Superfund Records Center
SITE: Centredale
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ENVIRONMENTAL
Data Services, Inc.

DIOXIN DATA VALIDATION REPORT
USEPA REGION I - TIER III

SDG No.: G2D130158
Laboratory: Severn Trent Laboratories, Inc., West Sacramento, CA
Site: Centredale Manor
Date: May 21, 2002
Samples:
Dioxin: 18/Soil/2102228, 2102229, 2102230, 2102231, 2102232, 2102233, 2102234, 2102235, 2102236, 2102237, 2102238, 2102239, 2102240, 2102241, 2102242, 2102243, 2102244, 2102245
1/PE Soil/2102252
1/PE Aqueous/2102253

A Tier III validation was performed on the dioxin/furan analytical data for eighteen soil samples, one soil PE sample and one aqueous PE 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.

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NA = Not Applicable.

Overall Evaluation of Data and Potential Usability Issues

Dioxin/Furans:

Dioxin/furan sample results were qualified as follows:

- 1234678-HpCDF and OCDF have been qualified (J) in sample 2012235 due to low matrix spike recoveries.
- 2378-TCDD has been qualified (J) in samples 2012229 and 2102230 due to poor field duplicate precision.
- 2378-TCDF has been qualified (J) in samples 2012244 and 2102245 due to poor field duplicate precision.
- The concentration of several analytes in several samples exceeded the linear range of the initial calibration curve but according to the case narrative, did not saturate the instrument detector. The laboratory flagged these results with an (E) and the reviewer further qualified as estimated (J).

Matrix Spike Analysis

MS/MSD Sample ID: 2012235

Compound	MS %R	MSD %R	RPD	Action
1234678-HpCDF	57%	Ok	Ok	J/UJ
OCDF	38%	Ok	Ok	J/UJ

- 1234678-HpCDF and OCDF have been qualified (J) in sample 2012235.

Field Duplicate Analysis

Compound	2102229 pg/g	2102230 pg/g	RPD	Action
2378-TCDD	6.5	14	73%	J

- 2378-TCDD has been qualified (J) in samples 2012229 and 2102230.

Compound	2102244 pg/g	2102245 pg/g	RPD	Action
2378-TCDF	4.1	7.2	55%	J

- 2378-TCDF has been qualified (J) in samples 2012244 and 2102245.

Additional Comments

- The concentration of several analytes in several samples exceeded the linear range of the initial calibration curve but according to the case narrative, did not saturate the instrument detector. The laboratory flagged these results with an (E) and the reviewer further qualified as estimated (J).
- An aqueous PE sample (2102253) and a soil PE sample (2102252) 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 sample 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 both 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.

Region I
Data Review Worksheets

Site Name: Centredale Manor
Reference Number: —

DIOXIN DATA REVIEW WORKSHEET
(LOW or HIGH RESOLUTION)

The following data package has been validated:

Lab Name: Severn Trent, West Sacramento, CA
DAS/Project No. Centredale Manor
SDG No. G2D130158
No. of Samples/Matrix 19 soil / 1 aqueous

Tech. Spec./Method No. 8290 - High Res. Dioxins/F
Sampling Date(s) 4/11/02
Shipping Date(s) 4/11/02
Date(s) Rec'd by Lab 4/13/02

Traffic Report Sample Nos. 2102228, 2102229, 2102230, 2102231, 2102232, 2102233, 2102234, 2102235, 2102236, 2102237, 2102238, 2102239, 2102240, 2102241, 2102242, 2102243, 2102244, 2102245, 2102252, 2102253
Equipment Blank Nos. —
Field Duplicate Nos. 2102230/2102229 2102245/2102244
PES Nos. 2102253 (aqueous) 2102252 (soil)

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
- Data Completeness
- Preservation/Technical Holding Times
- PE Samples/Accuracy Check
- Window Defining Mix
- 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 Limit (EDL) & Estimated Maximum Possible Concentration (EMPC)
- Toxicity Equivalency Factor (TEF) & Isomer Specificity
- Required Sample Reruns & Second Column Confirmation
- Dilutions

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 Weaver

Date: May 21, 2002

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

I. DATA COMPLETENESS

MISSING INFORMATION	DATE LAB CONTACTED	DATE RECEIVED
All criteria were met.		

addl comments: The concentration of some analytes in the samples exceeded the linear range of the initial calibration curve, but according to the case narrative did not saturate the instrument detector. The laboratory flagged these results (E) and the reviewer further qualified (J).

Reviewer: Nancy Weaver

Date: 5/21/02

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

II. PRESERVATION AND HOLDING TIMES

Sampler: JC Company: Loureiro 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
2102228	Soil	N	4/11/02	4/25/02	4/28/02	None
2102229				"	"	
2102230				"	"	
2102231				"	"	
2102232				"	"	
2102233				"	"	
2102234				"	"	
2102235				"	"	
2102236				"	4/29/02	
2102237				"	"	
2102238				"	"	
2102239				"	4/28/02	
2102240				"	4/29/02	
2102241				"	4/28/02	
2102242				"	"	
2102243				"	"	
2102244				"	"	
2102245				"	"	

Validator: Nancy Weaver

Date: 5/21/02

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

II. PRESERVATION AND HOLDING TIMES

Sampler: JC Company: Loureiro 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
PE	2102252	Soil	N	4/11/02	4/25/02	4/28/02	None
PE	2102253	Aqueous	↓	"	4/16/02	4/18/02	↓

Validator: Nancy Weaver

Date: 5/21/02

11/98

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

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

SDG No: 62D130158 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 Scores*	Non-EPA PES Scores**	Samples Affected	Action
E0F6K1AC	—	LCS	Solid	all analyte	%R ok	(60-140)	—	all Solid	None
EX1CP1AC	—	LCS	Water	all analyte	%R ok	(60-140)	—	all Water	None

* 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: Nancy Weaver

Date: 5/21/02

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
4/29/02	26AP021D2	all analyted	ok	all ok	all ok	all ok	all ok	all samples	None
4/27/02	27AP025D5	" "	"	"	"	"	"	" "	"
4/28/02	23AP025D5								
4/28/02	27AP025D5								
4/29/02	27AP025D5								
3/6/02	05MR021D2								
4/23/02	23AP025D5								
4/18/02	17AP021D2								
3/21/02	21MR025D5								

Comments: All criteria were met.

Validator: Nancy Weaver

Date: 5/21/02

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

V. INITIAL AND CONTINUING CALIBRATIONS Continued

Vb. CONTINUING CALIBRATION

Date of CCAL	Instrument File Name	Compound	%D	Ion Ratio	S/N	RT	Resolution	Samples Affected	Action
4/29/02	29AP02102	all analytes	ok	all ok	all ok	all ok	all ok	all Samples	None
4/27/02	27AP025D5	"	"	"	"	"	"		
4/28/02	27AP025D5								
4/29/02	29AP025D5								
4/18/02	18AP02102								
4/17/02	17AP023SD5								

Comments: all criteria were met.

Validator: Nancy Weaver

Date: 5/21/02

VI. COLUMN PERFORMANCE RESOLUTION CHECK

Date:_____ ID:_____

Was the chromatographic resolution of the TCDD/TCDF isomers and the in the CC3 solution for DB-5 columns calculated for each 12 hour period?

PASS

% Valley _____-TCDD/_____-TCDD_____ (QC Limit ≤ 25%)

% Valley _____-TCDF/_____-TCDF_____ (QC Limit ≤ 50%)

all

For DB-225 columns:

% Valley _____-TCDD/_____-TCDD_____ (QC Limit ≤ 25%)

% Valley _____-TCDF/_____-TCDF_____ (QC Limit ≤ 50%)

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 d 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: Nancy Weaver

Date: 5/21/02

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 [X] No [ ]

List the blank contamination below.

Sampler: JC 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)
4/25/02	4/27/02	Soil	E0F6K1AA	HRGC/HRMS	all NON-Detect	—
4/16/02	4/18/02	water	EX1CP1AA	↓	all Non-Detect	—

2. Field: Equipment (Rinsate) Blanks

Date Extracted	Date Analyzed	Matrix	Sample No. (Blank Type)	Instrument	Compound	Conc. (units)

Validator: Nancy Weaver Date: 5/21/02

Data Review Worksheets - (Low and High Resolution) Continued

VIIb. BLANKS ANALYSIS

Compound	Type of Blank	Date Blank Sample/Originated	Max Conc. (units)	Action Level (units)	Samples Affected	Action

all ND

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 concentrati 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 tha 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-detecu.

