

EXECUTIVE SUMMARY

Laboratory Performance: Two analytes were detected in the laboratory blank. One LCS/LCSD RPD exceeded QC criteria.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed to evaluate usability with reference to the EPA "National Functional Guidelines for Chlorinated Dioxin/Furan Data Review" (2005), as amended for use within EPA Region 3 following the document, "Region III Dioxin/Furan Data Validation Guidance" (1999), and the NFESC document entitled "Navy IRCDQM" (9/99).

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

"I attest that the data referenced herein were reviewed according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."



Tetra Tech NUS, Inc.
Megan Ritchie
Data Validator



Tetra Tech NUS, Inc.
Russell Sloboda
Data Validation Quality Assurance Officer

Attachments:

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

APPENDIX A

Qualified Analytical Results

PROJ_NO: 2192

SDG: C7E090120 MEDIA: WATER DATA FRACTION: DIOX

nsample FB-050807
samp_date 5/8/2007
lab_id C7E090120004
qc_type NM
units PG/L
Pct_Solids
DUP_OF:

| Parameter | Result | Val Qual | Qual Code |
|----------------------|--------|----------|-----------|
| 1,2,3,4,6,7,8,9-OCDD | 22 | J | P |
| 1,2,3,4,6,7,8,9-OCDF | 98 | U | |
| 1,2,3,4,6,7,8-HPCDD | 49 | U | |
| 1,2,3,4,6,7,8-HPCDF | 49 | U | |
| 1,2,3,4,7,8,9-HPCDF | 49 | U | |
| 1,2,3,4,7,8-HXCDD | 49 | U | |
| 1,2,3,4,7,8-HXCDF | 49 | U | |
| 1,2,3,6,7,8-HXCDD | 49 | U | |
| 1,2,3,6,7,8-HXCDF | 49 | U | |
| 1,2,3,7,8,9-HXCDD | 49 | U | |
| 1,2,3,7,8,9-HXCDF | 49 | U | |
| 1,2,3,7,8-PECDD | 49 | U | |
| 1,2,3,7,8-PECDF | 49 | U | |
| 2,3,4,6,7,8-HXCDF | 49 | U | |
| 2,3,4,7,8-PECDF | 49 | U | |
| 2,3,7,8-TCDD | 9.8 | U | |
| 2,3,7,8-TCDF | 9.8 | U | |

Qualifier Codes:

- a = Lab Blank Contamination
- b = Field Blank Contamination
- c = Calibration (i.e., %RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
- d = MS/MSD Noncompliance
- e = LSC/LSCD Noncompliance
- f = Laboratory Duplicate Imprecision
- g = Field Duplicate Imprecision
- h = Holding Time Exceedance
- i = ICP Serial Dilution Noncompliance
- j = GFAA PDS – GFAA MSA's $r < 0.995$ (correlation coefficient)
- k = ICP Interference – include ICSAB %Rs
- l = Instrument Calibration Range Exceedance
- m = Sample Preservation
- n = Internal Standard Noncompliance
- n01 = Internal Standard Recovery Noncompliance Dioxins
- n02 = Recovery Standard Noncompliance Dioxins
- n03 = Clean-up Standard Noncompliance Dioxins
- o = Poor Instrument Performance (i.e. baseline drifting)
- p = Uncertainty Near Detection Limit ($< 2 \times$ IDL for inorganics and $<$ CRQL for organics)
- q = Other Problems (can encompass of number of issues)
- r = Surrogates Recovery Noncompliance
- s = Pesticide/PCB Resolution
- t = % Breakdown Noncompliance for DDT and Endrin
- u = Pesticide/PCB % Difference Between Columns for Positive Results
- v = Non-linear Calibrations, Tuning $r < 0.995$ (correlation coefficient)
- w = Ratios of primary monitored ions outside of theoretical $\pm 15\%$, within $\pm 25\%$
- x = Signal to noise response drop
- y = Percent solids $< 30\%$
- z = Uncertainty at 2 sigma deviation is greater than sample activity

