EPA-454/R-00-038c

SOURCE CHARACTERIZATION FOR SEWAGE SLUDGE INCINERATORS

FINAL EMISSIONS REPORT, VOLUME II OF III, APPENDIX A - APPENDIX J

METROPOLITAN SEWER DISTRICT (MSD)
MILL CREEK WASTERWATER TREATMENT PLANT
CINCINNATI, OHIO

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TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS iii

1.0 INTRODUCTION 1-1
1.1 Summary of Test Program 1-1
1.2 Test Program Organization 1-3
1.3 Quality Assurance/Quality Control (QA/QC) Procedures 1-6
1.4 Description of Report Sections 1-6

2.0 SUMMARY AND DISCUSSION OF TEST RESULTS 2-1
2.1 Objectives and Test Matrix 2-1
2.2 Site-Specific Test Plan Changes and Sample Collection Problems 2-1
2.2.1 Air Emissions 2-2
2.2.2 Scrubber Water 2-4
2.2.3 Sewage Sludge 2-4
2.3 Air Organic Emissions Summary and Discussion 2-4
2.3.1 Toxic PCB Results 2-7
2.3.2 Dioxins, Furans (D/F) Results 2-12
2.3.3 PAH Results 2-16
2.4 Continuous Emissions Monitoring Summary and Discussion 2-19
2.5 Process Sample Measurements Summary and Discussion 2-21
2.5.1 Scrubber Water Organic Results 2-21
2.5.1.1 Toxic PCB Comparison of Scrubber Water In Versus Scrubber Water Out 2-21
2.5.1.2 Toxic PCB Results for Scrubber Water In 2-21
2.5.1.3 Toxic PCB Results for Scrubber Water Out 2-24
2.5.1.4 Dioxin/Furan Results for Scrubber Water 2-24
2.5.2 Sewage Sludge Organic Results 2-24
2.5.3 Scrubber Water and Sewage Sludge Inorganic Results 2-31

3.0 SAMPLING LOCATION DESCRIPTIONS 3-1
3.1 Flue Gas Sampling Location 3-1
3.1.1 Sampling Point Determination - EPA Method 1 3-1
3.1.2 Volumetric Measurements - EPA Method 2 3-5
3.1.3 Molecular Weight Determination - EPA Method 3A 3-5
3.1.4 Flue Gas Moisture Content - EPA Method 4 3-5
3.2 Process Sampling Locations 3-6
3.2.1 Scrubber Water 3-6
3.2.1.1 Inlet Sampling Location 3-6
3.2.1.2 Outlet Sampling Location 3-6
3.2.2 Sludge Feed 3-7

TABLE OF CONTENTS
(Continued)

Page

4.0 PROCESS DESCRIPTION AND OPERATION 4-1
4.1 Process Description 4-1
4.1.1 General 4-1
4.1.2 PreliminaryTreatment 4-1
4.1.3 Primary Treatment 4-1
4.1.4 Secondary Treatment 4-3
4.1.5 Tertiary Treatment 4-3
4.1.6 Sewage Sludge Thickening System 4-3
4.1.7 Sewage Sludge Digestion 4-4
4.1.8 Dewatering System 4-4
4.1.9 Incinerator Ash 4-5
4.2 Description of Incinerators 4-5
4.3 Description of Emissions Monitoring, Control and Emergency Equipment . . . 4-6
4.3.1 Emissions Control Equipment 4-6
4.3.2 Emissions Monitoring Equipment 4-6
4.3.3 Emergency Equipment 4-6
4.4 Process Operation Summary 4-7

5.0 SAMPLING AND ANALYTICAL PROCEDURES 5-1
5.1 Air Emissions 5-1
5.1.1 Air Emission Sampling 5-1
5.1.1.1 Modified Method 5 Sampling 5-1
5.1.1.2 Continuous Emission Monitoring for CO, O_2, and CO_2 5-9
5.1.1.3 Total Hydrocarbon Monitoring 5-13
5.1.2 Air Emission Sample Analysis 5-13
5.1.2.1 MM5 Sample Extraction 5-13
5.1.2.2 PCB Extract Cleanup and Analysis 5-16
5.1.2.3 D/F Extract Cleanup and Analysis 5-16
5.1.2.4 PAH Extract Cleanup and Analysis 5-20
5.2 Process Scrubber Water 5-20
5.2.1 Scrubber Water Sampling 5-20
5.2.2 Scrubber Water Analysis 5-23
5.2.2.1 PCB Analysis 5-23
5.2.2.2 D/F Analysis 5-24
5.2.2.3 Chlorine Analysis 5-25
5.2.2.4 pH/Temperature Determination 5-25
5.3 Process Sludge Feed 5-25
5.3.1 Sludge Feed Sampling 5-25
5.3.2 Sludge Feed Analysis 5-30
5.3.2.1 PCB Analysis 5-30

TABLE OF CONTENTS
(Continued)

Page

5.3.2.2 D/F Analysis 5-30
5.3.2.3 Chlorine Analysis 5-33
5.3.2.4 Percent Solids Analysis 5-34
5.3.2.5 Ultimate/Proximate Analysis 5-34

6.0 INTERNAL QA/QC ACTIVITIES 6-1
6.1 QA/QC Checks and Issues 6-1
6.1.1 Field Sampling 6-1
6.1.1.1 MM5 Emission Sampling 6-1
6.1.1.2 Continuous Emission Monitoring 6-3
6.1.2 Sample Handling 6-7
6.1.3 Laboratory Analysis 6-7
6.1.3.1 Emission Samples 6-8
6.1.3.2 Sewage Scrubber Water Samples 6-48
6.1.3.3 Sewage Sludge Feed Samples 6-66
6.2 QA Performance Audits 6-75
6.2.1 Field Sampling Audits 6-75
6.2.1.1 Dry Gas Meter 6-75
6.2.1.2 Pitot Tube 6-75
6.2.1.3 Thermocouples 6-76
6.2.1.4 Analytical Balance 6-76
6.2.1.5 Total Hydrocarbon Analyzer 6-77
6.2.1.6 CEM Systems Audit 6-78
6.2.2 Laboratory Analysis Audit 6-78
6.3 QA/QC Performance Review 6-80
6.3.1 Program Performance Targets and Results 6-80
6.3.2 Method Specific Performance Targets and Results 6-81
6.3.2.1 Air Emissions 6-81
6.3.2.2 Scrubber Water Samples 6-85
6.3.2.3 Sludge Feed Samples 6-86

LIST OF APPENDICES

Appendix A - Field Test Results

Appendix B - Raw Field Data
- B-1 Stack Sampling Data
  - B-1-1 Methods 1 & 2 Preliminary Stack Traverse Data
  - B-1-2 MM-5 Sampling Raw Field Data
- B-2 MM-5 Sample Recovery Field Data
- B-3 Percent Isokinetic Field Calculation Form
- B-4 Process Samples Field Data

Appendix C - Calibration Data for Field Equipment
- C-1 Summary of Field Equipment Used During Field Program
- C-2 Equipment Calibration Forms
  - C-2-1 Dry Gas Meter, Pitot Tube Calibrations
  - C-2-2 Post Test Meter Box Field Audit
  - C-2-3 Cylinder Gas Audits Summary Sheets
  - C-2-4 Cylinder Gas Audits

Appendix D - Sampling Logs and Chain-of-Custody Records
- D-1 Daily Sampling Logs
  - D-1-1 ETS Field Sampling Log
- D-2 Chain-of-Custody Records
- D-3 Process Sampling Logs
- D-4 Laboratory Record Book Sample Log In
- D-5 Field Test Log

Appendix E - PCB Analytical Lab Raw Data Results
- E-1 PCB Analytical Summaries
  - E-1-1 Air Samples
- E-2 PCB Lab Raw Data Sheets
  - E-2-1 Air Samples
  - E-2-2 Sewage Sludge Fractions
  - E-2-3 Scrubber Water Inlet Fractions
  - E-2-4 Scrubber Water Outlet Fractions
- E-3 PCB Blanks Lab Raw Data
  - E-3-1 Air Sampling Train
  - E-3-2 Sewage Sludge Blank Fractions
  - E-3-3 Scrubber Water Fractions

Appendix F - Dioxin/Furan Analytical Lab Raw Data Results
- F-1 D/F Results Summary
  - F-1-1 Air Sample Fractions
  - F-1-2 D/F EPA Audit Sample

TABLE OF CONTENTS
(Continued)

F-2 D/F Lab Raw Data Sheets
- F-2-1 Air Emission Runs
- F-2-2 EPA Audit Sample
- F-2-3 Sewage Sludge
- F-2-4 Scrubber Water Inlet
- F-2-5 Scrubber Water Outlet

F-3 D/F Blank Lab Raw Data Sheets
- F-3-1 Air Sampling Train & Proof Blanks, Lab Spikes, and Spike Dups
- F-3-2 Sewage Sludge Blank Fractions
- F-3-3 Scrubber Water Fractions

Appendix G - PAH Analytical Lab Raw Data Results
- G-1 PAH Results Summary
- G-2 PAH Blank Lab Summaries
- G-3 PAH Lab Raw Data Sheets
- G-4 PAH Blank Lab Raw Data Sheets

Appendix H - Chlorine Analytical Lab Raw Data Results
- H-1 Chlorine Sewage Sludge Results
- H-2 Chlorine Scrubber Water Inlet Results
- H-3 Chlorine Scrubber Water Outlet Results
- H-4 Chlorine Lab Sludge Blank Results
- H-5 Chlorine Lab Water Blank Results
- H-6 Chlorine Field Water Blank Results
- H-7 Chlorine Lab Raw Data Sheets

Appendix I - Percent Solids Analytical Lab Raw Data Results
- I-1 Total Percent Solids Results Summary
- I-2 Lab Raw Data Sheets

Appendix J - Ultimate/Proximate Analytical Results
- J-1 Analytical Summary
- J-2 Lab Raw Data Sheets

Appendix K - Equations and Guidelines Used for Calculating Results
- K-1 Stack Sampling Reference Methods 2-5 Example Calculations
- K-2 Example Calculations for PCB Analysis
- K-3 Relative Standard Deviation Calculation Worksheet
- K-4 Gas Concentration Correction to 7% O_2 Worksheet

Appendix L - Continuous Emissions Monitoring (CEM) Data
- L-1 CEM Test Data Summary
- L-2 1-Min Data Printouts

TABLE OF CONTENTS
(Continued)

L-3 CEM Response Time Determinations
L-4 C-4 CEM Calibration Records
L-5 CEM Calibration Gas Certifications

Appendix M - Process Field Data Sheets
M-1 Daily Process Data Summary Tables
M-2 Daily Process Data Sheets from MSD

Appendix N - Sampling and Analytical Protocols
N-1 PCB Protocols (Battelle)
N-1-1 Draft Air Emissions Method
N-1-2 Draft Sewage Sludge Method
N-1-3 Draft Scrubber Water Method
N-2 Battelle SOPs for D/F Analysis
N-3 PAH Protocols (Modified CARB Method 429)
N-4 Chlorine Protocol (Wastewater Method 4500 G, Modified ASTM D5233)
N-5 Percent Solids (Wastewater Method 2540 B)
N-6 Proximate/Ultimate Protocols (ASTM D3172, D4239, and others)
N-7 pH and Temperature (Wastewater Method 4500 H)
N-8 CO Protocol (40 CFR 60, Appendix A, Method 10A)
N-9 CO_2 and O_2 Protocols (40 CFR 60, Appendix A, Method 3A)
N-10 Composite Sampling

Appendix O - List of Project Participants with Titles
O-1 MSD
O-2 USEPA
O-3 Battelle
O-4 ETS
O-5 Pacific Environmental
O-6 T&E Lab
O-7 Quanterra Lab

Appendix P - Post Test Summary
P-1 Post Test Summary Report
P-2 QAPP Amendment Records
P-3 SSTP Amendment Records
P-4 Corrective Action Reports
P-5 QA Officer Site Visit Checklist

LIST OF TABLES

		Page
Table 1-1.	Test Matrix	1-2
Table 2-1.	Toxic PCB Results - Stack Gas Concentrations (ng/dscm, as measured)	2-8
Table 2-2.	Toxic Results - Stack Gas Concentrations (ng/dscm, adjusted To 7% O_2)	2-9
Table 2-3.	Toxic PCB Results - WHO Toxic Equivalent Stack Gas Concentrations (ng/dscm, adjusted to 7% O_2)	2-10
Table 2-4.	World Health Organization Toxic Equivalent Factors (TEFs) for Determining Coplanar PCB TEQs	2-11
Table 2-5.	D/F Results - Stack Gas Concentrations (ng/dscm, as measured)	2-13
Table 2-6.	D/F Results - Stack Gas Concentrations (ng/dscm, adjusted to 7% O_2)	2-14
Table 2-7.	D/F Results - TEQ Stack Gas Concentrations (ng/dscm, adjusted to 7% O_2)	2-15
Table 2-8.	PAH Results - Stack Gas Concentrations (ng/dscm, as measured)	2-17
Table 2-9.	PAH Results - Stack Gas Concentrations (ng/dscm, adjusted to 7% O_2	2-18
Table 2-10.	CEM Daily Results	2-19
Table 2-11.	Run 2, Run 3, and Run 4 Toxic PCB Results - Comparison of Inlet Versus Outlet Scrubber Water	2-22
Table 2-12.	Toxic PCB Results - Inlet Scrubber Water	2-23
Table 2-13.	Toxic PCB Results - Outlet Scrubber Water	2-25
Table 2-14.	D/F Results - Comparison of Inlet Versus Outlet Scrubber Water	2-26
Table 2-15.	D/F Results for Inlet Scrubber Water	2-27
Table 2-16.	D/F Results for Outlet Scrubber Water	2-28
Table 2-17.	Toxic PCB Results for Sewage Sludge	2-29
Table 2-18.	D/F Results for Sewage Sludge	2-30
Table 2-19.	Chlorine, Percent Solids, Temperature, and pH Results - Comparison of Inlet Versus Outlet Scrubber Water	2-31
Table 2-20.	Chlorine and Percent Solids Results for Sewage Sludge	2-32
Table 2-21.	Ultimate Analysis Results for Sewage Sludge	2-32
Table 2-22.	Proximate Analysis Results for Sewage Sludge	2-32
Table 4-1.	Summary of Data from Mill Creek WWTP Control Room Process Monitors	4-8
Table 5-1.	Pre-Field Surrogate Standards	5-5
Table 5-2.	Laboratory Internal Standards	5-17
Table 5-3.	Standards for Laboratory Control Spike Samples	5-18
Table 5-4.	Gas Chromatographic Operating Conditions for PAH Analysis	5-21
Table 6-1.	Gas Stratification Check Results	6-2
Table 6-2.	CEM Calibration and Linearity Check Data	6-4
Table 6-3.	Bias and Instrument Drift Check Data	6-5
Table 6-4.	Response Time Check	6-4
Table 6-5.	Sample Transfer Schedule	6-7

LIST OF TABLES
(Continued)

		Page
Table 6-6.	Summary of PCB Results and Standard Recoveries for Front Half Air Samples	6-9
Table 6-7a.	Summary of PCB Results and Standard Recoveries for Back Half Air Samples	6-10
Table 6-7b.	Back Half Air Data Corrected for Pre-sampling Surrogate Recovery	6-12
Table 6-8a.	Summary of PCB Results and Standard Recoveries for Front Half Lab Control Spike and Spike Duplicate Samples	6-14
Table 6-8b.	Summary of PCB Results and Standard Recoveries for Back Half Lab Control Spike and Spike Duplicate Samples	6-15
Table 6-9.	Summary of PCB Results and Standard Recoveries for Background and Method Blank Samples	6-16
Table 6-10.	Summary of PCB Results and Standard Recoveries for Field Blank and Proof Blank Front Half Air Samples	6-17
Table 6-11.	Summary of PCB Standard Recoveries for Field and Proof Blank Back Half Air Samples	6-18
Table 6-12.	Summary of Dioxin/Furan Results and Standard Recoveries for Front Half Air Samples	6-20
Table 6-13.	Summary of Dioxin/Furan Results and Standard Recoveries for Back Half Air Samples	6-22
Table 6-14a.	Summary of Dioxin/Furan Results and Standard Recoveries for Front Half Lab Control Spike and Spike Duplicate Samples	6-25
Table 6-14b.	Summary of Dioxin/Furan Results and Standard Recoveries for Back Half Lab Control Spike and Spike Duplicate Samples	6-27
Table 6-15.	Summary of Dioxin/Furan Results and Standard Recoveries for Lab and Method Blank Samples	6-30
Table 6-16.	Summary of Dioxin/Furan Results and Standard Recoveries for Field Blank and Proof Blank Front Half Air Samples	6-32
Table 6-17.	Summary of Dioxin/Furan Results and Standard Recoveries for Field Blank and Proof Blank Back Half Air Samples	6-34
Table 6-18.	Summary of PAH Results and Standard Recoveries for Front Half Air Samples	6-37
Table 6-19.	Summary of PAH Results and Standard Recoveries for Back Half Air Samples	6-39
Table 6-20a.	Summary of PAH Results and Standard Recoveries for Front Half Lab Control Spike and Spike Duplicate Samples	6-42
Table 6-20b.	Summary of PAH Results and Standard Recoveries for Back Half Lab Control Spike and Spike Duplicate Samples	6-44
Table 6-21.	Summary of PAH Results and Standard Recoveries for Lab and Method Blank Samples	6-46
Table 6-22.	Summary of PAH Results and Standard Recoveries for Field and Proof Blank Front Half Air Samples	6-49

