

US EPA ARCHIVE DOCUMENT

**DIOXIN DATA VALIDATION REPORT
USEPA REGION I - TIER III**

SDG No.: G2G220146
Laboratory: Severn Trent Laboratories, Inc., West Sacramento, CA
Site: Centredale Manor
Date: September 10, 2002
Samples:
Dioxin: 8/Soil/2108294, 2108295, 2108296, 2108297, 2108298, 2108299, 2108300,
2108301
1/Aqueous/2108302

A Tier III validation was performed on the dioxin/furan analytical data for eight soil samples and one aqueous blank sample collected by Loureiro Engineering Associates at the Centredale Manor Site in North Providence, Rhode Island. The samples were analyzed under EPA Method 8290 for high resolution dioxin/furans. The data were evaluated as a Tier III level in accordance with the "Region I EPA-NE Data Validation Functional Guidelines for Evaluating Dioxin/Furan Analyses", dated November 1998 and the "Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses" dated December 1996 and were based on the following parameters:

- * • Overall Evaluation of Data and Potential Usability Issues.
- * • Data Completeness.
- * • Preservation and Technical Holding Times.
- * • PE Samples/Accuracy Check.
- * • Window Defining Solution.
- * • Initial & Continuing Calibrations.
- * • Chromatographic Resolution.
- * • Instrument Sensitivity Check.
- * • Blanks.
- * • Matrix Spike Analysis.
- * • Laboratory & Field Duplicate Analysis.
- * • Internal/Clean-up/Recovery Standards.
- * • Sample Analysis & Identification.
- * • Sample Quantitation & Total Homologues.
- * • Estimated Detection Limits (EDL) & Estimated Maximum Possible Concentration (EMPC).
- * • Toxicity Equivalency (TEF) and Isomer Specificity.
- * • Required Sample Reruns & Second Column Confirmation.
- * • Dilutions.
- * = All criteria were met for this parameter.
- NA = Not Applicable.

Overall Evaluation of Data and Potential Usability Issues**Dioxin/Furans:**

Dioxin/furan sample results were qualified as follows:

- 23478-PeCDF has been qualified as estimated (UJ) in sample 2108302 due to a low LCS recovery.

Accuracy Check

Laboratory control sample recoveries outside of QC criteria that resulted in qualifications are summarized below.

LCS ID	Compound	%R	Samples Affected	Action
E47801AC	23478-PeCDF	46%	2108302	J/UJ

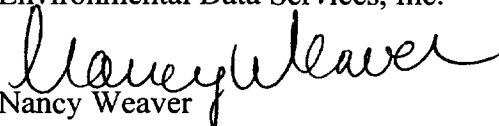
- 23478-PeCDF has been qualified as estimated (UJ) in sample 2108302.

Additional Comments

- Three compounds in sample 2108301 were reported from the 20X dilution due to the initial analysis of these compounds which saturated the instrument detector. The laboratory reported these results with a (D) flag indicating dilution. No action was taken on this basis.
- An aqueous PE sample (2108401) and two soil PE samples (2108342/2108402) were analyzed with this project. According to the client, Cambridge Analytical Isotopes did not provide a range of values for the aqueous PE sample. A range of expected values was provided for the soil PE samples and all results were acceptable and within the range. No action was taken by the reviewer on the basis of the PE samples. A copy of the Form Is for all PE samples, as well as Table 1 - Summary of Quality Assurance/Quality Control Sample Results is attached to this report.

Please contact the undersigned at (603) 226-0118 if you have any questions or need further information.

Very truly yours,
Environmental Data Services, Inc.


Nancy Weaver
Senior Chemist

Attachments: Data Validation Worksheets
Annotated Form Is

DATA SUMMARY KEY
ORGANIC DATA VALIDATION

- J = The associated numerical value is an estimated quantity.
- R = The data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification. The R replaces the numerical value or sample quantitation limit.
- U = The compound was analyzed for, but not detected. The associated numerical value is the sample quantitation limit or the adjusted sample quantitation limit.
- UJ = The compound was analyzed for, but not detected. The associated numerical value is the estimated sample quantitation limit.
- EB = The compound was detected in aqueous equipment blank associated soil/sediment samples.

DIOXIN DATA REVIEW WORKSHEET
(LOW or HIGH RESOLUTION)

The following data package has been validated:

Lab Name Sewer Treat, West Sacramento, CA
DAS/Project No. Centredale Manor
SDG No. 626 220146
No. of Samples/Matrix 8 Soil/Water

^{SW846}
Tech. Spec./Method No. 8290-High Res. Dioxin/fu
Sampling Date(s) 7/18/02
Shipping Date(s) 7/19/02
Date(s) Rec'd by Lab 7/20/02

Traffic Report Sample Nos. 2108294, 2108295, 2108296, 2108297, 2108298
2108299, 2108300, 2108301, 2108302

Equipment Blank Nos. 2108302

Field Duplicate Nos. 2108297/2108298

PES Nos. (2108402 + 2108342 both in other pkgs) summary attached

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Dioxin/Furan Analyses, November 1998 and Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996 were used to evaluate the data and/or approved modifications to the Functional Guidelines were used to evaluate the data. (Attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

The general criteria used to determine the performance were based on an examination of:

- | | |
|--|---|
| • Overall Evaluation of Data | • Laboratory & Field Duplicate Analysis |
| • Data Completeness | • Internal/Clean-up/Recovery Standards |
| • Preservation/Technical Holding Times | • Sample Analysis & Identification |
| • PE Samples/Accuracy Check | • Sample Quantitation & Total Homologues |
| • Window Defining Mix | • Estimated Detection Limit (EDL) & Estimated Maximum Possible Concentration (EMPC) |
| • Initial & Continuing Calibrations | • Toxicity Equivalency Factor (TEF) & Isomer Specificity |
| • Chromatographic Resolution | • Required Sample Reruns & Second Column Confirmation |
| • Instrument Sensitivity Check | • Dilutions |
| • Blanks | |
| • Matrix Spike Analysis | |

Definition of Qualifiers:

- A - Acceptable data
J - Approximate data due to quality control criteria
R - Reject data due to quality control criteria
U - Result not detected
EB - Compound detected in aqueous equipment blank associated with soil/sediment samples

Validator: Nancy Leaver

Date: 9/11/02

-I. DATA COMPLETENESS

MISSING INFORMATION

DATE LAB CONTACTED

DATE RECEIVED

All criteria were met.

