

US EPA ARCHIVE DOCUMENT



US ARMY CORPS
OF ENGINEERS
New England District

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Delivery Order No. 01

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***Task 22B Post-Third Party Validated
Archived Sediments Chemistry
Data Report – Revised***

**CENTREDALE MANOR
RESTORATION PROJECT
SUPERFUND SITE HUMAN HEALTH
AND BASELINE RISK ASSESSMENTS**

US EPA ARCHIVE DOCUMENT



Section 1 Dioxin/Furan, HCX and TCX Results

QA/QC Narrative Sediment and QC Results

QA/QC Narrative

DIOXIN/FURAN/HCX/TCX QA/QC SUMMARY

QC Batch 49038-01 – Sediment

PROJECT: USACE NAE Delivery Order #01 Centredale

PARAMETER: Dioxin/Furan by High Resolution Mass Spectrometry (HRMS)

LABORATORY: Battelle, Columbus, OH

MATRIX: Sediment

SAMPLE CUSTODY: Three additional sediment samples were received at Battelle Columbus in on August 16, 2001. The sediment samples were processed for Dioxin/Furan, HCB and TCX analyses. Note that these samples were not collected as part of the summer 2001 field event; instead these samples had been collected and initially analyzed by IT in 1999. The samples were subsequently archived at Cape Technologies, Portland ME and then shipped to Battelle in August 2001 for analysis. Samples were collected in July 1999; specific collection dates are reported with the electronic data deliverable (EDD).

Samples were received in at room temperature in a cardboard box without chain-of-custody documentation. The client was notified of the sample conditions. Sample identifications were taken directly off of the jar labels.

QA/QC MEASUREMENT PERFORMANCE CRITERIA:

	Reference Method	Blank	Surrogate Recovery	LCS/MS Recovery	SRM % Diff.	MS/MSD Replicate Relative Precision	Achieved RL (pg/g dry)	Project Goals ^c (pg/g dry)
Dioxin/ Furan/	L-23 Battelle SOP ASAT.II- 001-02	<5x MDL, or associated samples > 10x blank values	25-150% Recovery	LCS: Method 1613B, Table 6 OPR ^a MS: MS: 50-120% Recovery ^b	≤30% PD ^b	≤30% RPD ^{b, d}	Tetras: 0.75 – 7.70	Tetras : 0.008 – 0.587
							Penta- Hepta: 3.75 – 38.50	Penta- Hepta: 0.008 – 2,050
							Octas: 7.50 – 77.00	Octas: 4,670- 137,000

^a Method 1613B, Table 6 OPR requirements documented on LCS summary report table.

^b Certified values must be >5x the MDL.

^c Certified values must be >5x the MDL.

^d Sample replicate precision: concentrations in sample replicate must be >10x the MDL.

DIOXIN/FURAN/HCX/TCX QA/QC SUMMARY
QC Batch 49038-01 – Sediment

METHOD: Sediment samples were processed and analyzed for seventeen 2,3,7,8-substituted polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/PCDF) following general procedures in EPA Method 1613 as outlined in the Centredale Manor Task 22 QAPP (5/23/01) and as summarized below.

Sample Preparation – The samples were processed in BATCH 49038-01. Aliquots of each sediment sample were weighed into individual jars and mixed with Hydromatrix drying agent. Approximately 2.5 g wet weight of each sediment sample was used. The three samples plus six QC samples were prepared for PCDD/PCDF/TCX/HCX only. The sediment/Hydromatrix mixtures were placed into Accelerated Solvent Extraction (ASE) cells and spiked with $^{13}\text{C}_{12}$ -labeled PCDD/PCDF internal standard solutions. The laboratory control spike (LCS) and matrix spike (MS,MSD) samples were spiked with native PCDD/PCDF/HCX/TCX at this time. The samples were ASE extracted using toluene. Each extract was then spiked with 2,3,7,8-TCDD- $^{37}\text{Cl}_4$ cleanup standard for monitoring recovery of analytes through the cleanup procedures. Each extract was acid/base washed. The extracts were then processed through acid/base silica, alumina, and carbon cleanup columns. The extracts were spiked with 1,2,3,4-TCDD- $^{13}\text{C}_{12}$ and 1,2,3,7,8,9-HxCDD- $^{13}\text{C}_{12}$ recovery standard and concentrated to a final sample volume of 20 μL . All samples diluted up to 30 μL for analysis.

PCDD/PCDF Analysis – Each extract was analyzed by gas chromatography/high resolution mass spectrometry (GC/HRMS) in the selected ion-monitoring mode at a resolution of 10,000 or greater. A DB5 column was used for initial analysis of the seventeen 2,3,7,8-PCDD/PCDF; and a DB225 column was used for second column confirmation of 2,3,7,8-TCDF. Second column confirmations are not reported due to interference of a co-eluting ether with 2,3,7,8-TCDF. Instead the initial DB-5 results are reported and flagged “E” due to possible interference of co-eluting non-2,3,7,8-tetra furans.

The following revisions to Method 1613 as well as several items to note specifically related to these analyses are summarized below:

1. Quality control samples processed with this batch of samples included one method blank, one LCS, one soil standard reference material, one matrix spike, one matrix spike duplicate, and one sample prepared in duplicate.
2. The GC/HRMS instrumentation was calibrated for PCDD/PCDF at levels specified in Method 1613 with one additional calibration standard at concentrations equivalent to $\frac{1}{2}$ the level of Method 1613's lowest calibration point. The calibration range corresponds to the following levels in the samples assuming an average sample dry weight of 2.0 g of soil and a final sample volume of 30 μL : 3.75 to 3,000 pg/g dry for tetra compounds, 18.75 to 15,000 pg/g dry for penta through hepta compounds, and 37.5 to 30,000 pg/g dry for octa compounds.

