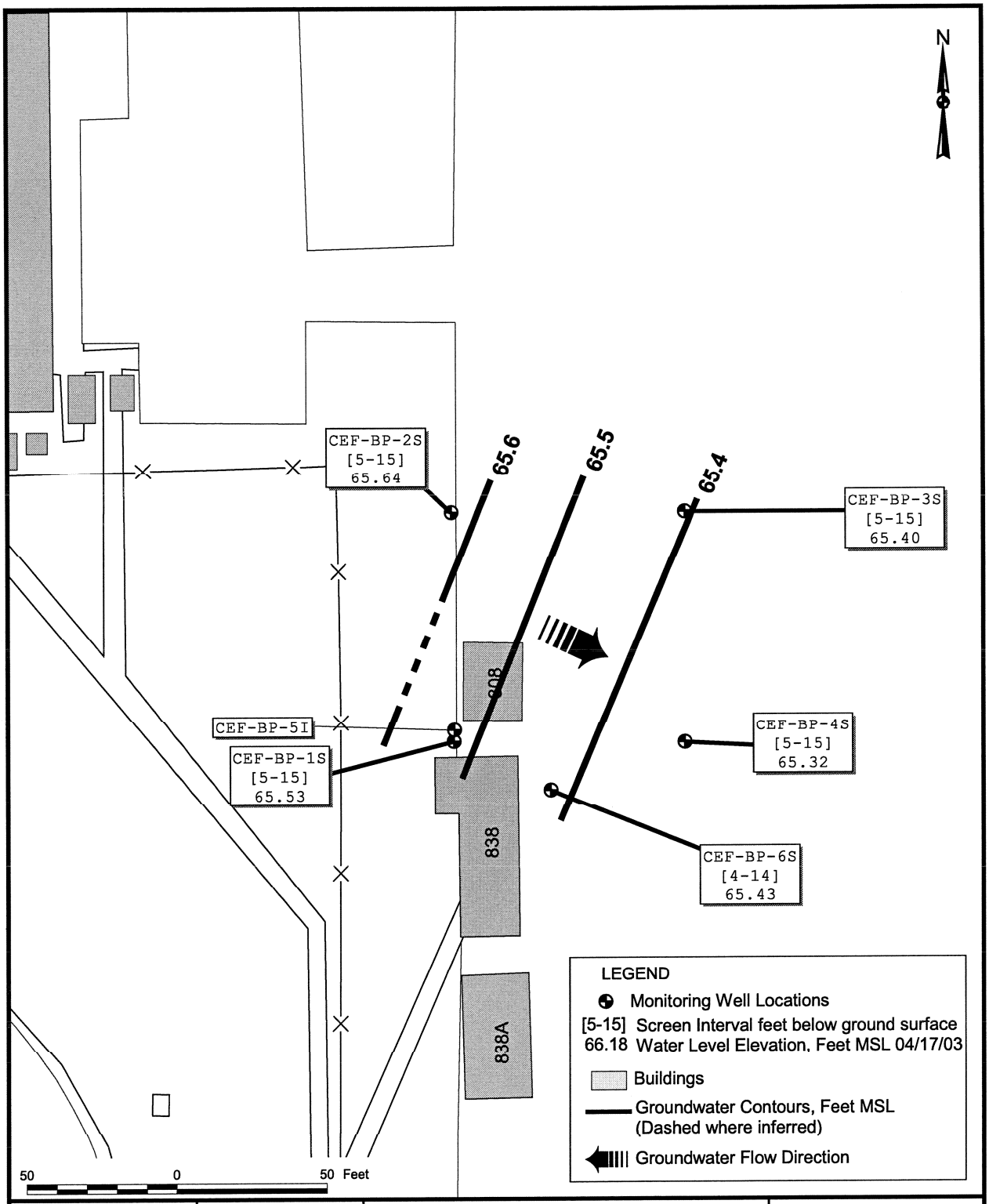


| | | | |
|---|---|---|---|
| DRAWN BY MJJ | DATE 24Mar03 | GROUNDWATER FLOW MAP (04/17/03)<br>BP WELLS SITE<br>TREATABILITY STUDY<br>NAVAL AIR STATION CECIL FIELD<br>JACKSONVILLE, FLORIDA | CONTRACT NUMBER 4248 |
| CHECKED BY | DATE | | APPROVED BY DATE |
| COST/SCHEDULE-AREA | | | APPROVED BY DATE |
| SCALE AS NOTED | | | DRAWING NO. FIGURE 2 / REV 0 |

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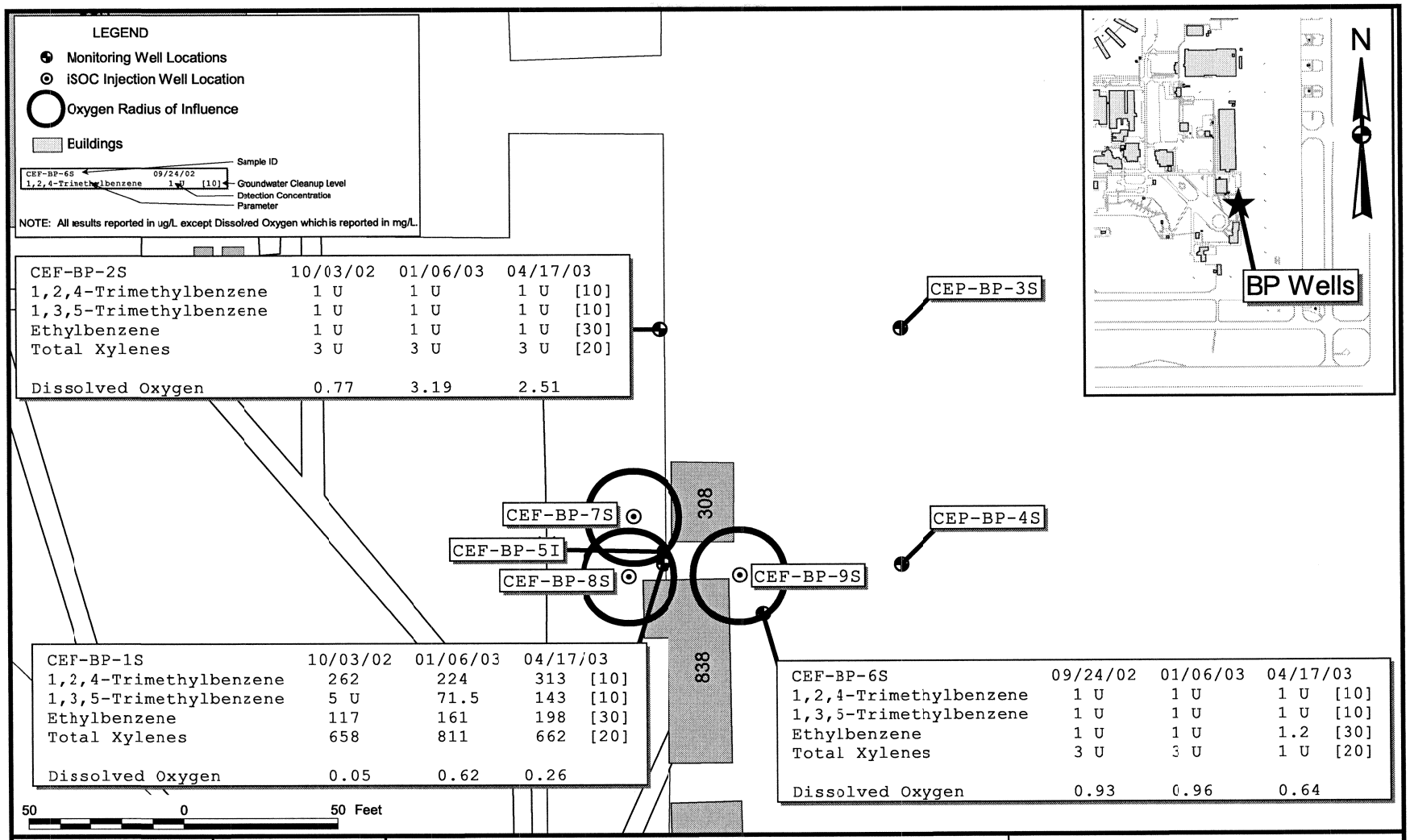


| DRAWN BY | DATE |
|---|---|
| MJJ | 24Mar03 |
| CHECKED BY | DATE |
| | |
| COST/SCHEDULE-AREA | |
| SCALE | |
| AS NOTED | |

COC AND DO MAP (09/24/02 - 04/17/03)

BP WELLS SITE

TREATABILITY STUDY

NAVAL AIR STATION CECIL FIELD

JACKSONVILLE, FLORIDA

| CONTRACT NUMBER | |
|---|---|
| 4248 | |
| APPROVED BY | DATE |
| | |
| APPROVED BY | DATE |
| | |
| DRAWING NO. | REV |
| FIGURE 3 | 0 |

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# ATTACHMENT A

## SECOND QUARTER FIELD DATA FOR APRIL 2003:
## FIELD CALIBRATION LOG
## GROUNDWATER SAMPLE LOG SHEETS
## LOW FLOW PURGE DATA SHEETS

Tetra Tech NUS, Inc.

# DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : NAS CECIL FIELD

SITE NAME: BP Wells

PROJECT No.: N4248MW0050240

INSTRUMENT NAME/MODEL:

MANUFACTURER:

SERIAL NUMBER:

| Date of Calibration | Instrument Name and Model | Instrument I.D. Number | Person Performing Calibration | Instrument Settings | | Instrument Readings | | Calibration Standard (Lot No.) | Remarks and Comments |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Pre-calibration | Post-calibration | Pre-calibration | Post-calibration | | |
| 4-17-03 | YSI-556 | 02F0623 | CM | | Cond - 1409 | 1527 | 1409 | NA | FIELD ENVIRONMENTA |
| | | | | | PH - 4.0 | 3.94 | 4.0 | NA | FIELD ENVIRONMENTAL |
| | | | | | PH - 10.0 | 10.55 | 10.0 | NA | FIELD ENVIRONMENTA |
| | | | | | ORP - 200-275 | 209.8 | | 5230 | EXP 08/05 |
| | YSI-556 | 02H1304 | CM | | Cond - 1409 | 1544 | 1409 | NA | FIELD ENVIRONMENTAL |
| | | | | | PH - 4.0 | 4.11 | 4.0 | NA | FIELD ENVIRONMENTAL |
| | | | | | PH - 10.0 | 9.94 | 10.0 | NA | FIELD ENVIRONMENTAL |
| | | | | | ORP - 200-275 | 182.6 | | 5230 | EXP 08/05 |
| | MINI RAE | 00127 | PL | | 100 PPM | | 96.5 | 109-36-2772 | ISOBUTYLENE |
| | | | | | | | | EXP - 3/05 | |
| | LaMotte 2020 | #0798-2998 | CM | 0.78 NTU | 0.93 NTU | 11.6 NTU | 9.91 NTU | 1.10 NTU | |

# Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: NAS Cecil Field
Project No.: N4248MW0050240

Sample ID No.: CEF-BP- GW - 01S -05
Sample Location: CEF-BP- 01S

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

Sampler: P Leverette

## SAMPLING DATA

| Date: 4/17/03 Time: 1435 Method: Peristaltic | Color | pH S.U. | S.C. mS/cm | Temp. °C | Turbidity NTU | DO mg/L | ORP mV | |
|---|---|---|---|---|---|---|---|---|
| | CLEAR | 6.51 | 0.269 | 20.90 | 0.5 | 0.26 | -114.9 | |

## PURGE DATA

| | |
|---|---|
| Date: | 4/17/03 |
| Method: | Peristaltic |
| Monitor Reading (ppm): | 611 |
| Well Casing Diameter: | 2-inch |
| Well Casing Material: | PVC |
| Total Well Depth (ft): | 14.72 |
| Static Water Level (ft): | 5.76 |
| One Casing Volume(gal/L): | 5.6 |
| Start Purge (hrs): | 1355 |
| End Purge (hrs): | 1430 |
| Total Purge Time (min): | 35 |
| Total Vol. Purged (gal/L): | 10.5 |

See Attached Low Flow Purge Data Sheet for Purge Data

## SAMPLE COLLECTION INFORMATION

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

## OBSERVATIONS / NOTES

Dedicated tubing in situ.

## LAB INFO

LAB: Accutest
4405 Vineland Rd., C-15
Orlando, FL 32811
COC #: 2269

**Check if Collected:**

[ ] MS / MSD [X] DUPLICATE / ID No.: CEF-BP-D1-05

Signature(s): [signature]

Tetra Tech NUS, Inc.

# LOW FLOW PURGE DATA SHEET

**PROJECT SITE NAME:** NAS CECIL FIELD
**PROJECT NUMBER:** N4248MW0050240

**WELL ID.:** CEF-BP-1S
**DATE:** 4/17/03

| Time (Hrs.) | Water Level (Ft. below TOC) | Cum.Vol. (liters) | Flow (mL/Min.) | pH (S.U.) | Cond. (mS/cm) | Turb. (NTU) | DO (mg/L) | Temp. (Celsius) | ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1355 | 5.76 | — | 300 | — | — | — | — | — | — | START PURGE |
| 1405 | 5.80 | 3.0 | 300 | 6.44 | 0.307 | 1.76 | 0.16 | 21.01 | -106.3 | |
| 1415 | 5.80 | 6.0 | 300 | 6.52 | 0.302 | 0.11 | 0.33 | 20.81 | -105.6 | |
| 1420 | 5.79 | 7.5 | 300 | 6.50 | 0.301 | 0.8 | 0.34 | 20.89 | -102.7 | |
| 1425 | 5.80 | 9.0 | 300 | 6.49 | 0.297 | 0.7 | 0.36 | 20.86 | -100.0 | |
| 1430 | 5.80 | 10.5 | 300 | 6.51 | 0.296 | 0.5 | 0.26 | 20.90 | -114.9 | |
| | SAMPLE TIME | | 1435 | | | | | | | |

**SIGNATURE(S):** [illegible]

# Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

Project / Site: NAS Cecil Field
Project No.: N4248MW0050240

Sample ID No.: CEF-BP-GW- 02S -05
Sample Location: CEF-BP-GW- 02S

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

Sampler: C. Metz

## SAMPLING DATA

| Date: 4-17-03 | Color | pH S.U. | S.C. µS/cm | Temp. °C | Turbidity NTU | DO mg/L | ORP mV | |
|---|---|---|---|---|---|---|---|---|
| Time: 1105 | | | | | | | | |
| Method: Peristaltic | Clear | 6.56 | 167 | 22.10 | 18.1 | 2.51 | +140 | |

## PURGE DATA

| | |
|---|---|
| Date: 4-17-03 | |
| Method: | Peristaltic |
| Monitor Reading (ppm): | 0 |
| Well Casing Diameter: | 2-inch |
| Well Casing Material: | PVC |
| Total Well Depth (ft): | 14.45 |
| Static Water Level (ft): | 6.14 |
| One Casing Volume(gal/L): | 5.1 8.3 ft |
| Start Purge (hrs): | 1025 |
| End Purge (hrs): | 1058 |
| Total Purge Time (min): | 33 |
| Total Vol. Purged (gal/L): | 9.5 |

See Attached Low Flow Purge Data Sheet for Purge Data

## SAMPLE COLLECTION INFORMATION

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

## OBSERVATIONS / NOTES

Dedicated tubing in situ.

## LAB INFO

LAB: Accutest
4405 Vineland Rd., C-15
Orlando, FL 32811
COC #: 2269

**Check if Collected:**

☐ MS / MSD ☐ DUPLICATE / ID No.: None

Signature(s): Charles Metz

Tetra Tech NUS, Inc.