Addl. Comments: Three compounds in sample 2108301 were reported from the 20x dilution due to the initial analysis of these compounds which saturated the instrument detector. The laboratory reported these results with a (D) flag indicating "dilution". No further action required by the reviewer.

Reviewer:

Mary H. Leaver

Date:

9/11/02

Region I
Data Review Worksheet - (Low and High Resolution)

II. PRESERVATION AND HOLDING TIMES

Sampler: JM Company: Laureiro Eng. Contacted Yes No Date: _____

1. Circle sample numbers with exceeded contract holding times or omitted preservation.

Sample Number	Matrix	Preserved Y/N	Date Sampled	Date Extracted	Date Analyzed	Action
2108294	Soil	N	7/18/02	8/6/02	8/14/02	None
2108295						
2108296						
2108297						
2108298						
2108299						
2108300						
2108301						
2108302	Water			7/24/02	7/27/02	

Validator: Maury Weaver

Date: 9/11/02

Region I
Data Review Worksheet - (Low and High Resolution)

III. ACCURACY CHECK (Performance Evaluation Results) - List all analytes that are outside criteria.

SDG No. 62622046 CASE/PROJECT No: Centredale Manor

Are more than one-half of the PES analytes within criteria for each parameter.

(Y) N

PE Sample Number	Ampule Number	Type of PES	Matrix	Analyte	Conc	Region I EPA PES Series*	Non-EPA PES Series**	Samples Affected	Action
E51661AC	—	LCS	Soil	All Analytes	all ok	all PASS (60-140)	—	all soils	None
E47801AC	—	LCS	Water	123789-HX CDD	195	(60-140)	—	Water Sample	(J)
↓	↓	↓	↓	23478-PCDF	46	(60-140)	—	(2108302)	(GluJ)
↓	↓	↓	↓	234678-HX CDF	224	↓	—	↓	(J)
↓	↓	↓	↓	123789-HX CDF	237	↓	—	↓	(J)
↓	↓	↓	↓	1234789-HPCDF	186	↓	—	↓	(J)

* For Region I PESs indicate the Region I PES Score Report Results: Action Low; Action High; TCL MISS; TCL CONTAMINANT

** For Non-EPA PESs indicate the Non-EPA PES Score: PES COMPOUND MISS; PES COMPOUND CONTAMINANT; PES COMPOUND HIT (% Recovery Limits)

Validator:

huleaver

Date:

9/11/02

Region I
Data Review Worksheets - (Low or High Resolution)

V. INITIAL AND CONTINUING CALIBRATIONS

Va. INITIAL CALIBRATION

Date of ICAL	Instrument File Name	Compound	%RSD	Ion Ratio	S/N	RT	Resolution	Samples Affected	Action
8/15/02	06AU02102	all analytes	all PASS	all PASS	all PASS	all	pass	all	None
8/14/02	12AU026DS								
8/15/02	14AU026DS								
8/6/02	06AU02102								
8/8/02	07AU026DS								
7/27/02	24JL026DS								
7/24/02	24JL026DS								

Comments: All criteria were met.

Validator: Larry Weaver

Date: 9/1/02

11/98

VI. COLUMN PERFORMANCE RESOLUTION CHECK

Date: _____ ID: _____

Was the chromatographic resolution of the TCDD/TCDF isomers and the _____ in the CCS solution for DB-5 columns calculated for each 12 hour period?

% Valley _____ -TCDD/ _____ -TCDD _____

(QC Limit $\leq$ 25%)

% Valley _____ -TCDF/ _____ -TCDF _____

(QC Limit $\leq$ 50%)

For DB-225 columns:

% Valley _____ -TCDD/ _____ -TCDD _____

(QC Limit $\leq$ 25%)

% Valley _____ -TCDF/ _____ -TCDF _____

(QC Limit $\leq$ 50%)

All PASS

ACTIONS:

- A. If the GC resolution criteria do not meet specifications, the positive hits will be qualified as "J". All tetras and hexas (for both dio. and furans) will be qualified. The heptas are not believed to be affected. OCDD and OCDF are not affected as there is only one isomer in each group. No action is taken for non-detects.
- B. The criteria for chromatographic resolution must be met for all standards and the reviewer must use professional judgement on the severity of the problem and its effect on the final results.

Validator: _____

W. Weaver

Date: _____

9/11/02

Region I
Data Review Worksheets - (Low and High Resolution)

VIIa. BLANKS ANALYSIS

Was a method blank prepared and analyzed for each matrix prior to analysis of sample?

Yes ☒ No ☐

List the blank contamination below.

Sampler: JM Company: Loureiro Eng.