Any additional minor revisions to Method 1613 are fully documented in the analytical record.

**HOLDING
TIMES:**

Samples were prepared for analysis in one analytical batch. Samples were extracted within 2 weeks of receipt at the laboratory and completely analyzed within 1 month of extraction.

<u>Batch</u>	<u>Extraction Date</u>	<u>Analysis Date</u>
49038-01	8/30/2001	9/11-9/13/2001

DIOXIN/FURAN/HCX/TCX QA/QC SUMMARY
QC Batch 49038-01 – Sediment

**DETECTION
LIMITS:**

Dioxin/furan results are reported relative to the sample-specific reporting limits (also referred to as QL in the QAPP) for that compound. The sample-specific RL is based on the low calibration standard and adjusted for sample specific processing factors and volumes, as follow:

$$RL = (\text{Concentration in Low Std.} \times \text{final extract volume} \times \text{dilution factors}) / \text{Sample size}$$

Where,

Concentration in low standard = 0.25 to 2.5 pg/μL

Final Extract Volume = 20 μL

Dilution Factor = documented in project file

Sample Size = approximately 2.5-g dry

Achieved RLs did not meet project detection limit goals for most target compounds. As noted in the QAPP, the project detection limit goals are provided for perspective rather than as a requirement for the analytical methods. If detection limits cannot be achieved, this will be addressed in the uncertainty discussions in the risk assessment.

BLANKS:

One laboratory method blank was processed with the analytical batch. Blanks are analyzed to ensure that the sample extraction and analysis methods were free of contamination.

49038-01– Several analytes were detected at a trace level; however, the levels detected were below the reporting level with the exception of 2,3,7,8-TCDD.

Concentrations of 2,3,7,8-TCDD in the samples were >10x the blank level and, therefore, "B" flags were not required.

**LABORATORY
CONTROL
SAMPLE:**

A laboratory control sample (LCS) was prepared with the analytical batch. The percent recoveries of target compounds were calculated to measure data quality in terms of accuracy.

49038-01– The LCS sample met the criteria found in Table 6 of Method 1613, Revision B for PCDD/PCDF.

**MATRIX
SPIKES:**

One matrix spike (MS)/matrix spike duplicate (MSD) sample set was prepared with the batch to measure data quality in terms of accuracy and precision. The MS and MSD were fortified with target compounds to monitor data quality in terms of accuracy and precision.

49038-01– For PCDD/PCDF, the matrix spike recoveries for analytes spiked >5x background were within the 50-120% limits. The RPD between duplicates for PCDD/PCDF analytes >5x background ranged from 0 - 3%.

The matrix spike recoveries for TCX and HCX were 43% and 120%, respectively and the matrix spike duplicate recovery for TCX and HCX were 27% and 26%, respectively. The RPD between duplicates for TCX and HCX were 47% and 129%, respectively. There are no applicable accuracy or precision requirements for HCX. This analyte was added to the matrix spike samples to investigate how well it behaves in a typical PCDD/PCDF extraction and cleanup process.

DIOXIN/FURAN/HCX/TCX QA/QC SUMMARY
QC Batch 49038-01 – Sediment

**INTERNAL
STANDARDS:**

Fifteen internal standards were added to each sample prior to processing, one standard was added after extraction and prior to sample cleanup. Internal standard recoveries were calculated to measure data quality in terms of accuracy (sample processing efficiency).

49038-01– Recoveries of internal standards were within 25-150% for most analytes in all samples.

In two of the samples, the measurement of the cleanup standard on both the initial (DB-5) and confirmation analyses (DB-225) was hindered by an interfering peak. The QC exceedences are believed to be caused from the high amount of native found in the samples and should not greatly effect the final concentrations found in the samples since the isotope dilution method of quantitation was used.

REPLICATES:

A laboratory duplicate was prepared with the batch. The relative percent differences (RPD) between laboratory replicate analyses for target compounds were calculated to measure data quality in terms of precision.

49038-01– The RPD for the PCDD/PCDF analytes detected above the action level of $>10\times$ MDL were all below the 30% limit.

SRM:

A standard reference material (CIL EDF 2513) was prepared with the analytical batch. The percent difference (PD) between detected concentrations and certified values was calculated to measure data quality in terms of accuracy.

49038-01– All analytes in the SRM were found to be within the limit of 30% difference from consensus values.

REFERENCES:

Battelle 2001. *Centredale Manor Restoration Project Superfund Site Baseline Risk Assessment, Initial Project Planning and Support*. Tasks 19-22 QAPP prepared under contract to USACE NAE. Delivery Order #59. May 23, 2001. 509pp + apps.

QUALITY ASSURANCE STATEMENT

Project Title: USACE/NED, Centredale Manor Task 22 Additional Sediment Samples

Project Number: G487002-22B2

Description of Data: Sediment samples for dioxin/furan analysis

Description of audit and review activities:

1) Reviewed sample preparation Laboratory Record Books (LRB). Tracked COC from sample receipt to analytical injection. Reviewed standard/spike preparation records. Resolved all resulting LRB numbers (i.e. sample tracking numbers) with analytical designations. Reviewed data package for data recording consistent with Good Laboratory Practices (GLP's).

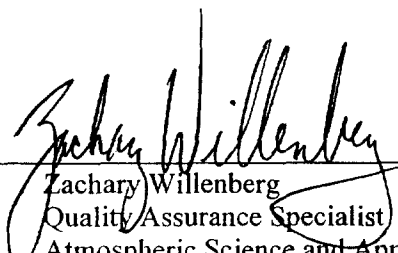
2) Reviewed analytical (HRMS) data. Reviewed all hand-entered parameters (e.g. sample masses, sample names, calibration curve date, etc) for each analytical run. Reviewed calibrations results to ensure that Relative Response Factors (RRF) were $\pm 20\%$ of calibration RRF. Reviewed 10% data transfer to spreadsheets. Reviewed confirmation runs and accurate data transfer.