LIST OF TABLES
(Continued)

		Page
Table 6-23.	Summary of PAH Standard Recoveries for Field and Proof Blank Back Half Air Samples	6-51
Table 6-24.	Summary of PCB Results and Standard Recoveries for Scrubber Water Inlet Samples	6-53
Table 6-25.	Summary of PCB Results and Standard Recoveries for Scrubber Water Outlet Samples	6-54
Table 6-26.	Summary of PCB Results and Standard Recoveries for Lab Control Spike and Spike Duplicate Scrubber Water Samples	6-56
Table 6-27.	Summary of PCB Results and Standard Recoveries for Lab Blank Scrubber Water Samples	6-58
Table 6-28.	Summary of Dioxin/Furan Results and Standard Recoveries for Scrubber Water Inlet Samples	6-59
Table 6-29.	Summary of Dioxin/Furan Results and Standard Recoveries for Scrubber Water Outlet Samples	6-61
Table 6-30.	Summary of Dioxin/Furan Results and Standard Recoveries for Lab Control Spike, Spike Duplicate, and Lab Blank Scrubber Water Samples	6-64
Table 6-31.	Intercomparison of Total Chlorine Analyses	6-66
Table 6-32.	Summary of PCB Results and Standard Recoveries for Sewage Sludge Samples	6-67
Table 6-33.	Summary of PCB Standard Recoveries for Matrix Spike, Spike Duplicate, and Lab Blank Sewage Sludge Samples	6-69
Table 6-34.	Summary of Dioxin/Furan Results and Standard Recoveries for Sewage Sludge Samples	6-71
Table 6-35.	Summary of Dioxin/Furan Results and Standard Recoveries for Matrix Spike, Spike Duplicate, and Background Sewage Sludge Samples	6-73
Table 6-36.	QA Results for Dry Gas Meter	6-76
Table 6-37.	Total Hydrocarbon Analyzer Audit Results	6-77
Table 6-38.	Results of the CEM Audit	6-78
Table 6-39.	Results of the Lab Dioxin/Furan Audit	6-79
Table 6-40.	Overall Program QA/QC Results	6-80
Table 6-41.	Data Quality Objectives for Precision, Accuracy, and Completeness for Field Measurements	6-81
Table 6-42.	Draft PCB Emission Method Performance Target Criteria and Results	6-82
Table 6-43.	D/F Emission Analysis Performance Target Criteria and Results	6-83
Table 6-44.	PAH Emission Performance Target Criteria and Results	6-84
Table 6-45.	Draft PCB Scrubber Water Method Performance Criteria	6-85
Table 6-46.	D/F Scrubber Water Analysis Performance Target Criteria and Results	6-86
Table 6-47.	Draft PCB Sewage Sludge Method Performance Criteria	6-87
Table 6-48.	D/F Sewage Sludge Feed Analysis Performance Target Criteria and Results	6-87

LIST OF FIGURES

Figure 1-1. Program Organization 1-4
Figure 2-1. CO and THC Daily Test Results - Run 2 2-20
Figure 2-2. CO and THC Daily Test Results - Run 3 2-20
Figure 2-3. CO and THC Daily Test Results - Run 4 2-20
Figure 3-1. Plant Process Sampling Locations 3-2
Figure 3-2. Schematic of Sampling Location Exhaust Stack for Incinerator No. 6 . . . 3-3
Figure 3-3. Sampling and Traverse Points for Incinerator Stack 3-4
Figure 4-1. Schematic Diagram of Mill Creek Wastewater Treatment Plant Process 4-2
Figure 5-1. Sampling Train for EPA Modified Method 5 5-2
Figure 5-2. Flow Chart for Emission Sample Recovery 5-8
Figure 5-3. Continuous Sampling System for Instrumental Methods (EPA Methods 3A and 10) 5-11
Figure 5-4. Flow Chart for Extraction of MM5 Sampling Train Front Half 5-14
Figure 5-5. Flow Chart for Extraction of MM5 Sampling Train Back Half 5-15
Figure 5-6. Flow Chart for Scrubber Water Sampling 5-22
Figure 5-7. Flow Diagram for Preparation and Extraction of Scrubber Water Samples for PCB Analysis 5-26
Figure 5-8. Flow Diagram for Preparation and Extraction of Scrubber Water Samples for D/F Analysis 5-27
Figure 5-9. Flow Chart for Sludge Feed Sampling 5-29
Figure 5-10. Flow Diagram for Sample Preparation and Extraction of Sludge Feed Samples for PCB Analysis 5-31
Figure 5-11. Flow Diagram for Preparation and Extraction of Sludge Feed Samples for D/F Analysis 5-32

APPENDIX A

Field Test Results

Table A-1
Field Results Summary

Table A-1
Field Test Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Clock Time Started	15:00	10:15	08:15	
Clock Time Ended	21:30	16:35	14:35	
Total Sampling Minutes	360	360	360	360
Average Stack Conditions				
Volumetric Flow				
acfm	17980	18130	19450	18520
dscfm	15520	15780	16790	16030
dscmm	439	447	475	454
Percent Moisture (%)	4.65	4.26	4.76	4.56
Avg Stack Temperature (°F)	116	115	117	116
Stack Gas Concentration				
CO (ppmdv)	1380	1170	1130	1230
THC (ppmdv)	70.6	54.2	37.5	54.1
CO_2 Conc. (%dV)	5.16	5.50	5.07	5.24
O_2 Conc. (%dV)	13.7	13.0	13.4	13.4
MM-5 Field Sampling Results				
Sampled Volume				
(dscf)	207	220	237	221
(dscm)	5.85	6.22	6.70	6.26
Percent Isokinetic	91.7	95.9	97.1	94.9
Process Sample Field Results				
Scrubber Water In				
pH	7.37	7.48	7.43	7.43
Temperature (°F)	87	87	87	87
Scrubber Water Out				
pH	6.49	6.57	6.51	6.52
Temperature (°F)	116	120	123	120

Footnotes

1. Process data logged by Pacific Environmental. (THC analyzer data provided by MSD)
2. CO, CO_2, and O_2 analyzer data is the arithmetic mean of corrected 1-minute averages collected during period sampled. THC analyzer data is arithmetic mean of corrected hourly reported values collected during the sampling period (8 data points per run).
3. Process scrubber water data is the arithmetic mean of the 6 grab samples collected during each sampling run.

Table A-2
Modified Method 5 Field Test Results Summary

Table A-2
MM-5 Field Test Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Time Started	15:00	10:15	08:15	
Time Ended	21:30	16:35	14:35	
Sampling Parameters MM-5				
Total Sampling Time (min.)	360	360	360	360
Number Traverse Points	72	72	72	72
Corrected Barometric Press (In. Hg)	29.55	29.64	29.63	29.61
Sampled Volume (dcf)	221.71	237.29	256.12	238.37
Avg. Meter Press (in. H_2O)	1.18	1.36	1.57	1.37
Avg. Meter Temp (°F)	99	105	106	103.3
Total Moisture Collected (g)	213.7	207.5	251.0	224.1
Dry Gas Meter Calibration Factor	0.9968	0.9968	0.9968	0.9968
Nozzle Inside Dia. (in.)	0.254	0.254	0.254	0.254
Pitot Tube Constant	0.836	0.836	0.836	0.836
Outlet Stack Parameters				
Stack Static Press. (in. H_2O)	-0.16	-0.16	-0.19	-0.17
Absolute Stack Press. (in. Hg)	29.54	29.63	29.62	29.60
Stack Area (sq. in)	1256.6	1256.6	1256.6	1256.6
Avg Stack Temperature (°F)	116	115	117	116
Avg. ΔP ($\sqrt{}$)	0.35	0.35	0.40	0.37
CO_2 Conc. (%dV)	5.16	5.50	5.07	5.24
O_2 Conc. (%dV)	13.7	13.0	13.4	13.4
MM-5 Sample Results				
Sampled Volume				
(dscf)	207	220	237	221
(dscm)	5.85	6.22	6.70	6.26
Stack Moisture				
Volume Collected (scf)	10.1	9.77	11.8	10.5
Percent Moisture (%)	4.65	4.26	4.76	4.56
Mole Fraction	0.0465	0.0426	0.0476	0.0456
Stack Gas Molecular Wt.				
Wet Basis	28.86	28.91	28.81	28.86
Dry Basis	29.38	29.40	29.35	29.38
Stack Gas Velocity				
ft/min	2061	2078	2228	2122
m/sec	10.47	10.56	11.32	10.78
Stack Gas Volumetric Flow				
acfm	17980	18130	19450	18520
dscfm	15520	15780	16790	16030
dscmm	439	447	475	454
Percent Isokinetic	91.7	95.9	97.1	94.9
Percent Excess Air	182	153	165	167

Table A-3
CEM CO Daily Test Run Averages

Table A-3
Field Test CO Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Clock Time Started	15:00	10:15	08:15	
Clock Time Ended	21:30	16:35	14:35	
Averaging Intervals	1 minute	1 minute	1 minute	
Sampling Parameters CEMs				
CO Daily Low (ppmdv)	1248	918	1023	1063
CO Daily High (ppmdv)	1607	2137	1372	1705
CO Mean Average (ppmdv)	1379	1170	1126	1225
Standard Deviation (%)	4.3	16.9	5.6	8.9

Footnotes

1. Daily low and high values are uncorrected 1-minute averages during period sampled.
2. Mean and standard deviation were calculated from corrected 1-minute averages during the period sampled.

Table A-4
CEM THC Daily Test Run Averages

Table A-4
Field Test THC Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Clock Time Started	15:00	10:15	08:15	
Clock Time Ended	21:30	16:35	14:35	
Averaging Intervals	hour	hour	hour	
Sampling Parameters CEMs				
THC Daily Low (ppmdv)	63.2	31.3	30.6	41.7
THC Daily High (ppmdv)	78.2	73.3	57.3	69.6
THC Mean Average (ppmdv)	70.6	54.2	37.5	54.1
Standard Deviation (%)	4.84	22.9	8.50	12.1

Footnotes

1. THC analyzer values are calibration corrected and calculated from hourly reported values during the sampling period (8 data points per run).

2. THC analyzer data collected by Pacific Environmental. (THC analyzer data provided by MSD)

Table A-5
CEM CO_2 and O_2 Daily Test Run Averages

Table A-5
Field Test CO_2 Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Clock Time Started	15:00	10:15	08:15	
Clock Time Ended	21:30	16:35	14:35	
Averaging Intervals	1 minute	1 minute	1 minute	
Sampling Parameters CEMs				
CO_2 Daily Low (%dv)	4.54	4.18	4.34	4.35
CO_2 Daily High (%dv)	5.70	8.26	5.56	6.51
CO_2 Mean Average (%dv)	5.16	5.50	5.07	5.24
Standard Deviation (%)	5.23	12.5	4.93	7.55

Footnotes

1. Carbon dioxide analyzer data is calibration corrected 1-minute averages during the sampling period.

Table A-6
Field Test O_2 Results Summary

	Run 2	Run 3	Run 4	Average
Run ID	MSD-MM5-R2	MSD-MM5-R3	MSD-MM5-R4	
Sample Date	7-20-99	7-21-99	7-22-99	
Clock Time Started	15:00	10:15	08:15	
Clock Time Ended	21:30	16:35	14:35	
Averaging Intervals	1 minute	1 minute	1 minute	
Sampling Parameters CEMs				
O_2 Daily Low (%dv)	12.9	9.49	12.1	11.5
O_2 Daily High (%dv)	14.6	15.0	14.6	14.7
O_2 Mean Average (%dv)	13.7	13.0	13.4	13.4
Standard Deviation (%)	2.77	7.21	4.77	4.92

Footnotes

1. Oxygen analyzer data is calibration corrected 1-minute averages during the sampling period.

APPENDIX B

Raw Field Data

B-1
Stack Sampling Data

Table B-1-1 – Methods 1 and 2 Preliminary Stack Traverse Data
Stratification Test Results
Cincinnati MSD Incinerator Stack

SAMPLING POINT	TIME	O_2 (%dv)	%DIFF. FROM MEAN	CO_2 (%dv)	%DIFF. FROM MEAN	CO (ppmdv)	%DIFF. FROM MEAN
A1	1545	15.26	4.2	4.31	-5.7	956	-13.5
A2	1549	14.85	1.4	4.27	-6.6	858	-22.4
A3	1553	14.73	0.5	4.35	-4.8	947	-14.3
A4	1557	14.94	2.0	4.16	-9.0	995	-10.0
A5	1601	15.09	3.0	4.29	-6.8	1060	-4.1
A6	1605	14.86	1.4	4.44	-2.8	1156	4.6
B1	1610	15.15	3.4	4.15	-9.2	1216	9.1
B2	1614	14.73	0.5	4.45	-2.6	1203	8.9
B3	1618	14.38	-1.8	4.76	4.2	1209	9.4
B4	1622	13.88	-5.3	5.21	14.0	1294	17.1
B5	1626	13.87	-5.3	5.28	15.5	1218	10.2
B6	1630	14.03	-4.2	5.15	12.7	1152	4.3
AVG.	-------	14.65	-------	4.57	-------	1105	-------

*Source not stratified if all points are less than 10% difference from mean (EPA Guidance Document GD-025)

METROPOLITAN SEWER DISTRICT
SEWAGE SLUDGE INCINERATOR
STRATIFICATION CHECK
JULY 19, 1999

Starting
07-19-99

Time	O2 %dv	CO2 %dv	CO ppmdv
15:43	11.76R	3.07R	2849.00R
15:44	14.18R	4.33R	1978.00R
15:45	15.26P	4.31P	956.00P
15:46	14.93R	4.18R	847.00R
15:47	14.96R	4.16R	833.00R
15:48	14.87R	4.24R	836.00R
15:49	14.85P	4.27P	858.00P
15:50	14.95R	4.18R	883.00R
15:51	14.89R	4.21R	890.00R
15:52	14.71R	4.38R	926.00R
15:53	14.73P	4.35P	947.00P
15:54	14.79R	4.30R	961.00R
15:55	14.80R	4.28R	983.00R
15:56	14.87R	4.23R	1000.00R
15:57	14.94P	4.16P	995.00P
15:58	14.93R	4.17R	1012.00R
15:59	15.14R	4.19R	1025.00R
16:00	15.14R	4.24R	1044.00R
16:01	15.09P	4.29P	1060.00P
16:02	15.07R	4.28R	1099.00R
16:03	15.02R	4.31R	1130.00R
16:04	14.88R	4.44R	1171.00R
16:05	14.86P	4.44P	1156.00P
16:06	14.89R	4.41R	1159.00R
16:07	16.69R	2.96R	1088.00R
16:08	15.25R	4.06R	917.00R
16:09	15.22R	4.09R	1197.00R
16:10	15.15P	4.15P	1216.00P
16:11	14.99R	4.28R	1225.00R
16:12	14.90R	4.32R	1221.00R
16:13	14.79R	4.42R	1212.00R
16:14	14.73P	4.45P	1203.00P
16:15	14.43R	4.68R	1181.00R
16:16	14.46R	4.66R	1203.00R
16:17	14.44R	4.69R	1205.00R
16:18	14.38P	4.76P	1209.00P
16:19	14.22R	4.87R	1213.00R
16:20	14.21R	4.87R	1195.00R
16:21	13.87R	5.18R	1245.00R
16:22	13.88P	5.21P	1294.00P
16:23	13.98R	5.13R	1319.00R
16:24	14.03R	5.11R	1279.00R
16:25	13.96R	5.18R	1241.00R
16:26	13.87P	5.28P	1218.00P
16:27	13.98R	5.18R	1213.00R
16:28	14.01R	5.16R	1206.00R
16:29	14.05R	5.15R	1175.00R
16:30	14.03P	5.15P	1152.00P

B-1-2
MM-5 Sampling Raw Field Data

3.3 VOID — FAILED LEAK CHECK @ PORT CHANGE

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Cinc. TEST LOCATION: #6 Incinerator DATE: 7-20-90