C. If positive results are detected in aqueous equipment (rinsate) blanks and the associated non-aqueous samples, then the validator should flag (EB) those detected compounds in the associated non-aqueous sample: indicate an indeterminate amount of sampling error has potentially affected the sample results.

Validator: Nancy Weaver

Date: 5/21/02

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

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE

List all MS/MSD analytes that are outside method QC acceptance criteria. 2102235

Compound	MS % Rec	MSD % Rec	RPD	Method QC Limits		Concentration			%RSD	Action
				% Rec	RPD	Unspiked Sample	MS	MSD		
2378-TCDD	0**	ok	ok	60-140	30					None - see be
2378-TCDF										
12378-PeCDF										
12378-PeCDD										
23478-PeCDF										
123478-HxCDF										
123678-HxCDF										
123478-HxCDD										
123678-HxCDD										
123789-HxCDD										
234678-HxCDF										
123789-HxCDF										
1234678-HpCDF	57*	ok	ok	60-140	30					(J)(UJ)
1234678-HpCDD	0**	ok	ok	60-140	30					None - See below
1234789-HpCDF										
OCDD	0**	0**	ok	60-140	30					None - See below
OCDF	38*	ok	ok	60-140	30					(J)(UJ)

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

* outside 60-140 QC limits

ACTIONS:

** Sample concentration > 4 times spike concentration, therefore, results not valid for %R (0% in MS).

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

Validator: Nancy Weaver

Date: 5/21/02

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

IX. ~~LABORATORY AND~~ FIELD DUPLICATES

Was a duplicate run for each matrix? Yes [ ] N ✓

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

SAMPLE ID: 2102229 DUPLICATE ID: 2102230

Compound	Sample Conc. pg/g	Sample EDL		Duplicate Conc. pg/g	Duplicate EDL		%RPD	Action
		EDL	2xEDL		EDL	2xEDL		
2378-TCDD	6.5	2.1	4.2	14	2.1	4.2	73	(J)
2378-TCDF	2.6	2.1	4.2	3.3	2.1	4.2	24	None
12378-PeCDF								
12378-PeCDD								
23478-PeCDF								
123478-HxCDF								
123678-HxCDF								
123478-HxCDD								
123678-HxCDD								
123789-HxCDD								
234678-HxCDF								
123789-HxCDF								
1234678-HpCDF	5.14	5.1	10.2	6.3	11	22	NC	None
1234678-HpCDD	5.9	11	22	7.4	11	22	23	None
1234789-HpCDF								
OCDD	41	21	42	59	21	42	36	None
OCDF								

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: Nancy Weaver

Date: 5/21/02

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

IX. LABORATORY AND FIELD DUPLICATES

Was a duplicate run for each matrix? Yes [ ] No [x]

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

SAMPLE ID: 2102244 DUPLICATE ID: 2102245

Compound	Sample Conc. pg/g	Sample EDL		Duplicate Conc. pg/g	Duplicate EDL		%RPD	Action
		EDL	2xEDL		EDL	2xEDL		
2378-TCDD	76	1.2	2.4	56	1.1	2.2	15	None
2378-TCDF	4.1	1.2	2.4	7.2	1.1	2.2	55	(J)
12378-PeCDF								
12378-PeCDD								
23478-PeCDF	2.9	5.8	11.6	3.5	5.7	11.4	19	None
123478-HxCDF	3.8	5.8	11.6	4.0	5.7	11.4	5	None
123678-HxCDF								
123478-HxCDD								
123678-HxCDD								
123789-HxCDD								
234678-HxCDF								
123789-HxCDF								
1234678-HpCDF	13	5.8	11.6	12	5.7	11.4	8	None
1234678-HpCDD	30	5.8	11.6	32	5.7	11.4	6	"
1234789-HpCDF								
OCDD	220	12	24	230	11	22	4	None
OCDF	22	22	44	23	11	22	4	"

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.

lidator: Nancy Weaver Date: 5/21/02

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
$^{13}C_{12}$-2378-TCDD												
$^{13}C_{12}$-2378-TCDF												
$^{13}C_{12}$-12378-PeCDD												
$^{13}C_{12}$-12378-PeCDF												
$^{13}C_{12}$-23478-PeCDF												
$^{13}C_{12}$-123478-HxCDD												
$^{13}C_{12}$-123678-HxCDD												
$^{13}C_{12}$-123789-HxCDD												
$^{13}C_{12}$-123478-HxCDF												
$^{13}C_{12}$-123678-HxCDF												
$^{13}C_{12}$-123789-HxCDF												
$^{13}C_{12}$-234678-HxCDF												
$^{13}C_{12}$-1234678-HpCDD												
$^{13}C_{12}$-1234678-HpCDF												
$^{13}C_{12}$-1234789-HpCDF												
$^{13}C_{12}$-OCDD												
$^{13}C_{12}$-2378-TCDD												

All Pass

Validator: U Weaver

Date: 5/21/02

Region I
Data Review Worksheet - (High Resolution)

XI. Sample Analysis and Identification

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

SAMPLE Nos						
NATIVE ANALYTES	RT	S/N	Ion Ratio	RT	S/N	Ion Ratio
2378-TCDD						
2378-TCDF						
12378-PeCDF						
12378-PeCDD						
23478-PeCDF						
123478-HxCDF						
123678-HxCDF						
123478-HxCDD						
123678-HxCDD						
123789-HxCDD						
234678-HxCDF						
123789-HxCDF						
1234678-HpCDF						
1234678-HpCDD						
1234789-HpCDF						
OCDD						
OCDF						
INTERNAL STANDARDS VS RECOVERY STANDARDS						
13C-2378-TCDD						
13C-2378-TCDF						
13C-12378-PeCDD						
13C-12378-PeCDF						
13C-123478-HxCDD						
13C-123678-HxCDD						
13C-123478-HxCDF						
13C-123678-HxCDF						
13C-123789-HxCDF						
13C-234678-HxCDF						
13C-1234678-HpCDD						
13C-1234678-HpCDF						
13C-1234789-HpCDF						
13C-OCDD						
37Cl-2378-TCDD						
RECOVERY STANDARDS						
13C-1234-TCDD						
13C-123789-HxCDD						

All Pass

Validator: Nancy Weaver

Date: 5/22/02

11/98

XII. SAMPLE CALCULATION

2102228

$$OCDD = \frac{36693200 \times 4000}{11125260 \times 1.01 \times 0.46 \times 10}$$

$$= 283.95 \approx 280 \text{ pg/g}$$

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

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

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

where:

Q_{is}	=	Quantity (ng) of appropriate internal standard added to sample before extraction.
A_x^1/A_x^2	=	Integrated areas of the two quantitation ions.
A_{is}^1/A_{is}^2	=	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.
$H_x^1 + H_x^2$	=	Peak heights of the noise for the quantitation ions.
$H_{is}^1 + H_{is}^2$	=	Peak heights of the internal standard quantitation ions.
D	=	Dilution.

Validator: Nancy Weaver

Date: 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102228

Lot-Sample #...:	G2D130158 - 001	Work Order #...:	EXWE41AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	54

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**91**		**2.2**	**1.000**	**91.000000**
Total TCDD	**120**		**2.2**		
1,2,3,7,8-PeCDD	ND		3.1	0.500	0
Total PeCDD	**27**		**11**		
1,2,3,4,7,8-HxCDD	ND		2.0	0.100	0
1,2,3,6,7,8-HxCDD	**5.8**	J	11	**0.100**	**0.580000**
1,2,3,7,8,9-HxCDD	ND		4.6	0.100	0
Total HxCDD	**49**		**11**		
1,2,3,4,6,7,8-HpCDD	**50**		**11**	**0.010**	**0.500000**
Total HpCDD	**100**		**11**		
OCDD	**280**		**22**	**0.001**	**0.280000**
2,3,7,8-TCDF	**17**	CON	**2.2**	**0.100**	**1.700000**
Total TCDF	**250**		**2.2**		
1,2,3,7,8-PeCDF	**7.3**	J	**11**	**0.050**	**0.360000**
2,3,4,7,8-PeCDF	**13**		**11**	**0.500**	**6.500000**
Total PeCDF	**380**		**11**		
1,2,3,4,7,8-HxCDF	**12**		**11**	**0.100**	**1.200000**
1,2,3,6,7,8-HxCDF	**12**		**11**	**0.100**	**1.200000**
2,3,4,6,7,8-HxCDF	**12**		**11**	**0.100**	**1.200000**
1,2,3,7,8,9-HxCDF	ND		1.5	0.100	0
Total HxCDF	**240**		**11**		
1,2,3,4,6,7,8-HpCDF	**34**		**11**	**0.010**	**0.340000**
1,2,3,4,7,8,9-HpCDF	ND		3.4	0.010	0
Total HpCDF	**57**		**11**		
OCDF	**23**		**22**	**0.001**	**0.023000**
Total TEQ Concentration					**104.883000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	80	40 - 135
13C-1,2,3,7,8-PeCDD	81	40 - 135
13C-1,2,3,6,7,8-HxCDD	86	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	73	40 - 135
13C-OCDD	74	40 - 135
13C-2,3,7,8-TCDF	66	40 - 135
13C-1,2,3,7,8-PeCDF	70	40 - 135
13C-1,2,3,4,7,8-HxCDF	77	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	77	40 - 135