3) Reviewed spreadsheets. Accessed e-file of excel spreadsheets and reviewed formula and relative and absolute cell addresses to ensure accurate data transposition.

4) Reviewed report. Ensured report accurately reflected raw data and resulting spreadsheets.

Description of outstanding issues or deficiencies which may affect data quality:

1) Minor QC issues were submitted to the analytical staff for correction, no outstanding issues present.



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12-18-01
Date

Sediment and QC Results

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-8	DIOXIN	MOD 1613B	5.05	pg/g - Dry Wt	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	0.24	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	OCDD	3288-87-9	DIOXIN	MOD 1613B	1.91	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	2.56	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	0.26	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	0.17	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	0.13	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	0.65	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	HCH	38178-99-3	DIOXIN	MOD 1613B	102.28	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	2.56	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	2.05	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	0.26	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	12.78	pg/g - Dry Wt	U
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	0.30	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	0.30	pg/g - Dry Wt	J
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	55	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	63	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	73	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	70	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	83	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	83	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	50	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	54	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	61	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	64	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	63	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	67	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	68	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	75	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	76	%RECOVERY	
48401-44-04	BCO	M_BLANK			8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	52	%RECOVERY	

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	16833.75	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	25.62	pg/g - Dry Wt	JT
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	26.96	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	89.61	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	84.66	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	1969.94	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	13181.52	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	73.46	pg/g - Dry Wt	ET
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	18.25	pg/g - Dry Wt	JT
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	36.47	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	96.76	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	82.59	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	2.35	pg/g - Dry Wt	JT
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	43.00	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	918.48	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	38.87	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	982.65	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	38.50	pg/g - Dry Wt	UT
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	HCB	38178-99-3	DIOXIN	MOD 1613B	161161.61	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	503.91	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	16833.75	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	1525.67	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	121.07	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	1424.54	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	705.12	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	1730.05	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	3624.37	pg/g - Dry Wt	T
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	45	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	61	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	77	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	77	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	88	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	93	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	24	%RECOVERY	&
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-8	DIOXIN	MOD 1613B	57	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	52	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	71	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	66	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	76	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	78	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	81	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	88	%RECOVERY	
AD-01-FD	48401-94-04	BCO	REPLICATE	7/19/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	60	%RECOVERY	

[illegible]

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	3578.42	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	2.40	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	1.19	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	2.22	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	2.58	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	29.29	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	115.61	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	2.57	pg/g - Dry Wt	ET
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	16.89	pg/g - Dry Wt	UT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	16.89	pg/g - Dry Wt	UT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	1.38	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	1.01	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	16.89	pg/g - Dry Wt	UT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	16.89	pg/g - Dry Wt	UT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	8.20	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	0.45	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	9.47	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	16.89	pg/g - Dry Wt	UT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	HCB	38178-99-3	DIOXIN	MOD 1613B	1381.68	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	30.00	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	3578.42	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	43.24	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	5.60	pg/g - Dry Wt	JT
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	21.30	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	17.82	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	17.66	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	53.18	pg/g - Dry Wt	T
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	60	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	65	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	73	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	70	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	79	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	81	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	53	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	58	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	62	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	64	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	64	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	69	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	72	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	70	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	79	%RECOVERY	
CMS-022-B	48401-94-03	BCO	NORMAL	7/14/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	69	%RECOVERY	

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	114758.56	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	78.08	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	5.92	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	25.92	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	23.30	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	209.08	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	1741.62	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	64.88	pg/g - Dry Wt	ET
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	6.54	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	15.94	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	38.33	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	11.97	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	16.13	pg/g - Dry Wt	UT
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	10.06	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	113.43	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55873-89-7	DIOXIN	MOD 1613B	6.81	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	158.55	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	16.13	pg/g - Dry Wt	UT
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	HxCX	38178-99-3	DIOXIN	MOD 1613B	33504.51	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	439.78	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	114758.56	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	1035.86	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	373.69	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	4041.83	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34485-46-8	DIOXIN	MOD 1613B	558.22	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	211.41	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	417.26	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	48	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	55	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	64	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	64	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	72	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	76	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	24	%RECOVERY	&
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	53	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	63	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	62	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	59	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	66	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	62	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	67	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	71	%RECOVERY	
CMS-451-F	48401-94-02	BCO	NORMAL	7/20/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	377	%RECOVERY	&E

[illegible]

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	99712.57	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	146.92	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	4.99	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	37.35	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	16.73	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	171.42	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	1553.12	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	40.97	pg/g - Dry Wt	ET
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	5.33	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	9.88	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	22.31	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	5.63	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	16.11	pg/g - Dry Wt	UT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	5.81	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	89.12	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	6.11	pg/g - Dry Wt	JT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	196.49	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	16.11	pg/g - Dry Wt	UT
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	HCH	38178-99-3	DIOXIN	MOD 1613B	75511.55	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	294.86	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	100185.00	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	1762.47	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	616.07	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	8017.94	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	856.75	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	181.72	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	345.36	pg/g - Dry Wt	T
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	78523-40-5	DIOXIN	MOD 1613B	99	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	74	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	82	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	82	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	98	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	100	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/27/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	32	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	72	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	73	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	78	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	75	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	82	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	80	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	90	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	99	%RECOVERY	
CMS-451-F	48401-94-02	BCO	DUPLICATE	7/20/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	1352	%RECOVERY	&E

SAMPLE_NO	LAB_ID	IDL	MDL	CRDL_CRQL	DIL_FACTOR	PCT_MOIST	COMMENTS	SAMPLE_SIZE	SAMPLE_SIZE_UNITS	FINAL_RESULT	FINAL_QUAL	VALID_COMMENT	FRACTION
CMS-451-F	48401-94-02		3.22		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		32.21		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		3.22		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2.33	G_DRY				T
CMS-451-F	48401-94-02		16.11		1.50		Lab Extraction ID = 49038-01-21	2					