APPENDIX B

Results as Reported by the Laboratory

Tetra Tech NUS, Inc
 Sample ID: FB-050807
 Trace Level Organic Compounds

| | | | | | |
|---------------------|-----------------|--------------------|----------|------------------|------------|
| Lot - Sample #....: | C7E090120 - 004 | Work Order #....: | JWJLT1AC | Matrix....: | WATER |
| Date Sampled....: | 05/08/07 | Date Received....: | 05/09/07 | Dilution Factor: | 1 |
| Prep Date....: | 05/18/07 | Analysis Date....: | 05/22/07 | | |
| Prep Batch #: | 7138288 | Instrument ID....: | M2A | Method: | SW846 8290 |
| Initial Wgt/Vol : | 1020 mL | | | | |
| Analyst ID....: | Bruce F. Wagner | | | | |

| PARAMETER | RESULT | | MINIMUM LEVEL | ESTIMATED DETECTION LIMIT | UNITS |
|---------------------|--------|-----|---------------|---------------------------|-------|
| 2,3,7,8-TCDD | ND | | 9.8 | 5.0 | pg/L |
| 1,2,3,7,8-PeCDD | ND | | 49 | 2.1 | pg/L |
| 1,2,3,4,7,8-HxCDD | ND | | 49 | 1.6 | pg/L |
| 1,2,3,6,7,8-HxCDD | ND | | 49 | 1.9 | pg/L |
| 1,2,3,7,8,9-HxCDD | ND | | 49 | 1.6 | pg/L |
| 1,2,3,4,6,7,8-HpCDD | ND | | 49 | 2.3 | pg/L |
| OCDD | 22 | J B | 98 | 2.9 | pg/L |
| 2,3,7,8-TCDF | ND | | 9.8 | 3.5 | pg/L |
| 1,2,3,7,8-PeCDF | ND | | 49 | 2.0 | pg/L |
| 2,3,4,7,8-PeCDF | ND | | 49 | 1.6 | pg/L |
| 1,2,3,4,7,8-HxCDF | ND | | 49 | 1.1 | pg/L |
| 1,2,3,6,7,8-HxCDF | ND | | 49 | 1.2 | pg/L |
| 2,3,4,6,7,8-HxCDF | ND | | 49 | 1.2 | pg/L |
| 1,2,3,7,8,9-HxCDF | ND | | 49 | 1.6 | pg/L |
| 1,2,3,4,6,7,8-HpCDF | ND | | 49 | 1.6 | pg/L |
| 1,2,3,4,7,8,9-HpCDF | ND | | 49 | 2.4 | pg/L |
| OCDF | ND | | 98 | 3.2 | pg/L |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|-------------------------|------------------|-----------------|
| 13C-2,3,7,8-TCDD | 85 | 40 - 135 |
| 13C-1,2,3,7,8-PeCDD | 68 | 40 - 135 |
| 13C-1,2,3,4,7,8-HxCDD | 90 | 40 - 135 |
| 13C-1,2,3,6,7,8-HxCDD | 97 | 40 - 135 |
| 13C-1,2,3,4,6,7,8-HpCDD | 89 | 40 - 135 |
| 13C-OCDD | 63 | 40 - 135 |
| 13C-2,3,7,8-TCDF | 84 | 40 - 135 |
| 13C-1,2,3,7,8-PeCDF | 63 | 40 - 135 |
| 13C-2,3,4,7,8-PeCDF | 63 | 40 - 135 |
| 13C-1,2,3,4,7,8-HxCDF | 85 | 40 - 135 |
| 13C-1,2,3,6,7,8-HxCDF | 83 | 40 - 135 |
| 13C-2,3,4,6,7,8-HxCDF | 89 | 40 - 135 |
| 13C-1,2,3,7,8,9-HxCDF | 83 | 40 - 135 |
| 13C-1,2,3,4,6,7,8-HpCDF | 79 | 40 - 135 |
| 13C-1,2,3,4,7,8,9-HpCDF | 74 | 40 - 135 |