# LOW FLOW PURGE DATA SHEET

**PROJECT SITE NAME:** NAS CECIL FIELD
**PROJECT NUMBER:** N4248MW0050240

**WELL ID.:** CEF-BP-25
**DATE:**

| Time (Hrs.) | Water Level (Ft. below TOC) | Cum.Vol. (liters) | Flow (mL/Min.) | pH (S.U.) | Cond. (µS/cm) | Turb. (NTU) | DO (mg/L) | Temp. (Celsius) | ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1025 | 6.14 | 0 | 300 | — | — | — | — | — | — | START Purge |
| 1035 | 6.20 | 3 | 300 | — | — | — | — | — | — | |
| 1042 | 6.20 | 5.1 | 300 | 6.64 | 162 | 45 | [illegible] | 21.31 | 111.6 | 1 Well Volume |
| 1045 | 6.20 | 6 | 300 | 6.66 | 163 | 31.6 | 3.54 | 21.55 | 116 | |
| 1048 | 6.20 | 7 | 250 | 6.59 | 166 | 23.3 | 2.75 | 22.07 | 134 | |
| 1050 | 6.18 | 7.50 | 250 | 6.57 | 166 | 20.8 | 2.70 | 22.05 | 135.2 | |
| 1053 | 6.18 | 8.25 | 250 | 6.57 | 166 | 18.6 | 2.58 | 22.13 | 136.6 | |
| 1055 | 6.18 | 8.75 | 250 | 6.56 | 166 | 19.1 | 2.55 | 22.11 | 138.4 | |
| 1058 | 6.18 | 9.50 | 250 | 6.56 | 167 | 18.1 | 2.51 | 22.10 | 140.0 | End Purge |

1105 = Sample Time

SIGNATURE(S): Charles M

PAGE 2 OF 2

# Tetra Tech NUS, Inc. GROUNDWATER SAMPLE LOG SHEET

| | | | |
|---|---|---|---|
| Project / Site: | NAS Cecil Field | Sample ID No.: | CEF-BP- GW 06S -05 |
| Project No.: | N4248MW0050240 | Sample Location: | CEF-BP- 06S |

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

Sampler: P LEVERETTE

## SAMPLING DATA

| Date: 4/17/03 | Color | pH S.U. | S.C. mS/cm | Temp. °C | Turbidity NTU | DO mg/L | ORP mV | COND |
|---|---|---|---|---|---|---|---|---|
| Time: 1335 | | | | | | | | |
| Method: Peristaltic | CLEAR | 6.05 | 0.245 | 22.70 | 4.59 | 0.64 | 78.0 | 0.24 |

## PURGE DATA

| | |
|---|---|
| Date: | 4/17/03 |
| Method: | Peristaltic |
| Monitor Reading (ppm): | 0 |
| Well Casing Diameter: | 2-inch |
| Well Casing Material: | PVC |
| Total Well Depth (ft): | 14.20 |
| Static Water Level (ft): | 6.46 |
| One Casing Volume(gal/L): | 4.8 |
| Start Purge (hrs): | 1300 |
| End Purge (hrs): | 1330 |
| Total Purge Time (min): | 30 |
| Total Vol. Purged (gal/L): | 9.0 |

See Attached Low Flow Purge Data Sheet for Purge Data

## SAMPLE COLLECTION INFORMATION

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

## OBSERVATIONS / NOTES

Dedicated tubing in situ.

## LAB INFO

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

COC #: 2269

**Check if Collected:**

☐ MS / MSD ☐ DUPLICATE / ID No.: None

Signature(s): [signature]

Tetra Tech NUS, Inc.

# LOW FLOW PURGE DATA SHEET

**PROJECT SITE NAME:** NAS CECIL FIELD
**PROJECT NUMBER:** N4248MW0050240

**WELL ID.:** CEF-BP-65
**DATE:** 4/17/03

| Time (Hrs.) | Water Level (Ft. below TOC) | Cum.Vol. (liters) | Flow (mL/Min.) | pH (S.U.) | Cond. (mS/cm) | Turb. (NTU) | DO (mg/L) | Temp. (Celsius) | ORP (mV) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 1300 | 6.96 | — | 300 | - | - | - | - | - | - | START PURGE |
| 1310 | 6.77 | 3.0 | 300 | 5.94 | 0.224 | 8.06 | 0.53 | 22.79 | 123.0 | |
| 1315 | 6.78 | 4.5 | 300 | 6.04 | 0.231 | 6.47 | 0.55 | 22.72 | 108.4 | |
| 1320 | 6.78 | 6.0 | 300 | 6.05 | 0.241 | 5.84 | 0.54 | 22.68 | 97.6 | |
| 1325 | 6.78 | 7.5 | 300 | 6.06 | 0.243 | 5.00 | 0.53 | 22.65 | 94.1 | |
| 1330 | 6.78 | 9.0 | 300 | 6.05 | 0.245 | 4.59 | 0.64 | 22.70 | 78.0 | |
| | SAMPLE TIME 1335 | | | | | | | | | |

**SIGNATURE(S):** [signature]

# ATTACHMENT B

## SECOND QUARTER LABORATORY REPORT FOR APRIL 2003 EVENT

Southeast
ACCUTEST
Laboratories

05/08/03

# Technical Report for

Tetra Tech, NUS

NAS Cecil Field-CTO-248

WR#N4248-WR331

Accutest Job Number: F17417

Report to:

Total number of pages in report: 56

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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Southeast • 4405 Vineland Road • Suite C-15 • Orlando, FL 32811 • tel: 407-425-6700 • fax: 407-425-0707 • http://www.accutest.com

# Sample Summary

Tetra Tech, NUS

Job No: F17417

NAS Cecil Field-CTO-248
Project No: WR#N4248-WR331

| Sample Number | Collected Date | Time By | Received | Matrix Code | Type | Client Sample ID |
|---|---|---|---|---|---|---|
| F17417-1 | 04/17/03 | 11:05 CM | 04/18/03 | AQ | Ground Water | CEF-BP-GW-02S-05 |
| F17417-2 | 04/17/03 | 14:35 CM | 04/18/03 | AQ | Ground Water | CEF-BP-GW-01S-05 |
| F17417-3 | 04/17/03 | 13:35 CM | 04/18/03 | AQ | Ground Water | CEF-BP-GW-06S-05 |
| F17417-4 | 04/17/03 | 00:00 CM | 04/18/03 | AQ | Ground Water | CEF-BP-D1-05 |

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-02S-05 | | |
| Lab Sample ID: | F17417-1 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B015303.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |
| Run #2 | | | | | | | |

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

VOA Special List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | ND | 1.0 | 0.70 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 100% | | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 116% | | 78-125% |
| 2037-26-5 | Toluene-D8 | 103% | | 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-BP-GW-02S-05 | | |
| Lab Sample ID: | F17417-1 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | RSKSOP-147/175 | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | XY010545.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| Run #2 | | | | | | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 5.76 | 0.50 | 0.30 | ug/l | |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-02S-05 | | |
| Lab Sample ID: | F17417-1 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| | | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

General Chemistry

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | 0.34 | 0.10 | mg/l | 1 | 04/18/03 16:34 | LL | EPA 300/SW846 9056 |
| Nitrogen, Nitrite | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 16:34 | LL | EPA 300/SW846 9056 |
| Phosphate, Ortho | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 11:50 | SL | EPA 365.3 |
| Sulfate | < 20 | 20 | mg/l | 1 | 04/18/03 16:34 | LL | EPA 300/SW846 9056 |
| Total Organic Carbon | 4.7 | 1.0 | mg/l | 1 | 04/21/03 | SL | EPA 415.1 |

RL = Reporting Limit

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-01S-05 | | |
| Lab Sample ID: | F17417-2 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B015318.D | 2 | 04/23/03 | KW | n/a | n/a | VB674 |
| Run #2 | B015340.D | 5 | 04/24/03 | KW | n/a | n/a | VB675 |

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

VOA Special List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | 198 | 2.0 | 1.4 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 313 [a] | 5.0 | 2.5 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | 143 | 2.0 | 1.0 | ug/l | |
| 1330-20-7 | Xylene (total) | 662 [a] | 15 | 5.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | 105% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 112% | 108% | 78-125% |
| 2037-26-5 | Toluene-D8 | 91% | 95% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 92% | 94% | 84-117% |

(a) Result is from Run# 2

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-01S-05 | | |
| Lab Sample ID: | F17417-2 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | RSKSOP-147/175 | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | XY010546.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| Run #2 | | | | | | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 6.62 | 0.50 | 0.30 | ug/l | |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-01S-05 | | |
| Lab Sample ID: | F17417-2 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| | | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

General Chemistry

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | 0.11 | 0.10 | mg/l | 1 | 04/18/03 16:49 | LL | EPA 300/SW846 9056 |
| Nitrogen, Nitrite | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 16:49 | LL | EPA 300/SW846 9056 |
| Phosphate, Ortho | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 11:50 | SL | EPA 365.3 |
| Sulfate | < 20 | 20 | mg/l | 1 | 04/18/03 16:49 | LL | EPA 300/SW846 9056 |
| Total Organic Carbon | 11.6 | 1.0 | mg/l | 1 | 04/21/03 | SL | EPA 415.1 |

RL = Reporting Limit

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-06S-05 | | |
| Lab Sample ID: | F17417-3 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B015304.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |
| Run #2 | | | | | | | |

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

VOA Special List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | 1.2 | 1.0 | 0.70 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 1.0 | 0.50 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 3.0 | 1.0 | ug/l | |

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

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-06S-05 | | |
| Lab Sample ID: | F17417-3 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | RSKSOP-147/175 | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | XY010547.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| Run #2 | | | | | | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 149 | 0.50 | 0.30 | ug/l | |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-GW-06S-05 | | |
| Lab Sample ID: | F17417-3 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| | | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

General Chemistry

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | 0.71 | 0.10 | mg/l | 1 | 04/18/03 17:05 | LL | EPA 300/SW846 9056 |
| Nitrogen, Nitrite | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 17:05 | LL | EPA 300/SW846 9056 |
| Phosphate, Ortho | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 11:50 | SL | EPA 365.3 |
| Sulfate | < 20 | 20 | mg/l | 1 | 04/18/03 17:05 | LL | EPA 300/SW846 9056 |
| Total Organic Carbon | 6.1 | 1.0 | mg/l | 1 | 04/21/03 | SL | EPA 415.1 |

RL = Reporting Limit

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-D1-05 | | |
| Lab Sample ID: | F17417-4 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | SW846 8260B | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | B015319.D | 2 | 04/23/03 | KW | n/a | n/a | VB674 |
| Run #2 | B015341.D | 5 | 04/24/03 | KW | n/a | n/a | VB675 |

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

VOA Special List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | 184 | 2.0 | 1.4 | ug/l | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 273 [a] | 5.0 | 2.5 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | 144 | 2.0 | 1.0 | ug/l | |
| 1330-20-7 | Xylene (total) | 542 [a] | 15 | 5.0 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 105% | 107% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | 107% | 78-125% |
| 2037-26-5 | Toluene-D8 | 94% | 97% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 97% | 96% | 84-117% |

(a) Result is from Run# 2

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-D1-05 | | |
| Lab Sample ID: | F17417-4 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| Method: | RSKSOP-147/175 | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

| | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| Run #1 | XY010548.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| Run #2 | | | | | | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 6.55 | 0.50 | 0.30 | ug/l | |

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

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

Accutest Laboratories

# Report of Analysis



| | | | |
|---|---|---|---|
| Client Sample ID: | CEF-BP-D1-05 | | |
| Lab Sample ID: | F17417-4 | Date Sampled: | 04/17/03 |
| Matrix: | AQ - Ground Water | Date Received: | 04/18/03 |
| | | Percent Solids: | n/a |
| Project: | NAS Cecil Field-CTO-248 | | |

General Chemistry

| Analyte | Result | RL | Units | DF | Analyzed | By | Method |
|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | 0.12 | 0.10 | mg/l | 1 | 04/18/03 17:21 | LL | EPA 300/SW846 9056 |
| Nitrogen, Nitrite | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 17:21 | LL | EPA 300/SW846 9056 |
| Phosphate, Ortho | < 0.10 | 0.10 | mg/l | 1 | 04/18/03 11:50 | SL | EPA 365.3 |
| Sulfate | < 20 | 20 | mg/l | 1 | 04/18/03 17:21 | LL | EPA 300/SW846 9056 |
| Total Organic Carbon | 11.7 | 1.0 | mg/l | 1 | 04/21/03 | SL | EPA 415.1 |

RL = Reporting Limit

# GC/MS Volatiles

## QC Data Summaries

### Includes the following where applicable:

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

# Blank Spike Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB673-BS | B015287.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |

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

F17417-1, F17417-3

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | 25 | 25.4 | 102 | 76-117 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 25 | 22.6 | 90 | 76-124 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 25 | 23.0 | 92 | 75-121 |
| 1330-20-7 | Xylene (total) | 75 | 77.6 | 103 | 78-120 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 97% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 111% | 78-125% |
| 2037-26-5 | Toluene-D8 | 101% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 94% | 84-117% |

# Blank Spike Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB674-BS | B015314.D | 1 | 04/23/03 | KW | n/a | n/a | VB674 |

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

F17417-2, F17417-4

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | 25 | 24.1 | 96 | 76-117 |
| 108-67-8 | 1,3,5-Trimethylbenzene | 25 | 24.6 | 98 | 75-121 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 107% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 112% | 78-125% |
| 2037-26-5 | Toluene-D8 | 96% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 98% | 84-117% |

# Blank Spike Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB675-BS | B015338.D | 1 | 04/24/03 | KW | n/a | n/a | VB675 |

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

F17417-2, F17417-4

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 95-63-6 | 1,2,4-Trimethylbenzene | 25 | 24.4 | 98 | 76-124 |
| 1330-20-7 | Xylene (total) | 75 | 75.5 | 101 | 78-120 |

| CAS No. | Surrogate Recoveries | BSP | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 113% | 78-125% |
| 2037-26-5 | Toluene-D8 | 96% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 97% | 84-117% |

# Method Blank Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB673-MB | B015288.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |

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

F17417-1, F17417-3

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

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 97% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 106% | 78-125% |
| 2037-26-5 | Toluene-D8 | 104% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 101% | 84-117% |

# Method Blank Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB674-MB | B015315.D | 1 | 04/23/03 | KW | n/a | n/a | VB674 |

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

F17417-2, F17417-4

| CAS No. | Compound | Result | RL | Units | Q |
|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | ND | 2.0 | ug/l | |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | 2.0 | ug/l | |

| CAS No. | Surrogate Recoveries | | Limits |
|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 108% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 102% | 84-117% |

# Method Blank Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| VB675-MB | B015339.D | 1 | 04/24/03 | KW | n/a | n/a | VB675 |

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

F17417-2, F17417-4

| CAS No. | Compound | Result | RL | Units | Q |
|---|---|---|---|---|---|
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | 2.0 | ug/l | |
| 1330-20-7 | Xylene (total) | ND | 6.0 | ug/l | |

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

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F17445-1MS | B015294.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |
| F17445-1MSD | B015295.D | 1 | 04/22/03 | KW | n/a | n/a | VB673 |
| F17445-1 | B015311.D | 1 | 04/23/03 | KW | n/a | n/a | VB673 |