START TIME: 09:30 END TIME: 12:30 POLLUTANT: RUN I.D.: MSD - MM5 - R1

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~EXIT~~ inlet	PROBE TEMP	IMP 4 EXIT	FILTER TEMP.	VAC
B 1	0	930		115	.26	.86	156.859	89	85	65	249	62	251	7
	5			115	.25	.83	159.64	94	85	65	249	60	249	7
	10			115	.25	.83	162.28	96	87	66	249	61	250	7
2	15			115	.26	.86	165.11	99	88	66	248	61	250	8
	20			116	.26	.86	167.69	101	89	66	249	63	249	8
	25			115	.26	.86	170.43	101	89	67	249	65	251	8
3	30			115	.26	.86	173.15	102	92	65	249	62	249	9
	35			115	.28	.92	176.17	98	89	64	248	59	249	9
	40			116	.27	.89	178.23	98	90	63	249	61	252	9
4	45			116	.29	.96	181.69	98	90	64	247	61	249	10
	50			115	.30	.99	184.45	99	91	66	249	60	253	10
	55			115	.32	1.1	187.43	~~101~~ 98	89	64	249	59	249	11
5	60			115	.31	1.0	190.58	102	91	63	249	62	250	11
	65			115	.35	1.2	193.52	102	91	65	249	62	252	11
	70			114	.35	1.2	196.61	99	91	65	250	63	253	11
6	75		-.16	114	.38	1.3	199.83	102	91	64	249	63	249	13
	80			114	.40	1.32	202.99	103	92	66	248	64	253	13
	85			114	.40	1.32	206.21	102	92	66	249	65	250	13
7	90			113	.42	1.4	209.44	103	92	64	251	63	252	13
	95			114	.43	1.4	212.71	105	94	65	250	63	249	14
	100			113	.44	1.5	215.89	105	94	65	251	61	242	15
8	105			113	.40	1.32	219.36	105	94	64	250	61	251	14
	110			115	.39	1.3	223.62	107	96	63	250	62	248	14
	115			114	.41	1.4	225.76	107	97	63	250	62	251	14
9	120			114	.38	1.3	228.95	105	96	63	249	63	249	14

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
101	FILTER	LIGHT BROWN
102	FRONT ACETONE/MECL	
103	FRONT HALF TOLUENE	
104	BACK HALF ACETONE/MECL	
~~#5~~ 105	BACK HALF TOLUENE	CONTAINS DI WATER
106	XAD II.	40% LIGHT YELLOW
107	IMPINGER COMPOUND	~~80%~~ SPENT
~~SILICA GEL~~		~~80% SPENT~~
108	IMPINGER MECL/ACETONE	
SILICA GEL		~~80%~~ SPENT

LEAK CHECK:

		PRE B	POST B		
VACUUM	~~15"~~	15"	15"		
RATE	~~0.004~~	.005	0.060		

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
XAD	360.0	370.5
#1	0	80
#2	100ml	101
#3	100ml	103
#4	0	2
#5	200g	209
#6	B-6	

NOZZLE Φ	0.254
PITOT #	233
BOX I.D.	12
GAMMA Y	.9968
ΔH@	1.6953
P_{bar}	29.65
FILTER	UNTARED
TECH.	FPC, BD

VOID

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

— FAILED LEAK CHECK @ PORT CHANGE

FACILITY: MSD Cing TEST LOCATION: #6 DATE: 7-20-99

START TIME: 09:30 END TIME: 12:30 POLLUTANT: RUN I.D.: MSD-M5-R1

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	125			114	.43	1.4	232.14	106	97	64	251	62	250	14
	130			114	.42	1.4	235.41	104	96	64	250	62	251	14
10	135			113	.41	1.4	238.61	102	94	65	250	62	257	14
	140			113	.40	1.3	241.84	100	94	63	251	58	258	14
	145			113	.37	1.2	245.01	103	97	66	251	59	254	14
11	150			113	.34	1.1	248.22	102	95	66	250	58	257	14
	155			113	.35	1.2	251.32	102	95	65	250	59	255	14
	160			113	.35	1.2	254.51	102	94	63	250	59	258	14
12	165			113	.29	.96	257.67	103	95	67	251	58	258	13
	170			113	.30	.99	260.78	103	96	64	250	59	253	13
	175			113	.32	1.1	263.61	102	96	65	250	62	255	13
[redacted]	180	1230	[redacted]				266.681							
[redacted]	180													
	185	185												
[redacted]	190	190												
2[redacted]	195	195												
	200	200												
[redacted]	205	205												
3[redacted]	210	210												
	215	215												
[redacted]	220	220												
4[redacted]	225	225												
	230	230												
[redacted]	235	235												
5[redacted]	240	240												

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION

LEAK CHECK:

VACUUM					
RATE					

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1		
#2		
#3		
#4		
#5		
#6		

NOZZLE Φ	
PITOT #	
BOX I.D.	
GAMMA γ	
ΔH@	
P_{BAR}	
FILTER	
TECH.	

k=3.2

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Cinc TEST LOCATION: #6 DATE: 7-20-99

START TIME: 0300 END TIME: 0230 POLLUTANT: RUN I.D.: MSD MMS-R 2

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~EXIT~~ INLET	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
B 1	0	~~300~~	AM	116	.27	.86	267.659	96	96	61	253	62	252	11
	5	1500		118	.25	.80	269.91	101	96	60	248	65	256	12
	10			116	.26	.83	272.62	99	96	58	253	62	255	12
2	15			118	.25	.80	275.31	103	98	59	250	63	251	12
	20			118	.26	.83	278.22	103	96	61	251	62	248	13
	25			118	.25	.80	280.82	103	96	62	248	63	253	13
3	30			116	.26	.83	283.6	103	95	56	251	62	255	14
	35			118	.27	.86	286.51	104	96	62	249	60	252	14
	40			118	.29	.93	288.23	107	98	62	250	59	246	15
4	45			118	.31	1.0	292.19	105	96	61	249	58	254	16
	50			118	.31	1.0	295.35	106	97	62	250	58	254	16
	55			117	.31	1.0	298.51	104	101	61	248	59	255	16
5	60			118	.32	1.0	301.34	107	101	62	246	58	252	16
	65			119	.35	1.1	304.49	106	101	62	250	58	255	17
	70			118	.35	1.1	307.14	106	102	64	250	58	251	17
6	75		-.16	118	.34	1.1	310.56	103	99	63	250	59	253	17
	80			117	.35	1.1	313.52	105	100	64	248	59	253	17
	85			118	.36	1.1	316.63	106	102	65	250	62	255	19
7	90			116	.38	1.2	319.77	105	101	63	249	61	251	20
	95			117	.38	1.2	323.01	105	102	62	251	59	257	20
	100			118	.38	1.2	326.28	105	102	64	252	59	253	20
8	105	~~1500~~		116	.38	1.2	329.301	102	96	64	251	65	260	7
	110			116	.39	1.3	334.88	105	98	63	250	56	254	9
	115			116	.40	1.3	337.76	108	98	63	250	56	249	9
9	120			116	.40	1.3	341.11	112	101	63	249	58	252	10

Post Leak: 331.

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
201	FILTER	LIGHT BROWN
202	3x MECL/ACETONE	
203	F.H. TOLUENE	
204	ACETONE	
205	B.H. TOLUENE	
206	XAD II	
207	IMPINGER CATCH	
208	IMPINGER MECL/ACETONE	
SILICA	GEL	70% SPENT

LEAK CHECK:

	Pre	Post	Pre	Post	Pre
VACUUM	15	21	20	10	15
RATE	0.006	0.004	0.006	0.003	0.005

Post 15 0.00

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
XAD	347.0	353.0
#1	0 ml	174 ml
#2	100 ml	100 ml
#3	100 ml	73 ml
#4	0 ml	0 ml
#5	872.5 g	914.2
#6	B-8	

NOZZLE Φ	0.254
PITOT #	233
BOX I.D.	12
GAMMA Y	.9968
ΔH@	1.6953
P_{bm}	29.55
FILTER	UNBAKED
TECH.	FPC

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD CINC TEST LOCATION: #6 DATE: 7-20-99

START TIME: 15:00 END TIME: 21:30 POLLUTANT: RUN I.D.: MSD-MM5-R2

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	125			115	.40	1.3	344.71	109	100	61	251	58	254	9
	130			115	.39	1.3	347.88	108	102	62	250	58	255	9
10	135			115	.38	1.2	351.13	108	101	58	248	59	253	9
	140			115	.40	1.3	354.52	107	102	60	252	61	258	10
	145			116	.40	1.3	357.68	107	98	63	253	59	250	10
11	150			115	.37	1.3	361.98	107	99	63	249	62	252	10
	155			115	.35	1.2	364.21	105	98	63	250	63	255	10
	160			115	.37	1.3	367.34	105	98	64	251	64	253	10
12	165			115	.31	1.1	370.47	106	98	64	250	65	256	9
	170			115	.29	1.0	373.62	109	102	64	251	65	249	9
	175			115	.29	1.0	376.64	108	101	65	250	64	259	9
	180	1880					379.663							
A 1	180	1880		116	.33	1.2	380.000	98	95	65	250	64	252	9
	185			116	.33	1.2	383.11	101	95	65	250	65	255	9
	~~190~~			116	.34	1.2	386.34	103	94	64	249	63	253	9
2	~~200~~	195		115	.34	1.2	389.21	102	94	62	250	62	253	9
	~~205~~	200		117	.35	1.2	392.24	103	96	65	249	64	250	9
	~~210~~	205		115	.35	1.2	395.29	103	94	62	245	61	251	10
3	~~215~~	210		117	.34	1.2	398.31	103	96	62	249	61	259	10
	~~220~~	215		118	.34	1.2	401.46	102	96	64	250	61	254	10
	~~225~~	220		117	.35	1.2	404.43	102	96	63	254	61	259	10
4	~~230~~	225		116	.34	1.2	407.47	101	94	60	250	60	247	10
	~~235~~	230		116	.33	1.2	410.51	102	94	61	246	62	254	10
		235		116	.33	1.2	413.59	99	94	61	245	59	257	10
5	240			118	.34	1.2	416.41	103	95	62	248	61	254	10
	245			116	.33	1.2	419.71	102	95	60	250	59	252	10
	250			116	.32	1.1	422.76	102	95	61	250	59	257	10
6	255		-.16	116	.35	1.2	425.64	102	96	60	252	60	255	10
	260			115	.35	1.2	428.92	101	93	59	255	59	254	10
	265			116	.36	1.3	431.87	103	94	61	250	59	253	10
7	270			116	.41	1.4	434.85	102	95	61	251	61	255	11
	275			116	.41	1.4	438.71	103	95	64	252	61	255	12
	280			116	.41	1.4	441.32	102	93	63	251	62	245	12
8	285			115	.40	1.4	444.51	101	92	64	250	64	244	12

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD CINC TEST LOCATION: #6 DATE: 7-20-99

START TIME: 15:00 END TIME: 21:30 POLLUTANT: RUN I.D.: MSD-MMS-R 2

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	290			114	.40	1.4	447.81	96	92	63	250	59	258	12
	295			114	.41	1.4	451.41	95	91	64	250	58	254	12
9	300			113	.41	1.4	454.93	95	88	63	251	59	244	12
	305			113	.42	1.5	457.36	95	88	62	250	59	252	13
	310			113	.40	1.4	460.68	95	87	64	249	60	245	13
10	315			114	.38	1.4	464.11	95	88	62	250	61	252	13
	320			113	.39	1.4	467.31	95	89	62	250	63	255	13
	325			113	.39	1.4	470.67	95	88	63	250	63	253	13
11	330			113	.34	1.2	473.71	95	87	63	247	64	245	12
	335			113	.34	1.2	476.97	95	87	64	250	63	252	12
	340			113	.33	1.2	480.05	95	86	63	249	64	246	12
12	345			112	.27	.97	483.13	95	88	64	250	66	261	11
	350			112	.25	.90	486.12	96	87	64	250	65	254	10
	355			112	.26	.90	488.97	95	87	63	250	64	250	10
	360						491.78							

Post Test Leak 14
.004

3.8

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Cinc TEST LOCATION: #6 DATE: 7-21-99

START TIME: 1015 END TIME: 16:35 POLLUTANT: RUN I.D.: MSD - MMS - R 3

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~TEMP.~~ TRAP	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
A 1	0	1015		115	.31	1.2	444.149	95	92	63	252	62	261	6
	5			115	.30	1.1	447.17	96	92	59	251	54	253	7
	10			115	.30	1.1	500.15	102	92	58	252	52	255	7
2	15			114	.30	1.1	503.24	101	92	58	249	53	251	7
	20			115	.30	1.1	506.33	101	93	55	250	52	255	7
	25			114	.32	1.2	509.43	102	93	56	251	52	253	7
3	30			112	.37	1.4	512.52	102	92	56	245	53	254	8
	35			113	.39	1.5	515.81	104	92	56	247	54	254	9
	40			113	.39	1.5	519.21	103	93	55	252	57	255	9
4	45			114	.34	1.3	522.66	103	92	56	252	57	254	9
	50			113	.31	1.2	525.91	103	93	56	250	56	254	9
	55			113	.33	1.3	529.05	104	93	56	251	57	255	8
5	60			113	.33	1.3	532.23	105	94	56	242	59	253	8
	65			113	.34	1.3	535.35	105	94	57	251	58	253	8
	70			113	.34	1.3	538.48	105	95	56	246	59	253	9
6	75		-.16	113	.36	1.4	541.61	105	95	56	249	59	253	10
	80			112	.36	1.4	545.31	105	95	56	253	60	254	10
	85			113	.37	1.4	548.41	106	96	57	252	62	254	10
7	90			112	.43	1.6	551.44	106	98	59	250	64	253	10
	95			112	.44	1.7	554.85	108	96	57	251	63	254	11
	100			114	.49	1.9	559.37	107	98	56	251	62	252	13
8	105			114	.46	1.7	562.31	107	97	55	250	62	256	12
	110			114	.37	1.4	565.97	110	100	56	252	62	255	11
	115			115	.39	1.5	569.62	107	97	57	252	60	253	11
9	120			113	.40	1.5	572.73	110	101	56	251	62	254	11

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
301	FILTER	VERY LIGHT GREY
302	FRONT HALF ACETONE/MECL	
303	FRONT HALF TOLUENE	
304	ACETONE/MECL	
305	BACK HALF TOLUENE	
306	XAD RESIN	70% LIGHT YELLOW
307	IMPINGER CONTENTS	LIGHT YELLOW TINT
308	IMPINGER ACETONE/MECL.	
SILICA	GEL	80% SILICA

LEAK CHECK:

	PRE PORT A	POST PORT A	PRE PORT B	POST PORT B	
VACUUM	15"	15"	15"	17"	
RATE	0.006	0.006	0.003	0.005	

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
XAD	342.0	347.5
#1	0	176 ml
#2	100 ml	106 ml
#3	100 ml	99 ml
#4	0	1
#5	872.5	892.5
#6	B-11	

NOZZLE Φ	0.254
PITOT #	233
BOX I.D.	12
GAMMA Y	.9968
ΔH@	1.6953
P_{BAR}	29.64
FILTER	UNTARED
TECH.	FPL

3.a

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Cinc. TEST LOCATION: #6 DATE: 7-21-94

START TIME: 10:15 END TIME: 16:35 POLLUTANT: RUN I.D.: MSD - MMS - R 3

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~EXIT~~ INLET	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	125			113	.33	1.3	576.31	110	101	58	252	62	254	11
	130			114	.38	1.4	580.11	111	102	59	252	64	252	10
10	135			113	.36	1.4	582.71	111	101	58	252	64	255	10
	140			113	.37	1.4	585.47	108	101	57	251	64	253	10
	145			113	.38	1.4	589.81	110	101	58	252	64	254	10
11	150			114	.30	1.1	593.23	112	101	56	251	65	254	11
	155			113	.31	1.2	595.92	109	102	56	252	65	254	11
	160			113	.32	1.2	598.63	106	102	56	253	65	254	10
12	165			114	.24	.91	602.38	112	102	64	252	64	253	9
	170			113	.24	.91	605.32	111	101	57	253	65	256	9
	175			112	.24	.91	608.21	111	101	58	252	64	254	9
	180	1315					611.099							
B 1	180	1338		118	.29	1.1	612.500	105	102	62	256	65	251	10
	185			116	.28	1.1	615.61	106	102	56	246	63	248	10
	190			116	.30	1.2	618.71	111	102	55	241	57	261	11
2	195			117	.30	1.2	621.86	112	102	56	248	59	253	11
	200			118	.31	1.2	625.07	113	103	56	237	60	252	11
	205			117	.29	1.1	628.21	109	103	56	252	65	255	11
3	210			118	.30	1.2	631.35	112	103	55	251	63	253	11
	215			117	.30	1.2	634.11	112	104	54	249	64	255	11
	220			116	.31	1.2	637.27	108	103	54	249	66	256	11
4	225			116	.33	1.3	640.91	112	104	55	244	66	258	11
	230			118	.30	1.2	644.31	112	104	55	245	58	250	11
	235			116	.31	1.2	647.15	112	104	54	245	57	246	12
5	240			118	.35	1.4	650.19	113	105	55	243	59	252	12
	245			117	.37	1.4	653.48	114	105	55	243	65	249	13
	250			116	.36	1.4	656.89	114	105	55	245	66	259	13
6	255		-.16	116	.40	1.6	660.25	115	105	55	244	63	252	15
	260			117	.40	1.6	663.99	115	106	55	245	64	254	15
	265			116	.40	1.6	667.71	115	106	55	247	63	258	15
7	270			117	.45	1.8	671.1	115	106	54	248	64	259	17
	275			118	.42	1.6	674.59	114	106	55	247	63	261	17
	280			118	.41	1.6	678.23	113	106	56	246	63	260	17
8	285			116	.42	1.6	681.99	112	105	58	246	60	261	17