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Tetra Tech NUS, Inc
Sample ID: FB-050807
Trace Level Organic Compounds

| | | | | | |
|----------------------------|------------------------|---------------------------|-----------------|-------------------------|-------------------|
| Lot - Sample #....: | C7E090120 - 004 | Work Order #....: | JWJLT1AC | Matrix....: | WATER |
| Date Sampled....: | 05/08/07 | Date Received....: | 05/09/07 | Dilution Factor: | 1 |
| Prep Date....: | 05/18/07 | Analysis Date....: | 05/22/07 | | |
| Prep Batch #: | 7138288 | Instrument ID....: | M2A | Method: | SW846 8290 |
| Initial Wgt/Vol : | 1020 mL | | | | |
| Analyst ID....: | Bruce F. Wagner | | | | |

QUALIFIERS

- B** Method blank contamination. The associated method blank contains the target analyte at a reportable level.
- J** Estimated Result.

APPENDIX C

Support Documentation

PROJECT NARRATIVE

Lot Number: C7E090120

Method(s): SW-846 8290

Dioxin Analysis

All QC criteria were met with the following exceptions:

For the following QC samples the recoveries of the listed internal standards were below the lower acceptance criterion (40%). The minimum required signal-to-noise ratio was present, and the target estimated detection limit for associated analytes was met. The results are reported in accordance with the standard operating procedure. When properly applied, isotope dilution techniques produce results that are independent of internal standard recovery.

JW883-1AA Method Blank

| | |
|----------------|-----|
| 13C-2378-TCDD | 16% |
| 13C-2378-TCDF | 13% |
| 13C12378-PeCDF | 32% |

JW883-1AC Laboratory Control Sample

| | |
|-----------------|-----|
| 13C-23478-PeCDF | 38% |
|-----------------|-----|

The relative percent difference for 2378-TCDF for the Laboratory Control Sample and Duplicate was 20%, which is outside the method suggested 15%. On both the LCS and LCSD the % recovery for 2378-TCDF was within QC limits. No adverse effects were seen on data quality.

Comments:

The percent difference (%D from the ICAL) for OCDF on closing standard b070523s3 was +20.6%. When the %D falls between 20 and 25%, the method requires the use of the average (of the bracketing) response factors for all samples on the shift. This adjustment was performed as specified by the method.

Insufficient sample volume was available for a matrix spike and matrix spike duplicate extraction; therefore a laboratory control sample and laboratory control sample duplicate was substituted.

The following flags are used to qualify results for chlorinated dioxin and furan results:

J – The reported result is an estimate. The amount reported is below the Minimum Level (ML). The qualitative definition of the ML is “the lowest level at which the analytical system must give a reliable signal and an acceptable calibration point”. The ML was introduced in EPA Methods 1624 and 1625 in 1980 and was promulgated in these methods in 1984 at 40 CFR Part 136, Appendix A. For the purposes of this report the ML is qualitatively defined as described above, and quantitatively defined as follows: **Minimum Level:** The concentration or mass of analyte in the sample that corresponds to the lowest calibration level in the initial calibration. It represents a concentration (in the sample extract) equivalent to that of the lowest calibration standard, after corrections for method-specified sample weights, volumes and cleanup procedures has been employed.

Example: The lowest calibration level for TCDD in the initial calibration is 0.5 pg/uL. A mass of 10 pg of 2,3,7,8-TCDD in the sample would result in a concentration of 0.5 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the lowest calibration standard, the 10 pg mass in the sample components is the ML. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example: A 1/10 dilution is performed on the sample extract described above. The ML for 2,3,7,8-TCDD becomes 100 pg rather than the default of 10 pg.

E – The reported result is an estimate. The amount reported is above the UCL described below.

The E qualifier is applied on the basis of the **Upper Calibration Level (UCL)**. The quantitative definition of the UCL is listed below:

Upper Calibration Level: The concentration or mass of analyte in the sample that corresponds to the highest calibration level in the initial calibration. It is equivalent to the concentration of the highest calibration standard, assuming that all method-specified sample weights, volumes, and cleanup procedures have been employed.