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

F17417-1, F17417-3

| CAS No. | Compound | F17445-1 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | ND | | 25 | 24.4 | 98 | 24.6 | 98 | 1 | 72-119/7 |
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | | 25 | 21.8 | 87 | 21.9 | 88 | 0 | 71-124/8 |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | | 25 | 21.4 | 86 | 21.4 | 86 | 0 | 71-119/7 |
| 1330-20-7 | Xylene (total) | ND | | 75 | 74.4 | 99 | 75.7 | 101 | 2 | 73-123/8 |

| CAS No. | Surrogate Recoveries | MS | MSD | F17445-1 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 101% | 99% | 101% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 112% | 114% | 116% | 78-125% |
| 2037-26-5 | Toluene-D8 | 98% | 100% | 105% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 89% | 91% | 102% | 84-117% |

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F17448-2MS | B015321.D | 1 | 04/23/03 | KW | n/a | n/a | VB674 |
| F17448-2MSD | B015322.D | 1 | 04/23/03 | KW | n/a | n/a | VB674 |
| F17448-2 | B015320.D | 1 | 04/23/03 | KW | n/a | n/a | VB674 |

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

F17417-2, F17417-4

| CAS No. | Compound | F17448-2 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 100-41-4 | Ethylbenzene | ND | | 25 | 23.1 | 92 | 23.3 | 93 | 1 | 72-119/7 |
| 108-67-8 | 1,3,5-Trimethylbenzene | ND | | 25 | 23.8 | 95 | 23.5 | 94 | 1 | 71-119/7 |

| CAS No. | Surrogate Recoveries | MS | MSD | F17448-2 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 109% | 107% | 113% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 116% | 115% | 125% | 78-125% |
| 2037-26-5 | Toluene-D8 | 97% | 97% | 99% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 101% | 99% | 113% | 84-117% |

# Matrix Spike/Matrix Spike Duplicate Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F17462-1MS | B015346.D | 1 | 04/24/03 | KW | n/a | n/a | VB675 |
| F17462-1MSD | B015347.D | 1 | 04/24/03 | KW | n/a | n/a | VB675 |
| F17462-1 | B015345.D | 1 | 04/24/03 | KW | n/a | n/a | VB675 |

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

F17417-2, F17417-4

| CAS No. | Compound | F17462-1 ug/l | Q | Spike ug/l | MS ug/l | MS % | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|---|---|---|---|---|---|---|---|---|---|
| 95-63-6 | 1,2,4-Trimethylbenzene | ND | | 25 | 22.3 | 89 | 22.3 | 89 | 0 | 71-124/8 |
| 1330-20-7 | Xylene (total) | ND | | 75 | 70.6 | 94 | 69.3 | 92 | 2 | 73-123/8 |

| CAS No. | Surrogate Recoveries | MS | MSD | F17462-1 | Limits |
|---|---|---|---|---|---|
| 1868-53-7 | Dibromofluoromethane | 106% | 106% | 108% | 86-115% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 111% | 111% | 105% | 78-125% |
| 2037-26-5 | Toluene-D8 | 94% | 96% | 98% | 87-113% |
| 460-00-4 | 4-Bromofluorobenzene | 94% | 94% | 105% | 84-117% |

# Instrument Performance Check (BFB)



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VB673-BFB | Injection Date: | 04/22/03 |
| Lab File ID: | B015285.D | Injection Time: | 13:15 |
| Instrument ID: | GCMSB | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 30797 | 34.5 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 42082 | 47.1 | | Pass |
| 95 | Base peak, 100% relative abundance | 89325 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 6689 | 7.5 | | Pass |
| 173 | Less than 2.0% of mass 174 | 0 | 0.0 | (0.0) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 74602 | 83.5 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 5189 | 5.8 | (7.0) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 74690 | 83.6 | (100.1) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4165 | 4.7 | (5.6) [b] | Pass |

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

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

| Lab Sample ID | Lab File ID | Date Analyzed | Time Analyzed | Hours Lapsed | Client Sample ID |
|---|---|---|---|---|---|
| VB673-CC664 | B015286.D | 04/22/03 | 13:40 | 00:25 | Continuing cal 40 |
| VB673-BS | B015287.D | 04/22/03 | 14:07 | 00:52 | Blank Spike |
| VB673-MB | B015288.D | 04/22/03 | 14:34 | 01:19 | Method Blank |
| ZZZZZZ | B015289.D | 04/22/03 | 15:03 | 01:48 | (unrelated sample) |
| ZZZZZZ | B015290.D | 04/22/03 | 15:33 | 02:18 | (unrelated sample) |
| ZZZZZZ | B015291.D | 04/22/03 | 16:00 | 02:45 | (unrelated sample) |
| ZZZZZZ | B015293.D | 04/22/03 | 16:56 | 03:41 | (unrelated sample) |
| F17445-1MS | B015294.D | 04/22/03 | 17:23 | 04:08 | Matrix Spike |
| F17445-1MSD | B015295.D | 04/22/03 | 17:50 | 04:35 | Matrix Spike Duplicate |
| ZZZZZZ | B015296.D | 04/22/03 | 18:17 | 05:02 | (unrelated sample) |
| ZZZZZZ | B015297.D | 04/22/03 | 18:44 | 05:29 | (unrelated sample) |
| ZZZZZZ | B015298.D | 04/22/03 | 19:11 | 05:56 | (unrelated sample) |
| ZZZZZZ | B015299.D | 04/22/03 | 19:39 | 06:24 | (unrelated sample) |
| ZZZZZZ | B015300.D | 04/22/03 | 20:06 | 06:51 | (unrelated sample) |
| ZZZZZZ | B015301.D | 04/22/03 | 20:33 | 07:18 | (unrelated sample) |
| ZZZZZZ | B015302.D | 04/22/03 | 21:00 | 07:45 | (unrelated sample) |
| F17417-1 | B015303.D | 04/22/03 | 21:27 | 08:12 | CEF-BP-GW-02S-05 |
| F17417-3 | B015304.D | 04/22/03 | 21:54 | 08:39 | CEF-BP-GW-06S-05 |
| ZZZZZZ | B015305.D | 04/22/03 | 22:21 | 09:06 | (unrelated sample) |
| ZZZZZZ | B015306.D | 04/22/03 | 22:50 | 09:35 | (unrelated sample) |
| F17445-1 | B015311.D | 04/23/03 | 01:14 | 11:59 | (used for QC only; not part of job F17417) |

# Instrument Performance Check (BFB)



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VB674-BFB | Injection Date: | 04/23/03 |
| Lab File ID: | B015312.D | Injection Time: | 12:45 |
| Instrument ID: | GCMSB | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 28266 | 28.9 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 46269 | 47.3 | | Pass |
| 95 | Base peak, 100% relative abundance | 97877 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 6596 | 6.7 | | Pass |
| 173 | Less than 2.0% of mass 174 | 363 | 0.37 | (0.45) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 80418 | 82.2 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 6480 | 6.6 | (8.1) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 80058 | 81.8 | (99.6) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 5635 | 5.8 | (7.0) [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 |
|---|---|---|---|---|---|
| VB674-CC664 | B015313.D | 04/23/03 | 13:10 | 00:25 | Continuing cal 40 |
| VB674-BS | B015314.D | 04/23/03 | 13:37 | 00:52 | Blank Spike |
| VB674-MB | B015315.D | 04/23/03 | 14:05 | 01:20 | Method Blank |
| ZZZZZZ | B015316.D | 04/23/03 | 14:34 | 01:49 | (unrelated sample) |
| ZZZZZZ | B015317.D | 04/23/03 | 15:03 | 02:18 | (unrelated sample) |
| F17417-2 | B015318.D | 04/23/03 | 15:32 | 02:47 | CEF-BP-GW-01S-05 |
| F17417-4 | B015319.D | 04/23/03 | 16:02 | 03:17 | CEF-BP-D1-05 |
| F17448-2 | B015320.D | 04/23/03 | 16:29 | 03:44 | (used for QC only; not part of job F17417) |
| F17448-2MS | B015321.D | 04/23/03 | 16:57 | 04:12 | Matrix Spike |
| F17448-2MSD | B015322.D | 04/23/03 | 17:24 | 04:39 | Matrix Spike Duplicate |
| ZZZZZZ | B015323.D | 04/23/03 | 17:51 | 05:06 | (unrelated sample) |
| ZZZZZZ | B015324.D | 04/23/03 | 18:18 | 05:33 | (unrelated sample) |
| ZZZZZZ | B015325.D | 04/23/03 | 18:45 | 06:00 | (unrelated sample) |
| ZZZZZZ | B015326.D | 04/23/03 | 19:13 | 06:28 | (unrelated sample) |
| ZZZZZZ | B015328.D | 04/23/03 | 20:11 | 07:26 | (unrelated sample) |
| ZZZZZZ | B015331.D | 04/23/03 | 21:39 | 08:54 | (unrelated sample) |

# Instrument Performance Check (BFB)



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VB675-BFB | Injection Date: | 04/24/03 |
| Lab File ID: | B015335.D | Injection Time: | 12:16 |
| Instrument ID: | GCMSB | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 26989 | 29.2 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 44664 | 48.4 | | Pass |
| 95 | Base peak, 100% relative abundance | 92296 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 6073 | 6.6 | | Pass |
| 173 | Less than 2.0% of mass 174 | 293 | 0.32 | (0.37) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 80029 | 86.7 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 5479 | 5.9 | (6.8) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 78568 | 85.1 | (98.2) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 4887 | 5.3 | (6.2) [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 |
|---|---|---|---|---|---|
| VB675-CC664 | B015337.D | 04/24/03 | 13:11 | 00:55 | Continuing cal 40 |
| VB675-BS | B015338.D | 04/24/03 | 13:38 | 01:22 | Blank Spike |
| VB675-MB | B015339.D | 04/24/03 | 14:06 | 01:50 | Method Blank |
| F17417-2 | B015340.D | 04/24/03 | 14:35 | 02:19 | CEF-BP-GW-01S-05 |
| F17417-4 | B015341.D | 04/24/03 | 15:04 | 02:48 | CEF-BP-D1-05 |
| ZZZZZZ | B015343.D | 04/24/03 | 15:58 | 03:42 | (unrelated sample) |
| ZZZZZZ | B015344.D | 04/24/03 | 16:25 | 04:09 | (unrelated sample) |
| F17462-1 | B015345.D | 04/24/03 | 16:53 | 04:37 | (used for QC only; not part of job F17417) |
| F17462-1MS | B015346.D | 04/24/03 | 17:20 | 05:04 | Matrix Spike |
| F17462-1MSD | B015347.D | 04/24/03 | 17:47 | 05:31 | Matrix Spike Duplicate |
| ZZZZZZ | B015348.D | 04/24/03 | 18:14 | 05:58 | (unrelated sample) |
| ZZZZZZ | B015349.D | 04/24/03 | 18:41 | 06:25 | (unrelated sample) |
| ZZZZZZ | B015350.D | 04/24/03 | 19:08 | 06:52 | (unrelated sample) |
| ZZZZZZ | B015351.D | 04/24/03 | 19:37 | 07:21 | (unrelated sample) |

# Instrument Performance Check (BFB)



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Sample: | VB664-BFB | Injection Date: | 04/09/03 |
| Lab File ID: | B015039.D | Injection Time: | 10:53 |
| Instrument ID: | GCMSB | | |

| m/e | Ion Abundance Criteria | Raw Abundance | % Relative Abundance | | Pass/Fail |
|---|---|---|---|---|---|
| 50 | 15.0 - 40.0% of mass 95 | 21141 | 33.4 | | Pass |
| 75 | 30.0 - 60.0% of mass 95 | 29565 | 46.7 | | Pass |
| 95 | Base peak, 100% relative abundance | 63301 | 100.0 | | Pass |
| 96 | 5.0 - 9.0% of mass 95 | 4112 | 6.5 | | Pass |
| 173 | Less than 2.0% of mass 174 | 86 | 0.14 | (0.16) [a] | Pass |
| 174 | 50.0 - 100.0% of mass 95 | 53386 | 84.3 | | Pass |
| 175 | 5.0 - 9.0% of mass 174 | 4199 | 6.6 | (7.9) [a] | Pass |
| 176 | 95.0 - 101.0% of mass 174 | 52813 | 83.4 | (98.9) [a] | Pass |
| 177 | 5.0 - 9.0% of mass 176 | 3528 | 5.6 | (6.7) [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 |
|---|---|---|---|---|---|
| VB664-IC664 | B015040.D | 04/09/03 | 14:22 | 03:29 | Initial cal 1 |
| VB664-IC664 | B015041.D | 04/09/03 | 14:49 | 03:56 | Initial cal 5 |
| VB664-IC664 | B015042.D | 04/09/03 | 15:16 | 04:23 | Initial cal 20 |
| VB664-ICC664 | B015043.D | 04/09/03 | 15:43 | 04:50 | Initial cal 40 |
| VB664-IC664 | B015044.D | 04/09/03 | 16:10 | 05:17 | Initial cal 70 |
| VB664-IC664 | B015045.D | 04/09/03 | 16:37 | 05:44 | Initial cal 100 |

# Volatile Internal Standard Area Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VB673-CC664 | Injection Date: | 04/22/03 |
| Lab File ID: | B015286.D | Injection Time: | 13:40 |
| Instrument ID: | GCMSB | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| Check Std | 1547968 | 9.56 | 1183966 | 12.78 | 697144 | 15.33 | 94970 | 6.88 |
| Upper Limit [a] | 3095936 | 10.06 | 2367932 | 13.28 | 1394288 | 15.83 | 189940 | 7.38 |
| Lower Limit [b] | 773984 | 9.06 | 591983 | 12.28 | 348572 | 14.83 | 47485 | 6.38 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| VB673-BS | 1639415 | 9.57 | 1241469 | 12.79 | 709862 | 15.33 | 111815 | 6.88 |
| VB673-MB | 1598257 | 9.57 | 1110888 | 12.79 | 538458 | 15.33 | 111642 | 6.89 |
| ZZZZZZ | 1415237 | 9.57 | 1006796 | 12.79 | 485215 | 15.33 | 110514 | 6.89 |
| ZZZZZZ | 1337922 | 9.57 | 936660 | 12.79 | 457507 | 15.33 | 87492 | 6.89 |
| ZZZZZZ | 1224985 | 9.57 | 871671 | 12.79 | 421799 | 15.33 | 72800 | 6.89 |
| ZZZZZZ | 1402385 | 9.57 | 990746 | 12.79 | 493515 | 15.33 | 98545 | 6.89 |
| F17445-1MS | 1440880 | 9.57 | 1117527 | 12.79 | 663859 | 15.33 | 96796 | 6.88 |
| F17445-1MSD | 1570861 | 9.57 | 1182896 | 12.79 | 698599 | 15.33 | 109287 | 6.89 |
| ZZZZZZ | 1558876 | 9.57 | 1084890 | 12.79 | 525699 | 15.33 | 105242 | 6.89 |
| ZZZZZZ | 1401153 | 9.57 | 978123 | 12.79 | 465968 | 15.33 | 88773 | 6.90 |
| ZZZZZZ | 1316769 | 9.57 | 926777 | 12.79 | 442046 | 15.33 | 84854 | 6.89 |
| ZZZZZZ | 1281955 | 9.57 | 898438 | 12.79 | 414091 | 15.33 | 82628 | 6.89 |
| ZZZZZZ | 1204875 | 9.57 | 847682 | 12.79 | 397985 | 15.33 | 74475 | 6.90 |
| ZZZZZZ | 1137299 | 9.57 | 822752 | 12.79 | 378321 | 15.33 | 74069 | 6.89 |
| ZZZZZZ | 1139406 | 9.57 | 803225 | 12.79 | 377633 | 15.33 | 70927 | 6.89 |
| F17417-1 | 1093018 | 9.57 | 771007 | 12.79 | 369015 | 15.33 | 61840 | 6.89 |
| F17417-3 | 1099759 | 9.57 | 772775 | 12.79 | 370511 | 15.33 | 64741 | 6.89 |
| ZZZZZZ | 1092674 | 9.57 | 783006 | 12.79 | 472146 | 15.33 | 57345 | 6.89 |
| ZZZZZZ | 1253697 | 9.57 | 862226 | 12.79 | 393119 | 15.33 | 87931 | 6.88 |
| F17445-1 | 1076244 | 9.57 | 761761 | 12.79 | 352821 | 15.33 | 65911 | 6.89 |