Post 14 .003 Pre 15 .003

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Cinc TEST LOCATION: #6 DATE: 7-21-99

START TIME: 1015 END TIME: 1635 POLLUTANT: RUN I.D.: MSD M MS R 3

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~EXIT~~ INLET	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	290			116	.41	1.6	685.45	109	105	55	247	62	259	17
	295			116	.41	1.6	689.01	113	105	55	249	60	258	16
9	300			116	.42	1.6	692.51	113	105	55	247	62	264	16
	305			118	.41	1.6	696.05	113	105	56	247	65	253	16
	310			116	.43	1.7	699.57	115	105	55	251	65	254	16
10	315			117	.41	1.6	703.05	114	107	56	249	64	259	17
	320			116	.44	1.7	706.51	114	106	56	249	65	257	17
	325			117	.42	1.6	710.02	114	105	56	250	63	254	17
11	330			116	.36	1.4	713.47	113	105	56	249	65	260	16
	335			117	.38	1.5	716.91	113	105	56	247	66	254	16
	340			116	.39	1.5	720.29	113	105	57	249	64	264	16
12	345			116	.28	1.1	723.65	114	105	56	250	65	253	15
	350			116	.25	.98	726.91	114	106	56	248	63	263	14
	355			116	.25	.98	729.89	113	105	56	248	66	261	13
	360	1635					732.845							

Post 17"
.005

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: [redacted] Cinc. TEST LOCATION: #6 DATE: 7-22-99

START TIME: 0815 END TIME: 1435 POLLUTANT: RUN I.D.: MSA - MMS - R 4

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD ~~EXIT~~ INLET	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
B 1	0	0815		114	.32	1.3	735.000	89	85	61	249	64	258	6
	5			114	.30	1.2	738.41	95	86	59	241	53	256	6
	10			114	.31	1.2	741.56	101	87	62	236	56	256	6
2	15			115	.30	1.2	744.75	102	89	58	232	56	259	6
	20			114	.34	1.3	747.89	102	89	58	252	55	257	6
	25			114	.32	1.3	751.05	103	90	60	251	55	255	6
3	30			114	.32	1.3	754.19	104	92	58	244	55	258	7
	35			114	.35	1.4	757.34	105	92	60	246	55	259	7
	40			115	.36	1.4	760.55	105	92	58	252	56	261	7
4	45			115	.37	1.4	763.81	105	93	61	248	56	260	7
	50			115	.37	1.4	767.01	105	94	61	247	58	258	7
	55			115	.36	1.4	770.22	106	94	60	249	58	256	7
5	60			115	.42	1.6	773.38	106	95	59	243	59	258	8
	65			115	.42	1.6	776.91	107	95	61	250	59	259	8
	70			114	.43	1.6	780.47	108	95	62	252	61	259	8
6	75		-.21	115	.48	1.9	784.11	108	95	61	243	62	257	10
	80			114	.49	1.9	787.83	112	96	65	249	58	258	10
	85			115	.49	1.9	791.62	112	96	62	252	60	261	10
7	90			115	.48	1.9	795.46	112	96	62	247	60	261	10
	95			114	.49	1.9	800.00	113	98	62	243	61	256	10
	100			115	.46	1.8	803.21	113	98	62	246	62	258	10
8	105			114	.46	1.8	807.13	113	102	64	247	62	255	10
	110			115	.46	1.8	810.81	114	100	61	244	63	262	10
	115			115	.48	1.9	814.19	109	100	63	242	63	262	10
9	120			115	.47	1.8	818.04	113	101	62	244	61	259	10

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION
401	FILTER	LIGHT BROWN
402	FRONT HALF ACETONE/MECL	
403	FRONT HALF TOLUENE	
404	ACETONE/MECL	
405	BACK HALF TOLUENE	
406	XAD II RESIN	60% YELLOW TINT
407	IMPINGER CONTENTS	CLEAR
408	IMPINGER ACETONE/MECL	
SILICA	GEL	70% SPENT

LEAK CHECK:

	PRE PORT B	POST PORT B	PRE PORT A	POST PORT
VACUUM	15	12"	16"	14"
RATE	0.005	0.002	0.006	0.005

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
XAD II	351.0g	355.5g
#1	0	187ml
#2	100ml	100ml
#3	100ml	101ml
#4	0	0
#5	7415	8500g
#6	B-14	

NOZZLE ⌀	.254
PITOT #	233
BOX I.D.	12
GAMMA Y	.9968
ΔH@	1.6953
P_{BAR}	29.63
FILTER	UNTARED
TECH.	FPC [illegible]

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: MSD Ciac TEST LOCATION: #6 DATE: 7/22/95

START TIME: 0815 END TIME: 1435 POLLUTANT: RUN I.D.: MSD - MMS - R4

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP. (1)	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET (6)	DGM TEMP. OUTLET (7)	XAD EXIT (5)	PROBE TEMP	IMP EXIT (4)	FILTER TEMP.	VAC
	125			115	.46	1.8	822.34	113	101	62	245	62	259	10
	130			115	.47	1.8	825.69	115	101	64	246	61	261	10
10	135			115	.46	1.8	829.40	113	102	64	244	63	255	10
	140			116	.47	1.8	833.34	113	101	62	243	63	257	11
	145			116	.47	1.8	837.01	113	102	64	244	63	256	11
11	150			116	.41	1.6	840.81	114	102	65	244	64	256	10
	155			115	.42	1.6	844.52	113	103	63	243	64	260	10
	160			115	.42	1.6	848.22	114	102	62	245	64	254	11
12	165			115	.28	1.1	851.87	112	101	62	243	63	258	9
	170			116	.27	1.1	855.12	112	102	64	246	63	259	9
	175			116	.27	1.1	858.27	113	101	64	251	63	251	9
	180	1115					861.355							
A 1	180	1135		117	.39	1.5	862.051	104	101	65	263	67	257	10
	185			116	.40	1.6	865.39	111	102	62	245	62	258	11
	190			117	.40	1.6	869.09	113	102	63	239	64	258	11
2	195			117	.39	1.5	872.58	114	103	62	242	64	252	11
	200			117	.40	1.6	876.10	109	103	63	243	63	261	11
	205			117	.39	1.5	879.72	113	103	62	245	63	260	11
3	210			117	.39	1.5	883.29	114	102	62	242	63	258	11
	215			116	.40	1.6	886.85	114	102	62	243	63	260	11
	220			117	.38	1.5	890.46	114	102	63	243	64	256	11
4	225			117	.38	1.5	894.01	113	103	64	244	64	259	11
	230			119	.37	1.4	897.55	114	103	64	246	65	260	11
	235			119	.37	1.4	901.05	115	104	63	242	64	258	11
5	240			121	.36	1.4	904.49	115	104	64	243	64	262	11
	245			121	.36	1.4	907.97	115	105	64	242	65	265	11
	250			119	.37	1.4	911.38	114	104	65	244	65	262	11
6	255			121	.41	1.6	914.81	114	104	63	242	64	259	12
	260			119	.41	1.6	918.38	115	104	64	245	64	260	12
	265			120	.41	1.6	922.01	115	104	63	243	64	262	12
7	270			118	.47	1.8	925.60	114	104	63	246	64	261	13
	275			118	.48	1.9	929.38	116	104	64	248	64	259	14
	280			118	.48	1.9	933.27	116	105	63	249	65	259	14
8	285			119	.46	1.8	937.17	115	105	65	246	66	265	14

Post 12 pre 6 · pre 5

.002 .008 .006

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

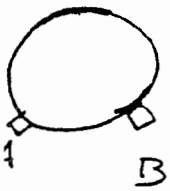
FACILITY: MSD Cinc. TEST LOCATION: #6 DATE: 7/22/94

START TIME: 0815 END TIME: 1435 POLLUTANT: RUN I.D.: MSD - M MS - R 4

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	290		-.16	118	.46	1.8	941.02	116	105	64	249	65	258	14
	295			118	.47	1.8	944.88	116	105	64	252	65	257	14
9	300			118	.46	1.8	948.72	116	106	64	252	63	259	14
	305			118	.45	1.8	952.55	117	107	64	251	62	260	14
	310			118	.45	1.8	956.36	117	106	63	255	62	260	14
10	315			118	.45	1.8	960.19	118	106	63	254	62	259	14
	320			118	.44	1.7	963.97	117	106	64	254	63	261	14
	325			118	.44	1.7	967.79	117	106	64	255	64	261	14
11	330			118	.43	1.7	971.49	118	107	64	257	64	258	14
	335			118	.42	1.6	975.23	118	107	64	257	64	260	14
	340			119	.42	1.6	978.95	119	111	62	256	64	258	14
12	345			119	.26	1.0	982.62	119	111	62	257	65	258	11
	350			119	.27	1.1	985.71	116	110	64	258	65	256	11
	355			119	.27	1.1	988.76	117	110	65	257	65	258	11
	360						991.815							

Post 14"
.005

CYCLONIC FLOW CHECK
40 CFR 60, APPENDIX A, METHOD 1, SECTION 2.4



Location: Inc. 6
Date: 7-19-99
wBT 106 DBT 128

Load Condition: 15,500 tons/hr
Start Time: 2:40
End Time: 3:09

Point No.	α
1	7°
2	3°
3	3°
4	2°
5	8°
6	8°
7	6°
8	4°
9	3°
10	3°
11	5°
12	7°

B

Point No.	α
13	5°
14	4°
15	4°
16	3°
17	3°
18	6°
19	2°
20	3°
21	7°
22	3°
23	5°
24	6°

Sum of the Absolute Value of the Rotation Angles ($\Sigma|\alpha|_{i=1,n}$): 110
where: α = rotation angle for point i, and
n = number of sampling points.

Average Rotation Angle ($\frac{\Sigma|\alpha|_{i=1,n}}{n}$): 4.58
where: α = rotation angle for point i, and
n = number of sampling points.

Note: the flow is determined to be cyclonic if the Average Rotation Angle is greater than 20°.

Flow Check Done by: FPC

B-2
MM-5 Sample Recovery Field Data

MSD--MM5-R1
VOID

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 99-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

VOIDED RUN HOLD FOR FURTHER INSTRUCTIONS

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-R1-101			UNIT 6	~~PROBE MT~~ ~~BLANK~~	FILTER	NA		AH	7/20/99	
MSD-MM5-R1-102				MSD-MM5-R1	ACETONE/MEOH FRONT RINSE	200 (est)		AH	7/20/99	
MSD-MM5-R1-103					TOLUENE FRONT RINSE	100 (est.)		AH	7/20/99	
MSD-MM5-R1-104 A PES					ACETONE/MEOH BACK RINSE	800 (est)		AH	7/20/99	
MSD-MM5-R1-105					TOLUENE BACK RINSE	400 (est)		AH	7/20/99	CONTAINS D.I. WATER
MSD-MM5-R1-106					XAD II RESN	NA		AH	7/20/99	
MSD-MM5-R1-107 A PES					IMPINGER CATCH	350 (est)		AH	7/20/99	
MSD-MM5-R1-108					IMPINGER ACETONE/MEOH RINSE			AH	7/20/99	

CHAIN OF CUSTODY				
Collected by: AHerz/W.T. Underwood	Date/Time 7/20/99 13:30			
Relinquished by: [signature] ETS	Date/Time 7/21/99 10:30	Received by: [signature]	Date/Time 7/21/99 1030	
Relinquished by: [signature]	Date/Time 7/21/99 13:30	Received by: [signature]	Date/Time 7/21/99 PES	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

RUN 2 SAMPLES

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 9 1/2-99-487-C-2
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-R2-201			UNIT 6	RUN NO.	FILTER	NA		AA	7/20/94	
			INCUBATOR	2						
MSD-MM5-R2-202			"	"	FRONT HALF ACETONE/MECL	200(ext)		AA	" "	
MSD-MM5-R2-203			"	"	FRONT HALF TOLUENE RINSE	110(ext)		AA	" "	
MSD-MM5-R2-204			"	"	BACK HALF ACETONE/MECL	520(ext)		AA	" "	
	BES 204A									
MSD-MM5-R2-205			"	"	BACK HALF TOLUENE RINSE	350(ext.)		AA	" "	
MSD-MM5-R2-206			"	"	XAD-2 RESIN	NA		AA	" "	
MSD-MM5-R2-207			"	"	IMPINGER CONTENTS	356ml		AA	" "	
	BES 207A									
MSD-MM5-R2-208			"	"	IMPINGER ACETONE/MECL	240ml		AA	" "	

CHAIN OF CUSTODY				
Collected by: AA/for/L.T. Underwood	Date/Time 7/20/94 23:00			
Relinquished by: [signature] ETS	Date/Time 7/21/94 10:30	Received by:	Date/Time	
Relinquished by: [signature]	Date/Time 7/21/94 11:20	Received by: [signature]	Date/Time 7/21/94 BES	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

MSD-MM5-R3

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 99-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO:	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-R3-301			UNIT 6 INCINERATOR	MSD-MM5-R3	FILTER	NA		AAA	7/21/99	LIGHT GREY
MSD-MM5-R3-302			"	(RUN 3)	FRONT HALF ACETONE/MECL	300 (est.)		AAA	7/21/99	
MSD-MM5-R3-303			"	"	FRONT HALF TOLUENE	120 (est)		AAA	7/21/99	
MSD-MM5-R3-304			"	"	BACK HALF ACETONE/MECL	970 (est)		AAA	7/21/99	
MSD-MM5-R3-305			"	"	BACK HALF TOLUENE	450 (est)		AAA	7/21/99	
MSD-MM5-R3-306			"	"	XAD II RESIN	NA		AAA	7/21/99	70% YELLOW COLOR
MSD-MM5-R3-307			"	"	IMPINGER CONTENTS	382 ml		AAA	7/21/99	
MSD-MM5-R3-308			"	"	IMPINGER ACETONE/MECL	250 ml		AAA	7/21/99	

CHAIN OF CUSTODY				
Collected by: A.A. Hatz / W.T. Greenwood	Date/Time 7/21/99 10:40			
Relinquished by: ETS	Date/Time 7/21/99 19:00	Received by:	Date/Time 7-21-99 19:00	
Relinquished by:	Date/Time	Received by:	Date/Time 7-21-99 10:30pm	
Relinquished by:	Date/Time	Received by:	Date/Time	

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 93-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM	5-R4-401		UNIT 6	MSD-	FILTER	NA		AA	7/22/99	
			INCINERATOR	MM5-						
MSD-MM	5-R4-402		"	RUN 4	FRONT HALF ACETONE/MECL	150(ml)		AA	7/22/99	
MSD-MM	5-R4-403		"	"	FRONT HALF TOLUENE	125(ml)		AA	7/22/99	
MSD-MM	5-R4-404		"	"	BACK HALF ACETONE/MECL	850(ml)		AA	7/22/99	
MSD-MM	5-R4-405		"	"	BACK HALF TOLUNE RINSE	450(ml)		AA	7/22/99	
MSD-MM	5-R4-406		"	"	XAD II RESIN	NA		AA	7/22/99	
MSD-MM	5-R4-407		"	"	IMPINGER CONTENTS	488ml		AA	7/22/99	
MSD-MM	5-R4-408		"	"	IMPINGER ACETONE/MECL	265ml		AA	7/22/99	

CHAIN OF CUSTODY				
Collected by: AA Hoz/W.T. Underwood	Date/Time 7/22/99/1800			
Relinquished by: [illegible] ETS	Date/Time 7/23/99/0800	Received by: [illegible]	Date/Time 7-23/99 800	
Relinquished by: [illegible]	Date/Time 7/23/99 1335	Received by: David B. Davis	Date/Time 7-23-99 1335	
Relinquished by:	Date/Time	Received by:	Date/Time	

B-22

PROOF BLANK #1

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: C9-487-W2
JOB.I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-M5	5-RB1-1001		UNIT 6	REAGENT BLANK	FILTER	NA		AAH	7/19/99	
MSD-M5	-RB1-1002		"	"	XAD II RESIN	NA		AA	7/19/99	
MSD-M5	-RB1-1003		"	"	WATER	←	500ml	AA	7/19/99	
MSD-M5	-RB1-1004		"	"	ACETONE	←	500ml	AA	7/19/99	
MSD-M5	-RB1-1005		"	"	METHYLENE CHLORIDE	←	500ml	AA	7/19/99	
MSD-M5	RB1-1006		"	"	TOLUENE	←	500ml	AA	7/19/99	

CHAIN OF CUSTODY				
Collected by: A.A. Hetz	Date/Time 7/19/99 19:30			
Relinquished by: [illegible] ETS	Date/Time 7/21/99 10:00	Received by: [illegible]	Date/Time 7-21-99 1080	
Relinquished by: [illegible]	Date/Time 7/21/99 13:	Received by: [illegible]	Date/Time 7/21/99 BE 10:30	
Relinquished by:	Date/Time	Received by:	Date/Time	