Example:

The maximum calibration level for TCDD in the initial calibration is 200 pg/uL. A mass of 4000 pg of 2,3,7,8-TCDD in the sampling components would result in a concentration of 200 pg/uL in the sample extract (at a final volume of 20 uL). Since the concentration in the sample extract corresponds to the concentration in the highest calibration standard, the 4000 pg mass in the sample components is the UCL. If the sample extract is further diluted, the ML will increase by the dilution factor.

Example:

A 1/10 dilution is performed on the sample extract described above. The UCL for 2,3,7,8-TCDD becomes 40,000 pg rather than the default of 4000 pg. In this

examples all positive 2,3,7,8-TCDD results above 40,000 pg are flagged with an E.

B – The analyte is present in the associated method blank at a reportable level. For this analysis, there is no method specified reporting level, other than the qualitative criterion that peaks must exhibit a signal-to-noise ratio of 2.5-to-1. Therefore, the presence of any amount of the analyte present in the blank will result a B qualifier on all associated samples.

If the blank has analytes present above the ML (described above) the need for corrective action beyond qualifying the associated data is evaluated. The determination is made whether the amount in the blank is less than 5% of the lowest amount in associated client samples or regulatory limit. If this is the case, sample processing may continue with the qualification of the data. If the amount in the blank is greater than 5% of the lowest amount in associated client samples or regulatory limit, corrective action must be taken.

The corrective actions may include extracting a second aliquot of sample if available, or notifying the client to assess the impact on the project objectives.

Note: Some laboratories do not report contamination in the blank unless it is above their lower calibration limit, or an established percentage of the level in the samples, or an established percentage of the regulatory limit. Likewise, some laboratories set a reporting limit at one half the lower calibration limit.

Q – Estimated maximum possible concentration. This qualifier is used when the result is generated from chromatographic data that does not meet all the qualitative criteria for a positive identification given in the method. The criteria include the following areas:

- Ion abundance ratios must be within specified limits (+/-15% of theoretical ion abundance ratio.)
- Retention time criteria (relative to the method-specified isotope labeled retention time standard).
- Co-maximization criterion. The two quantitation ion peaks must reach their maxima within 2 seconds of each other.
- Polychlorinated dibenzofuran purity. No peak can be identified as a polychlorinated dibenzofuran if a polychlorinated diphenyl ether peak maximizes within +/- 2 seconds of the furan candidate.

S – Ion suppression evident. The trace indicating the signal from the lock mass of the calibration compound shows a deflection at the retention time of the analyte. This may indicate a temporary suppression of the instrument sensitivity, due to a matrix-borne interference.

C – Coeluting Isomer. The isomer is known to coelute with another member of its homologue group, or the peak shape is shouldered, indicating the likelihood of a coeluting isomer

X – Other. See explanation in narrative.

Method Blank Report
Trace Level Organic Compounds

Lot - Sample #....: H7E180000 - 288B
 Dilution Factor: 1
 Prep Date....: 05/18/07
 Prep Batch #: 7138288
 Initial Wgt/Vol: 1000 mL
 Analyst ID....: Melissa A. Davidson