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 Internal Standard Area Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VB674-CC664 | Injection Date: | 04/23/03 |
| Lab File ID: | B015313.D | Injection Time: | 13:10 |
| Instrument ID: | GCMSB | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| Check Std | 1158490 | 9.56 | 942918 | 12.78 | 511418 | 15.33 | 76243 | 6.87 |
| Upper Limit [a] | 2316980 | 10.06 | 1885836 | 13.28 | 1022836 | 15.83 | 152486 | 7.37 |
| Lower Limit [b] | 579245 | 9.06 | 471459 | 12.28 | 255709 | 14.83 | 38122 | 6.37 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| VB674-BS | 1260547 | 9.57 | 1005379 | 12.79 | 534503 | 15.33 | 85886 | 6.88 |
| VB674-MB | 1189294 | 9.57 | 911278 | 12.79 | 410675 | 15.33 | 73789 | 6.89 |
| ZZZZZZ | 1019107 | 9.57 | 774061 | 12.79 | 349085 | 15.33 | 65537 | 6.89 |
| ZZZZZZ | 914171 | 9.56 | 689332 | 12.79 | 314257 | 15.33 | 69772 | 6.89 |
| F17417-2 | 900979 | 9.57 | 763614 | 12.79 | 436452 | 15.33 | 57248 | 6.88 |
| F17417-4 | 1347900 | 9.57 | 1100194 | 12.79 | 598726 | 15.33 | 92327 | 6.87 |
| F17448-2 | 1789119 | 9.57 | 1384235 | 12.79 | 621500 | 15.33 | 135725 | 6.89 |
| F17448-2MS | 1477081 | 9.57 | 1180104 | 12.79 | 618034 | 15.33 | 102688 | 6.88 |
| F17448-2MSD | 1476026 | 9.57 | 1164913 | 12.79 | 616676 | 15.33 | 107785 | 6.88 |
| ZZZZZZ | 1368075 | 9.57 | 1040448 | 12.79 | 461280 | 15.33 | 103820 | 6.89 |
| ZZZZZZ | 1093656 | 9.57 | 850705 | 12.79 | 367728 | 15.33 | 71836 | 6.89 |
| ZZZZZZ | 961146 | 9.57 | 734411 | 12.79 | 324140 | 15.33 | 61920 | 6.89 |
| ZZZZZZ | 878439 | 9.57 | 659348 | 12.79 | 297155 | 15.33 | 60784 | 6.89 |
| ZZZZZZ | 842942 | 9.56 | 634616 | 12.79 | 323782 | 15.33 | 72184 | 6.88 |
| ZZZZZZ | 775620 | 9.57 | 574602 | 12.79 | 276784 | 15.33 | 55375 | 6.89 |

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 Internal Standard Area Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| | | | |
|---|---|---|---|
| Check Std: | VB675-CC664 | Injection Date: | 04/24/03 |
| Lab File ID: | B015337.D | Injection Time: | 13:11 |
| Instrument ID: | GCMSB | Method: | SW846 8260B |

| | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| Check Std | 1313449 | 9.56 | 1085706 | 12.78 | 591728 | 15.33 | 97118 | 6.88 |
| Upper Limit [a] | 2626898 | 10.06 | 2171412 | 13.28 | 1183456 | 15.83 | 194236 | 7.38 |
| Lower Limit [b] | 656725 | 9.06 | 542853 | 12.28 | 295864 | 14.83 | 48559 | 6.38 |

| Lab Sample ID | IS 1 AREA | RT | IS 2 AREA | RT | IS 3 AREA | RT | IS 4 AREA | RT |
|---|---|---|---|---|---|---|---|---|
| VB675-BS | 1407225 | 9.57 | 1141678 | 12.79 | 614505 | 15.33 | 108144 | 6.89 |
| VB675-MB | 1317831 | 9.57 | 1022357 | 12.79 | 457476 | 15.33 | 96055 | 6.89 |
| F17417-2 | 1148103 | 9.57 | 907334 | 12.79 | 488946 | 15.33 | 83409 | 6.88 |
| F17417-4 | 1203309 | 9.56 | 955377 | 12.79 | 500114 | 15.33 | 89733 | 6.88 |
| ZZZZZZ | 1560056 | 9.57 | 1222634 | 12.79 | 563877 | 15.33 | 107511 | 6.89 |
| ZZZZZZ | 1368199 | 9.57 | 1083321 | 12.79 | 535435 | 15.33 | 93975 | 6.89 |
| F17462-1 | 1223477 | 9.57 | 940389 | 12.79 | 418579 | 15.33 | 84858 | 6.89 |
| F17462-1MS | 1159743 | 9.57 | 947113 | 12.79 | 515989 | 15.33 | 87611 | 6.89 |
| F17462-1MSD | 1206866 | 9.57 | 981749 | 12.79 | 529253 | 15.33 | 96188 | 6.89 |
| ZZZZZZ | 1173324 | 9.57 | 888595 | 12.79 | 397586 | 15.33 | 83130 | 6.89 |
| ZZZZZZ | 1065868 | 9.57 | 806948 | 12.79 | 362869 | 15.33 | 72193 | 6.89 |
| ZZZZZZ | 991029 | 9.57 | 747963 | 12.79 | 335377 | 15.33 | 64843 | 6.89 |
| ZZZZZZ | 952891 | 9.57 | 770187 | 12.79 | 351769 | 15.33 | 78778 | 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: F17417
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 |
|---|---|---|---|---|---|
| F17417-1 | B015303.D | 100.0 | 116.0 | 103.0 | 97.0 |
| F17417-2 | B015340.D | 105.0 | 108.0 | 95.0 | 94.0 |
| F17417-2 | B015318.D | 107.0 | 112.0 | 91.0 | 92.0 |
| F17417-3 | B015304.D | 100.0 | 113.0 | 103.0 | 98.0 |
| F17417-4 | B015341.D | 107.0 | 107.0 | 97.0 | 96.0 |
| F17417-4 | B015319.D | 105.0 | 107.0 | 94.0 | 97.0 |
| F17445-1MS | B015294.D | 101.0 | 112.0 | 98.0 | 89.0 |
| F17445-1MSD | B015295.D | 99.0 | 114.0 | 100.0 | 91.0 |
| F17448-2MS | B015321.D | 109.0 | 116.0 | 97.0 | 101.0 |
| F17448-2MSD | B015322.D | 107.0 | 115.0 | 97.0 | 99.0 |
| F17462-1MS | B015346.D | 106.0 | 111.0 | 94.0 | 94.0 |
| F17462-1MSD | B015347.D | 106.0 | 111.0 | 96.0 | 94.0 |
| VB673-BS | B015287.D | 97.0 | 111.0 | 101.0 | 94.0 |
| VB673-MB | B015288.D | 97.0 | 106.0 | 104.0 | 101.0 |
| VB674-BS | B015314.D | 107.0 | 112.0 | 96.0 | 98.0 |
| VB674-MB | B015315.D | 108.0 | 107.0 | 97.0 | 102.0 |
| VB675-BS | B015338.D | 106.0 | 113.0 | 96.0 | 97.0 |
| VB675-MB | B015339.D | 107.0 | 107.0 | 97.0 | 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: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB664-ICC664
Lab FileID: B015043.D

Response Factor Report MSVOA4

Method : C:\MSDCHEM\1\METHODS\82600409.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Thu Apr 10 08:26:41 2003
Response via : Initial Calibration

Calibration Files
1 =B015040.D 2 =B015041.D 3 =B015042.D
4 =B015043.D 5 =B015044.D 6 =B015045.D

| | | Compound | 1 | 2 | 3 | 4 | 5 | 6 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) | I | Fluorobenzene | ----------ISTD---------- | | | | | | | |
| 2) | | Dichlorodifluoromet | 0.228 | 0.163 | 0.198 | 0.202 | 0.220 | 0.221 | 0.205 | 11.55 |
| 3) | P | Chloromethane | 0.699 | 0.584 | 0.562 | 0.578 | 0.592 | 0.548 | 0.594 | 9.09 |
| 4) | C | Vinyl Chloride | 0.482 | 0.427 | 0.440 | 0.457 | 0.473 | 0.436 | 0.453 | 4.87 |
| 5) | | Bromomethane | | 0.151 | 0.142 | 0.149 | 0.161 | 0.145 | 0.150 | 4.99 |
| 6) | | Chloroethane | 0.232 | 0.215 | 0.197 | 0.204 | 0.222 | 0.205 | 0.212 | 6.12 |
| 7) | | Trichlorofluorometh | | 0.285 | 0.277 | 0.286 | 0.329 | 0.350 | 0.305 | 10.49 |
| 8) | | Ethyl Ether | 0.342 | 0.323 | 0.318 | 0.319 | 0.343 | 0.344 | 0.332 | 3.91 |
| 9) | C | 1,1-Dichloroethene | | 0.479 | 0.480 | 0.476 | 0.479 | 0.550 | 0.493 | 6.51 |
| 10) | | Freon 113 | | 0.204 | 0.204 | 0.197 | 0.210 | 0.222 | 0.207 | 4.41 |
| 11) | | Acetone | | 0.136 | 0.134 | 0.128 | 0.126 | 0.135 | 0.132 | 3.28 |
| 12) | | Iodomethane | 0.341 | 0.321 | 0.320 | 0.323 | 0.322 | 0.308 | 0.323 | 3.34 |
| 13) | | Methyl acetate | 0.369 | 0.333 | 0.314 | 0.310 | 0.314 | 0.318 | 0.326 | 6.90 |
| 14) | | Carbon Disulfide | 0.915 | 0.740 | 0.764 | 0.747 | 0.738 | 0.720 | 0.771 | 9.33 |
| 15) | | Methylene Chloride | | 0.711 | 0.654 | 0.635 | 0.632 | 0.620 | 0.650 | 5.51 |
| 16) | | trans-1,2-Dichloroe | 0.502 | 0.437 | 0.464 | 0.474 | 0.472 | 0.475 | 0.471 | 4.50 |
| 17) | | Acrylonitrile | | 0.119 | 0.128 | 0.133 | 0.133 | 0.134 | 0.129 | 4.80 |
| 18) | | Methyl Tert Butyl E | 0.507 | 0.524 | 0.554 | 0.573 | 0.583 | 0.588 | 0.555 | 5.93 |
| 19) | | Hexane | 0.427 | 0.361 | 0.441 | 0.438 | 0.438 | 0.433 | 0.423 | 7.28 |
| 20) | P | 1,1-Dichloroethane | 0.690 | 0.601 | 0.604 | 0.602 | 0.602 | 0.597 | 0.616 | 5.89 |
| 21) | | ETBE | 0.835 | 0.894 | 0.985 | 1.031 | 1.064 | 1.088 | 0.983 | 10.13 |
| 22) | | Vinyl acetate | 0.925 | 1.007 | 1.036 | 0.963 | 0.958 | 0.918 | 0.968 | 4.77 |
| 23) | | Di-isopropyl ether | 1.432 | 1.467 | 1.592 | 1.630 | 1.651 | 1.664 | 1.573 | 6.30 |
| 24) | | 2,2-Dichloropropane | 0.277 | 0.242 | 0.256 | 0.251 | 0.246 | 0.249 | 0.254 | 4.82 |
| 25) | | cis-1,2-Dichloroeth | 0.270 | 0.263 | 0.272 | 0.272 | 0.271 | 0.270 | 0.270 | 1.22 |
| 26) | | 2-Butanone | 0.178 | 0.184 | 0.192 | 0.192 | 0.197 | 0.197 | 0.190 | 3.99 |
| 27) | | Bromochloromethane | 0.134 | 0.128 | 0.121 | 0.121 | 0.121 | 0.121 | 0.124 | 4.59 |
| 28) | C | Chloroform | 0.458 | 0.446 | 0.430 | 0.431 | 0.433 | 0.449 | 0.441 | 2.57 |
| 29) | | Tetrahydrofuran | | 0.100 | 0.105 | 0.111 | 0.117 | 0.121 | 0.111 | 7.58 |
| 30) | | 1,1,1-Trichloroetha | 0.360 | 0.302 | 0.316 | 0.311 | 0.317 | 0.336 | 0.324 | 6.44 |
| 31) | S | Dibromofluoromethan | 0.252 | 0.244 | 0.245 | 0.242 | 0.243 | 0.244 | 0.245 | 1.50 |
| 32) | | Cyclohexane | 0.512 | 0.496 | 0.606 | 0.626 | 0.637 | 0.638 | 0.586 | 11.02 |
| 33) | | 1,1-Dichloropropene | 0.282 | 0.268 | 0.308 | 0.309 | 0.314 | 0.325 | 0.301 | 7.16 |
| 34) | | Carbon Tetrachlorid | 0.277 | 0.240 | 0.256 | 0.264 | 0.271 | 0.290 | 0.266 | 6.56 |
| 35) | S | 1,2-Dichloroethane- | 0.325 | 0.311 | 0.321 | 0.312 | 0.324 | 0.356 | 0.325 | 5.05 |
| 36) | | TAME | 0.557 | 0.605 | 0.624 | 0.656 | 0.675 | 0.723 | 0.640 | 9.03 |
| 37) | | Benzene | 1.203 | 1.081 | 1.085 | 1.073 | 1.052 | 1.070 | 1.094 | 5.00 |
| 38) | | 1,2-Dichloroethane | 0.427 | 0.428 | 0.406 | 0.405 | 0.413 | 0.425 | 0.417 | 2.53 |
| 39) | | Trichloroethene | 0.271 | 0.212 | 0.233 | 0.246 | 0.254 | 0.265 | 0.247 | 8.79 |
| 40) | | Methylcyclohexane | | 0.275 | 0.354 | 0.366 | 0.376 | 0.374 | 0.349 | 12.12 |
| 41) | C | 1,2-Dichloropropane | 0.371 | 0.350 | 0.356 | 0.359 | 0.359 | 0.361 | 0.359 | 1.95 |
| 42) | | Dibromomethane | 0.171 | 0.155 | 0.156 | 0.156 | 0.157 | 0.161 | 0.159 | 3.87 |
| 43) | | Bromodichloromethan | 0.320 | 0.318 | 0.321 | 0.325 | 0.334 | 0.348 | 0.328 | 3.46 |
| 44) | | 2-Nitropropane | 0.099 | 0.110 | 0.112 | 0.114 | 0.117 | 0.119 | 0.112 | 6.23 |
| 45) | | 2-Chloroethyl vinyl | | 0.181 | 0.199 | 0.207 | 0.215 | 0.222 | 0.205 | 7.79 |
| 46) | | 4-Methyl-2-pentanon | | 0.396 | 0.427 | 0.432 | 0.448 | 0.458 | 0.432 | 5.46 |