Contacted: Yes ☐ No ☒ Date: _____

1. Laboratory: Method and Instrument Blanks

Date Extracted	Date Analyzed	Matrix	Sample No. (Blank Type)	Instrument	Compound	Conc. (units)
8/6/02	8/14/02	Soil	E51LG1AA	HRC/HRMS	all ND	—
7/24/02	7/26/02	Water	E47801AA	" "	all ND	—

2. Field: Equipment (Rinsate) Blanks

Date Extracted	Date Analyzed	Matrix	Sample No. (Blank Type)	Instrument	Compound	Conc. (units)
7/24/02	7/27/02	water	2108302	HRC/HRMS	all ND	— →

Validator: hwa

Date: 9/11/02

Data Review Worksheets - (Low and High Resolution) Continued

VIIb. BLANKS ANALYSIS

[illegible]

ACTIONS:

- A. If no blank is run with a particular matrix, the non-detected results should be accepted without qualifying the data and the positive hits should be flagged "J". If all samples have the same hits with similar concentrations and no blank is run, professional judgment should be used to determine if all results should be rejected "R".
- B. If a blank is contaminated above the specified limits, any sample hits reported as below the action level are to be reported as non-detected, and not included in the TEF calculations. All data that are not greater than 10 times the blank action level are to be reported as non-detected. If the detected analyte is OCDD/OCDF or a Total Homologue all data that are not greater than 10 times the blank are to be reported as non-detected.
- C. If positive results are detected in aqueous equipment (rinse) blanks and the associated non-aqueous samples, then the validator should flag (ED) those detected compounds in the associated non-aqueous sample: indicate an indeterminate amount of sampling error has potentially affected the sample results.

Validator:

Date: 9/11/02

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

G2G190281-006.

List all MS/MSD analytes that are outside method QC acceptance criteria.

Not evaluated since this is not a sample in the package

Compound	MS % Rec	MSD % Rec	RPD	Method QC Limits		Concentration			%RSD	Action
				% Rec	RPD	Unspiked Sample	MS	MSD		
2378-TCDD										
2378-TCDF										
12378-PeCDF										
12378-PeCDD										
23473-PeCDF										
123473-HxCDF										
123673-HxCDF										
123478-HxCDD										
123673-HxCDD										
123789-HxCDD										
234678-HxCDF										
123789-HxCDF										
1234673-HpCDF										
1234673-HpCDD										
1234739-HpCDF										
OCDD										
OCDF										

Default Limits: % Recovery (50-150%), RPD (50%)

ACTIONS:

If recoveries are beyond 50-150%, recheck all calculations. Professional judgment should be used to flag sample data.

Signature:

[Signature]

Date:

9/11/02

IX. LABORATORY AND FIELD DUPLICATES

Was a duplicate run for each matrix?

Yes ☒ No

The RPD of each analyte detected must be within the 30% of the acceptance range for aqueous and 50% for solids.

SAMPLE ID: 2108297 DUPLICATE ID: 2108298

Compound	Sample Conc.	Sample EDL		Duplicate Conc.	Duplicate EDL		%RPD	Action
		EDL	2xEDL		EDL	2xEDL		
2373-TCDD	320	1.6		360	1.6		12	None
2373-TCDF	8.8	1.6		9.8	1.6		11	"
12373-PeCDF								
12373-PeCDD	4.5 J	7.8		5.2 J	7.9		NC	None
23473-PeCDF	5.6 J	7.8		5.1 J	7.9			
123473-HxCDF	6.0 J	7.8		5.8 J	7.9			
123673-HxCDF	5.2 J	7.8		5.4 J	7.9			
123473-HxCDD								
123673-HxCDD	8.2	7.8		11	7.9		29	None
123739-HxCDD	8.5	7.8		10	7.9		16	"
234673-HxCDF								
123739-HxCDF								
1234673-HpCDF	43	7.8		49	7.9		13	None
1234673-HpCDD	140	7.8		190	7.9		30	"
1234739-HpCDF								
OCDD	910	16		1200	16		27	None
OCDF	44	16		52	16		17	"

ACTIONS:

If RPD is greater than 30% for aqueous or 50% for solids, flag all positive results "J" and non-detects "UJ". Recheck all calculations if the duplicate precision is beyond the specified range. Professional judgement should be used to ascertain effect on the final data despite sample concentration.

Validator: Wheaver

Date: 9/11/02

Region I
Data Review Worksheets - (High Resolution)

Xb. INTERNAL STANDARD RECOVERY

Recovery Acceptance Criteria per Table 10 in Dioxin Validation SOP:

Sample Nos.															
Internal Standard	% Rec.	S/N	QC Range (%)	Action	% Rec.	S/N	QC Range (%)	Action	% Rec.	S/N	QC Range (%)	Action	% Rec.	S/N	QC Range (%)
¹⁴ C ₁₂ -2378-TCDD															
¹⁴ C ₁₂ -2378-TCDF															
¹⁴ C ₁₂ -12378-PeCDD															
¹⁴ C ₁₂ -12378-PeCDF															
¹⁴ C ₁₂ -23478-PeCDF															
¹⁴ C ₁₂ -123478-HxCDD															
¹⁴ C ₁₂ -123678-HxCDD															
¹⁴ C ₁₂ -123789-HxCDD															
¹⁴ C ₁₂ -123478-HxCDF															
¹⁴ C ₁₂ -123678-HxCDF															
¹⁴ C ₁₂ -123789-HxCDF															
¹⁴ C ₁₂ -234678-HxCDF															
¹⁴ C ₁₂ -1234678-HpCDD															
¹⁴ C ₁₂ -1234678-HpCDF															
¹⁴ C ₁₂ -1234789-HpCDF															
¹⁴ C ₁₂ -OCDD															
¹⁴ C ₁₂ -2378-TCDD															

OK PASS

Validator: Deleaver

Date: 9/11/02

Region I
Data Review Worksheet - (High Resolution)

XI. Sample Analysis and Identification

List any sample and analytes which did not meet identification criteria:

SAMPLE No.	RT	SN	Ion Ratio	RT	SN	Ion Ratio
1275-TCDO						
1275-TCDF						
12375-PeCDF						
12375-PeCDD						
12375-PeCDF						
12375-HxCDF						
123675-HxCDF						
123475-HxCDO						
123675-HxCDO						
12375-HxCDO						
123675-HxCDF						
12375-HxCDF						
123475-HpCDF						
1234675-HpCDO						
123475-HpCDF						
OCDO						
OCDF						
INTERNAL STANDARDS VS. RECOVERY STANDARDS						
12C-1275-TCDO						
12C-1275-TCDF						
12C-12375-PeCDO						
12C-12375-PeCDF						
12C-123475-HxCDO						
12C-123675-HxCDO						
12C-123475-HxCDF						
12C-123675-HxCDF						
12C-12375-HxCDF						
12C-1234675-HpCDF						
12C-1234675-HpCDO						
12C-1234675-HpCDF						
12C-123475-HpCDF						
12C-OCDO						
12C-1275-TCDO						
RECOVERY STANDARDS						
12C-1234-TCDO						
12C-12375-HxCDO						

all pass

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Validator: W. Weaver

Date: 9/11/02

XII. SAMPLE CALCULATION

2108299

$$2378\text{-TCDD} = \frac{10972470 \times 2000}{292465000 \times 10 \times 1.06 \times 0.61}$$

$$= 11.6 \approx 12 \text{ pg/g}$$

$$1234678\text{-HPCDD} = \frac{14694100 \times 2000}{272799000 \times 10 \times 1.02 \times 0.61} \approx 17 \text{ pg/g}$$

$$\text{Concentration (ng/g)} = \frac{Q_{is} \times (A_{x1} + A_{x2}) \times D}{(W \text{ or } V) \times (A_{is1} + A_{is2}) \times RRF_x}$$

$$EDL = \frac{2.5 \times Q_{is} \times (H_{x1} + H_{x2}) \times D}{(W \text{ or } V) \times (H_{is1} + H_{is2}) \times RRF_x}$$

$$EMPC = \frac{Q_{is} \times (A_{x1} + A_{x2}) \times D}{(W \text{ or } V) \times (A_{is1} + A_{is2}) \times RRF_x}$$

where:

Q_{is}	=	Quantity (ng) of appropriate internal standard added to sample before extraction.
A_{x1}/A_{x2}	=	Integrated areas of the two quantitation ions.
A_{is1}/A_{is2}	=	Integrated areas of the internal standard quantitation ions
W	=	Weight (g) of sample extracted.
V	=	Volume (L) of sample extracted.
RRF _x	=	Calculated relative response factor from the continuing calibration.
$H_{x1} + H_{x2}$	=	Peak heights of the noise for the quantitation ions.
$H_{is1} + H_{is2}$	=	Peak heights of the internal standard quantitation ions.
D	=	Dilution.

Validator: Maureen Leaver

Date: 9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108294

Lot-Sample #...: G2G220146 - 001
 Date Sampled...: 07/18/02
 Prep Date.....: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44VT2AC
 Date Received..: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix.....: SOLID
 Instrument: 6D5
 Units.....: pg/g
 % Moisture: 24

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	0.22	1	0
Total TCDD	ND	0.22		0
1,2,3,7,8-PeCDD	ND	0.43	1	0
Total PeCDD	ND	0.43		0
1,2,3,4,7,8-HxCDD	ND	0.22	0.1	0
1,2,3,6,7,8-HxCDD	ND	0.24	0.1	0
1,2,3,7,8,9-HxCDD	ND	0.22	0.1	0
Total HxCDD	ND	0.29		0
1,2,3,4,6,7,8-HpCDD	ND	1.2	0.01	0
Total HpCDD	ND	1.2		0
OCDD	9.3 J	13	0.0001	0.000930
2,3,7,8-TCDF	ND	0.26	0.1	0
Total TCDF	ND	0.26		0
1,2,3,7,8-PeCDF	ND	0.34	0.05	0
2,3,4,7,8-PeCDF	ND	0.34	0.5	0
Total PeCDF	ND	0.34		0
1,2,3,4,7,8-HxCDF	ND	0.18	0.1	0
1,2,3,6,7,8-HxCDF	ND	0.18	0.1	0
2,3,4,6,7,8-HxCDF	ND	0.20	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.20	0.1	0
Total HxCDF	ND	0.20		0
1,2,3,4,6,7,8-HpCDF	ND	0.39	0.01	0
1,2,3,4,7,8,9-HpCDF	ND	0.21	0.01	0
Total HpCDF	ND	0.39		0
OCDF	ND	0.38	0.0001	0
Total TEQ Concentration				0.000930

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	40 - 135
13C-1,2,3,7,8-PeCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	85	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	95	40 - 135
13C-OCDD	93	40 - 135
13C-2,3,7,8-TCDF	72	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-1,2,3,4,7,8-HxCDF	82	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	98	40 - 135

EW
9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108294

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

J Estimated result. Result is less than the reporting limit.