FIELD EBLANK #1

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 99-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-FB1-1301			UNIT 6	FIELD	FILTER	NA		AAH	7/21/99	
MSD-MM5-FB1-1302			INCINERATOR	BLANK	FRONT HALF ACETONE/MEC	200ml (est)		AAH	7/21/99	
MSD-MM5-FB1-1303			"	"	FRONT HALF TOLUENE	110 (est)		AAH	7/21/99	
MSD-MM5-FB1-1304			"	"	BACK HALF ACETONE/MEC	800 (est.)		AAH	7/21/99	
MSD-MM5-FB1-1305			"	"	BACK HALF TOLUENE	400 (est.)		AAH	7/21/99	
MSD-MM5-FB1-1306			"	"	XAD RESIN	NA		AAH	7/21/99	
MSD-MM5-FB1-1307			"	"	IMPINGER DI WATER	200ml		AAH	7/21/99	
MSD-MM5-FB1-1308			"	"	IMPINGER ACETONE/MEC	250ml		AAH	7/21/99	

CHAIN OF CUSTODY				
	Collected by: AA. Hite / W. Underwood	Date/Time 7/21/99 15:00		
	Relinquished by: [signature]	Date/Time 7/21/99 1909	Received by: [signature]	Date/Time 7/21/99 1910
	Relinquished by:	Date/Time	Received by: [signature]	Date/Time 7-21-99 10:30 AM
	Relinquished by:	Date/Time	Received by:	Date/Time

REAGENT BLANK

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 68-487-NZ
JOB I.D.: Cincinnati, MSD
TEST METHOD: Modified MS

SAMPLE NO:	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MMS	-PB1-1101		UNIT 6	PROOF	FILTER	NA		AAH	7/19/99	
MSD-MMS	-PB1 -1102		"	BLANK	ACETONE/MECL FRONT RINSE	200(est)		AAH	7/19/99	
MSD-MMS	-PB1 -1103		"	NO. 1	TOLUENE FRONT RINSE	125 ml		AAH	7/19/99	
MSD-MMS	-PB1 -1104 A BES		"	"	ACETONE/MECL BACK RINSE	875(est)		AAH	7/19/99	
MSD-MMS	-PB1 -1105		"	"	TOLUENE BACK RINSE	300(est)		AAH	7/19/99	
MSD-MMS	-PB1 -1106		"	"	XAD II RESIN	NA		AAH	7/19/99	
MSD-MMS	-PB1 -1107 A BES		"	"	REAGENT GRADE H_2O IN TRAP	200 ml		AAH	7/19/99	
MSD-MMS	-PB1 -1108		"	"	ACETONE/MECL IMPINGER RINSE	240(est.)		AAH	7/19/99	
#25										

CHAIN OF CUSTODY				
Collected by: AA. Hertz / W.T. Anderson	Date/Time 7/19/99 / 2000			
Relinquished by: ETS	Date/Time 7/21/99 10:00	Received by:	Date/Time 7-21-99 1030	
Relinquished by:	Date/Time 7/21/99 1330	Received by:	Date/Time 7/21/99 BES	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

PROOF BLANK #2

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 91L487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO:	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5	-PBZ-1201		UNIT 6	PROOF	FILTER	NA		AA H	7/20/99	
MSD-MM5	-PBZ-1202		"	BLANK	ACETONE/MECL FRONT RINSE	300ml (est)		AA	7/21/99	
MSD-MM5	-PBZ-1203		"	NO. 2	TOLUENE FRONT RINSE	110 (est)		AA	7/21/99	
MSD-MM5	-PBZ-1204 A BES		"	"	ACETONE/MECL BACK RINSE	850ml (est)		AA	7/21/99	
MSD-MM5	-PBZ-1205		"	"	TOLUENE BACK RINSE	200		AA	7/21/99	
MSD-MM5	-PBZ-1206		"	"	XAD II RESIN	NA		AA	7/21/99	
MSD-MM5	-PBZ-1207 A BES		"	"	REAGENT GRADE H_2O	200ml		AA	7/20/99	
MSD-MM5	-PBZ-1208		"	"	ACETONE/MECL IMPINGER RINSE	192ml		AA	7/20/99	

CHAIN OF CUSTODY				
Collected by: AA. Lete / W.J. Underwood	Date/Time 7/20/99 08:00			
Relinquished by: [illegible]	Date/Time 7/21/99 10:30	Received by: [illegible]	Date/Time 7/21/99 10:30	
Relinquished by: [illegible]	Date/Time 7/21/99 1530	Received by: [illegible]	Date/Time 7/21/99 BES 10:30	
Relinquished by:	Date/Time	Received by:	Date/Time	

B-3
Percent Isokinetic Field Calculation Form

APPENDIX B-1-1
STACK SAMPLING FIELD DATA
ISOKINETIC CALCULATIONS

delta H=K*deltaP

NOZZLE SIZER

Put in 35 and 55 ACFH to determine nozzle size range.

Desired Sample Volume	35	ACFH
Stack Temp.	106	degrees F
Moisture %	1	% H2O
Average delta P	1.85	in. H2O

Suggested Nozzle size 0.154697

K - FACTOR CALCULATOR

Choose a nozzle from inside the range and put the actual size in the K-factor calculator below.

delta Ha	1.68611	in. H2O
Meter Temp.	50	degrees F
Barometric	28.6	in. Hg
Static Pressure	0	in. H2O
Nozzle Diameter	0.16	inches
Moisture %	1	%
Stack Temp.	100	degrees F

Update the K factor for temperature changes of >5 degrees F for meterbox temperature and 15 degrees F stack temperature.

K Factor= **0.592544**

k * dP = dH 1.096206

Need to average a dH of 1 or higher to pull 30 dscf/hour.

0.5	0.16
0.52	0.16
0.54	0.17
0.56	0.26
0.54	0.25
0.48	0.25
0.49	0.21
0.49	0.23
0.45	0.26
0.42	0.28
0.34	0.27
0.3	0.28
0.469167	0.231667
0.64	
0.37	
0.5	
0.61	
0.74	
0.82	
0.86	
0.531958	

MOISTURE SATURATION CALCULATOR/STEAM TABLES

Stack Temp.	70	degrees F
Barometric	30.06	in. Hg
Static Pressure	0.18	in. H2O

Maximum % Saturation= 2.459186

SIZING NOZZLES FOR ISOKINETIC SAMPLING

The Method 5 sampling train is intended to operate at a sampling rate of 0.75 scfm. In order to operate at a variety of different sampling velocities while maintaining the same nominal sampling rate of 0.75 cfm, different sizes of nozzle openings are used on the sampling probe. The higher the gas velocity, the smaller the nozzle diameter needed to maintain an isokinetic rate, and vice versa. The equation to calculate an appropriate nozzle diameter is:

$$D_N = \sqrt{\frac{0.0358 \times Q_m \times P_m}{(T_m + 460) \times C_p \times (1 - B_{ws})}} \times \sqrt{\frac{(T_s + 460) \times M_s}{P_s \times \Delta P_{avg}}}$$

where

D_N	=	nozzle diameter, inches
Q_m	=	volumetric flow rate through meter, cfm
P_m	=	absolute pressure at meter, in. Hg
	≈	$P_B + 0.10$
P_s	=	absolute pressure at stack, in. Hg
	=	$P_B + P_{static}/13.6$
T_m	=	anticipated average temperature at meter, °F
T_s	=	average temperature in stack, °F
C_p	=	pitot tube calibration coefficient (0.84 for type S)
B_{ws}	=	water vapor in stack gas, volume fraction
M_s	=	molecular weight of stack gas, wet basis
	=	$M_d*(1-B_{ws}) + 18*B_{ws}$
ΔP_{avg}	=	average velocity head of stack gas, in. W.C.

For most situations, this equation can be simplified by making several assumptions. If Q_m = 0.75 cfm, $P_m = P_s$ = 29.92 in. Hg., M_s = 29.0, C_p = 0.84, then:

$$D_N = 0.97 \times \sqrt{\frac{\sqrt{\frac{T_S + 460}{\Delta P_{AVG}}}}{(T_M + 460)(1 - B_{WS})}}$$

If specific total sample volume limits or sampling rates other than 45 dcf and 0.75 cfm, respectively, are required, be sure to use the full equation. For instance, if a test requires that no more than 120 dscf be collected in three hours, then use a value of 0.67 (120/180) for Q_m in the full equation.

Once D_n is calculated, an actual nozzle is selected from those available closest to the calculated D_n. It should be remembered that a nozzle larger than the calculated D_n will require sampling at a higher ΔH than normally required, while using a nozzle smaller than the calculated D_n will result in a lower ΔH, and consequently, a lower sample volume.

K-FACTOR APPROACH FOR ISOKINETIC SAMPLING

Isokinetic sampling is performed using 3 basic steps:

1) Measure the velocity of the gas stream using a pitot tube.
2) Calculate a sampling ΔH based on the velocity of the gas stream.
3) Adjust the sampling rate of the Method 5 meter box to the calculated ΔH.

Nomographs or calculator programs are often used to calculate the ΔH required for isokinetic sampling. However, it is usually just as easy and convenient to use the K-factor approach to calculate ΔH. In this approach, a constant, K, is determined based on the preliminary traverse data. ΔH is then determined for each ΔP by simple multiplication. All that is required for this procedure is a simple calculator with one memory register. Although a calculator with programmable ability is useful, it is not necessary for this approach.

Isokinetic Rate Equation: The isokinetic rate equation can be written as follows:

$$\Delta H = \left[846.72\ D_N^4\ \Delta H_@\ C_P^2 (1-B_{WS})^2\ \frac{M_d\ (T_M+460)\ P_S}{M_S\ (T_S+460)\ P_M} \right] \Delta P$$

Note that this equation reduces to:

$$\Delta H = K \times \Delta P$$

where

$$K = 846.72\ D_N^4\ \Delta H_@\ C_P^2 (1-B_{WS})^2\ \frac{M_d\ (T_M+460)\ P_S}{M_S\ (T_S+460)\ P_M}$$

The equation for K can be simplified in most cases by assuming that the ratios M_d/M_s and P_s/P_M are equal to one. This is normally justified in non-combustion source stacks with low static pressures (< 3"W.C.) and combustion sources with moisture contents less than 6%.

NOMENCLATURE

B_{ws}= Assumed volume fraction of H_2O in stack

C_p = pitot tube coefficient (0.84 for Type S)

D_n = nozzle diameter (in.)

ΔH = pressure difference of orifice meter required to sample isokinetically (in. H_2O)

$\Delta H_@$= orifice meter coefficient, ΔH for 0.75 cfm at STP (in. H_2O)

M_s = assumed stack gas molecular weight
= $M_d*(1-B_{ws}) + 18*B_{ws}$ (lb/lb-mole)

M_d = dry gas molecular weight (29 for dry air) (lb/lb-mole)

P_s = absolute stack pressure (in. Hg)=$P_B + P_{static}/13.6$

P_m = meter absolute pressure (in. Hg)≈$P_B + 0.10$

ΔP = individual pressure difference of pitot tube for traverse point (in. H_2O)

T_m = average anticipated meter temperature, °F (use ambient + 10° for most cases)

T_s = average stack temperature from preliminary traverse, °F

RUN NUMBER	MSD-MM5-R1	
Date	07/20/99	
Start Time	09:30	
End Time	12:30	
Stack Diam.	40	inches
Nozzle I.D.	0.254	inches
Meter Box Gamma	0.9968	
Meter Box dH@	1.6953	
Barometric	29.25	in.Hg
Cp	0.84	
Test Duration	180	minutes

METHOD 1-4 RESULTS

Metered Volume	109.822	dcf
Volume @ Std.Cond.	101.725	dscf
% Water	4.66	%
% Isokinetics	91.1	%
Velocity	34.31	ft/sec
Actual Flow	17964	acfm
Std. Flow	16143	scfm
Dry Std. Flow	15392	dscfm

METHOD 4 DATA

	INIT. (ml)	FINAL (ml)	NET (ml)
IMP.1	0.0	80.0	80.0
IMP.2	100.0	101.0	1.0
IMP.3	100.0	103.0	3.0
IMP.4	0.0	2.0	2.0
IMP.5			0.0
IMP.6			0.0
XAD	360.0	370.5	10.5
TOTAL	560.0	656.5	96.5
S.G.	200.0	209.0	9.0

METHOD 3 DATA

%O2	13.1	Md	29.38
%CO2	5.4	Ms	28.85
%CO	0.0	Ps	29.24
%N2	81.5	Fo	1.451
O2+CO2	18.5	%EA	156

POINT	STACK TEMP (DegF)	STATIC (in.WC)	DP (in.WC)	DH (in.WC)	METER VOLUME (dcf)	METER TEMPERATURE INLET (DegF)	METER TEMPERATURE OUTLET (DegF)
1	115	-0.16	0.26	0.86	156.859	89	85
2	115		0.25	0.83	266.681	94	85
3	115		0.25	0.83		96	87
4	115		0.26	0.86		99	88
5	116		0.26	0.86		101	89
6	115		0.26	0.86		101	89
7	115		0.26	0.86		102	92
8	115		0.28	0.92		98	89
9	116		0.27	0.89		98	90
10	116		0.29	0.96		98	90
11	115		0.30	0.99		99	91
12	115		0.32	1.10		98	89
13	115		0.31	1.00		102	91
14	115		0.35	1.20		102	91
15	114		0.35	1.20		99	91
16	114		0.38	1.30		102	91
17	114		0.40	1.32		103	92
18	114		0.40	1.32		102	92
19	113		0.41	1.40		103	92
20	114		0.43	1.40		105	94
21	113		0.44	1.50		105	94
22	113		0.40	1.32		105	94
23	115		0.39	1.30		107	96
24	114		0.41	1.40		107	97
25	114		0.38	1.30		105	96
26	114		0.43	1.40		106	97
27	114		0.42	1.40		104	96
28	113		0.41	1.40		102	94
29	113		0.40	1.30		100	94
30	113		0.37	1.20		103	97
31	113		0.34	1.10		102	95
32	113		0.35	1.20		102	95
33	113		0.35	1.20		102	94
34	113		0.29	0.96		103	95
35	113		0.30	0.99		103	96
36	113		0.32	1.10		102	96
AVG.	114	-0.16	0.34	1.14	109.822		97

RUN NUMBER	MSD-MM5-R2	
Date	07/20/99	
Start Time	15:00	
End Time	21:30	
Stack Diam.	40	inches
Nozzle I.D.	0.254	inches
Meter Box Gamma	0.9968	
Meter Box dH@	1.6953	
Barometric	29.55	in.Hg
Cp	0.836	
Test Duration	360	minutes

METHOD 4 DATA

	INIT. (ml)	FINAL (ml)	NET (ml)
IMP.1	0.0	174.0	174.0
IMP.2	100.0	109.0	9.0
IMP.3	100.0	73.0	-27.0
IMP.4	0.0	0.0	0.0
IMP.5			0.0
IMP.6			0.0
XAD	347.0	353.0	6.0
TOTAL	547.0	709.0	162.0
S.G.	872.5	924.2	51.7

METHOD 1-4 RESULTS

Metered Volume	221.709	dcf
Volume @ Std.Cond.	206.517	dscf
% Water	4.65	%
% Isokinetics	91.7	%
Velocity	34.35	ft/sec
Actual Flow	17983	acfm
Std. Flow	16274	scfm
Dry Std. Flow	15518	dscfm

METHOD 3 DATA

%O2	13.8	Md	29.38
%CO2	5.2	Ms	28.86
%CO	0.0	Ps	29.54
%N2	81.0	Fo	1.365
O2+CO2	19.0	%EA	182