# Initial Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB664-ICC664
Lab FileID: B015043.D

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 47) | | cis-1,3-Dichloropro | 0.348 | 0.380 | 0.412 | 0.418 | 0.433 | 0.443 | 0.406 | 8.75 |
| 48) | I | Chlorobenzene-d5 | ----------ISTD---------- | | | | | | | |
| 49) | S | Toluene-d8 | 1.273 | 1.258 | 1.255 | 1.235 | 1.212 | 1.227 | 1.243 | 1.82 |
| 50) | C | Toluene | 1.537 | 1.390 | 1.444 | 1.427 | 1.413 | 1.443 | 1.442 | 3.51 |
| 51) | | trans-1,3-Dichlorop | 0.444 | 0.430 | 0.466 | 0.477 | 0.488 | 0.512 | 0.470 | 6.33 |
| 52) | | 1,1,2-Trichloroetha | 0.304 | 0.281 | 0.280 | 0.265 | 0.268 | 0.272 | 0.279 | 5.15 |
| 53) | | Tetrachloroethene | 0.312 | 0.303 | 0.329 | 0.325 | 0.324 | 0.325 | 0.320 | 3.13 |
| 54) | | 2-hexanone | | 0.341 | 0.400 | 0.405 | 0.413 | 0.420 | 0.396 | 7.98 |
| 55) | | 1,3-Dichloropropane | 0.509 | 0.552 | 0.525 | 0.524 | 0.528 | 0.535 | 0.529 | 2.69 |
| 56) | | Dibromochloromethan | 0.343 | 0.310 | 0.310 | 0.313 | 0.325 | 0.333 | 0.322 | 4.33 |
| 57) | | 1,2-Dibromoethane | 0.254 | 0.285 | 0.290 | 0.297 | 0.307 | 0.309 | 0.290 | 6.97 |
| 58) | | 1-Chlorohexane | 0.331 | 0.314 | 0.436 | 0.446 | 0.463 | 0.468 | 0.409 | 16.80 |
| | | ----- Linear regression ----- Coefficient = 0.9997 | | | | | | | | |
| | | Response Ratio = -0.01268 + 0.47225 *A | | | | | | | | |
| 59) | P | Chlorobenzene | 0.984 | 0.948 | 0.938 | 0.923 | 0.925 | 0.935 | 0.942 | 2.40 |
| 60) | | 1,1,1,2-Tetrachloro | 0.325 | 0.317 | 0.311 | 0.312 | 0.318 | 0.328 | 0.319 | 2.16 |
| 61) | C | Ethylbenzene | 1.568 | 1.502 | 1.583 | 1.599 | 1.632 | 1.694 | 1.597 | 4.03 |
| 62) | | m,p-Xylene | 1.054 | 1.109 | 1.196 | 1.226 | 1.271 | 1.327 | 1.197 | 8.45 |
| 63) | | o-Xylene | | 1.076 | 1.223 | 1.278 | 1.347 | 1.385 | 1.262 | 9.60 |
| 64) | | Styrene | 0.751 | 0.916 | 1.032 | 1.042 | 1.087 | 1.097 | 0.987 | 13.43 |
| 65) | P | Bromoform | 0.196 | 0.193 | 0.201 | 0.216 | 0.223 | 0.228 | 0.210 | 7.00 |
| 66) | I | 1,4-Dichlorobenzene-d | ----------ISTD---------- | | | | | | | |
| 67) | | Isopropylbenzene | 2.385 | 2.399 | 2.733 | 2.821 | 2.869 | 2.906 | 2.685 | 8.74 |
| 68) | S | 4-Bromofluorobenzen | 1.013 | 0.975 | 0.948 | 0.960 | 0.970 | 0.981 | 0.975 | 2.27 |
| 69) | | Bromobenzene | 0.964 | 0.866 | 0.829 | 0.830 | 0.829 | 0.832 | 0.858 | 6.27 |
| 70) | P | 1,1,2,2-Tetrachloro | 0.952 | 0.936 | 0.859 | 0.819 | 0.811 | 0.785 | 0.860 | 8.06 |
| 71) | | trans-1,4-Dichloro- | 0.353 | 0.344 | 0.366 | 0.381 | 0.401 | 0.416 | 0.377 | 7.44 |
| 72) | | 1,2,3-Trichloroprop | 0.271 | 0.222 | 0.206 | 0.198 | 0.206 | 0.215 | 0.220 | 12.07 |
| 73) | | n-Propylbenzene | 3.817 | 3.654 | 3.828 | 3.976 | 4.075 | 4.112 | 3.910 | 4.47 |
| 74) | | 2-Chlorotoluene | 2.491 | 2.521 | 2.517 | 2.548 | 2.646 | 2.733 | 2.576 | 3.65 |
| 75) | | 4-Chlorotoluene | 1.949 | 2.116 | 2.226 | 2.282 | 2.328 | 2.411 | 2.219 | 7.44 |
| 76) | | 1,3,5-Trimethylbenz | 2.100 | 2.171 | 2.377 | 2.444 | 2.524 | 2.590 | 2.368 | 8.24 |
| 77) | | sec-Butylbenzene | 2.731 | 2.664 | 3.013 | 3.152 | 3.175 | 3.196 | 2.989 | 7.87 |
| 78) | | 1,3-Dichlorobenzene | 1.597 | 1.441 | 1.438 | 1.468 | 1.455 | 1.461 | 1.477 | 4.06 |
| 79) | | 4-Isopropyltoluene | | 1.996 | 2.336 | 2.426 | 2.454 | 2.514 | 2.345 | 8.75 |
| 80) | | 1,4-Dichlorobenzene | 1.597 | 1.559 | 1.490 | 1.524 | 1.520 | 1.517 | 1.535 | 2.45 |
| 81) | | tert-Butylbenzene | 1.183 | 1.175 | 1.328 | 1.390 | 1.433 | 1.522 | 1.338 | 10.36 |
| 82) | | Benzyl Chloride | 1.379 | 1.332 | 1.406 | 1.445 | 1.472 | 1.487 | 1.420 | 4.17 |
| 83) | | n-Butylbenzene | 2.220 | 2.074 | 2.429 | 2.557 | 2.604 | 2.649 | 2.422 | 9.49 |
| 84) | | 1,2-Dichlorobenzene | 1.455 | 1.385 | 1.405 | 1.440 | 1.441 | 1.455 | 1.430 | 2.02 |
| 85) | | 1,2,4-Trimethylbenz | 2.023 | 2.290 | 2.456 | 2.537 | 2.586 | 2.663 | 2.426 | 9.69 |
| 86) | | 1,2-Dibromo-3-Chlor | 0.109 | 0.131 | 0.112 | 0.115 | 0.125 | 0.130 | 0.120 | 7.74 |
| 87) | | 1,2,4-Trichlorobenz | 0.926 | 0.853 | 0.882 | 0.926 | 0.957 | 0.994 | 0.923 | 5.48 |
| 88) | | Hexachlorobutadiene | 0.500 | 0.398 | 0.381 | 0.378 | 0.388 | 0.403 | 0.408 | 11.31 |
| 89) | | Naphthalene | 1.722 | 1.557 | 1.761 | 1.901 | 2.044 | 2.138 | 1.854 | 11.66 |
| 90) | | 1,2,3-Trichlorobenz | 0.865 | 0.746 | 0.777 | 0.817 | 0.859 | 0.890 | 0.826 | 6.75 |
| 91) | I | Tert Butyl alcohol-d1 | ----------ISTD---------- | | | | | | | |
| 92) | | Acrolein | 2.552 | 2.877 | 2.841 | 3.001 | 3.036 | 3.139 | 2.908 | 7.06 |
| 93) | | Tert-Butyl Alcohol | 2.050 | 2.200 | 2.155 | 2.159 | 2.277 | 2.239 | 2.180 | 3.63 |
| 94) | | 1,4-Dioxane | | 0.143 | 0.171 | 0.163 | 0.178 | 0.173 | 0.166 | 8.25 |
| 95) | | Cyclohexanone | | 1.069 | 0.876 | 0.909 | 0.991 | 0.966 | 0.962 | 7.82 |

(#) = Out of Range

82600409.M Fri Apr 11 08:59:13 2003 RPT1

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB673-CC664
Lab FileID: B015286.D

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\042203\B015286.D
Acq On : 22 Apr 2003 1:40 pm
Sample : CC664-40
Misc : ms2212,vb673,,,,,
MS Integration Params: Rteint.p

Vial: 1
Operator: Karenw
Inst : MSVOA4
Multiplr: 1.00

Method : C:\MSDCHEM\1\METHODS\82600409.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Thu Apr 10 08:26:41 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 | 144 | 0.00 |
| 2 | | Dichlorodifluoromethane | 0.205 | 0.252 | -22.9# | 180 | -0.01 |
| 3 | P | Chloromethane | 0.594 | 0.683 | -15.0 | 170 | 0.00 |
| 4 | C | Vinyl Chloride | 0.453 | 0.446 | 1.5 | 140 | 0.00 |
| 5 | | Bromomethane | 0.150 | 0.185 | -23.3# | 178 | 0.00 |
| 6 | | Chloroethane | 0.212 | 0.211 | 0.5 | 149 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.305 | 0.272 | 10.8 | 137 | 0.00 |
| 8 | | Ethyl Ether | 0.332 | 0.303 | 8.7 | 137 | 0.00 |
| 9 | C | 1,1-Dichloroethene | 0.493 | 0.528 | -7.1 | 159 | -0.01 |
| 10 | | Freon 113 | 0.207 | 0.207 | 0.0 | 151 | 0.00 |
| 11 | | Acetone | 0.132 | 0.113 | 14.4 | 127 | 0.00 |
| 12 | | Iodomethane | 0.323 | 0.330 | -2.2 | 147 | 0.00 |
| 13 | | Methyl acetate | 0.326 | 0.314 | 3.7 | 146 | 0.00 |
| 14 | | Carbon Disulfide | 0.771 | 0.802 | -4.0 | 154 | 0.00 |
| 15 | | Methylene Chloride | 0.650 | 0.636 | 2.2 | 144 | 0.00 |
| 16 | | trans-1,2-Dichloroethene | 0.471 | 0.485 | -3.0 | 147 | 0.00 |
| 17 | | Acrylonitrile | 0.129 | 0.095 | 26.4# | 103 | 0.00 |
| 18 | | Methyl Tert Butyl Ether | 0.555 | 0.590 | -6.3 | 148 | -0.01 |
| 19 | | Hexane | 0.423 | 0.440 | -4.0 | 144 | -0.01 |
| 20 | P | 1,1-Dichloroethane | 0.616 | 0.602 | 2.3 | 144 | 0.00 |
| 21 | | ETBE | 0.983 | 1.010 | -2.7 | 141 | -0.01 |
| 22 | | Vinyl acetate | 0.968 | 1.169 | -20.8# | 175 | 0.00 |
| 23 | | Di-isopropyl ether | 1.573 | 1.572 | 0.1 | 139 | -0.01 |
| 24 | | 2,2-Dichloropropane | 0.254 | 0.275 | -8.3 | 157 | 0.00 |
| 25 | | cis-1,2-Dichloroethene | 0.270 | 0.280 | -3.7 | 148 | -0.01 |
| 26 | | 2-Butanone | 0.190 | 0.186 | 2.1 | 139 | 0.00 |
| 27 | | Bromochloromethane | 0.124 | 0.121 | 2.4 | 144 | -0.01 |
| 28 | C | Chloroform | 0.441 | 0.453 | -2.7 | 151 | -0.01 |
| 29 | | Tetrahydrofuran | 0.111 | 0.111 | 0.0 | 144 | 0.00 |
| 30 | | 1,1,1-Trichloroethane | 0.324 | 0.357 | -10.2 | 165 | 0.00 |
| 31 | S | Dibromofluoromethane | 0.245 | 0.238 | 2.9 | 142 | 0.00 |
| 32 | | Cyclohexane | 0.586 | 0.606 | -3.4 | 139 | -0.01 |
| 33 | | 1,1-Dichloropropene | 0.301 | 0.321 | -6.6 | 149 | 0.00 |
| 34 | | Carbon Tetrachloride | 0.266 | 0.288 | -8.3 | 157 | 0.00 |
| 35 | S | 1,2-Dichloroethane-d4 | 0.325 | 0.348 | -7.1 | 160 | 0.00 |
| 36 | | TAME | 0.640 | 0.668 | -4.4 | 146 | 0.00 |
| 37 | | Benzene | 1.094 | 1.086 | 0.7 | 146 | 0.00 |
| 38 | | 1,2-Dichloroethane | 0.417 | 0.459 | -10.1 | 163 | 0.00 |
| 39 | | Trichloroethene | 0.247 | 0.255 | -3.2 | 149 | 0.00 |
| 40 | | Methylcyclohexane | 0.349 | 0.375 | -7.4 | 147 | 0.00 |
| 41 | C | 1,2-Dichloropropane | 0.359 | 0.356 | 0.8 | 143 | -0.01 |
| 42 | | Dibromomethane | 0.159 | 0.169 | -6.3 | 156 | 0.00 |

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB673-CC664
Lab FileID: B015286.D