Work Order #....: JW8831AA
 Analysis Date....: 05/23/07
 Instrument ID....: M2A

Matrix....: WATER
 Method: SW846 8290

| PARAMETER | RESULT | MINIMUM LEVEL | ESTIMATED DETECTION LIMIT | UNITS |
|----------------------------|-----------------|---------------|---------------------------|-------------|
| 2,3,7,8-TCDD | ND | 10 | 4.9 | pg/L |
| 1,2,3,7,8-PeCDD | ND | 50 | 0.60 | pg/L |
| 1,2,3,4,7,8-HxCDD | ND | 50 | 0.29 | pg/L |
| 1,2,3,6,7,8-HxCDD | ND | 50 | 0.33 | pg/L |
| 1,2,3,7,8,9-HxCDD | ND | 50 | 0.29 | pg/L |
| 1,2,3,4,6,7,8-HpCDD | ND | 50 | 0.32 | pg/L |
| OCDD | 1.8 J | 100 | 0.28 | pg/L |
| 2,3,7,8-TCDF | ND | 10 | 3.4 | pg/L |
| 1,2,3,7,8-PeCDF | ND | 50 | 0.77 | pg/L |
| 2,3,4,7,8-PeCDF | ND | 50 | 0.49 | pg/L |
| 1,2,3,4,7,8-HxCDF | ND | 50 | 0.20 | pg/L |
| 1,2,3,6,7,8-HxCDF | ND | 50 | 0.20 | pg/L |
| 2,3,4,6,7,8-HxCDF | ND | 50 | 0.17 | pg/L |
| 1,2,3,7,8,9-HxCDF | ND | 50 | 0.20 | pg/L |
| 1,2,3,4,6,7,8-HpCDF | 0.25 Q J | 50 | 0.19 | pg/L |
| 1,2,3,4,7,8,9-HpCDF | ND | 50 | 0.24 | pg/L |
| OCDF | ND | 100 | 0.21 | pg/L |

| INTERNAL STANDARDS | PERCENT RECOVERY | RECOVERY LIMITS |
|-------------------------|------------------|-----------------|
| 13C-2,3,7,8-TCDD | 16 | 40 - 135 |
| 13C-1,2,3,7,8-PeCDD | 47 | 40 - 135 |
| 13C-1,2,3,4,7,8-HxCDD | 74 | 40 - 135 |
| 13C-1,2,3,6,7,8-HxCDD | 74 | 40 - 135 |
| 13C-1,2,3,4,6,7,8-HpCDD | 91 | 40 - 135 |
| 13C-OCDD | 88 | 40 - 135 |
| 13C-2,3,7,8-TCDF | 13 | 40 - 135 |
| 13C-1,2,3,7,8-PeCDF | 32 | 40 - 135 |
| 13C-2,3,4,7,8-PeCDF | 43 | 40 - 135 |
| 13C-1,2,3,4,7,8-HxCDF | 63 | 40 - 135 |
| 13C-1,2,3,6,7,8-HxCDF | 62 | 40 - 135 |
| 13C-2,3,4,6,7,8-HxCDF | 77 | 40 - 135 |
| 13C-1,2,3,7,8,9-HxCDF | 79 | 40 - 135 |
| 13C-1,2,3,4,6,7,8-HpCDF | 79 | 40 - 135 |
| 13C-1,2,3,4,7,8,9-HpCDF | 89 | 40 - 135 |

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LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

| | | | | | |
|-------------------|-----------------|-------------------|---------------|--------------|------------|
| Client Lot # ...: | C7E090120 | Work Order # ...: | JW8831AC-LCS | Matrix | WATER |
| LCS Lot-Sample# : | H7E180000 - 288 | | JW8831AD-LCSD | | |
| Prep Date | 05/18/07 | Analysis Date ..: | 05/22/07 | | |
| Prep Batch # ...: | 7138288 | | | | |
| Dilution Factor : | 1 | | | | |
| Analyst ID.....: | Bruce F. Wagner | Instrument ID.: | M2A | Method.....: | SW846 8290 |
| Initial Wgt/Vol: | 1000 mL | | | | |