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	0	%RECOVERY	-
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	98	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	98	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19406-74-3	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	93	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	97	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	97	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	87	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	93	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	106	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	43	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	HCB	38178-99-3	DIOXIN	MOD 1613B	120	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	61	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	63	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	69	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	75	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	90	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	88	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	51	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	59	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	63	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	69	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	67	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	68	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	71	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	80	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	92	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MS	7/14/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	69	%RECOVERY	

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	0	%RECOVERY	-
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	98	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	96	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	93	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	98	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	92	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	89	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	93	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	95	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	94	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	103	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	27	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	HCB	38178-99-3	DIOXIN	MOD 1613B	26	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	57	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	59	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	65	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	70	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	78	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	81	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	48	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	55	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	58	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	65	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	63	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HpCDF	116843-04-0	DIOXIN	MOD 1613B	65	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	67	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	71	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	82	%RECOVERY	
CMS-022-B	48401-94-03	BCO	MSD	7/14/1999	8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	64	%RECOVERY	

SAMPLE_NO	LAB_ID	IDL	MDL	CRDL_CRQL	DIL_FACTOR	PCT_MOIST	COMMENTS	SAMPLE_SIZE	SAMPLE_SIZE_UNITS	FINAL_RESULT	FINAL_QUAL	VALID_COMMENT	FRACTION
CMS-022-B	48401-94-03		3.39		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		33.86		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		3.39		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B	48401-94-03		16.93		1.50		Lab Extraction ID = 49038-01-23	2.21	G_DRY				T
CMS-022-B													

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	8.5	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	3.8	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	10.7	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDD	57653-85-7	DIOXIN	MOD 1613B	0.9	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	6.1	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	1.4	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	5.7	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	2.7	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	3.3	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	14.7	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	2.0	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	2.9	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	0.4	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	1.8	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	5.3	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	15.0	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	13.1	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	TCX		DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	HCH	38178-99-3	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	NA	%DIFFERENCE	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDD	76523-40-5	DIOXIN	MOD 1613B	65	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	67	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	75	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	75	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	86	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	92	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	60	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	61	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	64	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-98-2	DIOXIN	MOD 1613B	71	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	69	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	73	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	74	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	82	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	99	%RECOVERY	
	48514-72-03	BCO	SRM		8/30/2001	9/13/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	66	%RECOVERY	

SAMPLE_NO	LAB_ID	LABORATORY	QC_TYPE	SAMP_DATE	EXTR_DATE	ANAL_DATE	CASE	SDG	PARAMETER	CAS_NO	CLASS	METHOD	LAB_RESULT	UNITS	LAB_QUAL
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	2,3,7,8-TCDD	1746-01-6	DIOXIN	MOD 1613B	102	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,7,8-PeCDD	40321-76-4	DIOXIN	MOD 1613B	92	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,4,7,8-HxCDD	39227-28-6	DIOXIN	MOD 1613B	95	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,6,7,8-HxCDD	57853-85-7	DIOXIN	MOD 1613B	103	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,7,8,9-HxCDD	19408-74-3	DIOXIN	MOD 1613B	93	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,4,6,7,8-HpCDD	35822-46-9	DIOXIN	MOD 1613B	97	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	OCDD	3268-87-9	DIOXIN	MOD 1613B	102	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	2,3,7,8-TCDF	51207-31-9	DIOXIN	MOD 1613B	96	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,7,8-PeCDF	57117-41-6	DIOXIN	MOD 1613B	98	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	2,3,4,7,8-PeCDF	57117-31-4	DIOXIN	MOD 1613B	86	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,4,7,8-HxCDF	70648-26-9	DIOXIN	MOD 1613B	97	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,6,7,8-HxCDF	57117-44-9	DIOXIN	MOD 1613B	92	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,7,8,9-HxCDF	72918-21-9	DIOXIN	MOD 1613B	90	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	2,3,4,6,7,8-HxCDF	60851-34-5	DIOXIN	MOD 1613B	95	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,4,6,7,8-HpCDF	67562-39-4	DIOXIN	MOD 1613B	93	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	1,2,3,4,7,8,9-HpCDF	55673-89-7	DIOXIN	MOD 1613B	95	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	OCDF	39001-02-0	DIOXIN	MOD 1613B	99	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	TCX		DIOXIN	MOD 1613B	10	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	HCH	38178-99-3	DIOXIN	MOD 1613B	28	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Tetra-Furans	51207-31-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Tetra-Dioxins	41903-57-5	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Penta-Furans	30402-15-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Penta-Dioxins	36088-22-9	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Hexa-Furans	55684-94-1	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Hexa-Dioxins	34465-46-8	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Hepta-Furans	38998-75-3	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	Total Hepta-Dioxins	37871-00-4	DIOXIN	MOD 1613B	NA	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-2,3,7,8-TCDD	78523-40-5	DIOXIN	MOD 1613B	50	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,7,8-PeCDD	109719-79-1	DIOXIN	MOD 1613B	71	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,4,7,8-HxCDD	109719-80-4	DIOXIN	MOD 1613B	65	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,6,7,8-HxCDD	109719-81-5	DIOXIN	MOD 1613B	67	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDD	109719-83-7	DIOXIN	MOD 1613B	78	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-OCDD	114423-97-1	DIOXIN	MOD 1613B	94	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-2,3,7,8-TCDF	89059-46-1	DIOXIN	MOD 1613B	50	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,7,8-PeCDF	109719-77-9	DIOXIN	MOD 1613B	51	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-2,3,4,7,8-PeCDF	116843-02-8	DIOXIN	MOD 1613B	18	%RECOVERY	&
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,4,7,8-HxCDF	114423-88-2	DIOXIN	MOD 1613B	57	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,6,7,8-HxCDF	116843-03-9	DIOXIN	MOD 1613B	57	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,7,8,9-HxCDF	116843-04-0	DIOXIN	MOD 1613B	60	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-2,3,4,6,7,8-HxCDF	116843-05-1	DIOXIN	MOD 1613B	68	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,4,6,7,8-HpCDF	116843-09-5	DIOXIN	MOD 1613B	70	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	13C-1,2,3,4,7,8,9-HpCDF	109719-94-0	DIOXIN	MOD 1613B	77	%RECOVERY	
	48401-44-04	BCO	LCS		8/30/2001	9/11/2001		49038-01	37Cl-2,3,7,8-TCDD	85508-50-5	DIOXIN	MOD 1613B	47	%RECOVERY	