US EPA ARCHIVE DOCUMENT

HW
9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108295

Lot-Sample #...: G2G220146 - 002
 Date Sampled...: 07/18/02
 Prep Date.....: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V12AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix.....: SOLID
 Instrument: 6D5
 Units.....: pg/g
 % Moisture: 35

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	1.4	J	1.5	1	1.400000
Total TCDD	1.4		1.5		
1,2,3,7,8-PeCDD	ND		0.69	1	0
Total PeCDD	ND		0.69		0
1,2,3,4,7,8-HxCDD	ND		0.32	0.1	0
1,2,3,6,7,8-HxCDD	ND		0.49	0.1	0
1,2,3,7,8,9-HxCDD	ND		0.39	0.1	0
Total HxCDD	ND		0.92		0
1,2,3,4,6,7,8-HpCDD	7.0	J	7.7	0.01	0.070000
Total HpCDD	14		7.7		
OCDD	110		15	0.0001	0.011000
2,3,7,8-TCDF	ND		0.52	0.1	0
Total TCDF	ND		0.52		0
1,2,3,7,8-PeCDF	ND		0.54	0.05	0
2,3,4,7,8-PeCDF	ND		0.52	0.5	0
Total PeCDF	ND		0.85		0
1,2,3,4,7,8-HxCDF	ND		0.28	0.1	0
1,2,3,6,7,8-HxCDF	ND		0.35	0.1	0
2,3,4,6,7,8-HxCDF	ND		0.28	0.1	0
1,2,3,7,8,9-HxCDF	ND		0.29	0.1	0
Total HxCDF	ND		2.1		0
1,2,3,4,6,7,8-HpCDF	6.2	J	7.7	0.01	0.062000
1,2,3,4,7,8,9-HpCDF	ND		0.31	0.01	0
Total HpCDF	15		7.7		
OCDF	24		15	0.0001	0.002400
Total TEQ Concentration					1.545400

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	81	40 - 135
13C-1,2,3,7,8-PeCDD	88	40 - 135
13C-1,2,3,6,7,8-HxCDD	77	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	97	40 - 135
13C-OCDD	105	40 - 135
13C-2,3,7,8-TCDF	86	40 - 135
13C-1,2,3,7,8-PeCDF	84	40 - 135
13C-1,2,3,4,7,8-HxCDF	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	85	40 - 135

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108295

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al, 1998).

J Estimated result. Result is less than the reporting limit.

US EPA ARCHIVE DOCUMENT

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108296

Lot-Sample #...: G2G220146 - 003
 Date Sampled...: 07/18/02
 Prep Date.....: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V22AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix.....: SOLID
 Instrument: 6D5
 Units.....: pg/g
 % Moisture: 27

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	97	1.4	1	97.000000
Total TCDD	110	1.4		
1,2,3,7,8-PeCDD	ND	1.9	1	0
Total PeCDD	ND	4.1		0
1,2,3,4,7,8-HxCDD	ND	0.69	0.1	0
1,2,3,6,7,8-HxCDD	ND	2.6	0.1	0
1,2,3,7,8,9-HxCDD	ND	3.0	0.1	0
Total HxCDD	18	6.9		
1,2,3,4,6,7,8-HpCDD	39	6.9	0.01	0.390000
Total HpCDD	76	6.9		
OCDD	260	14	0.0001	0.026000
2,3,7,8-TCDF	4.5	1.4	0.1	0.450000
Total TCDF	54	1.4		
1,2,3,7,8-PeCDF	ND	1.9	0.05	0
2,3,4,7,8-PeCDF	ND	2.7	0.5	0
Total PeCDF	25	6.9		
1,2,3,4,7,8-HxCDF	ND	2.7	0.1	0
1,2,3,6,7,8-HxCDF	ND	2.2	0.1	0
2,3,4,6,7,8-HxCDF	ND	1.7	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.37	0.1	0
Total HxCDF	13	6.9		
1,2,3,4,6,7,8-HpCDF	15	6.9	0.01	0.150000
1,2,3,4,7,8,9-HpCDF	ND	0.96	0.01	0
Total HpCDF	27	6.9		
OCDF	17	14	0.0001	0.001700
Total TEQ Concentration				98.017700

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	77	40 - 135
13C-1,2,3,7,8-PeCDD	72	40 - 135
13C-1,2,3,6,7,8-HxCDD	80	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	92	40 - 135
13C-OCDD	101	40 - 135
13C-2,3,7,8-TCDF	71	40 - 135
13C-1,2,3,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	84	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	97	40 - 135

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108296

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

CON Confirmation analysis.

US EPA ARCHIVE DOCUMENT

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108297

Lot-Sample #...: G2G220146 - 004
 Date Sampled...: 07/18/02
 Prep Date.....: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V32AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix.....: SOLID
 Instrument: 6D5
 Units.....: pg/g
 % Moisture: 36

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	320	1.6	1	320.000000
Total TCDD	360	1.6		
1,2,3,7,8-PeCDD	4.5 J	7.8	1	4.500000
Total PeCDD	13	7.8		
1,2,3,4,7,8-HxCDD	ND	2.9	0.1	0
1,2,3,6,7,8-HxCDD	8.2	7.8	0.1	0.820000
1,2,3,7,8,9-HxCDD	8.5	7.8	0.1	0.850000
Total HxCDD	65	7.8		
1,2,3,4,6,7,8-HpCDD	140	7.8	0.01	1.400000
Total HpCDD	260	7.8		
OCDD	910	16	0.0001	0.091000
2,3,7,8-TCDF	8.8 CON	1.6	0.1	0.880000
Total TCDF	83	1.6		
1,2,3,7,8-PeCDF	ND	2.8	0.05	0
2,3,4,7,8-PeCDF	5.6 J	7.8	0.5	2.800000
Total PeCDF	82	7.8		
1,2,3,4,7,8-HxCDF	6.0 J	7.8	0.1	0.600000
1,2,3,6,7,8-HxCDF	5.2 J	7.8	0.1	0.520000
2,3,4,6,7,8-HxCDF	ND	3.3	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.39	0.1	0
Total HxCDF	74	7.8		
1,2,3,4,6,7,8-HpCDF	43	7.8	0.01	0.430000
1,2,3,4,7,8,9-HpCDF	ND	2.5	0.01	0
Total HpCDF	82	7.8		
OCDF	44	16	0.0001	0.004400
Total TEQ Concentration				332.895400