LW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102228

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102229

Lot-Sample #...:	G2D130158 - 002	**Work Order #...:**	EXWE51AC	**Matrix.....:**	SOLID
Date Sampled...:	04/11/02	**Date Received..:**	04/13/02	**Instrument:**	5D5
Prep Date.....:	04/25/02	**Analysis Date..:**	04/28/02	**Units.....:**	pg/g
Prep Batch #...:	2115445	**Dilution Factor:**	1	**% Moisture:**	52

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**6.5 J**		**2.1**	**1.000**	**6.500000**
Total TCDD	**7.8**		**2.1**		
1,2,3,7,8-PeCDD	ND		2.1	0.500	0
Total PeCDD	ND		2.1		0
1,2,3,4,7,8-HxCDD	ND		1.3	0.100	0
1,2,3,6,7,8-HxCDD	ND		1.3	0.100	0
1,2,3,7,8,9-HxCDD	ND		1.2	0.100	0
Total HxCDD	ND		2.1		0
1,2,3,4,6,7,8-HpCDD	**5.9**	**J**	**11**	**0.010**	**0.059000**
Total HpCDD	**11**		**11**		
OCDD	**41**		**21**	**0.001**	**0.041000**
2,3,7,8-TCDF	**2.6**	**CON**	**2.1**	**0.100**	**0.260000**
Total TCDF	**32**		**2.1**		
1,2,3,7,8-PeCDF	ND		1.3	0.050	0
2,3,4,7,8-PeCDF	ND		1.6	0.500	0
Total PeCDF	**21**		**11**		
1,2,3,4,7,8-HxCDF	ND		3.2	0.100	0
1,2,3,6,7,8-HxCDF	ND		1.6	0.100	0
2,3,4,6,7,8-HxCDF	ND		1.6	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.2	0.100	0
Total HxCDF	**14**		**11**		
1,2,3,4,6,7,8-HpCDF	ND		5.1	0.010	0
1,2,3,4,7,8,9-HpCDF	ND		0.78	0.010	0
Total HpCDF	ND		5.1		0
OCDF	ND		4.5	0.001	0
Total TEQ Concentration					**6.860000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	75	40 - 135
13C-1,2,3,7,8-PeCDD	79	40 - 135
13C-1,2,3,6,7,8-HxCDD	84	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	72	40 - 135
13C-OCDD	69	40 - 135
13C-2,3,7,8-TCDF	67	40 - 135
13C-1,2,3,7,8-PeCDF	70	40 - 135
13C-1,2,3,4,7,8-HxCDF	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	71	40 - 135

RW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102229

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102230

Lot-Sample #...:	G2D130158 - 003	Work Order #...:	EXWE61AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	52

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**14** J		**2.1**	**1.000**	**14.000000**
Total TCDD	**19**		**2.1**		
1,2,3,7,8-PeCDD	ND		2.3	0.500	0
Total PeCDD	ND		3.0		0
1,2,3,4,7,8-HxCDD	ND		1.2	0.100	0
1,2,3,6,7,8-HxCDD	ND		1.3	0.100	0
1,2,3,7,8,9-HxCDD	ND		1.1	0.100	0
Total HxCDD	ND		2.9		0
1,2,3,4,6,7,8-HpCDD	**7.4**	**J**	**11**	**0.010**	**0.074000**
Total HpCDD	**15**		**11**		
OCDD	**59**		**21**	**0.001**	**0.059000**
2,3,7,8-TCDF	**3.3**	**CON**	**2.1**	**0.100**	**0.330000**
Total TCDF	**37**		**2.1**		
1,2,3,7,8-PeCDF	ND		1.4	0.050	0
2,3,4,7,8-PeCDF	ND		2.1	0.500	0
Total PeCDF	**22**		**11**		
1,2,3,4,7,8-HxCDF	ND		3.4	0.100	0
1,2,3,6,7,8-HxCDF	ND		1.8	0.100	0
2,3,4,6,7,8-HxCDF	ND		2.0	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.0	0.100	0
Total HxCDF	**17**		**11**		
1,2,3,4,6,7,8-HpCDF	**6.3**	**J**	**11**	**0.010**	**0.063000**
1,2,3,4,7,8,9-HpCDF	ND		0.84	0.010	0
Total HpCDF	**6.3**		**11**		
OCDF	ND		4.5	0.001	0
Total TEQ Concentration					**14.526000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	61	40 - 135
13C-1,2,3,7,8-PeCDD	63	40 - 135
13C-1,2,3,6,7,8-HxCDD	70	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	57	40 - 135
13C-OCDD	58	40 - 135
13C-2,3,7,8-TCDF	52	40 - 135
13C-1,2,3,7,8-PeCDF	55	40 - 135
13C-1,2,3,4,7,8-HxCDF	59	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	59	40 - 135

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102230

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102231

Lot-Sample #...:	G2D130158 - 004	Work Order #...:	EXWE71AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	35

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	97		1.5	1.000	97.000000
Total TCDD	120		1.5		
1,2,3,7,8-PeCDD	10		7.7	0.500	5.000000
Total PeCDD	64		7.7		
1,2,3,4,7,8-HxCDD	6.5	J	7.7	0.100	0.650000
1,2,3,6,7,8-HxCDD	85		7.7	0.100	8.500000
1,2,3,7,8,9-HxCDD	21		7.7	0.100	2.100000
Total HxCDD	380		7.7		
1,2,3,4,6,7,8-HpCDD	870		7.7	0.010	8.700000
Total HpCDD	1700		7.7		
OCDD	6500 J	~~E~~	15	0.001	6.500000
2,3,7,8-TCDF	9.9	CON	1.5	0.100	0.990000
Total TCDF	110		1.5		
1,2,3,7,8-PeCDF	6.1	J	7.7	0.050	0.300000
2,3,4,7,8-PeCDF	9.4		7.7	0.500	4.700000
Total PeCDF	230		7.7		
1,2,3,4,7,8-HxCDF	14		7.7	0.100	1.400000
1,2,3,6,7,8-HxCDF	18		7.7	0.100	1.800000
2,3,4,6,7,8-HxCDF	14		7.7	0.100	1.400000
1,2,3,7,8,9-HxCDF	ND		0.93	0.100	0
Total HxCDF	450		7.7		
1,2,3,4,6,7,8-HpCDF	270		7.7	0.010	2.700000
1,2,3,4,7,8,9-HpCDF	12		7.7	0.010	0.120000
Total HpCDF	820		7.7		
OCDF	650		15	0.001	0.650000
Total TEQ Concentration					142.510000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	84	40 - 135
13C-1,2,3,6,7,8-HxCDD	73	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	59	40 - 135
13C-OCDD	46	40 - 135
13C-2,3,7,8-TCDF	62	40 - 135
13C-1,2,3,7,8-PeCDF	72	40 - 135
13C-1,2,3,4,7,8-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	60	40 - 135

lw 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102231

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated result. Result is less than the reporting limit.