POINT	STACK TEMP (DegF)	STATIC (in.WC)	DP (in.WC)	DH (in.WC)	METER VOLUME (dcf)	METER TEMPERATURE INLET (DegF)	METER TEMPERATURE OUTLET (DegF)
1	116	-0.16	0.27	0.86	267.659	96	96
2	118	-0.16	0.25	0.80	329.301	101	96
3	116		0.26	0.83		99	96
4	118		0.25	0.80	331.382	103	96
5	118		0.26	0.83	379.663	103	96
6	118		0.25	0.80		103	96
7	116		0.26	0.83	380.000	103	95
8	118		0.27	0.86	491.786	104	96
9	118		0.29	0.93		107	98
10	118		0.31	1.00		105	96
11	118		0.31	1.00		106	97
12	117		0.31	1.00		104	101
13	118		0.32	1.00		107	101
14	119		0.35	1.10		106	101
15	118		0.35	1.10		106	102
16	118		0.34	1.10		103	99
17	117		0.35	1.10		105	100
18	118		0.36	1.10		106	102
19	116		0.38	1.20		105	101
20	117		0.38	1.20		105	102
21	118		0.38	1.20		105	102
22	116		0.38	1.20		102	96
23	116		0.39	1.30		105	98
24	116		0.40	1.30		108	98
25	116		0.40	1.30		112	101
26	115		0.40	1.30		109	100
27	115		0.39	1.30		108	102
28	115		0.38	1.20		108	101
29	115		0.40	1.30		107	102
30	116		0.40	1.30		107	98
31	115		0.37	1.30		107	99
32	115		0.35	1.20		105	98
33	115		0.37	1.30		105	98
34	115		0.31	1.10		106	98
35	115		0.29	1.00		109	102
36	115		0.29	1.00		108	101
37	116		0.33	1.20		98	95
38	116		0.33	1.20		101	95
39	116		0.34	1.20		103	94
40	115		0.34	1.20		102	94
41	117		0.35	1.20		103	96
42	115		0.35	1.20		103	94
43	117		0.34	1.20		103	98
44	118		0.34	1.20		102	96
45	117		0.35	1.20		102	98
46	116		0.34	1.20		101	94
47	116		0.33	1.20		102	94
48	116		0.33	1.20		99	94
49	118		0.34	1.20		103	95
50	116		0.33	1.20		102	95
51	116		0.32	1.10		102	95
52	116		0.35	1.20		102	96
53	115		0.35	1.20		101	93
54	116		0.36	1.30		103	94
55	116		0.41	1.40		102	95
56	116		0.41	1.40		103	95
57	116		0.41	1.40		102	93
58	115		0.40	1.40		101	92
59	114		0.40	1.40		96	92
60	114		0.41	1.40		95	91
61	113		0.41	1.40		95	88
62	113		0.42	1.50		95	88
63	113		0.40	1.40		95	87
64	114		0.38	1.40		95	88
65	113		0.39	1.40		95	89
66	113		0.39	1.40		95	88
67	113		0.34	1.20		95	87
68	113		0.34	1.20		95	87
69	113		0.33	1.20		95	86
70	112		0.27	0.97		95	88
71	112		0.25	0.90		96	87
72	112		0.26	0.90		95	87
AVG.	116	-0.16	0.35	1.18	221.709		99

RUN NUMBER	MSD-MM5-R3	
Date	07/21/99	
Start Time	10:15	
End Time	16:35	
Stack Diam.	40	inches
Nozzle I.D.	0.254	inches
Meter Box Gamma	0.9968	
Meter Box dH@	1.6953	
Barometric	29.64	in.Hg
Cp	0.8355	
Test Duration	360	minutes

METHOD 1-4 RESULTS

Metered Volume	237.295	dcf
Volume @ Std.Cond.	219.662	dscf
% Water	4.26	%
% Isokinetics	95.9	%
Velocity	34.63	ft/sec
Actual Flow	18133	acfm
Std. Flow	16487	scfm
Dry Std. Flow	15785	dscfm

METHOD 4 DATA

	INIT. (ml)	FINAL (ml)	NET (ml)
IMP.1	0.0	176.0	176.0
IMP.2	100.0	106.0	6.0
IMP.3	100.0	99.0	-1.0
IMP.4	0.0	1.0	1.0
IMP.5			0.0
IMP.6			0.0
XAD	342.0	347.5	5.5
TOTAL	542.0	729.5	187.5
S.G.	872.5	892.5	20.0

METHOD 3 DATA

%O2	13.0	Md	29.40
%CO2	5.5	Ms	28.91
%CO	0.0	Ps	29.53
%N2	81.5	Fo	1.436
O2+CO2	18.5	%EA	153

POINT	STACK TEMP (DegF)	STATIC (in.WC)	DP (in.WC)	DH (in.WC)	METER VOLUME (dcf)	METER TEMPERATURE INLET (DegF)	METER TEMPERATURE OUTLET (DegF)
1	115	-0.16	0.31	1.20	494.149	95	92
2	115	-0.16	0.30	1.10	611.089	96	92
3	115		0.30	1.10	.	102	92
4	114		0.30	1.10	612.500	101	92
5	115		0.30	1.10	732.845	101	93
6	114		0.32	1.20		102	93
7	112		0.37	1.40		102	92
8	113		0.39	1.50		104	92
9	113		0.39	1.50		103	93
10	114		0.34	1.30		103	92
11	113		0.31	1.20		103	93
12	113		0.33	1.30		104	93
13	113		0.33	1.30		105	94
14	113		0.34	1.30		105	94
15	113		0.34	1.30		105	95
16	113		0.36	1.40		105	95
17	112		0.36	1.40		105	95
18	113		0.37	1.40		106	96
19	112		0.43	1.60		106	96
20	112		0.44	1.70		108	96
21	114		0.49	1.90		107	98
22	114		0.46	1.70		107	97
23	114		0.37	1.40		110	100
24	115		0.39	1.50		107	97
25	113		0.40	1.50		110	101
26	113		0.35	1.30		110	101
27	114		0.38	1.40		111	102
28	113		0.36	1.40		111	101
29	113		0.37	1.40		108	101
30	113		0.38	1.40		110	101
31	114		0.30	1.10		112	101
32	113		0.31	1.20		109	102
33	113		0.32	1.20		106	102
34	114		0.24	0.91		112	102
35	113		0.24	0.91		111	101
36	112		0.24	0.91		111	101
37	118		0.29	1.10		105	102
38	116		0.28	1.10		106	102
39	116		0.30	1.20		111	102
40	117		0.30	1.20		112	102
41	118		0.31	1.20		113	103
42	117		0.29	1.10		109	103
43	118		0.30	1.20		112	103
44	117		0.30	1.20		112	104
45	116		0.31	1.20		108	103
46	116		0.33	1.30		112	104
47	118		0.30	1.20		112	104
48	118		0.31	1.20		112	104
49	118		0.35	1.40		113	105
50	117		0.37	1.40		114	105
51	116		0.36	1.40		114	105
52	116		0.40	1.60		115	105
53	117		0.40	1.60		115	106
54	116		0.40	1.60		115	106
55	117		0.45	1.80		115	106
56	118		0.42	1.60		114	106
57	118		0.41	1.60		113	106
58	116		0.42	1.60		112	105
59	116		0.41	1.60		109	105
60	118		0.41	1.60		113	105
61	116		0.42	1.60		113	105
62	118		0.41	1.60		113	105
63	116		0.43	1.70		115	105
64	117		0.41	1.60		114	107
65	116		0.44	1.70		114	106
66	117		0.42	1.60		114	105
67	116		0.36	1.40		113	105
68	117		0.38	1.50		113	105
69	116		0.39	1.50		113	105
70	116		0.28	1.10		114	105
71	116		0.25	0.98		114	106
72	116		0.25	0.98		113	105
AVG.	115	-0.16	0.35	1.36	237.295		105

RUN NUMBER	MSD-MM5-R4	
Date	07/22/99	
Start Time	08:15	
End Time	14:35	
Stack Diam.	40	inches
Nozzle I.D.	0.254	inches
Meter Box Gamma	0.9968	
Meter Box dH@	1.6953	
Barometric	29.63	in.Hg
Cp	0.8355	
Test Duration	360	minutes

METHOD 1-4 RESULTS

Metered Volume	256.119	dcf
Volume @ Std.Cond.	236.604	dscf
% Water	4.76	%
% Isokinetics	97.1	%
Velocity	37.14	ft/sec
Actual Flow	19447	acfm
Std. Flow	17629	scfm
Dry Std. Flow	16790	dscfm

METHOD 4 DATA

	INIT. (ml)	FINAL (ml)	NET (ml)
IMP.1	0.0	187.0	187.0
IMP.2	100.0	100.0	0.0
IMP.3	100.0	101.0	1.0
IMP.4	0.0	0.0	0.0
IMP.5			0.0
IMP.6			0.0
XAD	351.0	355.5	4.5
TOTAL	551.0	743.5	192.5
S.G.	791.5	850.0	58.5

METHOD 3 DATA

%O2	13.4	Md	29.35
%CO2	5.1	Ms	28.81
%CO	0.0	Ps	29.62
%N2	81.5	Fo	1.471
O2+CO2	18.5	%EA	165

POINT	STACK TEMP (DegF)	STATIC (in.WC)	DP (in.WC)	DH (in.WC)	METER VOLUME (dcf)	METER TEMPERATURE INLET (DegF)	METER TEMPERATURE OUTLET (DegF)
1	114	-0.21	0.32	1.30	735.000	89	85
2	114	-0.16	0.30	1.20	861.355	95	86
3	114		0.31	1.20		101	87
4	115		0.30	1.20	862.051	102	89
5	114		0.34	1.30	991.815	102	89
6	114		0.32	1.30		103	90
7	114		0.32	1.30		104	92
8	114		0.35	1.40		105	92
9	115		0.36	1.40		105	92
10	115		0.37	1.40		105	93
11	115		0.37	1.40		105	94
12	115		0.36	1.40		106	94
13	115		0.42	1.60		106	95
14	115		0.42	1.60		107	95
15	114		0.43	1.60		108	95
16	115		0.48	1.90		108	95
17	114		0.49	1.90		112	96
18	115		0.49	1.90		112	96
19	115		0.48	1.90		112	96
20	114		0.49	1.90		113	98
21	115		0.46	1.80		113	98
22	114		0.46	1.80		113	102
23	115		0.46	1.80		114	100
24	115		0.48	1.90		109	100
25	115		0.47	1.80		113	101
26	115		0.46	1.80		113	101
27	115		0.47	1.80		115	101
28	115		0.46	1.80		113	102
29	116		0.47	1.80		113	101
30	116		0.47	1.80		113	102
31	116		0.41	1.60		114	102
32	115		0.42	1.60		113	103
33	115		0.42	1.60		114	102
34	115		0.28	1.10		112	101
35	116		0.27	1.10		112	102
36	116		0.27	1.10		113	101
37	117		0.39	1.50		104	101
38	116		0.40	1.60		111	102
39	117		0.40	1.60		113	102
40	117		0.39	1.50		114	103
41	117		0.40	1.60		109	103
42	117		0.39	1.50		113	103
43	117		0.39	1.50		114	102
44	116		0.40	1.60		114	102
45	117		0.38	1.50		114	102
46	117		0.38	1.50		113	103
47	119		0.37	1.40		114	103
48	119		0.37	1.40		115	104
49	121		0.38	1.40		115	104
50	121		0.38	1.40		115	105
51	119		0.37	1.40		114	104
52	121		0.41	1.60		114	104
53	119		0.41	1.60		115	104
54	120		0.41	1.60		115	104
55	118		0.47	1.80		114	104
56	118		0.48	1.90		116	104
57	118		0.48	1.90		116	105
58	119		0.46	1.80		115	105
59	118		0.46	1.80		116	105
60	118		0.47	1.80		116	105
61	118		0.46	1.80		116	106
62	118		0.45	1.80		117	107
63	118		0.45	1.80		117	106
64	118		0.45	1.80		118	106
65	118		0.44	1.70		117	106
66	118		0.44	1.70		117	106
67	118		0.43	1.70		116	107
68	118		0.42	1.60		118	107
69	119		0.42	1.60		119	111
70	119		0.26	1.00		119	111
71	119		0.27	1.10		116	110
72	119		0.27	1.10		117	110
AVG.	117	-0.19	0.40	1.57	256.119		106

B-4
Process Samples Field Data

Scrubber Solution Sample Collection

Plant: ~~#1~~ ~~#2~~ ~~#3~~
Date: 7-20-99 Day 1 trial #2
Sample Collection Point: _____
Sampler: Brian Canterbury
Volume Collected: H_2O = 1000mL x 2 (in + out) sludge - 500mL for each sam period

COMMENTS:
"WI" = water input into scrubber
"WO" = water output - drainage from scrubber

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge #2-1	3:09	
WI #2-1	3:17	30°C 7.27 pH
WO #2-1	3:21	46°C 6.53 pH
Sludge #2-2	4:00	
WI #2-2	4:07	31°C 7.37 pH
WO #2-2	4:11	48°C 6.35 pH
Sludge #2-3	5:05	
WI #2-3	5:11	31°C 7.45 pH
WO #2-3	5:14	47°C 6.47 pH
Sludge #2-4	6:06	
WI #2-4	6:09	31°C 7.44 pH
WO #2-4	6:13	47°C 6.50 pH
Sludge #2-5	7:16	
WI #2-5	7:22	30°C 7.36 pH
WO #2-5	7:24	46°C 6.54 pH
Sludge #2-6	8:40	
WI #2-6	8:48	30°C 7.36
WO #2-6	8:50	46°C 6.55 pH

troubleshooting. delay ~~filter~~ port change

~~filter~~ port change

Scrubber Solution Sample Collection

Plant: MSD.
Date: 7-21-99
Sample Collection Point:
Sampler: Brian Canterbury
Volume Collected: 1000 mL WI; 1000 mL WO; 500 cc sludge
COMMENTS:

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge 3-1	10:19	
WI 3-1	10:25	30°C 7.51 pH
WO 3-1	10:29	46°C 6.60 pH
Sludge 3-2	11:16	
WI 3-2	11:22	31°C 7.47 pH
WO 3-2	11:27	47°C 6.69 pH
Sludge 3-3	12:17	
WI 3-3	12:22	30°C 7.46 pH
WO 3-3	12:27	50°C 6.55 pH
Sludge 3-4	1:36	
WI 3-4	1:42	30°C 7.47 pH
WO 3-4	1:46	49°C 6.63 pH
Sludge 3-5	2:35	
WI 3-5	2:40	30°C 7.49 pH
WO 3-5	2:43	49°C 6.45 pH
Sludge 3-6	3:37	
WI 3-6	3:43	31°C 7.48 pH
WO 3-6	3:48	51°C 6.50 pH

port change @ 1:15

Scrubber Solution Sample Collection

Plant: MSD
Date: 7-22-99
Sample Collection Point:
Sampler: Brian Canterbury
Volume Collected: 1000 mL WI, 1000 mL WO 500 cc sludge

COMMENTS:

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge 4-1	8:15	
WI 4-1	8:23	30°C pH 7.46
WO 4-1	8:26	51°C pH 6.45
Sludge 4-2	9:17	
WI 4-2	9:23	30°C pH 7.55
WO 4-2	9:25	49°C pH 6.58
Sludge 4-3	10:17	
WI 4-3	10:22	31°C pH 7.40
WO 4-3	10:25	51°C pH 6.46
Port change @ 11:15 → Sludge 4-4	11:45	
WI 4-4	11:51	30°C pH 7.27
WO 4-4	11:54	51°C pH 6.45
Sludge 4-5	12:45	
WI 4-5	12:53	31°C pH 7.49
WO 4-5	12:55	49°C pH 6.66
Sludge 4-6	1:45	
WI 4-6	1:51	31°C pH 7.41
WO 4-6	1:54	51°C pH 6.49