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	79	40 - 135
13C-1,2,3,7,8-PeCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	101	40 - 135
13C-OCDD	112	40 - 135
13C-2,3,7,8-TCDF	73	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-1,2,3,4,7,8-HxCDF	86	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	102	40 - 135

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9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108297

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108298

Lot-Sample #...: G2G220146 - 005
 Date Sampled...: 07/18/02
 Prep Date...: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V52AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix...: SOLID
 Instrument: 6D5
 Units...: pg/g
 % Moisture: 37

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	360	1.6	1	360.000000
Total TCDD	410	1.6		
1,2,3,7,8-PeCDD	5.2 J	7.9	1	5.200000
Total PeCDD	23	7.9		
1,2,3,4,7,8-HxCDD	ND	3.6	0.1	0
1,2,3,6,7,8-HxCDD	11	7.9	0.1	1.100000
1,2,3,7,8,9-HxCDD	10	7.9	0.1	1.000000
Total HxCDD	90	7.9		
1,2,3,4,6,7,8-HpCDD	190	7.9	0.01	1.900000
Total HpCDD	370	7.9		
OCDD	1200	16	0.0001	0.120000
2,3,7,8-TCDF	9.8 CON	1.6	0.1	0.980000
Total TCDF	150	1.6		
1,2,3,7,8-PeCDF	ND	4.0	0.05	0
2,3,4,7,8-PeCDF	5.1 J	7.9	0.5	2.500000
Total PeCDF	140	7.9		
1,2,3,4,7,8-HxCDF	5.8 J	7.9	0.1	0.580000
1,2,3,6,7,8-HxCDF	5.4 J	7.9	0.1	0.540000
2,3,4,6,7,8-HxCDF	ND	3.6	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.35	0.1	0
Total HxCDF	83	7.9		
1,2,3,4,6,7,8-HpCDF	49	7.9	0.01	0.490000
1,2,3,4,7,8,9-HpCDF	ND	2.2	0.01	0
Total HpCDF	94	7.9		
OCDF	52	16	0.0001	0.005200
Total TEQ Concentration				374.415200

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	79	40 - 135
13C-1,2,3,7,8-PeCDD	69	40 - 135
13C-1,2,3,6,7,8-HxCDD	85	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	94	40 - 135
13C-OCDD	100	40 - 135
13C-2,3,7,8-TCDF	73	40 - 135
13C-1,2,3,7,8-PeCDF	72	40 - 135
13C-1,2,3,4,7,8-HxCDF	88	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	100	40 - 135

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108298

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

US EPA ARCHIVE DOCUMENT

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108299

Lot-Sample #...: G2G220146 - 006
 Date Sampled...: 07/18/02
 Prep Date.....: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V62AC
 Date Received..: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix.....: SOLID
 Instrument: 6D5
 Units.....: pg/g
 % Moisture: 39

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	12	1.6	1	12.000000
Total TCDD	27	1.6		
1,2,3,7,8-PeCDD	ND	1.2	1	0
Total PeCDD	8.7	8.2		
1,2,3,4,7,8-HxCDD	ND	0.56	0.1	0
1,2,3,6,7,8-HxCDD	ND	1.3	0.1	0
1,2,3,7,8,9-HxCDD	ND	1.3	0.1	0
Total HxCDD	16	8.2		
1,2,3,4,6,7,8-HpCDD	17	8.2	0.01	0.170000
Total HpCDD	40	8.2		
OCDD	120	16	0.0001	0.012000
2,3,7,8-TCDF	4.4	1.6	0.1	0.440000
Total TCDF	36	1.6		
1,2,3,7,8-PeCDF	ND	2.9	0.05	0
2,3,4,7,8-PeCDF	ND	2.6	0.5	0
Total PeCDF	8.8	8.2		
1,2,3,4,7,8-HxCDF	ND	2.2	0.1	0
1,2,3,6,7,8-HxCDF	ND	2.0	0.1	0
2,3,4,6,7,8-HxCDF	ND	1.7	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.36	0.1	0
Total HxCDF	6.2	8.2		
1,2,3,4,6,7,8-HpCDF	10	8.2	0.01	0.100000
1,2,3,4,7,8,9-HpCDF	ND	0.64	0.01	0
Total HpCDF	15	8.2		
OCDF	10	16	0.0001	0.001000
Total TEQ Concentration				12.723000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	40 - 135
13C-1,2,3,7,8-PeCDD	70	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	94	40 - 135
13C-OCDD	102	40 - 135
13C-2,3,7,8-TCDF	68	40 - 135
13C-1,2,3,7,8-PeCDF	72	40 - 135
13C-1,2,3,4,7,8-HxCDF	82	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	95	40 - 135

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9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108299

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

jlw
9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108300

Lot-Sample #...: G2G220146 - 007
 Date Sampled...: 07/18/02
 Prep Date...: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V72AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix...: SOLID
 Instrument: 6D5
 Units...: pg/g
 % Moisture: 39