RW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102232

Lot-Sample #...:	G2D130158 - 005	Work Order #...:	EXWE81AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	22

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	120		1.3	1.000	120.000000
Total TCDD	140		1.3		
1,2,3,7,8-PeCDD	3.7	J	6.4	0.500	1.800000
Total PeCDD	35		6.4		
1,2,3,4,7,8-HxCDD	4.7	J	6.4	0.100	0.470000
1,2,3,6,7,8-HxCDD	18		6.4	0.100	1.800000
1,2,3,7,8,9-HxCDD	11		6.4	0.100	1.100000
Total HxCDD	150		6.4		
1,2,3,4,6,7,8-HpCDD	440		6.4	0.010	4.400000
Total HpCDD	840		6.4		
OCDD	4000		13	0.001	4.000000
2,3,7,8-TCDF	12	CON	1.3	0.100	1.200000
Total TCDF	210		1.3		
1,2,3,7,8-PeCDF	4.7	J	6.4	0.050	0.240000
2,3,4,7,8-PeCDF	12		6.4	0.500	6.000000
Total PeCDF	420		6.4		
1,2,3,4,7,8-HxCDF	12		6.4	0.100	1.200000
1,2,3,6,7,8-HxCDF	11		6.4	0.100	1.100000
2,3,4,6,7,8-HxCDF	11		6.4	0.100	1.100000
1,2,3,7,8,9-HxCDF	ND		0.60	0.100	0
Total HxCDF	310		6.4		
1,2,3,4,6,7,8-HpCDF	120		6.4	0.010	1.200000
1,2,3,4,7,8,9-HpCDF	7.7		6.4	0.010	0.077000
Total HpCDF	370		6.4		
OCDF	260		13	0.001	0.260000
Total TEQ Concentration					145.947000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	78	40 - 135
13C-1,2,3,7,8-PeCDD	87	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	70	40 - 135
13C-OCDD	70	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	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	66	40 - 135

RW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102232

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102233

Lot-Sample #...:	G2D130158 - 006	Work Order #...:	EXWE91AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	13

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**0.99**	**J**	**1.2**	**1.000**	**0.990000**
Total TCDD	**0.99**		**1.2**		
1,2,3,7,8-PeCDD	ND		0.67	0.500	0
Total PeCDD	ND		0.88		0
1,2,3,4,7,8-HxCDD	ND		0.83	0.100	0
1,2,3,6,7,8-HxCDD	ND		2.3	0.100	0
1,2,3,7,8,9-HxCDD	ND		2.4	0.100	0
Total HxCDD	**9.3**		**5.8**		
1,2,3,4,6,7,8-HpCDD	**45**		**5.8**	**0.010**	**0.450000**
Total HpCDD	**85**		**5.8**		
OCDD	**340**		**12**	**0.001**	**0.340000**
2,3,7,8-TCDF	**0.69**	**J CON**	**1.2**	**0.100**	**0.069000**
Total TCDF	**2.4**		**1.2**		
1,2,3,7,8-PeCDF	ND		0.40	0.050	0
2,3,4,7,8-PeCDF	ND		0.52	0.500	0
Total PeCDF	**7.9**		**5.8**		
1,2,3,4,7,8-HxCDF	ND		0.74	0.100	0
1,2,3,6,7,8-HxCDF	ND		0.57	0.100	0
2,3,4,6,7,8-HxCDF	ND		0.76	0.100	0
1,2,3,7,8,9-HxCDF	ND		0.37	0.100	0
Total HxCDF	**5.0**		**5.8**		
1,2,3,4,6,7,8-HpCDF	**7.0**		**5.8**	**0.010**	**0.070000**
1,2,3,4,7,8,9-HpCDF	ND		0.40	0.010	0
Total HpCDF	**14**		**5.8**		
OCDF	**11**	**J**	**12**	**0.001**	**0.011000**
Total TEQ Concentration					**1.930000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	81	40 - 135
13C-1,2,3,7,8-PeCDD	91	40 - 135
13C-1,2,3,6,7,8-HxCDD	82	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	77	40 - 135
13C-OCDD	73	40 - 135
13C-2,3,7,8-TCDF	70	40 - 135
13C-1,2,3,7,8-PeCDF	78	40 - 135
13C-1,2,3,4,7,8-HxCDF	75	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135

DW
5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102233

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102234

Lot-Sample #...:	G2D130158 - 007	Work Order #...:	EXWFA1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	11

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**5.3**		1.1	**1.000**	**5.300000**
Total TCDD	**7.5**		1.1		
1,2,3,7,8-PeCDD	ND		0.89	0.500	0
Total PeCDD	ND		2.4		0
1,2,3,4,7,8-HxCDD	ND		0.56	0.100	0
1,2,3,6,7,8-HxCDD	ND		1.9	0.100	0
1,2,3,7,8,9-HxCDD	ND		2.1	0.100	0
Total HxCDD	**15**		**5.6**		
1,2,3,4,6,7,8-HpCDD	**33**		**5.6**	**0.010**	**0.330000**
Total HpCDD	**62**		**5.6**		
OCDD	**200**		11	**0.001**	**0.200000**
2,3,7,8-TCDF	**4.6**	**CON**	**1.1**	**0.100**	**0.460000**
Total TCDF	**38**		**1.1**		
1,2,3,7,8-PeCDF	ND		1.8	0.050	0
2,3,4,7,8-PeCDF	ND		2.8	0.500	0
Total PeCDF	**27**		**5.6**		
1,2,3,4,7,8-HxCDF	**4.2**	**J**	**5.6**	**0.100**	**0.420000**
1,2,3,6,7,8-HxCDF	ND		1.2	0.100	0
2,3,4,6,7,8-HxCDF	ND		1.5	0.100	0
1,2,3,7,8,9-HxCDF	ND		0.51	0.100	0
Total HxCDF	**19**		**5.6**		
1,2,3,4,6,7,8-HpCDF	**10**		**5.6**	**0.010**	**0.100000**
1,2,3,4,7,8,9-HpCDF	ND		2.3	0.010	0
Total HpCDF	**23**		**5.6**		
OCDF	**17**		**11**	**0.001**	**0.017000**
Total TEQ Concentration					**6.827000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	82	40 - 135
13C-1,2,3,6,7,8-HxCDD	85	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	75	40 - 135
13C-OCDD	68	40 - 135
13C-2,3,7,8-TCDF	66	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-1,2,3,4,7,8-HxCDF	73	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	75	40 - 135

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102234

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102235

Lot-Sample #...:	G2D130158 - 008	Work Order #...:	EXWFC1AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	25

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	440		1.3	1.000	440.000000
Total TCDD	460		1.3		
1,2,3,7,8-PeCDD	7.7		6.6	0.500	3.800000
Total PeCDD	50		6.6		
1,2,3,4,7,8-HxCDD	14		6.6	0.100	1.400000
1,2,3,6,7,8-HxCDD	47		6.6	0.100	4.700000
1,2,3,7,8,9-HxCDD	34		6.6	0.100	3.400000
Total HxCDD	260		6.6		
1,2,3,4,6,7,8-HpCDD	1200		6.6	0.010	12.000000
Total HpCDD	2400		6.6		
OCDD	8400 J	~~J~~	13	0.001	8.400000
2,3,7,8-TCDF	6.8	CON	1.3	0.100	0.680000
Total TCDF	120		1.3		
1,2,3,7,8-PeCDF	4.6	J	6.6	0.050	0.230000
2,3,4,7,8-PeCDF	7.6		6.6	0.500	3.800000
Total PeCDF	200		6.6		
1,2,3,4,7,8-HxCDF	13		6.6	0.100	1.300000
1,2,3,6,7,8-HxCDF	12		6.6	0.100	1.200000
2,3,4,6,7,8-HxCDF	9.5		6.6	0.100	0.950000
1,2,3,7,8,9-HxCDF	ND		0.53	0.100	0
Total HxCDF	290		6.6		
1,2,3,4,6,7,8-HpCDF	180 J		6.6	0.010	1.800000
1,2,3,4,7,8,9-HpCDF	13		6.6	0.010	0.130000
Total HpCDF	490		6.6		
OCDF	470 J		13	0.001	0.470000
Total TEQ Concentration					484.260000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	68	40 - 135
13C-1,2,3,7,8-PeCDD	68	40 - 135
13C-1,2,3,6,7,8-HxCDD	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	52	40 - 135
13C-OCDD	46	40 - 135
13C-2,3,7,8-TCDF	55	40 - 135
13C-1,2,3,7,8-PeCDF	62	40 - 135
13C-1,2,3,4,7,8-HxCDF	58	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	53	40 - 135

ERW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102235

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102236

Lot-Sample #...:	G2D130158 - 009	Work Order #...:	EXWFD1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/29/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	16