Section 2

Third Party Validation Report

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENVIRONMENTAL MEASUREMENT & EVALUATION
11 Technology Drive
North Chelmsford, MA 01863-2431

MEMORANDUM

DATE: November 18, 2002

SUBJ: Data Validation Report - Centredale Manor Site
Case: Sediments B1OF1, SDG: 49038-01 D/F
November 12, 2002 Revision

FROM: Steve Stodola, QA Chemist, OEME SS

TO: Cornell Rosiu, OSRR

Attached please find the revised Data Validation Report for the SDG mentioned above. The memorandum was revised as per Anna Krasko's instructions. Please replace any copies of the October 18, 2002 version with the attached November 12th version. None of the results changed. There was only a small change in the text of the memorandum. I will forward a copy to Battelle-Duxbury.

If you have any questions, please give me a call at 617-918-8634.

cc: G. Sotolongo, OEME
Anna Krasko, OSRR

Steve Stodola
US EPA Approval Signature

November 18, 2002
Date

Ms. Christine Clark
Regional Sample Control Custodian
Office of Environmental Measurement and Evaluation
U.S. EPA Region I
11 Technology Drive
North Chelmsford, MA 01863

September 19, 2002
Revised: November 12, 2002

Re: TO No. 010, Task No. 2, TDF No. 0460A
Case No. Sediments B1OF1, SDG No. 49038-01 D/F
Battelle Laboratories - Columbus, OH
Centredale Manor, N. Providence, RI

Dioxin/Furan, TCX, and HCX: 3/Sediment/AD-01-FD, CMS-022-B, CMS-451-F

1/Soil SRM/CIL EDF 2513

Dear Ms. Clark:

A Tier III data validation was performed on the Dioxin/Furan, TCX, and HCX analytical data for three sediment samples collected by IT Corporation for the U.S. EPA at the Centredale Manor Site in N. Providence, RI. The samples were analyzed according to EPA Method 1613B, September 15, 1997. The samples were validated using first the criteria in the Centredale Manor Tasks 19-22 QAPP (5/23/01) prepared by Battelle Duxbury Operations, which includes the criteria in EPA Method 1613B, September 15, 1997, defaulting next to Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996 criteria, and to EPA Region I's Environmental Services Assistance Team Dioxin Data Validation SOP ESAT-01-0007 (01/31/01). The criteria for HCX and TCX are documented in Battelle's December 7, 2001 letter to EPA. See the Supporting Documentation section. The data were evaluated based on the following parameters:

- Overall Evaluation of Data and Potential Usability Issues
- Data Completeness (CSF Audit - Tier I)
- Preservation and Technical Holding Times
- * • PE Samples/Accuracy Check
- * • Window Defining Mix
- Initial and Continuing Calibrations
- Chromatographic Resolution
- * • Instrument Sensitivity Check
- Blanks
- Matrix Spike/Matrix Spike Duplicate
- * • Laboratory Control Sample
- Laboratory and Field Duplicates
- Internal/Clean-Up Standards
- * • Sample Analysis and Identification
- Sample Quantitation

- * • Estimated Detection Limits (EDL) and Estimated Maximum Possible Concentration (EMPC)
- 2378-TCDD Toxicity Equivalents (TE) and Isomer Specificity
- * • Required Sample Reruns and Second Column Confirmation
- System Performance

* - All criteria were met for this parameter.

The following information was used to generate the Data Validation Memorandum attachments:

Table I: Recommendation Summary Table - summarizes validation recommendations

Table II: Overall Evaluation of Data - summarizes site objectives and potential usability issues

Data Summary Tables - summarize accepted, qualified, and rejected data

Overall Evaluation of Data and Potential Usability Issues

The following is a summary of the site investigation/assessment objectives for the three samples in this SDG:

- To determine by HRGC/HRMS analysis whether or not Tetrachloroxanthene (TCX) is present in the sample found to have high levels of Dioxins, Furans, and Hexachloroxanthene (HCX).

One Cambridge Isotope Laboratories (CIL) Standard Reference Material (SRM) sample was evaluated for this SDG (CIL EDF 2513 for Dioxin/Furan congeners in soil). All congeners were within the Centredale Manor Tasks 19-22 QAPP (5/23/01) specified criterion of less than 30% D from the consensus value.

The initial calibration % RSD criterion was exceeded for HCX (curve 2, high range) and TCX.

The method blanks had low level contamination. However, this contamination does not have an impact on the usability of the data due to the relative magnitude of the low blank contamination and the significantly higher positive results in the samples. Contaminants were found in both the blanks and the field samples. When the analyte concentrations in the field samples were less than the corresponding blank action level, the field sample results reported by the laboratory were qualified as non-detected (U) on the Data Summary Table. See Table I for a summary of the qualifiers applied due to blank contamination.

Data Validation indicated minor data quality problems which do not significantly impact the usability of the data. See the discussion below for details. The reported results are usable for the site objectives.