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	41	1.6	1	41.000000
Total TCDD	76	1.6		
1,2,3,7,8-PeCDD	ND	1.1	1	0
Total PeCDD	9.6	8.2		
1,2,3,4,7,8-HxCDD	ND	0.77	0.1	0
1,2,3,6,7,8-HxCDD	ND	3.0	0.1	0
1,2,3,7,8,9-HxCDD	ND	2.9	0.1	0
Total HxCDD	24	8.2		
1,2,3,4,6,7,8-HpCDD	25	8.2	0.01	0.250000
Total HpCDD	51	8.2		
OCDD	130	16	0.0001	0.013000
2,3,7,8-TCDF	7.9	1.6	0.1	0.790000
Total TCDF	96	1.6		
1,2,3,7,8-PeCDF	4.3	8.2	0.05	0.210000
2,3,4,7,8-PeCDF	4.4	8.2	0.5	2.200000
Total PeCDF	54	8.2		
1,2,3,4,7,8-HxCDF	ND	4.0	0.1	0
1,2,3,6,7,8-HxCDF	ND	3.1	0.1	0
2,3,4,6,7,8-HxCDF	ND	3.1	0.1	0
1,2,3,7,8,9-HxCDF	ND	0.35	0.1	0
Total HxCDF	18	8.2		
1,2,3,4,6,7,8-HpCDF	17	8.2	0.01	0.170000
1,2,3,4,7,8,9-HpCDF	ND	1.1	0.01	0
Total HpCDF	25	8.2		
OCDF	13	16	0.0001	0.001300
Total TEQ Concentration				44.634300

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	71	40 - 135
13C-1,2,3,6,7,8-HxCDD	82	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	98	40 - 135
13C-OCDD	107	40 - 135
13C-2,3,7,8-TCDF	75	40 - 135
13C-1,2,3,7,8-PeCDF	76	40 - 135
13C-1,2,3,4,7,8-HxCDF	84	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	103	40 - 135

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108300

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al, 1998).

CON Confirmation analysis.

J Estimated result. Result is less than the reporting limit.

Jew
9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108301

Lot-Sample #...: G2G220146 - 008
 Date Sampled...: 07/18/02
 Prep Date...: 08/06/02
 Prep Batch #...: 2218489

Work Order #...: E44V82AC
 Date Received...: 07/20/02
 Analysis Date...: 08/14/02
 Dilution Factor: 1

Matrix...: SOLID
 Instrument: 6D5
 Units...: pg/g
 % Moisture: 47

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	1200 D	38	1	1,200.000000
Total TCDD	1300	38		
1,2,3,7,8-PeCDD	15	9.4	1	15.000000
Total PeCDD	77	9.4		
1,2,3,4,7,8-HxCDD	12	9.4	0.1	1.200000
1,2,3,6,7,8-HxCDD	97	9.4	0.1	9.700000
1,2,3,7,8,9-HxCDD	33	9.4	0.1	3.300000
Total HxCDD	390	9.4		
1,2,3,4,6,7,8-HpCDD	3300	9.4	0.01	33.000000
Total HpCDD	5200	9.4		
OCDD	42000 D	380	0.0001	4.200000
2,3,7,8-TCDF	27 CON	1.9	0.1	2.700000
Total TCDF	460	1.9		
1,2,3,7,8-PeCDF	8.7 J	9.4	0.05	0.430000
2,3,4,7,8-PeCDF	16	9.4	0.5	8.000000
Total PeCDF	300	9.4		
1,2,3,4,7,8-HxCDF	39	9.4	0.1	3.900000
1,2,3,6,7,8-HxCDF	15	9.4	0.1	1.500000
2,3,4,6,7,8-HxCDF	9.7	9.4	0.1	0.970000
1,2,3,7,8,9-HxCDF	ND	0.94	0.1	0
Total HxCDF	610	9.4		
1,2,3,4,6,7,8-HpCDF	620	9.4	0.01	6.200000
1,2,3,4,7,8,9-HpCDF	70	9.4	0.01	0.700000
Total HpCDF	2700	9.4		
OCDF	1800 D	380	0.0001	0.180000
Total TEQ Concentration				1,290.980000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	73	40 - 135
13C-1,2,3,7,8-PeCDD	71	40 - 135
13C-1,2,3,6,7,8-HxCDD	76	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	98	40 - 135
13C-OCDD	94	40 - 135
13C-2,3,7,8-TCDF	70	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	80	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	91	40 - 135

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LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108301

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

CON Confirmation analysis.
D Result was obtained from the analysis of a dilution.
J Estimated result. Result is less than the reporting limit.

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9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108302

Lot-Sample #...: G2G220146 - 009
 Date Sampled...: 07/18/02
 Prep Date.....: 07/24/02
 Prep Batch #...: 2205351

Work Order #...: E44V91AA
 Date Received...: 07/20/02
 Analysis Date...: 07/27/02
 Dilution Factor: 1

Matrix.....: WATER
 Instrument: 6D5
 Units.....: pg/L
 % Moisture:

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	4.2	1	0
Total TCDD	ND	4.2		0
1,2,3,7,8-PeCDD	ND	6.4	1	0
Total PeCDD	ND	6.4		0
1,2,3,4,7,8-HxCDD	ND	4.0	0.1	0
1,2,3,6,7,8-HxCDD	ND	4.2	0.1	0
1,2,3,7,8,9-HxCDD	ND	3.6	0.1	0
Total HxCDD	ND	4.2		0
1,2,3,4,6,7,8-HpCDD	ND	4.3	0.01	0
Total HpCDD	ND	4.3		0
OCDD	ND	5.1	0.0001	0
2,3,7,8-TCDF	ND	3.0	0.1	0
Total TCDF	ND	3.0		0
1,2,3,7,8-PeCDF	ND	4.6	0.05	0
2,3,4,7,8-PeCDF	ND UJ	4.5	0.5	0
Total PeCDF	ND	5.5		0
1,2,3,4,7,8-HxCDF	ND	2.7	0.1	0
1,2,3,6,7,8-HxCDF	ND	2.7	0.1	0
2,3,4,6,7,8-HxCDF	ND	2.8	0.1	0
1,2,3,7,8,9-HxCDF	ND	2.9	0.1	0
Total HxCDF	ND	2.9		0
1,2,3,4,6,7,8-HpCDF	ND	2.3	0.01	0
1,2,3,4,7,8,9-HpCDF	ND	2.8	0.01	0
Total HpCDF	ND	2.8		0
OCDF	ND	4.4	0.0001	0
Total TEQ Concentration				0