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	5.9		1.2	1.000	5.900000
Total TCDD	60		1.2		
1,2,3,7,8-PeCDD	ND		2.2	0.500	0
Total PeCDD	28		6.0		
1,2,3,4,7,8-HxCDD	ND		1.5	0.100	0
1,2,3,6,7,8-HxCDD	5.3	J	6.0	0.100	0.530000
1,2,3,7,8,9-HxCDD	5.0	J	6.0	0.100	0.500000
Total HxCDD	51		6.0		
1,2,3,4,6,7,8-HpCDD	58		6.0	0.010	0.580000
Total HpCDD	120		6.0		
OCDD	350		12	0.001	0.350000
2,3,7,8-TCDF	11	CON	1.2	0.100	1.100000
Total TCDF	220		1.2		
1,2,3,7,8-PeCDF	5.0	J	6.0	0.050	0.250000
2,3,4,7,8-PeCDF	9.5		6.0	0.500	4.700000
Total PeCDF	360		6.0		
1,2,3,4,7,8-HxCDF	9.4		6.0	0.100	0.940000
1,2,3,6,7,8-HxCDF	8.3		6.0	0.100	0.830000
2,3,4,6,7,8-HxCDF	8.9		6.0	0.100	0.890000
1,2,3,7,8,9-HxCDF	ND		0.85	0.100	0
Total HxCDF	200		6.0		
1,2,3,4,6,7,8-HpCDF	37		6.0	0.010	0.370000
1,2,3,4,7,8,9-HpCDF	3.1	J	6.0	0.010	0.031000
Total HpCDF	67		6.0		
OCDF	43		12	0.001	0.043000
Total TEQ Concentration					17.014000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	47	40 - 135
13C-1,2,3,7,8-PeCDD	85	40 - 135
13C-1,2,3,6,7,8-HxCDD	75	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	65	40 - 135
13C-OCDD	57	40 - 135
13C-2,3,7,8-TCDF	57	40 - 135
13C-1,2,3,7,8-PeCDF	72	40 - 135
13C-1,2,3,4,7,8-HxCDF	63	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	60	40 - 135

5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102236

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

DW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102237

Lot-Sample #...:	G2D130158 - 010	Work Order #...:	EXWFE1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/29/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	36

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**120**		**1.6**	**1.000**	**120.000000**
Total TCDD	**130**		**1.6**		
1,2,3,7,8-PeCDD	ND		2.4	0.500	0
Total PeCDD	ND		5.5		0
1,2,3,4,7,8-HxCDD	ND		3.3	0.100	0
1,2,3,6,7,8-HxCDD	**10**		**7.8**	**0.100**	**1.000000**
1,2,3,7,8,9-HxCDD	**8.6**		**7.8**	**0.100**	**0.860000**
Total HxCDD	**66**		**7.8**		
1,2,3,4,6,7,8-HpCDD	**200**		**7.8**	**0.010**	**2.000000**
Total HpCDD	**380**		**7.8**		
OCDD	**1600**		**16**	**0.001**	**1.600000**
2,3,7,8-TCDF	5.0	CON	1.6	0.100	0.500000
Total TCDF	**110**		**1.6**		
1,2,3,7,8-PeCDF	ND		2.4	0.050	0
2,3,4,7,8-PeCDF	**5.9**	**J**	**7.8**	**0.500**	**3.000000**
Total PeCDF	**200**		**7.8**		
1,2,3,4,7,8-HxCDF	**7.6**	**J**	**7.8**	**0.100**	**0.760000**
1,2,3,6,7,8-HxCDF	**6.1**	**J**	**7.8**	**0.100**	**0.610000**
2,3,4,6,7,8-HxCDF	**6.3**	**J**	**7.8**	**0.100**	**0.630000**
1,2,3,7,8,9-HxCDF	ND		1.6	0.100	0
Total HxCDF	**140**		**7.8**		
1,2,3,4,6,7,8-HpCDF	**44**		**7.8**	**0.010**	**0.440000**
1,2,3,4,7,8,9-HpCDF	ND		2.7	0.010	0
Total HpCDF	**97**		**7.8**		
OCDF	**77**		**16**	**0.001**	**0.077000**
Total TEQ Concentration					**131.477000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	94	40 - 135
13C-1,2,3,6,7,8-HxCDD	78	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	71	40 - 135
13C-OCDD	73	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	66	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	66	40 - 135

DLW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102237

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

lew 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102238

Lot-Sample #...:	G2D130158 - 011	Work Order #...:	EXWFF1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/29/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	43

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**1500** J		**1.8**	**1.000**	**1,500.000000**
Total TCDD	**1500**		**1.8**		
1,2,3,7,8-PeCDD	ND		3.4	0.500	0
Total PeCDD	**32**		**8.8**		
1,2,3,4,7,8-HxCDD	**5.5**	J	**8.8**	**0.100**	**0.550000**
1,2,3,6,7,8-HxCDD	**17**		**8.8**	**0.100**	**1.700000**
1,2,3,7,8,9-HxCDD	**13**		**8.8**	**0.100**	**1.300000**
Total HxCDD	**130**		**8.8**		
1,2,3,4,6,7,8-HpCDD	**390**		**8.8**	**0.010**	**3.900000**
Total HpCDD	**680**		**8.8**		
OCDD	**2600**		**18**	**0.001**	**2.600000**
2,3,7,8-TCDF	**19**	CON	**1.8**	**0.100**	**1.900000**
Total TCDF	**200**		**1.8**		
1,2,3,7,8-PeCDF	**4.9**	J	**8.8**	**0.050**	**0.240000**
2,3,4,7,8-PeCDF	**10**		**8.8**	**0.500**	**5.000000**
Total PeCDF	**250**		**8.8**		
1,2,3,4,7,8-HxCDF	**11**		**8.8**	**0.100**	**1.100000**
1,2,3,6,7,8-HxCDF	**8.9**		**8.8**	**0.100**	**0.890000**
2,3,4,6,7,8-HxCDF	**8.5**	J	**8.8**	**0.100**	**0.850000**
1,2,3,7,8,9-HxCDF	ND		1.4	0.100	0
Total HxCDF	**200**		**8.8**		
1,2,3,4,6,7,8-HpCDF	**55**		**8.8**	**0.010**	**0.550000**
1,2,3,4,7,8,9-HpCDF	ND		3.9	0.010	0
Total HpCDF	**130**		**8.8**		
OCDF	**82**		**18**	**0.001**	**0.082000**
Total TEQ Concentration					**1,520.662000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	84	40 - 135
13C-1,2,3,7,8-PeCDD	98	40 - 135
13C-1,2,3,6,7,8-HxCDD	83	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	79	40 - 135
13C-OCDD	78	40 - 135
13C-2,3,7,8-TCDF	69	40 - 135
13C-1,2,3,7,8-PeCDF	79	40 - 135
13C-1,2,3,4,7,8-HxCDF	62	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	65	40 - 135

lew 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102238

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102239

Lot-Sample #...:	G2D130158 - 012	**Work Order #...:**	EXWFG1AC	**Matrix....:**	SOLID
Date Sampled...:	04/11/02	**Date Received..:**	04/13/02	**Instrument:**	5D5
Prep Date.....:	04/25/02	**Analysis Date..:**	04/28/02	**Units.....:**	pg/g
Prep Batch #...:	2115445	**Dilution Factor:**	1	**% Moisture:**	18

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**14**		**1.2**	**1.000**	**14.000000**
Total TCDD	**23**		**1.2**		
1,2,3,7,8-PeCDD	ND		0.93	0.500	0
Total PeCDD	**9.4**		**6.1**		
1,2,3,4,7,8-HxCDD	ND		0.83	0.100	0
1,2,3,6,7,8-HxCDD	**11**		**6.1**	**0.100**	**1.100000**
1,2,3,7,8,9-HxCDD	**5.8**	**J**	**6.1**	**0.100**	**0.580000**
Total HxCDD	**65**		**6.1**		
1,2,3,4,6,7,8-HpCDD	**38**		**6.1**	**0.010**	**0.380000**
Total HpCDD	**74**		**6.1**		
OCDD	**210**		**12**	**0.001**	**0.210000**
2,3,7,8-TCDF	**9.0**	**CON**	**1.2**	**0.100**	**0.900000**
Total TCDF	**71**		**1.2**		
1,2,3,7,8-PeCDF	**3.3**	**J**	**6.1**	**0.050**	**0.170000**
2,3,4,7,8-PeCDF	**4.9**	**J**	**6.1**	**0.500**	**2.500000**
Total PeCDF	**76**		**6.1**		
1,2,3,4,7,8-HxCDF	**4.8**	**J**	**6.1**	**0.100**	**0.480000**
1,2,3,6,7,8-HxCDF	**4.1**	**J**	**6.1**	**0.100**	**0.410000**
2,3,4,6,7,8-HxCDF	**4.4**	**J**	**6.1**	**0.100**	**0.440000**
1,2,3,7,8,9-HxCDF	ND		0.33	0.100	0
Total HxCDF	**120**		**6.1**		
1,2,3,4,6,7,8-HpCDF	**160**		**6.1**	**0.010**	**1.600000**
1,2,3,4,7,8,9-HpCDF	ND		2.0	0.010	0
Total HpCDF	**280**		**6.1**		
OCDF	**84**		**12**	**0.001**	**0.084000**
Total TEQ Concentration					**22.854000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	86	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	72	40 - 135
13C-OCDD	69	40 - 135
13C-2,3,7,8-TCDF	67	40 - 135
13C-1,2,3,7,8-PeCDF	75	40 - 135
13C-1,2,3,4,7,8-HxCDF	72	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	68	40 - 135