Data Completeness (CSF Audit - Tier I)

The following data or information in the data package had discrepancies and/or was missing. The laboratory was asked to submit the following information:

1. The SRM summary spreadsheets with the measured concentrations and the %Ds reported.
2. MS/MSD and duplicate precision summary spreadsheets with the measured concentrations, recoveries, and RPDs reported.
3. A corrected Method Blank Report to address the following discrepancies:
 - 3A. The analysis date is listed as 9/11/2001 but the congener results appear to be from the 9/13/2001 quantitation report (file 4888369C, #1).
 - 3B. The Total Homologue results on the Method Blank Report do not appear to match those on the 9/13/2001 quantitation report (file 4888369C, #1).
 - 3C. The Method Blank results for 1234678-HpCDF and 1234789-HpCDF were qualified as "U" and should have been qualified as "J".
 - 3D. The Method Blank 2378-TCDF result was flagged as being reported from the confirmation analysis but none of the sample results for this congener were reported from the confirmation runs.
4. The raw data and the associated quantitation report for the 9/11/2001 analysis of the Method Blank (data file: 4888368A, #2).

Items 1 and 2 were requested via the TOPO on July 15, 2002 and items 3 and 4 were requested via the TOPO on August 27, 2002. Items 1 and 2 were received via the TOPO on August 14, 2002 and items 3 and 4 were received via the TOPO on September 5, 2002. All items were adequately addressed.

Preservation and Technical Holding Times

The samples were received by the laboratory at room temperature. This exceeded the $< -10^{\circ}\text{C}$ preservation criterion in Method 1613B. The results for all samples are estimated (J, UJ) since the preservation criterion was not met.

The samples were extracted more than 25 months after the sampling date. According to the method (Section 8.4.1) there are no demonstrated maximum holding times for these samples.

Initial and Continuing Calibrations

The following table summarizes the Initial Calibration (IC) results which did not meet the criterion specified in the Centredale Manor Tasks 19-22 QAPP (5/23/01) of RSD $\leq 25\%$ and the resulting sample qualifications:

IC Date	Compound	% RSD	Action		Affected Samples
			Positive Detects	NDs	
07/19/01	TCX	30	J	UJ	All
07/19/01	HCX (Curve 2, High Range)	45	J	UJ	AD-01-FD, CMS-451-F

The data associated with the noncompliant initial calibrations are qualified due to the variability. The quantitation of the analytes in the samples could be biased.

Chromatographic Resolution

The hexachloroxanthene (HCX) peaks exhibit compromised chromatography, i.e., broad shape. The broad peak shape created irregularities in the response factors used to calculate the concentrations of HCX. Therefore, professional judgment was used to estimate (J, UJ) all HCX results due to the poor chromatography.

Blanks

All of the blanks associated with this SDG were evaluated for possible sources of contamination. The following table summarizes the highest concentration of contamination that was detected in the blanks. The table lists the action levels and the sample affected:

Congener	Type of Blank	Blank Concentration (ng/Kg)	Action Level (ng/Kg)	Sample Affected
123478-HxCDF	Method Blank (9/13/01) (2.22 g)	0.35	1.8	CMS-022-B
1234789-HpCDF	Method Blank (9/13/01) (2.22 g)	0.18	0.90	CMS-022-B

Blank actions are based on Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, December 1996 and EPA Region I's Environmental Services Assistance Team Dioxin Data Validation SOP ESAT-01-0007 (01/31/01) criteria.

Blank action levels are calculated as ten times the highest concentration of the contaminant determined in any blank for common contaminants (OCDD/OCDF and Total Homologues) and five times the highest concentration for all other analytes. The positive sample results that are less than the blank action level are reported as non-detects (U) at the reported concentration on the Data Summary Table.

Matrix Spike/Matrix Spike Duplicate

One MS/MSD pair was evaluated for this SDG: CMS-022-B MS/CMS-022-B MSD.

The following table summarizes the sediment MS/MSD results which did not meet the recovery criteria of 50-120% and/or Relative Percent Difference (RPD) $\leq 30\%$ as documented in the Centredale Manor Tasks 19-22 QAPP (5/23/01):

CMS-022-B					
Congener	MS % Rec.	MSD % Rec.	RPD	Action	
				Positive Detects	NDs
TCX	43	27	46	J	UJ

Professional judgment was used to estimate (J, UJ) values for TCX in all samples since percent recoveries and precision were outside the required criteria.

Laboratory and Field Duplicates

- Laboratory Duplicate

One laboratory duplicate pair was evaluated for this SDG (CMS-451-F/CMS-451-F DUP).

The table below summarizes the soil laboratory duplicate results which did not meet the duplicate criterion of Relative Percent Difference (RPD) $\leq 30\%$ as documented in the Centredale Manor Tasks 19-22 QAPP (5/23/01):

Congener	CMS-451-F	CMS-451-F DUP	RPD	Action	Affected Sample
	Sample Conc. (ng/Kg)	Duplicate Conc. (ng/Kg)		Positive Detects	
HCH	33504	75512	77	J	CMS-451-F

The positive results were estimated (J) for HCH in sample CMS-451-F due to laboratory duplicate precision outside criterion.

Internal/Clean-Up Standards

- Internal Standards

The following table summarizes the internal standards with recoveries which did not meet the acceptance criterion of 25-150% specified in the Centredale Manor Tasks 19-22 QAPP (5/23/01):

Internal Standard	% Recovery	Action		Affected Samples
		Positive Detects	NDs	
¹³ C ₁₂ -2378-TCDF	24	J	UJ	AD-01-FD
¹³ C ₁₂ -2378-TCDF	24	J	UJ	CMS-451-F

The corresponding non-labeled congeners were estimated as shown in the table due to internal standard recoveries outside criterion.