APPENDIX C

Calibration Data for Field Equipment

C-1
Summary of Field Equipment Used During Field Program

Table 9-2. Field Equipment List

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
Air Sampling Equipment					
MM5 Hardware					
Meter Boxes (Consoles and Pumps)	Must have recent calibrations	3	ETS		
Umbilicals	25 foot	3	ETS		
Impinger Arms		3	ETS		
Water Recirculation Pumps		3	ETS		
Impinger Caddies	Large	3	ETS		
Heater Boxes	Nutech w/Large Clamp	3	ETS		
Method 23 Towers		2	ETS		
4-ft Effective Probes	New Style	2	ETS		
Heating Jackets	New Style	4	ETS		
Pitot Tips	New - With Recent Cals	2	ETS		
Glass Liners	Fit 4-ft Probe - New	3	ETS		
5/8 Teflon Unions	New	3	ETS		
Glass Nozzle Kits	Complete	2	ETS		
Thomas Pump for Pitot Back Purge	Small	2	ETS		
MM5 Glassware/Reagents/Recovery					
Threaded Filter Housings	Teflon Frits, Extra Caps and Rings	3	ETS		
Double L's		3	ETS		
Condensers		3	ETS		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
XAD Traps	Spiked, Prepped	10	ETS/ Battelle		
2-L Screw Impingers	Modified Stems	3	ETS		
1-L Ball Impingers	O-Ring - Standard Stems	3	ETS		
1-L Ball Impingers	O Ring - Modified Stems	9	ETS		
Screw to Ball Adapter	Adapt 1st Impinger to Balljoint	3	ETS		
Filters - Binder Free	Quartz - Cleaned	12	ETS/ Battelle		
Water	4-L Jug - HPLC Grade	1	ETS		
Silica Gel	Bulk	4+ kg	ETS		
Acetone	4-L Jug - Highest Grade	4	ETS		
Methylene Chloride	4-L Jug - Highest Grade	4	ETS		
Toluene	4-L Jug - Highest Grade	4	ETS		
Hexane-Rinsed Aluminum Foil	Thick	10 ft	ETS		
Teflon Tape	1-in.Width	6 rolls	ETS		
Teflon Probe Brush	6-ft Length (clean and in foil)	2	ETS		
Teflon Rinse Bottle	125 mL	4	ETS		
Glass Funnel	In Foil	4	ETS		
Metal Spatula	In Foil	2	ETS		
Metal Tweezers	In Foil	2	ETS		
Ring Stands		4	ETS		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
Waste Jug	4 L	2-3	ETS		
5/8-in. x 5/8-in. x 1/4-in. 3-way Stopcocks	Soak Configuration	3	ETS		
Timer/Stopwatch		2	ETS		
1-L Erlenmeyer Flasks	Clean Glass	2	ETS		
250-mL Graduated Cylinders	Clean Glass	6	ETS		
1000-mL Graduated Cylinders	Clean Glass	2	ETS		
Petri Dishes + Lids (Container 1)	Clean glass	12	ETS		
Front-Half Rinse Catch Bottle (Container 2)	500-mL Amber Glass - Teflon-lined Cap	12	ETS		
Front-Half Rinse Catch Bottle (Container 3)	250-mL Amber Glass - Teflon-lined Cap	12	ETS		
Back-Half Rinse Catch Bottles (Container 4)	1000-mL Amber Glass - Teflon-lined Cap	24	ETS		
Back-Half Rinse Catch Bottle (Container 5)	1000-mL Amber Glass - Teflon-lined Cap	12	ETS		
Impinger Liquid Catch Bottles (Container 7)	1000-mL Amber glass - Teflon-lined Cap	24	ETS		
Impinger Rinse Catch Bottle (Container 8)	250-mL Amber Glass - Teflon-lned cap	12	ETS		
Silica Gel Containers (Container 9)	500-mL Nalgene Bottles	12	ETS		
Triple Beam Balance		2	ETS		
Refrigerator		1	ETS		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
Methods 3A/10 Hardware					
CO Analyzers	10,000 ppm Span	2	ETS		
O_2 Analyzers		2	ETS		
CO_2 Analyzers		2	ETS		
3-4 ft CEM Probes		2	ETS		
CEM Probe Heaters	3-4 ft	3	ETS		
CEM Filter Assemblies		2	ETS		
CEM Heaters		3	ETS		
Silicon Heat Strips		2	ETS		
3-4 ft Heated CEM Jumpers	Heated 3/8-in. Teflon	3	ETS		
Condensers		3	ETS		
Peristaltic Pumps	Variable Speed or Steady-Rate	2	ETS		
200-ft Dry Sample Lines		2	ETS		
Propane CGA Low Gas	60-90 ppm, 800+ psi	1	ETS		
Propane CGA Mid Gas	124.6 ppm, 800+ psi	1	ETS		
O_2/CO_2 Mid Cal Gas	10-15% $O_{2/8}$-12% CO_2	1	ETS		
O_2/CO_2 High Cal Gas	20-25% $O_{2/16}$-20%CO_2	1	ETS		
CO 3000 ppm span	30% - ~900 ppm 60% - ~1800 ppm 100%- ~3000ppm	1 each	ETS		
Zero Nitrogen	1000+ psi	1	ETS		
Spare CEM Filters		5	ETS		
Spare Masterflex Tubing		10'	ETS		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
ETS Fittings Box	Stocked	1	ETS		
Tubing Box	Stocked	1	ETS		
CEMS Computer	CARS Loaded	1	ETS		
Scaffolding					
Four 5-ft Bucks	Must form 4 x 8 "L" with Two Sections		ETS		
Safety Rails, Running Boards, Toe Boards, Ladder	As Needed		ETS		
Miscellaneous Hardware and Equipment					
Rope		50 ft	ETS		
Duct Tape		4 rolls	ETS		
2 x 6 x 8 Lumber		2	ETS		
2 x 4 x 8 Lumber		4	ETS		
Nails			ETS		
C Clamps	8-inch	4	ETS		
Hand Truck		1	ETS		
Extension Cords	100 ft	5	ETS		
Extension Cords	25 ft	2	ETS		
Power Strips		6	ETS		
Stove Switch		3	ETS		
3-Way Plugs		2	ETS		
Tool Boxes	With Saw and Hammer	2	ETS		
Ice-Only Coolers		3	ETS		
Radios and Chargers		4	ETS		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
Data Computers		2	ETS		
Printer	Paper, Cable, and Spare Cartridge	1	ETS		
Sample Labels	Both Air and Process Samples		ETS		
Process Sampling/ Analysis					
Large Cookie Sheets	Aluminum, Hexane Rinsed	4	Battelle		
Teflon Scoop	Capacity	3	Battelle		
Large Separatory Funnel	2 L	2	Battelle		
Ring Stand For Large Funnel		1	Battelle		
Scrubber Water Sample Jars (Subsamples)	250-mL Amber Glass - Teflon-lined Cap	120	ETS		
Scrubber Water Sample Jars (Composites)	1000-mL Amber Glass - Teflon-lined Cap	24	ETS		
Scrubber Water Sample Jars (Composites)	250-mL Amber Glass - Teflon-lined Cap	24	ETS		
Sludge Sample Jars	1000-mL Amber Glass - Teflon-lined Cap	12	ETS		
Sludge Sample Jars	250-mL Amber Glass - Teflon-lined Cap	12	ETS		
pH Meter	Calibration Standards	2	ETS		
New Coolers for Samples		12	Battelle		
Blue Ice	Packs	36	Battelle		
Gallon Zip-Loc Bags	Boxes of 100	3	Battelle		

Table 9-2. (Continued)

Item	Comment	No.	ETS/ Battelle	Technician Initials	PM/QAC Initials
Thermometers for Coolers		12	Battelle		

C-2
Equipment Calibration Forms

E T S , I N C .

METER CONSOLE CALIBRATION FORM

Contract No. 99-487w2
Job I.D.

Print Date 07/14/99

Meter Box No.: 12
Delta H: 1.5953
Gamma: 0.9968

Analyst: _____
Calibration Date: 07/14/99
Test Meter No. 9548
Barometric Pressure 29.02

QA/QC Check: _____
Previous Calibration Date: 03/04/99
Previous Gamma: 0.9792

Temp Check
Ice H2O 33 degrees F
Boiling H2O 213 degrees F

Run	Orf Set	Initial Test	Final Test	Volume Test	Init Temp	Finl Temp	Test Temp	Initial Box	Final Box	Volume Box	I-I Temp	I-O Temp	F-I Temp	F-O Temp	Temp	Time	Delta H	Gamma
1	0.5	644.054	654.557	10.503	76.0	76.0	76.00	88.678	99.208	10.530	78.0	78.0	78.0	81.0	78.75	25.0	1.65017	1.00128
2	1.0	654.956	665.408	10.452	76.0	76.0	76.00	99.603	110.123	10.520	81.0	79.0	81.0	85.0	81.50	17.5	1.62469	1.00119
3	1.5	665.632	677.052	11.420	76.0	77.0	76.50	110.350	121.916	11.566	85.0	81.0	82.0	88.0	84.00	16.0	1.70177	0.99739
4	2.0	677.242	688.220	10.978	76.0	76.0	76.00	122.108	133.390	11.282	88.0	82.0	84.0	90.0	86.00	13.5	1.73840	0.98621
5	2.5	688.435	698.494	10.059	76.0	76.0	76.00	133.495	143.764	10.269	89.0	83.0	84.0	91.0	86.75	11.0	1.71600	0.99291
6	3.0	698.803	709.236	10.433	76.0	76.0	76.00	144.186	154.750	10.564	90.0	84.0	85.0	92.0	87.75	10.5	1.74097	1.00164

C-2-1

Dry Gas Meter, Pitot Tube Calibrations
(MM5 Field Train)

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 1 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	0	0	0.000
2	35	35	0.006
3	101	103	-0.357
4	202	205	-0.453
5	302	305	-0.394
6	402	402	-0.233
7	503	502	-0.208
8	600	603	-0.283
9	700	704	-0.345
10	800	802	-0.159
11	902	905	-0.220
			-0.241 AVERAGE DIFF

Calibration Performed By ..... A.P.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 2 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	0	2	-0.435
2	32	33	-0.203
3	100	102	-0.357
4	202	204	-0.302
5	301	304	-0.394
6	401	403	-0.239
7	504	505	-0.104
8	601	604	-0.263
9	703	707	-0.344
10	799	801	-0.159
11	901	905	-0.294
			-0.262 AVERAGE DIFF

Calibration Performed By ..... R.D.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HH71 CAL-R
THERMOCOUPLE NUMBER 3 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	1	4	-0.651
2	32	34	-0.407
3	101	103	-0.357
4	200	203	-0.455
5	301	305	-0.526
6	402	407	-0.580
7	501	506	-0.520
8	601	605	-0.377
9	701	706	-0.303
10	800	804	-0.317
11	900	905	-0.368
			-0.469 AVERAGE DIFF

Calibration Performed By ..... A.D.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No.... ..... 12 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 4 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	1	5	-0.860
2	32	35	-0.610
3	101	105	-0.713
4	201	205	-0.605
5	299	305	-0.791
6	402	406	-0.464
7	498	502	-0.418
8	600	605	-0.472
9	704	712	-0.607
10	798	801	-0.236
11	902	906	-0.294
			-0.560 AVERAGE DIFF

Calibration Performed By ..... A.D.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HH71 CAL-K
THERMOCOUPLE NUMBER 5 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	0	2	-0.435
2	32	34	-0.407
3	100	103	-0.536
4	201	205	-0.605
5	300	304	-0.326
6	402	407	-0.348
7	501	504	-0.312
8	600	604	-0.377
9	700	705	-0.431
10	799	802	-0.238
11	900	904	-0.294
			-0.418 AVERAGE DIFF

Calibration Performed By ..... A.D.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HA71 CAL-K
THERMOCOUPLE NUMBER 6 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	0	3	-0.652
2	33	35	-0.406
3	101	104	-0.535
4	200	205	-0.758
5	305	312	-0.915
6	400	405	-0.581
7	501	504	-0.312
8	601	604	-0.283
9	700	705	-0.431
10	802	807	-0.396
11	902	911	-0.661
			-0.539 AVERAGE DIFF

Calibration Performed By ..... A.D.Allen

Post Test Calibration-Contract #\- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

R

E.T.S. INC.
METER CONSOLE CALIBRATION FORM

Meter Box No..... 12 REFERENCE CALIBRATOR HA71 CAL-K
THERMOCOUPLE NUMBER 7 Date 09-Mar-99

	Reference Temperature	Thermocouple Temperature	Difference %
1	0	4	-0.879
2	35	38	-0.686
3	100	103	-0.536
4	200	204	-0.686
5	300	306	-0.789
6	401	405	-0.465
7	500	503	-0.313
8	600	605	-0.472
9	701	706	-0.431
10	799	802	-0.238
11	899	904	-0.368
			-0.518 AVERAGE DIFF

Calibration Performed By ..... A.D.Allen

Post Test Calibration-Contract #:- ----------

Pre-Test Calibration-Contract #- ----------

Comments:

R

ETS, Inc
PITOT TUBE CALIBRATION WORKSHEET

Date: 05/21/99
Pitot Tube Identification #: 233
Calibrated By: J.McKenna

SIDE "A" CALIBRATION

RUN NO.	delta P std. (in. Water)	delta P (s) (in. Water)	Cp (s)	DEVIATION Cp(s) - Cp(A)
1	0.41	0.57	0.8396	0.0034
2	0.41	0.57	0.8396	0.0034
3	0.40	0.57	0.8293	-0.0069

Avg. Cp for Side A - Cp(A): 0.8362

SIDE "B" CALIBRATION

RUN NO.	delta P std. (in. Water)	delta P (s) (in. Water)	Cp (s)	DEVIATION Cp(s) - Cp(B)
1	0.41	0.57	0.8396	0.0048
2	0.41	0.58	0.8324	-0.0024
3	0.41	0.58	0.8324	-0.0024

Avg. Cp for Side B - Cp(B): 0.8348

Avg. Dev. Side "A": 3.701E-17 (Allowable Limit =(0.01)
Avg. Dev. Side "B": 3.701E-17 (Allowable Limit =(0.01)
Cp(A) - Cp(B): 0.0014 (Allowable Limit =(0.01)

Cp for Pitot # 233 : 0.8355

Comments:

C-2-2

Raw Field Data Sheets – Post Test Meter Box Field Audit

TABLE C-1 - Post-Test Calibration
Alternative Method 5 Sampling Train - Dry Gas Meter Box
Cincinnati MSD Incinerator Test Program

METER BOX ID	ETS-12
Meter Box dH@	1.6953 in W.C.
Meter Box Gamma	0.9968
Avg. Cal. Check (Yqa)	1.0391
Percent Error	4.23 %

RUN NUMBER	**AUDIT-RUN 1**
Barometric	29.63 in Hg
Sample Run Time	20 min
Metered Volume	15.888 dcf
Avg. Meter Temp.	113 F
	572.9 R
Average dH	1.9 in W.C.
Average Sqrt (dH)	1.38
Dry Molecular Wt. (Md)	28.84 lb/lb-mole
Cal Check (Yqa)	1.0470

RUN NUMBER	**AUDIT-RUN 2**
Barometric	29.63 in Hg
Sample Run Time	20 min
Metered Volume	12.878 dcf
Avg. Meter Temp.	116 F
	575.6 R
Average dH	1.3 in W.C.
Average Sqrt (dH)	1.14
Dry Molecular Wt. (Md)	28.84 lb/lb-mole
Cal Check (Yqa)	1.0718

RUN NUMBER	**AUDIT-RUN 3**
Barometric	29.63 in Hg
Sample Run Time	20 min
Metered Volume	10.936 dcf
Avg. Meter Temp.	110 F
	570.4 R
Average dH	0.82 in W.C.
Average Sqrt (dH)	0.91
Dry Molecular Wt. (Md)	28.34 lb/lb-mole
Cal Check (Yqa)	0.9985

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

POST-TEST DGM AUDIT - CONDITION 1 (LOW)

FACILITY: CINCINNATI MSD TEST LOCATION: #6 INCINERATOR DATE: 7/22/94

START TIME: 1500 END TIME: 1520 POLLUTANT: RUN I.D.: DGM - M - R 1

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	0	1500				.82	992.246	112	111					
	5					.82	994.46	111	108					
	10					.82	997.65	113	107					
	15					.82	000.34	114	106					
	20	1520				.82	003.182	115	107					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION

LEAK CHECK: BACK-HALF LEAK CHECK

VACUUM	7"				
RATE	0.0				

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1		
#2		
#3		
#4		
#5		
#6		

NOZZLE Φ	NA
PITOT #	NA
BOX I.D.	12
GAMMA Y	0.9968
ΔH@	1.6953
P_{bar}	29.63
FILTER	NA
TECH.	FR/WTU

POST-TEST
DGM AUDIT – CONDITION 2 (HIGH)

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

FACILITY: CINCINNATI MSD TEST LOCATION: #6 INCINERATOR DATE: 7/22/99

START TIME: 1525 END TIME: 1545 POLLUTANT: RUN I.D.: DGM - M - R 2

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft^3	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
	0	1525				1.9	007.027	113	106					
	5					1.9	008.01	116	107					
	10					1.9	011.99	118	107					
	15					1.9	015.93	120	110					
	20	~~TOT~~	1545			1.9	019.909	120	112					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION

LEAK CHECK:

VACUUM					
RATE					

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1		
#2		
#3		
#4		
#5		
#6	C-23	

NOZZLE Φ	NA
PITOT #	NA
BOX I.D.	12
GAMMA Y	0.9968
ΔH@	1.6953
P_{BAR}	29.63
FILTER	NA
TECH.	FPC/WTO

EPA MODIFIED METHOD 0010 ISOKINETIC SAMPLING DATA SHEET

POST-TEST DGM AUDIT – CONDITION 3 (MID)

FACILITY: CINCINNATI MSD TEST LOCATION: #6 INCINERATOR DATE: 7/22/99

START TIME: 15:50 END TIME: 16:10 POLLUTANT: RUN I.D.: DGM - M - R 3

POINT	SAMPLE TIME	TIME	STATIC	STACK TEMP.	STACK ΔP	METER ΔH	DGM VOLUME ft³	DGM TEMP. INLET	DGM TEMP. OUTLET	XAD EXIT	PROBE TEMP	IMP EXIT	FILTER TEMP.	VAC
0	1550					1.3	020.376	119	112					
5						1.3	023.56	117	111					
10						1.3	026.84	118	112					
15						1.3	030.37	120	113					
20	1610					1.3	033.254	121	113					

CHAIN OF CUSTODY:

CONTAINER	SAMPLE I.D.	DESCRIPTION

LEAK CHECK:

VACUUM					
RATE					

IMPINGER CONTENTS:

IMPINGER	INITIAL	FINAL
#1		
#2		
#3		
#4		
#5		
#6		

NOZZLE Φ	
PITOT #	
BOX I.D.	
GAMMA Y	
ΔHΘ	
P_{BAR}	
FILTER	
TECH.	