MW
5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102239

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102240

Lot-Sample #...:	G2D130158 - 013	Work Order #...:	EXWFH1AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/29/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	17

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**1.7**		**1.2**	**1.000**	**1.700000**
Total TCDD	**5.8**		**1.2**		
1,2,3,7,8-PeCDD	ND		0.67	0.500	0
Total PeCDD	**46**		**6.0**		
1,2,3,4,7,8-HxCDD	ND		0.84	0.100	0
1,2,3,6,7,8-HxCDD	**170**		**6.0**	**0.100**	**17.000000**
1,2,3,7,8,9-HxCDD	**55**		**6.0**	**0.100**	**5.500000**
Total HxCDD	**1000**		**6.0**		
1,2,3,4,6,7,8-HpCDD	**310**		**6.0**	**0.010**	**3.100000**
Total HpCDD	**510**		**6.0**		
OCDD	**76**		**12**	**0.001**	**0.076000**
2,3,7,8-TCDF	**5.5**	CON	**1.2**	**0.100**	**0.550000**
Total TCDF	**25**		**1.2**		
1,2,3,7,8-PeCDF	**3.3**	J	**6.0**	**0.050**	**0.170000**
2,3,4,7,8-PeCDF	**6.6**		**6.0**	**0.500**	**3.300000**
Total PeCDF	**95**		**6.0**		
1,2,3,4,7,8-HxCDF	**28**		**6.0**	**0.100**	**2.800000**
1,2,3,6,7,8-HxCDF	**10**		**6.0**	**0.100**	**1.000000**
2,3,4,6,7,8-HxCDF	**9.7**		**6.0**	**0.100**	**0.970000**
1,2,3,7,8,9-HxCDF	ND		1.5	0.100	0
Total HxCDF	**1700**		**6.0**		
1,2,3,4,6,7,8-HpCDF	**4100** J		**6.0**	**0.010**	**41.000000**
1,2,3,4,7,8,9-HpCDF	**14**		**6.0**	**0.010**	**0.140000**
Total HpCDF	**7200**		**6.0**		
OCDF	**1200**		**12**	**0.001**	**1.200000**
Total TEQ Concentration					**78.506000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	76	40 - 135
13C-1,2,3,7,8-PeCDD	89	40 - 135
13C-1,2,3,6,7,8-HxCDD	83	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	79	40 - 135
13C-OCDD	82	40 - 135
13C-2,3,7,8-TCDF	66	40 - 135
13C-1,2,3,7,8-PeCDF	74	40 - 135
13C-1,2,3,4,7,8-HxCDF	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	72	40 - 135

RW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102240

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated result. Result is less than the reporting limit.

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102241

Lot-Sample #...:	G2D130158 - 014	Work Order #...:	EXWFJ1AC	Matrix.....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	17

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**150**		**1.2**	**1.000**	**150.000000**
Total TCDD	**170**		**1.2**		
1,2,3,7,8-PeCDD	ND		2.0	0.500	0
Total PeCDD	**27**		**6.0**		
1,2,3,4,7,8-HxCDD	ND		1.0	0.100	0
1,2,3,6,7,8-HxCDD	ND		2.8	0.100	0
1,2,3,7,8,9-HxCDD	ND		2.7	0.100	0
Total HxCDD	**37**		**6.0**		
1,2,3,4,6,7,8-HpCDD	**43**		**6.0**	**0.010**	**0.430000**
Total HpCDD	**81**		**6.0**		
OCDD	**280**		**12**	**0.001**	**0.280000**
2,3,7,8-TCDF	**10**	**CON**	**1.2**	**0.100**	**1.000000**
Total TCDF	**100**		**1.2**		
1,2,3,7,8-PeCDF	**3.7**	**J**	**6.0**	**0.050**	**0.180000**
2,3,4,7,8-PeCDF	**4.9**	**J**	**6.0**	**0.500**	**2.500000**
Total PeCDF	**68**		**6.0**		
1,2,3,4,7,8-HxCDF	**3.8**	**J**	**6.0**	**0.100**	**0.380000**
1,2,3,6,7,8-HxCDF	**3.3**	**J**	**6.0**	**0.100**	**0.330000**
2,3,4,6,7,8-HxCDF	ND		2.7	0.100	0
1,2,3,7,8,9-HxCDF	ND		0.58	0.100	0
Total HxCDF	**54**		**6.0**		
1,2,3,4,6,7,8-HpCDF	**19**		**6.0**	**0.010**	**0.190000**
1,2,3,4,7,8,9-HpCDF	ND		1.1	0.010	0
Total HpCDF	**31**		**6.0**		
OCDF	**15**		**12**	**0.001**	**0.015000**
Total TEQ Concentration					**155.305000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	66	40 - 135
13C-1,2,3,7,8-PeCDD	67	40 - 135
13C-1,2,3,6,7,8-HxCDD	64	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	62	40 - 135
13C-OCDD	61	40 - 135
13C-2,3,7,8-TCDF	53	40 - 135
13C-1,2,3,7,8-PeCDF	58	40 - 135
13C-1,2,3,4,7,8-HxCDF	58	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	59	40 - 135

LW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102241

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

QW
5/24/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102242

Lot-Sample #...:	G2D130158 - 015	**Work Order #...:**	EXWFK1AC	**Matrix....:**	SOLID
Date Sampled...:	04/11/02	**Date Received..:**	04/13/02	**Instrument:**	5D5
Prep Date.....:	04/25/02	**Analysis Date..:**	04/28/02	**Units.....:**	pg/g
Prep Batch #...:	2115445	**Dilution Factor:**	1	**% Moisture:**	27

PARAMETER	RESULT	DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND	0.89	1.000	0
Total TCDD	ND	0.89		0
1,2,3,7,8-PeCDD	ND	3.8	0.500	0
Total PeCDD	ND	3.8		0
1,2,3,4,7,8-HxCDD	ND	2.0	0.100	0
1,2,3,6,7,8-HxCDD	ND	2.1	0.100	0
1,2,3,7,8,9-HxCDD	ND	1.9	0.100	0
Total HxCDD	ND	2.1		0
1,2,3,4,6,7,8-HpCDD	ND	1.5	0.010	0
Total HpCDD	ND	1.5		0
OCDD	ND	5.3	0.001	0
2,3,7,8-TCDF	ND	1.4	0.100	0
Total TCDF	ND	1.4		0
1,2,3,7,8-PeCDF	ND	2.3	0.050	0
2,3,4,7,8-PeCDF	ND	2.3	0.500	0
Total PeCDF	ND	2.3		0
1,2,3,4,7,8-HxCDF	ND	2.3	0.100	0
1,2,3,6,7,8-HxCDF	ND	2.1	0.100	0
2,3,4,6,7,8-HxCDF	ND	2.4	0.100	0
1,2,3,7,8,9-HxCDF	ND	2.5	0.100	0
Total HxCDF	ND	2.5		0
1,2,3,4,6,7,8-HpCDF	ND	0.83	0.010	0
1,2,3,4,7,8,9-HpCDF	ND	0.97	0.010	0
Total HpCDF	ND	0.97		0
OCDF	ND	2.0	0.001	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	94	40 - 135
13C-1,2,3,6,7,8-HxCDD	86	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	84	40 - 135
13C-OCDD	85	40 - 135
13C-2,3,7,8-TCDF	62	40 - 135
13C-1,2,3,7,8-PeCDF	77	40 - 135
13C-1,2,3,4,7,8-HxCDF	68	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	77	40 - 135

JLW
5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102242

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102243

Lot-Sample #...:	G2D130158 - 016	Work Order #...:	EXWFL1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	26