- Clean-Up Standards

The following table summarizes the clean-up standard with recovery which did not meet the acceptance criterion of 25-150% specified in the Centredale Manor Tasks 19-22 QAPP (5/23/01):

Clean-Up Standard	% Recovery	Action		Affected Sample
		Positive Detects	NDs	
¹⁷ Cl ₄ -2378-TCDD	377	J	UJ	CMS-451-F

Since high recoveries may indicate interference in the clean-up process, the sample was qualified as noted above for all congeners. The high concentration of native 2378-TCDD may have contributed to the high recovery of the clean-up standard.

Sample Quantitation

Concentrations quantitated and reported by the laboratory below the lowest calibration standard are flagged (J) on the Data Summary Table. Quantitation is not accurate when the reported results are below the lowest calibration standard.

The concentrations of 2378-TCDD were above the highest calibration standard for all of the samples and are flagged (J) on the Data Summary Table. Quantitation is not accurate when the reported results are above the highest calibration standard.

The laboratory reported the 2378-TCDF values for all samples as "Estimated" due to co-elution with matrix interferences. These values are flagged (J) on the Data Summary Table.

2378-TCDD Toxicity Equivalents (TE) and Isomer Specificity

All TE values were calculated by the ESAT data validator using the validated data discussed above in this report. As a result, the TE values in the Data Summary Table may differ from the values reported by the laboratory. The validated data accounts for blank contamination and any necessary dilutions. The TE calculations include the reported EMPC values. The TEF values used are published in EPA/625/3-89/016, "Interim Procedures for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans (CDDs and CDFs)" 1989 Update, Part II, page 13.

System Performance

No trends were noted with the dioxin/furan analysis. The results for HCX and TCX indicated analytical problems. The problems included: noncompliant initial calibrations for TCX and HCX (curve 2, high range); poor HCX chromatography; poor MS/MSD precision and low MS/MSD recoveries for TCX; and poor duplicate precision for HCX.

Very truly yours,

LOCKHEED ENVIRONMENTAL

Marie Bane for

Robert Peary
Scientist

Louis Macri

Louis Macri
ESAT Program Manager

cc: Cornell Rosiu, EPA RPM (DV Memorandum, Data Summary Table)

Attachments: Table I: Recommendation Summary Table
Table II: Overall Evaluation of Data
Data Summary Tables
Data Validation Worksheets
Analytical Method
PE Score Results
Communications
Field Sampling Notes

Table I
 Recommendation Summary Table for Dioxins/Furans
 Centredale Manor Site
 Case No.: Sediment B1OF1 / SDG No.: 49038-01 D/F

Sample Nos.	AD-01-FD	CMS-022-B	CMS-451-F
Compound			
2378-TCDD	J ^{1, 10}	J ^{1, 10}	J ^{1, 9, 10}
12378-PeCDD	J ¹	J ¹	J ^{1, 9}
123478-HxCDD	J ¹	J ¹	J ^{1, 9}
123678-HxCDD	J ¹	J ¹	J ^{1, 9}
123789-HxCDD	J ¹	J ¹	J ^{1, 9}
1234678-HpCDD	J ¹	J ¹	J ^{1, 9}
OCDD	J ¹	J ¹	J ^{1, 9}
2378-TCDF	J ^{1, 2, 8}	J ^{1, 2}	J ^{1, 2, 8, 9}
12378-PeCDF	J ¹	J ¹	J ^{1, 9}
23478-PeCDF	J ¹	J ¹	J ^{1, 9}
123478-HxCDF	J ¹	J ^{1, 5}	J ^{1, 9}
123678-HxCDF	J ¹	J ¹	J ^{1, 9}
123789-HxCDF	J ¹	J ¹	J ^{1, 9}
234678-HxCDF	J ¹	J ¹	J ^{1, 9}
1234678-HpCDF	J ¹	J ¹	J ^{1, 9}
1234789-HpCDF	J ¹	J ^{1, 5}	J ^{1, 9}
OCDF	J ¹	J ¹	J ^{1, 9}
HCX	J ^{1, 3, 4}	J ^{1, 4}	J ^{1, 3, 4, 7, 9}
TCX	J ^{1, 3, 6}	J ^{1, 3, 6}	J ^{1, 3, 6, 9}

Table I
Recommendation Summary Table for Dioxins/Furans

A	-	Accept results.
J¹	-	Preservation not maintained; J detects, UJ non-detects.
J²	-	Co-elution of matrix interferences; J detects.
J³	-	Initial calibration outside criterion; J detects, UJ non-detects.
J⁴	-	Poor chromatography; J detects, UJ non-detects.
J⁵	-	Method blank contamination; positive sample results less than the blank action level are reported as non-detects (U) at the concentration reported.
J⁶	-	MS/MSD recovery and/or RPD outside criteria; J detects, UJ non-detects.
J⁷	-	Laboratory duplicate precision (%D) outside criterion; J detects.
J⁸	-	Internal standard recovery outside criterion; J detects, UJ non-detects.
J⁹	-	Clean-up standard recovery outside criterion; J detects, UJ non-detects.
J¹⁰	-	Concentration above the upper calibration range; J detects.