| PARAMETER | SPIKE AMOUNT | MEASURED AMOUNT | UNITS | PERCENT RECOVERY | RECOVERY LIMITS | RPD | RPD LIMITS |
|--------------------------|--------------|-----------------|-------|-------------------------|------------------------|------|------------|
| 2,3,7,8-TCDD | 200 | 183 | pg/L | 92 | (72 - 122) | | |
| | 200 | 191 | pg/L | 96 | (72 - 122) | 4.4 | (0 - 15) |
| 1,2,3,7,8-PeCDD | 1000 | 891 | pg/L | 89 | (72 - 122) | | |
| | 1000 | 1010 | pg/L | 101 | (72 - 122) | 13 | (0 - 15) |
| 1,2,3,4,7,8-HxCDD | 1000 | 963 | pg/L | 96 | (69 - 119) | | |
| | 1000 | 988 | pg/L | 99 | (69 - 119) | 2.6 | (0 - 15) |
| 1,2,3,6,7,8-HxCDD | 1000 | 850 | pg/L | 85 | (72 - 122) | | |
| | 1000 | 988 | pg/L | 99 | (72 - 122) | 15 | (0 - 15) |
| 1,2,3,7,8,9-HxCDD | 1000 | 970 | pg/L | 97 | (71 - 129) | | |
| | 1000 | 1040 | pg/L | 104 | (71 - 129) | 6.8 | (0 - 15) |
| 1,2,3,4,6,7,8-HpCDD | 1000 | 882 | pg/L | 88 | (66 - 116) | | |
| | 1000 | 961 | pg/L | 96 | (66 - 116) | 8.6 | (0 - 15) |
| OCDD | 2000 | 1940 | pg/L | 97 | (70 - 120) | | |
| | 2000 | 1950 | pg/L | 98 | (70 - 120) | 0.76 | (0 - 15) |
| 2,3,7,8-TCDF | 200 | 209 | pg/L | 105 | (74 - 124) | | |
| | 200 | 172 | pg/L | 86 | (74 - 124) | 20 | (0 - 15) |
| 1,2,3,7,8-PeCDF | 1000 | 880 | pg/L | 88 | (69 - 119) | | |
| | 1000 | 996 | pg/L | 100 | (69 - 119) | 12 | (0 - 15) |
| 2,3,4,7,8-PeCDF | 1000 | 924 | pg/L | 92 | (70 - 120) | | |
| | 1000 | 972 | pg/L | 97 | (70 - 120) | 5.1 | (0 - 15) |
| 1,2,3,4,7,8-HxCDF | 1000 | 917 | pg/L | 92 | (70 - 120) | | |
| | 1000 | 992 | pg/L | 99 | (70 - 120) | 7.9 | (0 - 15) |
| 1,2,3,6,7,8-HxCDF | 1000 | 940 | pg/L | 94 | (69 - 119) | | |
| | 1000 | 980 | pg/L | 98 | (69 - 119) | 4.1 | (0 - 15) |
| 2,3,4,6,7,8-HxCDF | 1000 | 917 | pg/L | 92 | (69 - 119) | | |
| | 1000 | 1010 | pg/L | 101 | (69 - 119) | 9.7 | (0 - 15) |
| 1,2,3,7,8,9-HxCDF | 1000 | 979 | pg/L | 98 | (70 - 120) | | |
| | 1000 | 985 | pg/L | 98 | (70 - 120) | 0.58 | (0 - 15) |
| 1,2,3,4,6,7,8-HpCDF | 1000 | 941 | pg/L | 94 | (68 - 118) | | |
| | 1000 | 989 | pg/L | 99 | (68 - 118) | 5.0 | (0 - 15) |
| 1,2,3,4,7,8,9-HpCDF | 1000 | 892 | pg/L | 89 | (69 - 119) | | |
| | 1000 | 989 | pg/L | 99 | (69 - 119) | 10 | (0 - 15) |
| OCDF | 2000 | 1610 | pg/L | 81 | (61 - 128) | | |
| | 2000 | 1690 | pg/L | 84 | (61 - 128) | 4.4 | (0 - 15) |
| INTERNAL STANDARD | | | | PERCENT RECOVERY | RECOVERY LIMITS | | |
| 13C-2,3,7,8-TCDD | | | | 53 | (40 - 135) | | |
| | | | | 80 | (40 - 135) | | |
| 13C-1,2,3,7,8-PeCDD | | | | 46 | (40 - 135) | | |
| | | | | 67 | (40 - 135) | | |
| 13C-1,2,3,4,7,8-HxCDD | | | | 80 | (40 - 135) | | |