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**49**		**1.3**	**1.000**	**49.000000**
Total TCDD	**53**		**1.3**		
1,2,3,7,8-PeCDD	ND		2.3	0.500	0
Total PeCDD	ND		2.3		0
1,2,3,4,7,8-HxCDD	ND		1.4	0.100	0
1,2,3,6,7,8-HxCDD	**3.5**	**J**	**6.7**	**0.100**	**0.350000**
1,2,3,7,8,9-HxCDD	ND		3.0	0.100	0
Total HxCDD	**24**		**6.7**		
1,2,3,4,6,7,8-HpCDD	**61**		**6.7**	**0.010**	**0.610000**
Total HpCDD	**220**		**6.7**		
OCDD	**570**		**13**	**0.001**	**0.570000**
2,3,7,8-TCDF	**2.0**	**CON**	**1.3**	**0.100**	**0.200000**
Total TCDF	**18**		**1.3**		
1,2,3,7,8-PeCDF	ND		1.2	0.050	0
2,3,4,7,8-PeCDF	ND		1.6	0.500	0
Total PeCDF	**18**		**6.7**		
1,2,3,4,7,8-HxCDF	ND		2.4	0.100	0
1,2,3,6,7,8-HxCDF	ND		1.5	0.100	0
2,3,4,6,7,8-HxCDF	ND		2.0	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.4	0.100	0
Total HxCDF	**24**		**6.7**		
1,2,3,4,6,7,8-HpCDF	**14**		**6.7**	**0.010**	**0.140000**
1,2,3,4,7,8,9-HpCDF	ND		0.98	0.010	0
Total HpCDF	**31**		**6.7**		
OCDF	**25**		**13**	**0.001**	**0.025000**
Total TEQ Concentration					**50.895000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	74	40 - 135
13C-1,2,3,7,8-PeCDD	85	40 - 135
13C-1,2,3,6,7,8-HxCDD	74	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	74	40 - 135
13C-OCDD	76	40 - 135
13C-2,3,7,8-TCDF	59	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-1,2,3,4,7,8-HxCDF	58	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	66	40 - 135

JW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102243

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

JW
5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102244

Lot-Sample #...:	G2D130158 - 017	Work Order #...:	EXWFM1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	13

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**76**		**1.2**	**1.000**	**76.000000**
Total TCDD	**82**		**1.2**		
1,2,3,7,8-PeCDD	ND		2.1	0.500	0
Total PeCDD	ND		3.5		0
1,2,3,4,7,8-HxCDD	ND		1.1	0.100	0
1,2,3,6,7,8-HxCDD	ND		2.7	0.100	0
1,2,3,7,8,9-HxCDD	ND		2.0	0.100	0
Total HxCDD	**19**		**5.8**		
1,2,3,4,6,7,8-HpCDD	**30**		**5.8**	**0.010**	**0.300000**
Total HpCDD	**66**		**5.8**		
OCDD	**220**		**12**	**0.001**	**0.220000**
2,3,7,8-TCDF	**4.1** J	**CON**	**1.2**	**0.100**	**0.410000**
Total TCDF	**54**		**1.2**		
1,2,3,7,8-PeCDF	ND		1.6	0.050	0
2,3,4,7,8-PeCDF	**2.9**		**5.8**	**0.500**	**1.400000**
Total PeCDF	**87**		**5.8**		
1,2,3,4,7,8-HxCDF	**3.8**	**J**	**5.8**	**0.100**	**0.380000**
1,2,3,6,7,8-HxCDF	ND		2.1	0.100	0
2,3,4,6,7,8-HxCDF	ND		2.7	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.4	0.100	0
Total HxCDF	**84**		**5.8**		
1,2,3,4,6,7,8-HpCDF	**13**		**5.8**	**0.010**	**0.130000**
1,2,3,4,7,8,9-HpCDF	ND		0.74	0.010	0
Total HpCDF	**27**		**5.8**		
OCDF	**22**		**12**	**0.001**	**0.022000**
Total TEQ Concentration					**78.862000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	79	40 - 135
13C-1,2,3,7,8-PeCDD	88	40 - 135
13C-1,2,3,6,7,8-HxCDD	78	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	80	40 - 135
13C-OCDD	81	40 - 135
13C-2,3,7,8-TCDF	61	40 - 135
13C-1,2,3,7,8-PeCDF	73	40 - 135
13C-1,2,3,4,7,8-HxCDF	69	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	73	40 - 135

DW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102244

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

RW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102245

Lot-Sample #...:	G2D130158 - 018	**Work Order #...:**	EXWFN1AC	**Matrix....:**	SOLID
Date Sampled...:	04/11/02	**Date Received..:**	04/13/02	**Instrument:**	5D5
Prep Date.....:	04/25/02	**Analysis Date..:**	04/28/02	**Units.....:**	pg/g
Prep Batch #...:	2115445	**Dilution Factor:**	1	**% Moisture:**	12

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	**56**		**1.1**	**1.000**	**56.000000**
Total TCDD	**64**		**1.1**		
1,2,3,7,8-PeCDD	ND		1.2	0.500	0
Total PeCDD	ND		5.1		0
1,2,3,4,7,8-HxCDD	ND		0.74	0.100	0
1,2,3,6,7,8-HxCDD	ND		2.1	0.100	0
1,2,3,7,8,9-HxCDD	ND		1.7	0.100	0
Total HxCDD	**19**		**5.7**		
1,2,3,4,6,7,8-HpCDD	**32**		**5.7**	**0.010**	**0.320000**
Total HpCDD	**64**		**5.7**		
OCDD	**230**		**11**	**0.001**	**0.230000**
2,3,7,8-TCDF	**7.2 J**	**CON**	**1.1**	**0.100**	**0.720000**
Total TCDF	**92**		**1.1**		
1,2,3,7,8-PeCDF	ND		2.3	0.050	0
2,3,4,7,8-PeCDF	**3.5**	**J**	**5.7**	**0.500**	**1.700000**
Total PeCDF	**93**		**5.7**		
1,2,3,4,7,8-HxCDF	**4.0**	**J**	**5.7**	**0.100**	**0.400000**
1,2,3,6,7,8-HxCDF	ND		2.5	0.100	0
2,3,4,6,7,8-HxCDF	ND		2.4	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.0	0.100	0
Total HxCDF	**81**		**5.7**		
1,2,3,4,6,7,8-HpCDF	**12**		**5.7**	**0.010**	**0.120000**
1,2,3,4,7,8,9-HpCDF	ND		1.0	0.010	0
Total HpCDF	**27**		**5.7**		
OCDF	**23**		**11**	**0.001**	**0.023000**
Total TEQ Concentration					**59.513000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	77	40 - 135
13C-1,2,3,7,8-PeCDD	85	40 - 135
13C-1,2,3,6,7,8-HxCDD	81	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	80	40 - 135
13C-OCDD	81	40 - 135
13C-2,3,7,8-TCDF	57	40 - 135
13C-1,2,3,7,8-PeCDF	71	40 - 135
13C-1,2,3,4,7,8-HxCDF	68	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	74	40 - 135

MW 5/21/02

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102245

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
J	Estimated result. Result is less than the reporting limit.

lw 5/21/02

TABLE 1
SUMMARY OF QUALITY ASSURANCE / QUALITY CONTROL SAMPLE RESULTS
DIOXIN DELINEATION SAMPLING - FIRST COMPONENT OF ALLENDALE POND INVESTIGATION
CENTREDALE MANOR RESTORATION PROJECT SUPERFUND SITE
NORTH PROVIDENCE, RHODE ISLAND