EPA-NE - Data Validation Worksheet

Overall Evaluation of Data - Data Validation Memorandum - Table II

DIOXIN/FURAN ANALYSIS					
DQO (list all DQOs)	Sampling* and/or Analytical Method Appropriate Yes or No	Measurement Error		Sampling Variability	Potential Usability Issues
		Analytical Error	Sampling Error		
To determine by HRGC/HRMS analysis whether or not Tetrachloroxanthene (TCX) is present in the samples found to have high levels of Dioxins, Furans, and Hexachloroxanthene (HCX)..	Yes, Sampling Method appropriate for all samples. Yes, Analytical Method appropriate for all samples.	Refer to qualification in R/S Key on Table I: J ^{2,3,4,5,6,7,8,9,10}	Refer to qualification in R/S Key on Table I: J ¹	**	One Cambridge Isotope Laboratories (CIL) Standard Reference Material (SRM) sample was evaluated for this SDG (CIL EDF 2513 for Dioxin/Furan congeners in soil). All congeners were within the Centredale Manor Tasks 19-22 QAPP (5/23/01) specified criterion of less than 30% D from the consensus value. The initial calibration % RSD criterion was exceeded for HCX (curve 2, high range) and TCX. The method blanks had low level contamination. However, this contamination does not have an impact on the usability of the data due to the relative magnitude of the low blank contamination and the significantly higher positive results in the samples. Contaminants were found in both the blanks and the field samples. When the analyte concentrations in the field samples were less than the corresponding blank action level, the field sample results reported by the laboratory were qualified as non-detected (U) on the Data Summary Table. See Table I for a summary of the qualifiers applied due to blank contamination. Data Validation indicated minor data quality problems which do not significantly impact the usability of the data. See the discussion in the Data Validation Memorandum for details. The reported results are usable for the site objectives.

* The evaluation of "sampling error" cannot be completely assessed in the data validation.

** Sampling variability is not assessed in data validation.

Validator: H. B. Cline for Robert PearyDate: 11/12/02

Data Summary Table
Dioxin/Furan Analysis - Sediment Samples

SITE: Centredale Manor - N. Providence, RI
CASE NO. Sediments 810F1 SDG No. 49038-01 D/F
LABORATORY: BATTELLE

SAMPLE NUMBER: STATION LOCATION: MATRIX:	Toxicity Equivalency Factors (1)	AD-01-FD# ALLENDALE DAM SEDIMENT		CMS-022-B# CENTREDALE MANOR SITE SEDIMENT		CMS-451-F# CENTREDALE MANOR SITE SEDIMENT	
TCDD/TCDF CONC.:		ng/Kg	DL/EMPC	ng/Kg	DL/EMPC	ng/Kg	DL/EMPC
2,3,7,8-TCDD	1.0	16833.75 J		3578.42 J		114758.56 J	
1,2,3,7,8-PeCDD	0.5	25.62 J		2.40 J		78.08 J	
1,2,3,4,7,8-HxCDD	0.1	26.98 J		1.19 J		5.92 J	
1,2,3,6,7,8-HxCDD	0.1	89.61 J		2.22 J		25.92 J	
1,2,3,7,8,9-HxCDD	0.1	84.68 J		2.58 J		23.30 J	
1,2,3,4,6,7,8-HpCDD	0.01	1969.94 J		29.29 J		209.08 J	
OCDD	0.001	13181.52 J		115.61 J		1741.62 J	
2,3,7,8-TCDF	0.1	73.46 J		2.57 J		64.88 J	
1,2,3,7,8-PeCDF	0.05	18.25 J		UJ	16.89	8.54 J	
2,3,4,7,8-PeCDF	0.5	36.47 J		UJ	16.89	15.94 J	
1,2,3,4,7,8-HxCDF	0.1	96.76 J		UJ	1.38	38.33 J	
1,2,3,6,7,8-HxCDF	0.1	82.59 J		1.01 J		11.97 J	
1,2,3,7,8,9-HxCDF	0.1	2.35 J		UJ	16.89	UJ	16.13
2,3,4,6,7,8-HxCDF	0.1	43.00 J		UJ	16.89	10.06 J	
1,2,3,4,6,7,8-HpCDF	0.01	918.48 J		8.20 J		113.43 J	
1,2,3,4,7,8,9-HpCDF	0.01	38.87 J		UJ	0.45	8.81 J	
OCDF	0.001	982.65 J		9.47 J		158.55 J	
TOTAL TCDD		16833.75 J		3578.42 J		114758.56 J	
TOTAL PeCDD		121.07 J		5.60 J		373.69 J	
TOTAL HxCDD		705.12 J		17.82 J		558.22 J	
TOTAL HpCDD		3624.37 J		53.18 J		417.26 J	
TOTAL TCDF		503.91 J		30.00 J		439.76 J	
TOTAL PeCDF		1525.67 J		43.24 J		1035.86 J	
TOTAL HxCDF		1424.54 J		21.30 J		4041.83 J	
TOTAL HpCDF		1730.05 J		17.66 J		211.41 J	
HCH		161151.61 J		1381.88 J		33504.51 J	
TCX		UJ	38.50	UJ	16.89	UJ	16.13
TOXIC EQUIVALENT(1):		17000 J		3600 J		110000 J	
PERCENT SOLIDS:		39.0		88.7		93.0	
DILUTION FACTOR:		1.5		1.5		1.5	
DATE SAMPLED:		07/19/99		07/14/99		07/20/99	
DATE OF RECEIPT:		08/16/01		08/16/01		08/16/01	
SAMPLE EXTRACTION DATE:		08/30/01		08/30/01		08/30/01	
ANALYSIS DATE:		09/13/01		09/13/01		09/13/01	
LAB SAMPLE ID:		49038-01-20		49038-01-19		49038-01-18	

* = The values in this column are either the Detection Limits (DL) or the Estimated Maximum Possible Concentration (EMPC). The EMPC results are marked with a "**". The DL values are unmarked. The EMPC values are not qualified with a "J", since they are already estimated.

= Results reported on a dry weight basis.

(1) = The Toxic Equivalent concentrations are calculated with the Toxicity Equivalency Factors (TEFs) found in "Interim Procedures for Estimating Risks Associated with Exposure to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans (CDDs and CDFs)" 1989 Update, Part II, page 13.

Concentrations reported by the laboratory below the lowest standard are flagged (J) on the Data Summary Table as estimated values. All other necessary qualifications are defined in Table I.