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	80	40 - 135
13C-1,2,3,7,8-PeCDD	78	40 - 135
13C-1,2,3,6,7,8-HxCDD	90	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	85	40 - 135
13C-OCDD	81	40 - 135
13C-2,3,7,8-TCDF	74	40 - 135
13C-1,2,3,7,8-PeCDF	70	40 - 135
13C-1,2,3,4,7,8-HxCDF	87	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	85	40 - 135

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9/11/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2108302

Notes:

WHO TEFs for human risk assessment based on the conclusions of the World Health Organization meeting in Stockholm, Sweden, 15-18 June 1997 (Van den Berg et al., 1998).

US EPA ARCHIVE DOCUMENT

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9/11/02

TABLE 3
SUMMARY OF PERFORMANCE EVALUATION SAMPLE RESULTS
ADDITIONAL SAMPLING - DIOXIN DELINEATION
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

		AQUEOUS			SOLID		
		PE Standard	PE Sample Result	PE Standard	PE Sample Result	PE Sample Result	Range of Expected Values ¹
Location ID		CMS-DEL-PEAQ	CMS-DEL-PEAQ	NA	CMS-DEL-PES1	CMS-DEL-PES2	NA
Sample ID		2108401	2108401	NA	2108402	2108342	NA
Sample Date		NA	NA	NA	NA	NA	NA
Sample Time		NA	NA	NA	NA	NA	NA
Sample Depth		NA	N/A	NA	N/A	N/A	N/A
Laboratory		CIL	STL	CIL	STL	STL	CIL
Lot Number		34761-95	G2G190281	MAR-21985-85-A	G2G230229	G2G240279	MAR-21985-85-A
Lab. Number		NA	013	EDF-2513	021	020	EDF-2513
Date Dioxins/Furans Analyzed		NA	07/27/2002	NA	08/08/2002	08/11/2002	NA
Constituent	TEF	pg/L	pg/L	pg/g	pg/g	pg/g	pg/g
2,3,7,8-TCDD	1.000	15000	8100 E	500	500 E	470 E	260 - 670
Total TCDD	-	ND	8100	ND	500	470	-
1,2,3,7,8-PeCDD	1.000	ND	<12	1000	1100	940	560 - 1370
Total PeCDD	-	ND	<12	ND	1100	940	-
1,2,3,4,7,8-HxCDD	0.100	6000	2400	1000	840	810	500 - 1290
1,2,3,6,7,8-HxCDD	0.100	15000	8100	1000	1000	940	520 - 1210
1,2,3,7,8,9-HxCDD	0.100	ND	<42	1000	1000	1000	460 - 1330
Total HxCDD	-	ND	11000	ND	2900	2800	-
1,2,3,4,6,7,8-HpCDD	0.010	20000	8700	1500	1500	1300	710 - 2070
Total HpCDD	-	ND	8700	ND	1500	1400	-
OCDD	0.0001	30000	12000	2500	4100 E	3500 D	1980 - 5030
2,3,7,8-TCDF	0.100	7000	4600 CON E	500	440 CON E	450 CON E	260 - 640
Total TCDF	-	ND	4800	ND	500	450	-
1,2,3,7,8-PeCDF	0.050	5000	3000	1000	1100	920	590 - 1150
2,3,4,7,8-PeCDF	0.500	ND	<3.2	1000	950	820	410 - 1310
Total PeCDF	-	ND	3000	ND	2000	1800	-
1,2,3,4,7,8-HxCDF	0.100	ND	<13	1000	1100	940	530 - 1230
1,2,3,6,7,8-HxCDF	0.100	ND	<14	1000	1200	1100	340 - 1560
2,3,4,6,7,8-HxCDF	0.100	ND	<27	1000	1200	1200	480 - 1350
1,2,3,7,8,9-HxCDF	0.100	ND	<3.7	1000	1200	1200	390 - 1260
Total HxCDF	-	ND	27	ND	4600	4500	-
1,2,3,4,6,7,8-HpCDF	0.010	10000	5000	1500	1500	1200	520 - 2010
1,2,3,4,7,8,9-HpCDF	0.010	ND	<3.4	1500	1500	1200	250 - 1980
Total HpCDF	-	ND	5000	ND	3000	2400	-
OCDF	0.0001	ND	<4.3	2500	3000	2000	1170 - 3330

TABLE 3 (continued)
SUMMARY OF PERFORMANCE EVALUATION SAMPLE RESULTS
ADDITIONAL SAMPLING - DIOXIN DELINEATION
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

Notes to Table 3

Laboratory results of samples analyzed by STL using USEPA Method 8290

pg/g = picograms per gram = parts per trillion (ppt)

pg/L = picograms per liter = parts per trillion (ppt)

D = Result was obtained from the analysis of a dilution

E = Estimated result; result concentration exceeds the calibration range

CON = Confirmation analysis

NA = Not applicable

ND = Not determined

STL = Severn Trent Laboratories, Inc. - Sacramento

PE = Performance Evaluation

Results have been adjusted for dry weight; the solid performance evaluation sample, as prepared, is dry

TEF = Toxic Equivalency Factor provided by World Health Organization (WHO) (7/23/99).

TEQ = Toxic Equivalents

¹ These values represent the upper and lower 95% tolerance limits which indicate the range of results that 95% of the laboratories should obtain 95% of the time for a single sample analysis.

CIL = Cambridge Isotope Laboratories