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 43 | | Bromodichloromethane | 0.328 | 0.353 | -7.6 | 156 | 0.00 |
| 44 | | 2-Nitropropane | 0.112 | 0.125 | -11.6 | 159 | 0.00 |
| 45 | | 2-Chloroethyl vinyl ether | 0.205 | 0.203 | 1.0 | 141 | 0.00 |
| 46 | | 4-Methyl-2-pentanone | 0.432 | 0.439 | -1.6 | 146 | 0.00 |
| 47 | | cis-1,3-Dichloropropene | 0.406 | 0.437 | -7.6 | 150 | 0.00 |
| 48 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 145 | 0.00 |
| 49 | S | Toluene-d8 | 1.243 | 1.242 | 0.1 | 145 | 0.00 |
| 50 | C | Toluene | 1.442 | 1.464 | -1.5 | 148 | 0.00 |
| 51 | | trans-1,3-Dichloropropene | 0.470 | 0.525 | -11.7 | 159 | 0.00 |
| 52 | | 1,1,2-Trichloroethane | 0.279 | 0.287 | -2.9 | 157 | 0.00 |
| 53 | | Tetrachloroethene | 0.320 | 0.353 | -10.3 | 157 | 0.00 |
| 54 | | 2-hexanone | 0.396 | 0.393 | 0.8 | 140 | 0.00 |
| 55 | | 1,3-Dichloropropane | 0.529 | 0.562 | -6.2 | 155 | 0.00 |
| 56 | | Dibromochloromethane | 0.322 | 0.337 | -4.7 | 156 | 0.00 |
| 57 | | 1,2-Dibromoethane | 0.290 | 0.306 | -5.5 | 149 | 0.00 |
| 58 | | 1-Chlorohexane | 0.409 | 0.464 | -13.4 | 151 | 0.00 |
| 59 | P | Chlorobenzene | 0.942 | 0.928 | 1.5 | 145 | 0.00 |
| 60 | | 1,1,1,2-Tetrachloroethane | 0.319 | 0.328 | -2.8 | 152 | 0.00 |
| 61 | C | Ethylbenzene | 1.597 | 1.678 | -5.1 | 152 | 0.00 |
| 62 | | m,p-Xylene | 1.197 | 1.298 | -8.4 | 153 | 0.00 |
| 63 | | o-Xylene | 1.262 | 1.367 | -8.3 | 155 | 0.00 |
| 64 | | Styrene | 0.987 | 1.069 | -8.3 | 148 | 0.00 |
| 65 | P | Bromoform | 0.210 | 0.255 | -21.4# | 170 | 0.00 |
| 66 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 167 | 0.00 |
| 67 | | Isopropylbenzene | 2.685 | 2.504 | 6.7 | 148 | 0.00 |
| 68 | S | 4-Bromofluorobenzene | 0.975 | 0.903 | 7.4 | 157 | 0.00 |
| 69 | | Bromobenzene | 0.858 | 0.757 | 11.8 | 152 | 0.00 |
| 70 | P | 1,1,2,2-Tetrachloroethane | 0.860 | 0.809 | 5.9 | 165 | 0.00 |
| 71 | | trans-1,4-Dichloro-2-Butene | 0.377 | 0.384 | -1.9 | 168 | 0.00 |
| 72 | | 1,2,3-Trichloropropane | 0.220 | 0.200 | 9.1 | 168 | 0.00 |
| 73 | | n-Propylbenzene | 3.910 | 3.727 | 4.7 | 157 | 0.00 |
| 74 | | 2-Chlorotoluene | 2.576 | 2.434 | 5.5 | 160 | 0.00 |
| 75 | | 4-Chlorotoluene | 2.219 | 2.157 | 2.8 | 158 | 0.00 |
| 76 | | 1,3,5-Trimethylbenzene | 2.368 | 2.208 | 6.8 | 151 | 0.00 |
| 77 | | sec-Butylbenzene | 2.989 | 2.809 | 6.0 | 149 | 0.00 |
| 78 | | 1,3-Dichlorobenzene | 1.477 | 1.347 | 8.8 | 153 | 0.00 |
| 79 | | 4-Isopropyltoluene | 2.345 | 2.216 | 5.5 | 153 | 0.00 |
| 80 | | 1,4-Dichlorobenzene | 1.535 | 1.410 | 8.1 | 155 | 0.00 |
| 81 | | tert-Butylbenzene | 1.338 | 1.326 | 0.9 | 160 | 0.00 |
| 82 | | Benzyl Chloride | 1.420 | 1.490 | -4.9 | 172 | 0.00 |
| 83 | | n-Butylbenzene | 2.422 | 2.426 | -0.2 | 159 | 0.00 |
| 84 | | 1,2-Dichlorobenzene | 1.430 | 1.334 | 6.7 | 155 | 0.00 |
| 85 | | 1,2,4-Trimethylbenzene | 2.426 | 2.330 | 4.0 | 153 | 0.00 |
| 86 | | 1,2-Dibromo-3-Chloropropane | 0.120 | 0.115 | 4.2 | 168 | 0.00 |
| 87 | | 1,2,4-Trichlorobenzene | 0.923 | 0.850 | 7.9 | 153 | 0.00 |
| 88 | | Hexachlorobutadiene | 0.408 | 0.401 | 1.7 | 177 | 0.00 |
| 89 | | Naphthalene | 1.854 | 1.801 | 2.9 | 158 | 0.00 |
| 90 | | 1,2,3-Trichlorobenzene | 0.826 | 0.762 | 7.7 | 156 | 0.00 |
| 91 | I | Tert Butyl alcohol-d10 | 1.000 | 1.000 | 0.0 | 145 | 0.00 |
| 92 | | Acrolein | 2.908 | 2.447 | 15.9 | 119 | -0.01 |
| 93 | | Tert-Butyl Alcohol | 2.180 | 2.136 | 2.0 | 144 | 0.00 |
| 94 | | 1,4-Dioxane | 0.166 | 0.173 | -4.2 | 154 | 0.00 |
| 95 | | Cyclohexanone | 0.962 | 0.866 | 10.0 | 139 | 0.00 |

Average % D = 6.4

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB673-CC664
Lab FileID: B015286.D

```
(#) = Out of Range                SPCC's out = 0  CCC's out = 0
 B015043.D  82600409.M        Wed Apr 23 09:12:25 2003   RPT1
```

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB674-CC664
Lab FileID: B015313.D

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\042303\B015313.D  Vial: 1
Acq On : 23 Apr 2003 1:10 pm  Operator: Karenw
Sample : CC664-40  Inst : MSVOA4
Misc : ms2212,vb674,,,,,  Multiplr: 1.00
MS Integration Params: Rteint.p

Method : C:\MSDCHEM\1\METHODS\82600409.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Wed Apr 23 11:09:32 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 | 108 | 0.00 |
| 2 | | Dichlorodifluoromethane | 0.205 | 0.258 | -25.9# | 138 | 0.00 |
| 3 | P | Chloromethane | 0.594 | 0.589 | 0.8 | 110 | 0.00 |
| 4 | C | Vinyl Chloride | 0.453 | 0.397 | 12.4 | 93 | 0.00 |
| 5 | | Bromomethane | 0.150 | 0.204 | -36.0# | 147 | 0.00 |
| 6 | | Chloroethane | 0.212 | 0.192 | 9.4 | 101 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.305 | 0.342 | -12.1 | 129 | -0.01 |
| 8 | | Ethyl Ether | 0.332 | 0.283 | 14.8 | 95 | -0.01 |
| 9 | C | 1,1-Dichloroethene | 0.493 | 0.459 | 6.9 | 104 | -0.01 |
| 10 | | Freon 113 | 0.207 | 0.215 | -3.9 | 117 | 0.00 |
| 11 | | Acetone | 0.132 | 0.101 | 23.5# | 84 | -0.01 |
| 12 | | Iodomethane | 0.323 | 0.337 | -4.3 | 112 | 0.00 |
| 13 | | Methyl acetate | 0.326 | 0.290 | 11.0 | 101 | 0.00 |
| 14 | | Carbon Disulfide | 0.771 | 0.697 | 9.6 | 100 | 0.00 |
| 15 | | Methylene Chloride | 0.650 | 0.550 | 15.4 | 93 | 0.00 |
| 16 | | trans-1,2-Dichloroethene | 0.471 | 0.406 | 13.8 | 92 | 0.00 |
| 17 | | Acrylonitrile | 0.129 | 0.114 | 11.6 | 92 | -0.01 |
| 18 | | Methyl Tert Butyl Ether | 0.555 | 0.606 | -9.2 | 114 | -0.01 |
| 19 | | Hexane | 0.423 | 0.348 | 17.7 | 85 | -0.01 |
| 20 | P | 1,1-Dichloroethane | 0.616 | 0.535 | 13.1 | 96 | 0.00 |
| 21 | | ETBE | 0.983 | 0.890 | 9.5 | 93 | -0.01 |
| 22 | | Vinyl acetate | 0.968 | 1.042 | -7.6 | 116 | 0.00 |
| 23 | | Di-isopropyl ether | 1.573 | 1.357 | 13.7 | 90 | -0.01 |
| 24 | | 2,2-Dichloropropane | 0.254 | 0.254 | 0.0 | 109 | 0.00 |
| 25 | | cis-1,2-Dichloroethene | 0.270 | 0.265 | 1.9 | 105 | -0.01 |
| 26 | | 2-Butanone | 0.190 | 0.170 | 10.5 | 95 | 0.00 |
| 27 | | Bromochloromethane | 0.124 | 0.127 | -2.4 | 113 | 0.00 |
| 28 | C | Chloroform | 0.441 | 0.453 | -2.7 | 113 | -0.01 |
| 29 | | Tetrahydrofuran | 0.111 | 0.107 | 3.6 | 103 | -0.01 |
| 30 | | 1,1,1-Trichloroethane | 0.324 | 0.339 | -4.6 | 117 | 0.00 |
| 31 | S | Dibromofluoromethane | 0.245 | 0.260 | -6.1 | 116 | 0.00 |
| 32 | | Cyclohexane | 0.586 | 0.478 | 18.4 | 82 | 0.00 |
| 33 | | 1,1-Dichloropropene | 0.301 | 0.305 | -1.3 | 106 | -0.01 |
| 34 | | Carbon Tetrachloride | 0.266 | 0.300 | -12.8 | 122 | 0.00 |
| 35 | S | 1,2-Dichloroethane-d4 | 0.325 | 0.355 | -9.2 | 122 | 0.00 |
| 36 | | TAME | 0.640 | 0.690 | -7.8 | 113 | -0.01 |
| 37 | | Benzene | 1.094 | 1.004 | 8.2 | 101 | 0.00 |
| 38 | | 1,2-Dichloroethane | 0.417 | 0.419 | -0.5 | 111 | 0.00 |
| 39 | | Trichloroethene | 0.247 | 0.241 | 2.4 | 106 | 0.00 |
| 40 | | Methylcyclohexane | 0.349 | 0.335 | 4.0 | 98 | 0.00 |
| 41 | C | 1,2-Dichloropropane | 0.359 | 0.324 | 9.7 | 97 | -0.01 |
| 42 | | Dibromomethane | 0.159 | 0.174 | -9.4 | 120 | 0.00 |

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB674-CC664
Lab FileID: B015313.D

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 43 | | Bromodichloromethane | 0.328 | 0.356 | -8.5 | 118 | -0.01 |
| 44 | | 2-Nitropropane | 0.112 | 0.118 | -5.4 | 112 | 0.00 |
| 45 | | 2-Chloroethyl vinyl ether | 0.205 | 0.198 | 3.4 | 103 | 0.00 |
| 46 | | 4-Methyl-2-pentanone | 0.432 | 0.408 | 5.6 | 102 | 0.00 |
| 47 | | cis-1,3-Dichloropropene | 0.406 | 0.437 | -7.6 | 112 | 0.00 |
| 48 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 115 | 0.00 |
| 49 | S | Toluene-d8 | 1.243 | 1.183 | 4.8 | 110 | 0.00 |
| 50 | C | Toluene | 1.442 | 1.277 | 11.4 | 103 | 0.00 |
| 51 | | trans-1,3-Dichloropropene | 0.470 | 0.501 | -6.6 | 121 | 0.00 |
| 52 | | 1,1,2-Trichloroethane | 0.279 | 0.271 | 2.9 | 118 | 0.00 |
| 53 | | Tetrachloroethene | 0.320 | 0.293 | 8.4 | 104 | 0.00 |
| 54 | | 2-hexanone | 0.396 | 0.347 | 12.4 | 99 | 0.00 |
| 55 | | 1,3-Dichloropropane | 0.529 | 0.531 | -0.4 | 117 | 0.00 |
| 56 | | Dibromochloromethane | 0.322 | 0.344 | -6.8 | 127 | 0.00 |
| 57 | | 1,2-Dibromoethane | 0.290 | 0.308 | -6.2 | 120 | 0.00 |
| 58 | | 1-Chlorohexane | 0.409 | 0.398 | 2.7 | 103 | 0.00 |
| 59 | P | Chlorobenzene | 0.942 | 0.879 | 6.7 | 110 | 0.00 |
| 60 | | 1,1,1,2-Tetrachloroethane | 0.319 | 0.328 | -2.8 | 121 | 0.00 |
| 61 | C | Ethylbenzene | 1.597 | 1.474 | 7.7 | 106 | 0.00 |
| 62 | | m,p-Xylene | 1.197 | 1.139 | 4.8 | 107 | 0.00 |
| 63 | | o-Xylene | 1.262 | 1.197 | 5.2 | 108 | 0.00 |
| 64 | | Styrene | 0.987 | 0.985 | 0.2 | 109 | 0.00 |
| 65 | P | Bromoform | 0.210 | 0.244 | -16.2 | 130 | 0.00 |
| 66 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 123 | 0.00 |
| 67 | | Isopropylbenzene | 2.685 | 2.473 | 7.9 | 108 | 0.00 |
| 68 | S | 4-Bromofluorobenzene | 0.975 | 0.933 | 4.3 | 119 | 0.00 |
| 69 | | Bromobenzene | 0.858 | 0.754 | 12.1 | 111 | 0.00 |
| 70 | P | 1,1,2,2-Tetrachloroethane | 0.860 | 0.840 | 2.3 | 126 | 0.00 |
| 71 | | trans-1,4-Dichloro-2-Butene | 0.377 | 0.329 | 12.7 | 106 | 0.00 |
| 72 | | 1,2,3-Trichloropropane | 0.220 | 0.221 | -0.5 | 137 | 0.00 |
| 73 | | n-Propylbenzene | 3.910 | 3.389 | 13.3 | 105 | 0.00 |
| 74 | | 2-Chlorotoluene | 2.576 | 2.257 | 12.4 | 109 | 0.00 |
| 75 | | 4-Chlorotoluene | 2.219 | 2.018 | 9.1 | 108 | 0.00 |
| 76 | | 1,3,5-Trimethylbenzene | 2.368 | 2.170 | 8.4 | 109 | 0.00 |
| 77 | | sec-Butylbenzene | 2.989 | 2.691 | 10.0 | 105 | 0.00 |
| 78 | | 1,3-Dichlorobenzene | 1.477 | 1.312 | 11.2 | 110 | 0.00 |
| 79 | | 4-Isopropyltoluene | 2.345 | 2.133 | 9.0 | 108 | 0.00 |
| 80 | | 1,4-Dichlorobenzene | 1.535 | 1.393 | 9.3 | 112 | 0.00 |
| 81 | | tert-Butylbenzene | 1.338 | 1.241 | 7.2 | 109 | 0.00 |
| 82 | | Benzyl Chloride | 1.420 | 1.458 | -2.7 | 124 | 0.00 |
| 83 | | n-Butylbenzene | 2.422 | 2.188 | 9.7 | 105 | 0.00 |
| 84 | | 1,2-Dichlorobenzene | 1.430 | 1.334 | 6.7 | 114 | 0.00 |
| 85 | | 1,2,4-Trimethylbenzene | 2.426 | 2.284 | 5.9 | 110 | 0.00 |
| 86 | | 1,2-Dibromo-3-Chloropropane | 0.120 | 0.127 | -5.8 | 135 | 0.00 |
| 87 | | 1,2,4-Trichlorobenzene | 0.923 | 0.856 | 7.3 | 113 | 0.00 |
| 88 | | Hexachlorobutadiene | 0.408 | 0.352 | 13.7 | 114 | 0.00 |
| 89 | | Naphthalene | 1.854 | 1.898 | -2.4 | 122 | 0.00 |
| 90 | | 1,2,3-Trichlorobenzene | 0.826 | 0.775 | 6.2 | 116 | 0.00 |
| 91 | I | Tert Butyl alcohol-d10 | 1.000 | 1.000 | 0.0 | 117 | -0.01 |
| 92 | | Acrolein | 2.908 | 2.656 | 8.7 | 103 | -0.01 |
| 93 | | Tert-Butyl Alcohol | 2.180 | 1.946 | 10.7 | 105 | 0.00 |
| 94 | | 1,4-Dioxane | 0.166 | 0.165 | 0.6 | 118 | 0.00 |
| 95 | | Cyclohexanone | 0.962 | 0.746 | 22.5# | 96 | 0.00 |

Average % D = 8.4

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB674-CC664
Lab FileID: B015313.D

```
(#) = Out of Range                SPCC's out = 0  CCC's out = 0
 B015043.D  82600409.M       Thu Apr 24 11:03:11 2003   RPT1
```

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB675-CC664
Lab FileID: B015337.D

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\042403\B015337.D
Acq On : 24 Apr 2003 1:11 pm
Sample : CC664-40
Misc : ms2218,vb675,,,,,
MS Integration Params: Rteint.p