		AQUEOUS			SOLID	
	Equipment Rinsate Blank	PE Standard	PE Sample Result	PE Standard	PE Sample Result	Range of Expected Values[1]
Location ID	AP-DEL-BKE	AP-DEL-PEAQ	AP-DEL-PEAQ	AP-DEL-PES	AP-DEL-PES	AP-DEL-PES
Sample ID	2102251	2102253	2102253	2102252	2102252	2102252
Sample Date	4/10/02	NA	NA	NA	4/11/02	NA
Sample Time	1600	NA	NA	NA	1730	NA
Sample Depth	NA	NA	N/A	N/A	NA	N/A
Laboratory	STL	CIL	STL	CIL	STL	CIL
Lot Number	G2D130156	34761-82	G2D130158	MAR-21985-85-A	G2D130158	MAR-21985-85-A
Lab. Number	#024	NA	#020	EDF-2513	#019	EDF-2513
Date Analyzed	4/18/02	NA	4/18/02	NA	4/28/02	NA
Constituent	pg/L	pg/L	pg/L	pg/g	pg/g	pg/g
2,3,7,8-TCDD	<2.1	ND	<1.3	500	380	260 - 670
Total TCDD	<2.1	ND	<1.3	ND	380	-
1,2,3,7,8-PeCDD	<3.0	ND	<12	1000	820	560 - 1370
Total PeCDD	<7.9	ND	<12	ND	820	-
1,2,3,4,7,8-HxCDD	<1.9	6000	3100	1000	780	500 - 1290
1,2,3,6,7,8-HxCDD	<2.2	15000	9800	1000	900	520 - 1210
1,2,3,7,8,9-HxCDD	<1.7	ND	36 J	1000	860	460 - 1330
Total HxCDD	<2.2	ND	13000	ND	2600	-
1,2,3,4,6,7,8-HpCDD	<4.9	20000	11000	1500	1500	710 - 2070
Total HpCDD	<4.9	ND	11000	ND	1600	-
OCDD	<18	30000	16000	2500	3500	1980 - 5030
2,3,7,8-TCDF	<1.4	7000	4300 E, CON	500	430 E, CON	260 - 640
Total TCDF	<1.4	ND	4400	ND	480	-
1,2,3,7,8-PeCDF	<2.0	5000	2900	1000	880	590 - 1150
2,3,4,7,8-PeCDF	<1.9	ND	<1.4	1000	900	410 - 1310
Total PeCDF	<2.6	ND	2900	ND	1800	-
1,2,3,4,7,8-HxCDF	<1.6	ND	<5.0	1000	870	530 - 1230
1,2,3,6,7,8-HxCDF	<1.6	ND	<11	1000	900	340 - 1560
2,3,4,6,7,8-HxCDF	<1.7	ND	<16	1000	1000	480 - 1350
1,2,3,7,8,9-HxCDF	<1.6	ND	<1.2	1000	900	390 - 1260
Total HxCDF	<1.7	ND	<16	ND	3700	-
1,2,3,4,6,7,8-HpCDF	<2.2	10000	6200	1500	1400	520 - 2010
1,2,3,4,7,8,9-HpCDF	<2.8	ND	<2.3	1500	1500	250 - 1980
Total HpCDF	<2.8	ND	6200	ND	2900	-
OCDF	<5.7	ND	<6.5	2500	2300	1170 - 3330
Total TEQ Concentration		ND		ND		-

Notes:
pg/g = picograms per gram = parts per trillion (ppt)
pg/L = picograms per liter = parts per trillion (ppt)
CON = Confirmation analysis
J = Estimated result; result is less than the reporting limit
NA = Not applicable
ND = Not determined
STL = Severn Trent Laboratories, Inc. - Sacramento
CIL = Cambridge Isotope Laboratories
PE = Performance Evaluation
Results have been adjusted for dry weight; the solid performance evaluation sample, as prepared, is dry
E = Estimated result; result concentration exceeds the calibration range
[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.

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102252 PE

Lot-Sample #...:	G2D130158 - 019	Work Order #...:	EXWFP1AC	Matrix....:	SOLID
Date Sampled...:	04/11/02	Date Received..:	04/13/02	Instrument:	5D5
Prep Date.....:	04/25/02	Analysis Date..:	04/28/02	Units.....:	pg/g
Prep Batch #...:	2115445	Dilution Factor:	1	% Moisture:	

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	380		1.0	1.000	380.000000
Total TCDD	380		1.0		
1,2,3,7,8-PeCDD	820		5.0	0.500	410.000000
Total PeCDD	820		5.0		
1,2,3,4,7,8-HxCDD	780		5.0	0.100	78.000000
1,2,3,6,7,8-HxCDD	900		5.0	0.100	90.000000
1,2,3,7,8,9-HxCDD	860		5.0	0.100	86.000000
Total HxCDD	2600		5.0		
1,2,3,4,6,7,8-HpCDD	1500		5.0	0.010	15.000000
Total HpCDD	1600		5.0		
OCDD	3500		10	0.001	3.500000
2,3,7,8-TCDF	430	E CON	1.0	0.100	43.000000
Total TCDF	480		1.0		
1,2,3,7,8-PeCDF	880		5.0	0.050	44.000000
2,3,4,7,8-PeCDF	900		5.0	0.500	450.000000
Total PeCDF	1800		5.0		
1,2,3,4,7,8-HxCDF	870		5.0	0.100	87.000000
1,2,3,6,7,8-HxCDF	900		5.0	0.100	90.000000
2,3,4,6,7,8-HxCDF	1000		5.0	0.100	100.000000
1,2,3,7,8,9-HxCDF	900		5.0	0.100	90.000000
Total HxCDF	3700		5.0		
1,2,3,4,6,7,8-HpCDF	1400		5.0	0.010	14.000000
1,2,3,4,7,8,9-HpCDF	1500		5.0	0.010	15.000000
Total HpCDF	2900		5.0		
OCDF	2300		10	0.001	2.300000
Total TEQ Concentration					1,997.800000

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	28	40 - 135
13C-1,2,3,7,8-PeCDD	45	40 - 135
13C-1,2,3,6,7,8-HxCDD	37	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	35	40 - 135
13C-OCDD	36	40 - 135
13C-2,3,7,8-TCDF	29	40 - 135
13C-1,2,3,7,8-PeCDF	36	40 - 135
13C-1,2,3,4,7,8-HxCDF	32	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	33	40 - 135

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102252 PE

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

*	Surrogate recovery is outside stated control limits.
CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102253 PE

Lot-Sample #...:	G2D130158 - 020	**Work Order #...:**	EXWFQ1AA	**Matrix....:**	WATER
Date Sampled...:	04/11/02	**Date Received..:**	04/13/02	**Instrument:**	5D5
Prep Date.....:	04/16/02	**Analysis Date..:**	04/18/02	**Units.....:**	pg/L
Prep Batch #...:	2106506	**Dilution Factor:**	1	**% Moisture:**	

PARAMETER	RESULT		DETECTION LIMIT	TEF FACTOR	TEQ CONCENTRATION
2,3,7,8-TCDD	ND		1.3	1.000	0
Total TCDD	ND		1.3		0
1,2,3,7,8-PeCDD	ND		12	0.500	0
Total PeCDD	ND		12		0
1,2,3,4,7,8-HxCDD	**3100**		**50**	**0.100**	**310.000000**
1,2,3,6,7,8-HxCDD	**9800**		**50**	**0.100**	**980.000000**
1,2,3,7,8,9-HxCDD	**36**	**J**	**50**	**0.100**	**3.600000**
Total HxCDD	**13000**		**50**		
1,2,3,4,6,7,8-HpCDD	**11000**		**50**	**0.010**	**110.000000**
Total HpCDD	**11000**		**50**		
OCDD	**16000**		**100**	**0.001**	**16.000000**
2,3,7,8-TCDF	**4300**	**CON E**	**10**	**0.100**	**430.000000**
Total TCDF	**4400**		**10**		
1,2,3,7,8-PeCDF	**2900**		**50**	**0.050**	**140.000000**
2,3,4,7,8-PeCDF	ND		1.4	0.500	0
Total PeCDF	**2900**		**50**		
1,2,3,4,7,8-HxCDF	ND		5.0	0.100	0
1,2,3,6,7,8-HxCDF	ND		11	0.100	0
2,3,4,6,7,8-HxCDF	ND		16	0.100	0
1,2,3,7,8,9-HxCDF	ND		1.2	0.100	0
Total HxCDF	ND		16		0
1,2,3,4,6,7,8-HpCDF	**6200**		**50**	**0.010**	**62.000000**
1,2,3,4,7,8,9-HpCDF	ND		2.3	0.010	0
Total HpCDF	**6200**		**50**		
OCDF	ND		6.5	0.001	0
Total TEQ Concentration					**2,051.600000**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	81	40 - 135
13C-1,2,3,7,8-PeCDD	69	40 - 135
13C-1,2,3,6,7,8-HxCDD	95	40 - 135
13C-1,2,3,4,6,7,8-HpCDD	70	40 - 135
13C-OCDD	67	40 - 135
13C-2,3,7,8-TCDF	80	40 - 135
13C-1,2,3,7,8-PeCDF	67	40 - 135
13C-1,2,3,4,7,8-HxCDF	87	40 - 135
13C-1,2,3,4,6,7,8-HpCDF	76	40 - 135

LOUREIRO ENGINEERING ASSOCIATES, P.C.

Dioxins/Furans, HRGC/HRMS (8290)

Client Sample ID: 2102253 PE

Notes:

TEF values are cited in U.S. Environmental Protection Agency, (1989) Interim procedures for estimating risks associated with exposures to mixtures of chlorinated dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 update. U.S. Environmental Protection Agency, Risk Assessment forum, Washington, DC; EPA/625/3-89/016.

CON	Confirmation analysis.
E	Estimated result. Result concentration exceeds the calibration range.
J	Estimated result. Result is less than the reporting limit.