Vial: 1
Operator: Karenw
Inst : MSVOA4
Multiplr: 1.00

Method : C:\MSDCHEM\1\METHODS\82600409.M (RTE Integrator)
Title : EPA 624 & SWA 5030B/8260B
Last Update : Wed Apr 23 11:09:32 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 | 122 | 0.00 |
| 2 | | Dichlorodifluoromethane | 0.205 | 0.299 | -45.9# | 181 | 0.00 |
| 3 | P | Chloromethane | 0.594 | 0.621 | -4.5 | 131 | 0.00 |
| 4 | C | Vinyl Chloride | 0.453 | 0.454 | -0.2 | 121 | 0.00 |
| 5 | | Bromomethane | 0.150 | 0.218 | -45.3# | 178 | 0.00 |
| 6 | | Chloroethane | 0.212 | 0.210 | 0.9 | 125 | 0.00 |
| 7 | | Trichlorofluoromethane | 0.305 | 0.401 | -31.5# | 171 | 0.00 |
| 8 | | Ethyl Ether | 0.332 | 0.517 | -55.7# | 198 | 0.00 |
| 9 | C | 1,1-Dichloroethene | 0.493 | 0.468 | 5.1 | 120 | -0.01 |
| 10 | | Freon 113 | 0.207 | 0.204 | 1.4 | 127 | 0.00 |
| 11 | | Acetone | 0.132 | 0.108 | 18.2 | 102 | 0.00 |
| 12 | | Iodomethane | 0.323 | 0.324 | -0.3 | 122 | 0.00 |
| 13 | | Methyl acetate | 0.326 | 0.294 | 9.8 | 116 | 0.00 |
| 14 | | Carbon Disulfide | 0.771 | 0.685 | 11.2 | 112 | 0.00 |
| 15 | | Methylene Chloride | 0.650 | 0.553 | 14.9 | 106 | 0.00 |
| 16 | | trans-1,2-Dichloroethene | 0.471 | 0.415 | 11.9 | 107 | 0.00 |
| 17 | | Acrylonitrile | 0.129 | 0.121 | 6.2 | 111 | 0.00 |
| 18 | | Methyl Tert Butyl Ether | 0.555 | 0.598 | -7.7 | 127 | 0.00 |
| 19 | | Hexane | 0.423 | 0.339 | 19.9 | 94 | 0.00 |
| 20 | P | 1,1-Dichloroethane | 0.616 | 0.543 | 11.9 | 110 | 0.00 |
| 21 | | ETBE | 0.983 | 0.893 | 9.2 | 106 | -0.01 |
| 22 | | Vinyl acetate | 0.968 | 1.050 | -8.5 | 133 | 0.00 |
| 23 | | Di-isopropyl ether | 1.573 | 1.361 | 13.5 | 102 | 0.00 |
| 24 | | 2,2-Dichloropropane | 0.254 | 0.259 | -2.0 | 126 | 0.00 |
| 25 | | cis-1,2-Dichloroethene | 0.270 | 0.264 | 2.2 | 119 | 0.00 |
| 26 | | 2-Butanone | 0.190 | 0.180 | 5.3 | 114 | 0.00 |
| 27 | | Bromochloromethane | 0.124 | 0.126 | -1.6 | 128 | 0.00 |
| 28 | C | Chloroform | 0.441 | 0.454 | -2.9 | 128 | 0.00 |
| 29 | | Tetrahydrofuran | 0.111 | 0.107 | 3.6 | 118 | 0.00 |
| 30 | | 1,1,1-Trichloroethane | 0.324 | 0.341 | -5.2 | 134 | 0.00 |
| 31 | S | Dibromofluoromethane | 0.245 | 0.260 | -6.1 | 131 | 0.00 |
| 32 | | Cyclohexane | 0.586 | 0.496 | 15.4 | 97 | 0.00 |
| 33 | | 1,1-Dichloropropene | 0.301 | 0.307 | -2.0 | 121 | 0.00 |
| 34 | | Carbon Tetrachloride | 0.266 | 0.307 | -15.4 | 142 | 0.00 |
| 35 | S | 1,2-Dichloroethane-d4 | 0.325 | 0.357 | -9.8 | 139 | 0.00 |
| 36 | | TAME | 0.640 | 0.690 | -7.8 | 128 | 0.00 |
| 37 | | Benzene | 1.094 | 1.026 | 6.2 | 117 | 0.00 |
| 38 | | 1,2-Dichloroethane | 0.417 | 0.413 | 1.0 | 125 | 0.00 |
| 39 | | Trichloroethene | 0.247 | 0.244 | 1.2 | 121 | 0.00 |
| 40 | | Methylcyclohexane | 0.349 | 0.342 | 2.0 | 114 | 0.00 |
| 41 | C | 1,2-Dichloropropane | 0.359 | 0.325 | 9.5 | 110 | 0.00 |
| 42 | | Dibromomethane | 0.159 | 0.174 | -9.4 | 136 | 0.00 |

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB675-CC664
Lab FileID: B015337.D

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 43 | | Bromodichloromethane | 0.328 | 0.358 | -9.1 | 134 | 0.00 |
| 44 | | 2-Nitropropane | 0.112 | 0.116 | -3.6 | 125 | 0.00 |
| 45 | | 2-Chloroethyl vinyl ether | 0.205 | 0.200 | 2.4 | 118 | 0.00 |
| 46 | | 4-Methyl-2-pentanone | 0.432 | 0.424 | 1.9 | 120 | 0.00 |
| 47 | | cis-1,3-Dichloropropene | 0.406 | 0.444 | -9.4 | 129 | 0.00 |
| 48 | I | Chlorobenzene-d5 | 1.000 | 1.000 | 0.0 | 133 | 0.00 |
| 49 | S | Toluene-d8 | 1.243 | 1.184 | 4.7 | 127 | 0.00 |
| 50 | C | Toluene | 1.442 | 1.299 | 9.9 | 121 | 0.00 |
| 51 | | trans-1,3-Dichloropropene | 0.470 | 0.489 | -4.0 | 136 | 0.00 |
| 52 | | 1,1,2-Trichloroethane | 0.279 | 0.265 | 5.0 | 133 | 0.00 |
| 53 | | Tetrachloroethene | 0.320 | 0.301 | 5.9 | 123 | 0.00 |
| 54 | | 2-hexanone | 0.396 | 0.355 | 10.4 | 116 | 0.00 |
| 55 | | 1,3-Dichloropropane | 0.529 | 0.524 | 0.9 | 133 | 0.00 |
| 56 | | Dibromochloromethane | 0.322 | 0.335 | -4.0 | 142 | 0.00 |
| 57 | | 1,2-Dibromoethane | 0.290 | 0.310 | -6.9 | 138 | 0.00 |
| 58 | | 1-Chlorohexane | 0.409 | 0.410 | -0.2 | 122 | 0.00 |
| 59 | P | Chlorobenzene | 0.942 | 0.892 | 5.3 | 128 | 0.00 |
| 60 | | 1,1,1,2-Tetrachloroethane | 0.319 | 0.318 | 0.3 | 135 | 0.00 |
| 61 | C | Ethylbenzene | 1.597 | 1.498 | 6.2 | 124 | 0.00 |
| 62 | | m,p-Xylene | 1.197 | 1.172 | 2.1 | 127 | 0.00 |
| 63 | | o-Xylene | 1.262 | 1.251 | 0.9 | 130 | 0.00 |
| 64 | | Styrene | 0.987 | 0.998 | -1.1 | 127 | 0.00 |
| 65 | P | Bromoform | 0.210 | 0.241 | -14.8 | 148 | 0.00 |
| 66 | I | 1,4-Dichlorobenzene-d4 | 1.000 | 1.000 | 0.0 | 142 | 0.00 |
| 67 | | Isopropylbenzene | 2.685 | 2.549 | 5.1 | 128 | 0.00 |
| 68 | S | 4-Bromofluorobenzene | 0.975 | 0.951 | 2.5 | 141 | 0.00 |
| 69 | | Bromobenzene | 0.858 | 0.774 | 9.8 | 132 | 0.00 |
| 70 | P | 1,1,2,2-Tetrachloroethane | 0.860 | 0.846 | 1.6 | 147 | 0.00 |
| 71 | | trans-1,4-Dichloro-2-Butene | 0.377 | 0.277 | 26.5# | 103 | 0.00 |
| 72 | | 1,2,3-Trichloropropane | 0.220 | 0.219 | 0.5 | 157 | 0.00 |
| 73 | | n-Propylbenzene | 3.910 | 3.516 | 10.1 | 125 | 0.00 |
| 74 | | 2-Chlorotoluene | 2.576 | 2.350 | 8.8 | 131 | 0.00 |
| 75 | | 4-Chlorotoluene | 2.219 | 2.108 | 5.0 | 131 | 0.00 |
| 76 | | 1,3,5-Trimethylbenzene | 2.368 | 2.259 | 4.6 | 131 | 0.00 |
| 77 | | sec-Butylbenzene | 2.989 | 2.825 | 5.5 | 127 | 0.00 |
| 78 | | 1,3-Dichlorobenzene | 1.477 | 1.370 | 7.2 | 132 | 0.00 |
| 79 | | 4-Isopropyltoluene | 2.345 | 2.213 | 5.6 | 129 | 0.00 |
| 80 | | 1,4-Dichlorobenzene | 1.535 | 1.415 | 7.8 | 132 | 0.00 |
| 81 | | tert-Butylbenzene | 1.338 | 1.294 | 3.3 | 132 | 0.00 |
| 82 | | Benzyl Chloride | 1.420 | 1.436 | -1.1 | 141 | 0.00 |
| 83 | | n-Butylbenzene | 2.422 | 2.251 | 7.1 | 125 | 0.00 |
| 84 | | 1,2-Dichlorobenzene | 1.430 | 1.362 | 4.8 | 134 | 0.00 |
| 85 | | 1,2,4-Trimethylbenzene | 2.426 | 2.379 | 1.9 | 133 | 0.00 |
| 86 | | 1,2-Dibromo-3-Chloropropane | 0.120 | 0.131 | -9.2 | 162 | 0.00 |
| 87 | | 1,2,4-Trichlorobenzene | 0.923 | 0.880 | 4.7 | 135 | 0.00 |
| 88 | | Hexachlorobutadiene | 0.408 | 0.373 | 8.6 | 140 | 0.00 |
| 89 | | Naphthalene | 1.854 | 1.995 | -7.6 | 149 | 0.00 |
| 90 | | 1,2,3-Trichlorobenzene | 0.826 | 0.817 | 1.1 | 142 | 0.00 |
| 91 | I | Tert Butyl alcohol-d10 | 1.000 | 1.000 | 0.0 | 149 | 0.00 |
| 92 | | Acrolein | 2.908 | 2.090 | 28.1# | 104 | 0.00 |
| 93 | | Tert-Butyl Alcohol | 2.180 | 1.861 | 14.6 | 128 | 0.00 |
| 94 | | 1,4-Dioxane | 0.166 | 0.164 | 1.2 | 149 | 0.00 |
| 95 | | Cyclohexanone | 0.962 | 0.728 | 24.3# | 119 | 0.00 |

Average % D = 8.5

# Continuing Calibration Summary

Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: VB675-CC664
Lab FileID: B015337.D

```
(#) = Out of Range                SPCC's out = 0  CCC's out = 0
 B015043.D  82600409.M       Fri Apr 25 09:01:43 2003   RPT1
```

# GC Volatiles

## QC Data Summaries

Includes the following where applicable:

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

# Blank Spike Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GXY255 BS | XY010544.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |

The QC reported here applies to the following samples: Method: RSKSOP-147/175

F17417-1, F17417-2, F17417-3, F17417-4

| CAS No. | Compound | Spike ug/l | BSP ug/l | BSP % | Limits |
|---|---|---|---|---|---|
| 74-82-8 | Methane | 108 | 125 | 116 | 50-126 |

# Duplicate Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F17417-3DUP | XY010549.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| F17417-3 | XY010547.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |

The QC reported here applies to the following samples: Method: RSKSOP-147/175

F17417-1, F17417-2, F17417-3, F17417-4

| CAS No. | Compound | F17417-3 ug/l | Q | DUP ug/l | Q | RPD | Limits |
|---|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 149 | | 127 | | 16 | 29 |

# Method Blank Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| GXY255-MB | XY010543.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |

The QC reported here applies to the following samples: Method: RSKSOP-147/175

F17417-1, F17417-2, F17417-3, F17417-4

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

# Matrix Spike Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|---|---|---|---|---|---|---|---|
| F17417-4MS | XY010550.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |
| F17417-4 | XY010548.D | 1 | 04/21/03 | CV | n/a | n/a | GXY255 |

The QC reported here applies to the following samples: Method: RSKSOP-147/175

F17417-1, F17417-2, F17417-3, F17417-4

| CAS No. | Compound | F17417-4 ug/l | Q | Spike ug/l | MS ug/l | MS % | Limits |
|---|---|---|---|---|---|---|---|
| 74-82-8 | Methane | 6.55 | | 108 | 92.9 | 80 | 50-150 [a] |

(a) Advisory control limits.

# Initial Calibration Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: GXY255-ICC255
Lab FileID: XY010536.D

Response Factor Report VOA5

Method : C:\HPCHEM\2\METHODS\DGMEE.M (Chemstation Integrator)
Title : Dissolved Gases in Water
Last Update : Mon Apr 21 11:49:05 2003
Response via : Initial Calibration

Calibration Files
1 =XY010534.D 2 =XY010535.D 3 =XY010536.D
4 =XY010537.D 5 =XY010538.D 6 =XY010539.D 7 =XY010540.D

| | Compound | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|
| 1) | Methane | 2.427 | 2.417 | 2.307 | 1.992 | 2.234 | 2.083 | 2.449 | 2.273 E4 | 7.90 |
| 2) | Ethylene | | 4.364 | 4.375 | 3.757 | 4.147 | 3.904 | 4.429 | 4.163 E4 | 6.69 |
| 3) | Ethane | | 4.266 | 4.379 | 3.779 | 4.178 | 3.997 | 4.543 | 4.190 E4 | 6.51 |

(#) = Out of Range

DGMEE.M Mon Apr 21 15:45:55 2003 EF

# Continuing Calibration Summary



Job Number: F17417
Account: TETRPAPT Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

Sample: GXY255-CC255
Lab FileID: XY010551.D

Evaluate Continuing Calibration Report

```
Data File : C:\HPCHEM\2\DATA\042103\XY010551.D          Vial: 100
Acq On    : 21 Apr 2003   3:12 pm                     Operator: ClaireV
Sample    : cc255-1000                                Inst    : VOA5
Misc      : gc2471,gxy255,,,,,1                       Multiplr: 1.00
IntFile   : EVENTS.E

Method       : C:\HPCHEM\2\METHODS\DGMEE.M (Chemstation Integrator)
Title        : Dissolved Gases in Water
Last Update  : Fri Apr 11 10:53:19 2003
Response via : Multiple Level Calibration

Min. RRF     :   0.000  Min. Rel. Area :  50%  Max. R.T. Dev  0.50min
Max. RRF Dev :  30%     Max. Rel. Area : 150%
```

| | Compound | Amount | Calc. | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|
| 1 | Methane | 1000.000 | 862.386 | 13.8 | 88 | -0.17 |
| 2 | Ethylene | 1000.000 | 877.462 | 12.3 | 88 | -0.08 |
| 3 | Ethane | 1000.000 | 878.132 | 12.2 | 88 | -0.07 |

Average % D = 12.7

(#) = Out of Range  SPCC's out = 0  CCC's out = 0
XY010538.D DGMEE.M  Mon Apr 21 15:28:52 2003  EF

# General Chemistry

## QC Data Summaries

Includes the following where applicable:

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

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F17417
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Analyte | Batch ID | RL | MB Result | Units | BSP %Recov | QC Limits |
|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | GP4055/GN11623 | 0.10 | <0.10 | mg/l | 93.0 | 90-110% |
| Nitrogen, Nitrite | GP4055/GN11623 | 0.10 | <0.10 | mg/l | 95.0 | 90-110% |
| Phosphate, Ortho | GP4054/GN11613 | 0.10 | <0.10 | mg/l | 98.5 | 87-112% |
| Sulfate | GP4055/GN11623 | 20 | <20 | mg/l | 92.3 | 90-110% |
| Total Organic Carbon | GN11626 | 1.0 | <1.0 | mg/l | 90.0 | 86-116% |

Associated Samples:
Batch GN11626: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4054: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4055: F17417-1, F17417-2, F17417-3, F17417-4

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F17417
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Analyte | Batch ID | QC Sample | Units | Original Result | DUP Result | RPD | QC Limits |
|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | GP4055/GN11623 | F17417-1 | mg/l | 0.34 | 0.33 | 3.0 | 0-20% |
| Nitrogen, Nitrite | GP4055/GN11623 | F17417-1 | mg/l | <0.10 | <0.10 | 0.0 | 0-20% |
| Phosphate, Ortho | GP4054/GN11613 | F17417-1 | mg/l | <0.10 | <0.10 | 5.5 | 0-22% |
| Sulfate | GP4055/GN11623 | F17417-1 | mg/l | <20 | <20 | 0.0 | 0-20% |
| Total Organic Carbon | GN11626 | F17376-1 | mg/l | 3.2 | 2.8 | 13.8 | 0-20% |

Associated Samples:
Batch GN11626: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4054: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4055: F17417-1, F17417-2, F17417-3, F17417-4

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F17417
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Analyte | Batch ID | QC Sample | Units | Original Result | Spike Amount | MS Result | %Rec | QC Limits |
|---|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | GP4055/GN11623 | F17417-1 | mg/l | 0.34 | 1 | 1.2 | 86.0N(a) | 90-110% |
| Nitrogen, Nitrite | GP4055/GN11623 | F17417-1 | mg/l | <0.10 | 1 | 0.87 | 87.0N(a) | 90-110% |
| Phosphate, Ortho | GP4054/GN11613 | F17417-1 | mg/l | <0.10 | 0.300 | 0.38 | 98.2 | 74-126% |
| Sulfate | GP4055/GN11623 | F17417-1 | mg/l | <20 | 100 | 96.9 | 85.0N(a) | 90-110% |
| Total Organic Carbon | GN11626 | F17376-1 | mg/l | 3.2 | 50.000 | 55.3 | 104.3 | 76-118% |

Associated Samples:
Batch GN11626: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4054: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4055: F17417-1, F17417-2, F17417-3, F17417-4
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F17417
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

| Analyte | Batch ID | QC Sample | Units | Original Result | Spike Amount | MSD Result | RPD | QC Limit |
|---|---|---|---|---|---|---|---|---|
| Nitrogen, Nitrate | GP4055/GN11623 | F17417-1 | mg/l | 0.34 | 1 | 1.2 | 0.0N(a) | |
| Nitrogen, Nitrite | GP4055/GN11623 | F17417-1 | mg/l | <0.10 | 1 | 0.85 | 2.3N(a) | |
| Sulfate | GP4055/GN11623 | F17417-1 | mg/l | <20 | 100 | 97.0 | 0.1N(a) | |
| Total Organic Carbon | GN11626 | F17376-1 | mg/l | 3.2 | 50.000 | 55.4 | 0.1 | |

Associated Samples:
Batch GN11626: F17417-1, F17417-2, F17417-3, F17417-4
Batch GP4055: F17417-1, F17417-2, F17417-3, F17417-4
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

Accutest Laboratories Instrument Runlog
Inorganics Analyses

Login Number: F17417
Account: TETRPAPT - Tetra Tech, NUS
Project: NAS Cecil Field-CTO-248

File ID: 03041801.IC  Date Analyzed: 04/18/03  Methods: EPA 300/SW846 9056
Analyst: LL  Run ID: GN11623
Parameters: Nitrogen, Nitrate,Nitrogen, Nitrite,Sulfate

| | Time | Sample Description | Dilution Factor | PS Recov | Comments |
|---|---|---|---|---|---|
| | 14:11 | GN11623-ICV1 | 1 | | |
| | 14:27 | GN11623-ICB1 | 1 | | |
| | 14:43 | GN11623-CCV1 | 1 | | |
| | 14:58 | GN11623-CCB1 | 1 | | |
| | 15:14 | GP4055-MB1 | 1 | | |
| | 15:30 | GP4055-B1 | 1 | | |
| | 15:46 | GP4055-S1 | 1 | | |
| | 16:02 | GP4055-S2 | 1 | | |
| | 16:18 | GP4055-D1 | 1 | | |
| | 16:34 | F17417-1 | 1 | | |
| | 16:49 | F17417-2 | 1 | | |
| | 17:05 | F17417-3 | 1 | | |
| | 17:21 | F17417-4 | 1 | | |
| ----------> | Last reportable sample/prep for job F17417 | | | | |
| | 17:37 | ZZZZZZ | 1 | | |
| | 17:53 | GN11623-CCV2 | 1 | | |
| | 18:09 | GN11623-CCB2 | 1 | | |
| ----------> | Last reportable CCB for job F17417 | | | | |
| | 18:25 | ZZZZZZ | 1 | | |
| | 18:41 | ZZZZZZ | 1 | | |
| | 18:57 | GN11623-CCV3 | 1 | | |
| | 19:13 | GN11623-CCB3 | 1 | | |

Refer to raw data for calibration curve and standards.

TETRA TECH NUS, INC. | CHAIN OF CUSTODY | NUMBER 2269 | PAGE 1 OF 1

PROJECT NO: N4248 CTO 248 | FACILITY: BP Wells

PROJECT MANAGER: PAUL CALLIGAN | PHONE NUMBER: 813 886 0202 | LABORATORY NAME AND CONTACT: ACCUTEST Sue Bell

SAMPLERS (SIGNATURE): Charles Mott, Pete Smith | NAS CECIL FIELD

FIELD OPERATIONS LEADER: M. DAVE | PHONE NUMBER: 904 636 6125 | ADDRESS: 4405 Vineland Rd

CARRIER/WAYBILL NUMBER: Fedex 8371 1005 6110 | CITY, STATE: ORLANDO, FL 32811

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

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

PRESERVATIVE USED: HCl HCl $H_2SO_4$ None

TYPE OF ANALYSIS: SELECT VOCs * | DISSOLVED METHANE RSK SOP 147/175 | TOC | EPA 415.1 | SELECT Anions * EPA 300

| DATE YEAR 2003 | 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 | SELECT VOCs * | DISSOLVED METHANE RSK SOP 147/175 | TOC | SELECT Anions * EPA 300 | | | | | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 4-17 | 1105 | CEF-BP-GW-02S-05 | | | | GW | G | 8 | 3 | 3 | 1 | 1 | | | | | Cool to 4°C |
| 2 4-17 | 1435 | CEF-BP-GW-01S-05 | | | | GW | G | 8 | 3 | 3 | 1 | 1 | | | | | |
| 3 4-17 | 1335 | CEF-BP-GW-06S-05 | | | | GW | G | 8 | 3 | 3 | 1 | 1 | | | | | * See Analyte list in work release N4248-WR331 |
| 4 4-17 | 0000 | CEF-BP-DI-06 | | | | GW | G | 8 | 3 | 3 | 1 | 1 | | | | | |

1 Cooler !!!

| | | | | | |
|---|---|---|---|---|---|
| 1. RELINQUISHED BY: Charles Mott | DATE 4-17-03 | TIME 1720 | 1. RECEIVED BY: Fedex | DATE | TIME |
| 2. RELINQUISHED BY: Fedex | DATE 4/18/03 | TIME 9:30 | 2. RECEIVED BY: [illegible] | DATE | TIME |
| 3. RELINQUISHED BY | DATE | TIME | 3. RECEIVED BY | DATE | TIME |

COMMENTS

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

# ATTACHMENT C

## SECOND QUARTER FIELD NATURAL ATTENUATION DATA: GEOCHEMICAL FIELD ANALYTICAL LOG SHEETS

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: NAS Cecil Field, BP Wells
Project No.: N4248.MW0050240
Sampled By: P LEVERETTE
Field Analyst: C METZ
Field Form Checked as per QA/QC Checklist (initials): MMA

Sample ID No.: CEF-BP-GW- 015 -05
Sample Location: CEF-BP-GW- 015
Duplicate: ☒
Blank: ☐

**SAMPLING DATA:**

| | Color (Visual) | pH (SU) | S.C. (mS/cm) | Turbidity (NTU) | DO (Meter, mg/l) | Temp. (°C) | ORP (Eh) (+/- mv) | |
|---|---|---|---|---|---|---|---|---|
| Date: 4/17/03 | | | | | | | | |
| Time: 1435 | | | | | | | | |
| Method: Peristaltic | CLEAR | 6.51 | 0.269 | 0.5 | 0.26 | 20.90 | -114.9 | |

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Dissolved Oxygen:**

Equipment: CHEMetrics Range: ☒ 0 - 1.0 mg/L ☐ 1 - 12 mg/L
Analysis Time: 1437
CHEMetrics: 0.8 mg/L Dup = 0.8 mg/L
Notes:

**Sulfide ($S^{2-}$):**

Equipment: Chemetrics (kit # K-9510)
Analysis Time: 1446
Concentration: 0.2 mg/L Dup = 0.2 mg/L
Filtered: ☐
Notes:

**Carbon Dioxide:**

Equipment: CHEMetrics (Range: 10-100 mg/L) (1910, 1920, or 1925)
Analysis Time: 1440
CHEMetrics: 70 mg/L Dup ≈ 70 mg/L
Notes:

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

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050240**
Sampled By: PL
Field Analyst: CM
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW-** 015 **-05**
Sample Location: **CEF-BP-GW-** 015
Duplicate: ☒
Blank: ☐

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Alkalinity:** 50-500 mg/L Analysis Time: 1449

Equipment: — CHEMetrics (Range: 9815 mg/L) Filtered: ☐

Kits: 9810, 9815, 9820

| Parameter: | Hydroxide | Carbonate | Bicarbonate |
|---|---|---|---|
| Relationship: | | | |

CHEMetrics: 130 mg/L Dup = 130 mg/L = $CaCO_3$

Notes:

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

**Ferrous Iron ($Fe^{2+}$):**

Equipment: DR-700 DR-8 90 IR-18C Color Wheel Other: _____ Analysis Time: 1444

Program/Module: ~~500nm~~ 33

Concentration: 1.41 mg/L Dup = 1.39 mg/L Filtered: ☐

Notes:

**Hydrogen Sulfide ($H_2S$):**

Equipment: HS-C Other: _____ Analysis Time: 1438

Concentration: 2.0 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes: Dup = 2.0 mg/L

**QA/QC Checklist:**

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

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050240**
Sampled By: C. Metz / P. Lereiette
Field Analyst: C. Metz
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW-** 02S **-05**
Sample Location: **CEF-BP-GW-** 02S
Duplicate: ☐
Blank: ☐

**SAMPLING DATA:**

| | Color (Visual) | pH (SU) | S.C. (mS/cm) | Turbidity (NTU) | DO (Meter, mg/l) | Temp. (°C) | ORP (Eh) (+/- mv) | |
|---|---|---|---|---|---|---|---|---|
| Date: 4-17-03 | | | | | | | | |
| Time: 1105 | | | | | | | | |
| Method: Peristaltic | Clear | 6.56 | 167 | 18.1 | 2.51 | 22.10 | +140 | |

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

**Dissolved Oxygen:**

Equipment: CHEMetrics Range ☐ 0 - 1.0 mg/L ☒ 1 - 12 mg/L Analysis Time: 1108

CHEMetrics: 3 mg/L

Notes: exceeded 0-1.0 mg/L range

**Sulfide ($S^{2-}$):**

Equipment: Chemetrics (kit # K-9510) Analysis Time: 1115

Concentration: 0 mg/L Filtered: ☐

Notes:

**Carbon Dioxide:**

Equipment: CHEMetrics (Range: 10-100 mg/L) (1910, 1920, or 1925) Analysis Time: 1111

CHEMetrics: 16 mg/L

Notes:

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

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050240**
Sampled By: C. METZ / P. LEVELLETTE
Field Analyst: C. METZ
Field Form Checked as per QA/QC Checklist (initials): MDA

Sample ID No.: **CEF-BP-GW-** 02S **-05**
Sample Location: **CEF-BP-GW-** 02S
Duplicate: ☐
Blank: ☐

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

## Alkalinity:

Equipment: —

CHEMetrics (Range: ~~0-100~~ 0-80 mg/L)
Kits (9810) 9815, 9820

Analysis Time: 1120
Filtered: ☐

| Parameter: | Hydroxide | ~~Carbonate~~ | Bicarbonate |
|---|---|---|---|
| Relationship: | | | |

CHEMetrics: 70 mg/L = $CaCO_3$ =

Notes:

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

## Ferrous Iron ($Fe^{2+}$):

Equipment: DR-700 (DR-8 90) IR-18C Color Wheel Other: _____ Analysis Time: 1118

Program/Module: 500nm 33

Concentration: 0.02 mg/L Filtered: ☐

Notes:

## Hydrogen Sulfide ($H_2S$):

Equipment: (HS-C) Other: _____ Analysis Time: 1109

Concentration: 0.0 mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes:

## QA/QC Checklist:

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

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050240**
Sampled By: P LEVERETTE
Field Analyst: C METZ
Field Form Checked as per QA/QC Checklist (initials): MNA

Sample ID No.: **CEF-BP-GW-** 065' **-05**
Sample Location: **CEF-BP-GW-** 06.5'
Duplicate: ☐
Blank: ☐

**SAMPLING DATA:**

| | Color (Visual) | pH (SU) | S.C. (mS/cm) | Turbidity (NTU) | DO (Meter, mg/l) | Temp. (°C) | ORP (Eh) (+/- mv) | |
|---|---|---|---|---|---|---|---|---|
| Date: 4/17/03 | | | | | | | | |
| Time: 1335 | | | | | | | | |
| Method: Peristaltic | CLEAR | 6.05 | 0.245 | 4.59 | 0.64 | 22.70 | 78.0 | |

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

## Dissolved Oxygen:

Equipment:
CHEMetrics Range ☒ 0 - 1.0 mg/L ☒ 1 - 12 mg/L
Analysis Time: 1337
CHEMetrics: 1.0 mg/L
Notes:

## Sulfide ($S^{2-}$):

Equipment: Chemetrics (kit # K-9510)
Analysis Time: 1345
Concentration: 0 mg/L
Filtered: ☐
Notes:

## Carbon Dioxide:

Equipment:
CHEMetrics (Range: 1910 mg/L)
(1910, 1920, or 1925)
Analysis Time: 1340
CHEMetrics: 25 mg/L
Notes:

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

Tetra Tech NUS, Inc.

# FIELD ANALYTICAL LOG SHEET
# GEOCHEMICAL PARAMETERS



Project Site Name: **NAS Cecil Field, BP Wells**
Project No.: **N4248.MW0050240**
Sampled By: P.L
Field Analyst: C.M
Field Form Checked as per QA/QC Checklist (initials): MWA

Sample ID No.: **CEF-BP-GW-** 06s **-05**
Sample Location: **CEF-BP-GW-** 06s
Duplicate: ☐
Blank: ☐

**SAMPLE COLLECTION/ANALYSIS INFORMATION:**

## Alkalinity:

Analysis Time: 1348

Equipment: —

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

Filtered: ☐

| Parameter: | Hydroxide | Carbonate | Bicarbonate |
|---|---|---|---|
| Relationship: | | | |

CHEMetrics: 70 mg/L = $CaCO_3$

Notes:

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

## Ferrous Iron ($Fe^{2+}$):

Equipment: DR-700 DR-820 IR-18C Color Wheel Other: _____ Analysis Time: 1343

Program/Module: 500nm 33

Concentration: 0.08 mg/L

Filtered: ☐

Notes:

## Hydrogen Sulfide ($H_2S$):

Equipment: HS-C Other: _____ Analysis Time: 1338

Concentration: 0.10 cm mg/L Exceeded 5.0 mg/L range on color chart: ☐

Notes:

## QA/QC Checklist:

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