C-2-3

Cylinder Gas Audits Summary Sheets
- O_2, CO_2, CO
- THC

TABLE C-1 - Cylinder Gas Audit Results
Reference Method Analyzers

CEMS Information						
Analyzer Type	Oxygen		Carbon Dioxide		Carbon Monoxide	
Manufacturer	Teledyne		Horiba		TECO	
Model Number	320A		PIR-2000		48H	
Serial Number	102469		91-20-15		48-25815-222	
Span Value/Range	25% dv		20% dv		6000 ppmdv	
Cylinder Gas	*Audit Point 1*		*Audit Point 1*		*Audit Point 1*	
Information	14.2 % dv		5.93 % dv		467.0 ppmdv	
Certified Audit Value	AAL9476		AAL9476		ALM008858	
(C_a)	Protocol 1		Protocol 1		Protocol 1	
Cylinder I.D. Number	04/07/99		04/07/99		02/08/99	
Type of Certification						
Certification Date						
Audit Results	July 22, 1999		July 22, 1999		July 22, 1999	
	(% dv)	Time	(% dv)	Time	(ppm)	Time
Test 1	14.10	07:18	5.93	07:18	443.8	07:22
Test 2	13.94	07:26	5.94	07:26	444.4	07:30
Test 3	14.25	07:32	5.90	07:32	444.8	07:36
Average Response	14.10 % dv		5.92 % dv		444.3 ppm	
(C_m)	-0.7 %		-3.5 %		-4.9 %	
Accuracy (A)*						

TABLE C-1 - Cylinder Gas Audit Results
Hydrocarbon Analyzer

CEMS Information	**PRE-TEST AUDIT**		**POST-TEST AUDIT**	
Analyzer Type	Total Hydrocarbon		Total Hydrocarbon	
Manufacturere	Horiba		Horiba	
Model Number	MPA-510		MPA-510	
Serial Number	57034007		57034007	
Span Value/Range	300 ppmwv		300 ppmwv	
Cylinder Gas Information	*Audit Point 1*	*Audit Point 2*	*Audit Point 1*	*Audit Point 2*
Certified Audit Value (C_a)	86.6 ppm	124.6 ppm	86.6 ppm	124.6 ppm
Cylinder I.D. Number	CC90980	CC94773	CC90980	CC94773
Type of Certification	Protocol 1	Protocol 1	Protocol 1	Protocol 1
Certification Date	04/22/98	10/05/98	04/22/98	10/05/98
Audit Results	July 19, 1999	July 19, 1999	July 22, 1999	July 22, 1999
	(ppm) Time	(ppm) Time	(ppm) Time	(ppm) Time
Test 1	85.9 11:22	124.1 11:17	82.8 14:47	120.3 14:43
Test 2	85.9 11:28	124.1 11:24	81.0 14:57	119.1 14:57
Test 3	85.9 11:37	124.1 11:33	78.1 15:11	114.6 15:03
Average Response (C_m)	85.9 ppm	124.1 ppm	80.6 ppm	118.0 ppm
Accuracy (A)*	-0.8 %	-0.4 %	-6.9 %	-5.3 %

TABLE C-1 - Battelle Calibration Gas Cylinder Audit
Reference Method Analyzers
Raw CARS data for calibration gas cylinder audit
Cincinnati MSD Incinerator Test Program

Month	Day	Year	Time	CO2 %dv	CO ppmdv	O2 %dv
7	22	99	711	0.15	1820.00	0.05
7	22	99	712	0.13	590.00	0.04
7	22	99	713	0.13	8.05	0.04
7	22	99	714	0.13	6.32	0.03
7	22	99	715	0.12 Z	5.87 Z	0.03 Z
7	22	99	716	0.14	6.21	0.19
7	22	99	717	5.27	5.20	12.94
7	22	99	718	5.93 C	-6.21	14.10 C
7	22	99	719	5.78	-6.04	12.95
7	22	99	720	0.53	162.60	0.69
7	22	99	721	0.15	441.60	0.07
7	22	99	722	0.13	443.80 C	0.04
7	22	99	723	0.12	444.20	0.03
7	22	99	724	2.22	430.30	5.62
7	22	99	725	5.88	96.30	13.74
7	22	99	726	5.94 C	-2.52	13.94 C
7	22	99	727	5.33	-5.59	11.97
7	22	99	728	0.34	206.00	0.37
7	22	99	729	0.15	441.80	0.07
7	22	99	730	0.13	444.40 C	0.05
7	22	99	731	4.24	350.20	10.98
7	22	99	732	5.90 C	18.73	14.25 C
7	22	99	733	5.94	-5.48	14.14
7	22	99	734	1.35	106.40	2.30
7	22	99	735	0.16	428.70	0.10
7	22	99	736	0.13	444.80 C	0.05
7	22	99	737	0.12	445.10	0.04
7	22	99	738	0.12	446.00	0.03
7	22	99	739	0.13	445.60	0.12
7	22	99	740	0.14	445.40	0.86

Z zero calibration gas
C cylinder gas audit

C-2-4

Raw Field Data Sheets – Cylinder Gas Audits
- O_2, CO_2, CO
- THC

Marker	Description	Display	Average
A	Data was Absent from original raw data file.	√	
C	CYLINDER GAS AUDIT	√	√
D	DELAY FOR SAMPLING TRAIN TROUBLESHOOTING	√	
H	HIGH CALIBRATION GAS	√	
L	LOW CALIBRATION GAS	√	
M	MID CALIBRATION GAS	√	
P	SAMPLING POINT	√	√
R	RESPONSE TIME	√	
Z	ZERO CALIBRATION GAS	√	
*	Data was not used in calculated parameter averages.		

METROPOLITAN SEWER DISTRICT
SEWAGE SLUDGE INCINERATOR
CALIBRATION GAS CYLINDER AUDIT
JULY 22, 1999

Starting
07-22-99

Time	O2 %dv	CO2 %dv	CO ppmdv
07:11	0.05	0.15	1820.00
07:12	0.04	0.13	590.00
07:13	0.04	0.13	8.05
07:14	0.03	0.13	6.32
07:15	0.03Z	0.12Z	5.87Z
07:16	0.19	0.14	6.20
07:17	12.94	5.27	5.20
07:18	14.10C	5.93C	-6.20
07:19	12.95	5.78	-6.04
07:20	0.69	0.53	162.60
07:21	0.07	0.15	441.60
07:22	0.04	0.13	443.80C
07:23	0.03	0.12	444.20
07:24	5.62	2.22	430.30
07:25	13.74	5.88	96.30
07:26	13.94C	5.94C	-2.52
07:27	11.97	5.33	-5.59
07:28	0.37	0.34	206.00
07:29	0.07	0.15	441.80
07:30	0.05	0.13	444.40C
07:31	10.98	4.24	350.20
07:32	14.25C	5.90C	18.73
07:33	14.14	5.93	-5.48
07:34	2.30	1.35	106.40
07:35	0.10	0.16	428.70
07:36	0.05	0.13	444.80C
07:37	0.04	0.12	445.10
07:38	0.03	0.12	446.00
07:39	0.12	0.13	445.60
07:40	0.86	0.14	445.40

CYLINDER GAS AUDIT (CGA)
DATA FORM

Date of Audit: 7/22/99

FACILITY INFORMATION

Facility Name: Cincinnati MSD

Address:

Source ID:

CEMS INFORMATION

Analyzer Type: O_2

Sample Location: ETS Truck

Manufacturer: Teledyne

Model No.: 320A

Serial No: (ETS #2) 102469

Span Value: 25%

Range: 25%

CYLINDER GAS INFORMATION

Audit Point:	1 (units)	2 (units)
Certified Audit Value (C_a):	14.2 (%dry)	( )
Cylinder ID No.:	AAL 9476	
Type of Certification:		
Certification Date:	4/7/99	

AUDIT RESULTS

Audit Point:	1 (units)	time	2 (units)	time
Test 1:	14.10 (%dry)	07:18	( )	:
Test 2:	13.94 (%dry)	07:26	( )	:
Test 3:	14.25 (%dry)	07:32	( )	:
Average Response (C_m):	14.10 (%dry)		( )	
Accuracy (A):	-0.70 (%)		(%)	

Equation 1-1 from 40 CFR 60 Appendix F, "*Calculations for CEMS Data Accuracy*"

$$A = \left(\frac{C_m - C_a}{C_a}\right) \times 100$$

CEMS must meet either of the following, whichever is greater:

1) +/- 15 percent of the average audit value
2) +/- 5 ppm

CYLINDER GAS AUDIT (CGA)
DATA FORM

Date of Audit: 7/22/99

FACILITY INFORMATION

Facility Name: Cincinnati MSD

Address:

Source ID:

CEMS INFORMATION

Analyzer Type: CO_2

Sample Location: ETS Truck

Manufacturer: HORIBA

Model No.: PIR-2000

Serial No: (ETS #5) 91-20-15

Span Value: 20%

Range: 20%

CYLINDER GAS INFORMATION

Audit Point:	1 (units)	2 (units)
Certified Audit Value (C_a):	6.13 (% dv)	( )
Cylinder ID No.:	AAL9476	
Type of Certification:		
Certification Date:	4/7/99	

AUDIT RESULTS

Audit Point:	1 (units)	time	2 (units)	time
Test 1:	5.93 (% dv)	07:18	( )	:
Test 2:	5.94 (% dv)	07:26	( )	:
Test 3:	5.90 (% dv)	07:32	( )	:
Average Response (C_m):	5.92 (% dv)		( )	
Accuracy (A):	-3.54 (%)		(%)	

Equation 1-1 from 40 CFR 60 Appendix F, "*Calculations for CEMS Data Accuracy*"

$$A = \left(\frac{C_m - C_a}{C_a}\right) \times 100$$

CEMS must meet either of the following, whichever is greater:

1) +/- 15 percent of the average audit value
2) +/- 5 ppm

CYLINDER GAS AUDIT (CGA)
DATA FORM

Date of Audit: 7/22/99

FACILITY INFORMATION

Facility Name: Cincinnati MSO

Address:

Source ID:

CEMS INFORMATION

Analyzer Type: CO

Sample Location: ETS Trucks

Manufacturer: TECO

Model No.: 48H

Serial No: (ETS #1) 48-25815-222

Span Value: 6000 ppmdv

Range: 10000 ppmdv

CYLINDER GAS INFORMATION

Audit Point:	1 (units)	2 (units)
Certified Audit Value (C_a):	467.0 (ppmdv)	( )
Cylinder ID No.:	ALM008858	
Type of Certification:	PROTOCOL 1	
Certification Date:	2/8/99	

AUDIT RESULTS

Audit Point:	1 (units)	time	2 (units)	time
Test 1:	443.8 (ppmdv)	07:22	( )	:
Test 2:	444.4 (ppmdv)	07:30	( )	:
Test 3:	444.8 (ppmdv)	07:36	( )	:
Average Response (C_m):	444.3 (ppmdv)		( )	
Accuracy (A):	-4.86 (%)		(%)	

Equation 1-1 from 40 CFR 60 Appendix F, "*Calculations for CEMS Data Accuracy*"

$$A = \left(\frac{C_m - C_a}{C_a}\right) \times 100$$

CEMS must meet either of the following, whichever is greater:

1) +/- 15 percent of the average audit value
2) +/- 5 ppm

PRE-TEST AUDIT

CYLINDER GAS AUDIT (CGA)
DATA FORM

Date of Audit: 7/19/99

FACILITY INFORMATION

Facility Name: CINCINNATI MSD

Address: 1600 GEST ST
CINCINNATI OH

Source ID:

CEMS INFORMATION

Analyzer Type: HORIBA, WET/EXTRACTIVE THC

Sample Location: #6 INCINERATOR

Manufacturer: HORIBA

Model No.: MPA-510

Serial No: 57034007

Span Value: 300ppm

Range: 300ppm

CYLINDER GAS INFORMATION

Audit Point:	1 (units)	2 (units)
Certified Audit Value (C_a):	86.6 (ppm)	124.6 (ppm)
Cylinder ID No.:	CC90980	CC94773
Type of Certification:	PROTOCOL 1	PROTOCOL 1
Certification Date:	4/22/98	10/5/98

AUDIT RESULTS

Audit Point:	1 (units)	time	2 (units)	time
Test 1:	85.9 (ppm)	11:22:00	124.1 (ppm)	11:17:15
Test 2:	85.9 (ppm)	11:28:45	124.1 (ppm)	11:24:30
Test 3:	85.9 (ppm)	11:37:30	124.1 (ppm)	11:37:00
Average Response (C_m):	135 Sec		135 (Sec)	
Accuracy (A):	(%)		(%)	

Equation 1-1 from 40 CFR 60 Appendix F, "*Calculations for CEMS Data Accuracy*"

$$A = \left(\frac{C_m - C_a}{C_a}\right) \times 100$$

CEMS must meet either of the following, whichever is greater:

1) +/- 15 percent of the average audit value
2) +/- 5 ppm

Post-Test Audit

CYLINDER GAS AUDIT (CGA)
DATA FORM

Date of Audit: 7/22/99

FACILITY INFORMATION

Facility Name: Cincinnati MSD

Address: 1600 Gest Street
Cincinnati, Ohio

Source ID:

CEMS INFORMATION

Analyzer Type: Horiba, Wet Extractive, THC

Sample Location: #6 Incinerator

Manufacturer: Horiba

Model No.: MPA-510

Serial No: 57034007

Span Value: 300 ppm

Range: 300ppm

CYLINDER GAS INFORMATION

Audit Point:	1 (units)	2 (units)
Certified Audit Value (C_a):	86.6 (ppm)	124.6 (ppm)
Cylinder ID No.:	CC90980	CC94773
Type of Certification:	Protocol 1	Protocol 1
Certification Date:	4/22/98	10/5/98

AUDIT RESULTS

Audit Point:	1 (units)	time	2 (units)	time
Test 1:	120.3 (ppm)	14:43	82.8 (ppm)	14:47
Test 2:	119.1 (ppm)	14:52	81.0 (ppm)	14:57
Test 3:	114.6 (ppm)	15:03	78.1 (ppm)	15:11
Average Response (C_m):	1:15 (Secs)		1:15 (Sec)	
Accuracy (A):	(%)		(%)	

Equation 1-1 from 40 CFR 60 Appendix F, "*Calculations for CEMS Data Accuracy*"

$$A = \left(\frac{C_m - C_a}{C_a}\right) \times 100$$

CEMS must meet either of the following, whichever is greater:

1) +/- 15 percent of the average audit value
2) +/- 5 ppm

APPENDIX D

Sampling Logs and Chain-of-Custody Records

D-1
Daily Sampling Logs

ETS, Inc.
FIELD LOG

Client: EPA/Battelle/Cincinnati MSD
ETS Contract No.: 99-487-WZ

Client Contact: Gene Riley / Tony Wilbeth
Acknowledgement:

Date	Task	Start Time	End Time	Hours	On Scope?	Reason
7/18/99	Meet at ETS, Check Equipment	10:00	11:00	1.0	Y	
"	Travel to Cincinnati (Pick up Charge Duty @ 12:00, 1/2-hour for dinner)	11:00	20:30	9.5	Y	
7/19/99	Arrive on Site Check in / Safety Meeting	07:30	08:30	1.0	Y	
	WTU/CBD/FEC Setup Sampling AAH Tools Facility Lab	08:30	10:00	1.5	Y	
	Delay - No power to truck Cannot access lab	10:00	11:00	1.0	N	
	WTU/CBD/FEC continue setup AAH performs CGA (11:00-11:30) and set up/access lab	11:00	14:30	3.5	Y	

03/17/94

ETS, Inc.
FIELD LOG

Client: EPA / BATTELLE / CINCINNATI MSD
ETS Contract No.: 99-487-WZ

Client Contact: GENE RILEY / TOM WISMITH
Acknowledgement:

Date	Task	Start Time	End Time	Hours	On Scope?	Reason
7/19/99	PRELIMINARY FLOW / MOISTURE	14:30	15:30	1.0	Y	
	AND RESPONSE TIME CHECKS					
	STRATIFICATION CHECK (WTW/FPC/SBD)	15:30	17:00	1.5	Y	
	REACT DIAMS (AAH)					
	FPC/SBD LEAVE SITE @ 17:30					
	COMPLETE LAB SETUP, PROOF	17:00	20:00	3.0	Y	
	BLANK #1, PREPARE RUN 1 TRAIN					
	AAH/WTW LEAVE SITE @ 20:00					
7/20/99	ARRIVE ON SITE, PRETEST	07:00	09:30	2.5	Y	
	PREPARATION					
	MSD-MM5-R1	09:30	12:30	3.0	N	FAILED LEAK CHECK - RUN VOID
	FAILED LEAK CHECK, RECOVER/	12:30	15:00	2.5	N	" "
	RECHARGE TRAIN, PREPARE FOR					FPC/CBD - 1-HOUR LUNCH
	MSD-MM5-R2					

ETS, Inc.
FIELD LOG

Client: EPA/Battelle Cincinnati MSD
ETS Contract No.: 99-487-VVZ

Client Contact: Gene Riley / Tony Wisbith
Acknowledgement:

Date	Task	Start Time	End Time	Hours	On Scope?	Reason
7/20/99	MSD-MM5-R2	15:00	21:30	6.5	Y	
7/20/99	LEAK CHECK, SECURE EQUIPMENT	21:30	22:00	0.5	Y	
	FRC AND CBD LEAVE SITE					
	AT 22:00					
7/20/99	RECOVER MSD-MM5-R2	22:00	23:30	1.5	Y	
	AAH/WTU LEAVE AT 23:30					
7/21/99	SETUP AND RECOVER	07:00	09:00	2.0	Y	
	FIELD PROOF BLANK #2					
	PREP GLASSWARE FOR					
	MSD-MM5-R3, FRC AND					
	SBD ARRIVE @ 08:30					
	FIELD BLANK #1 AND RECOVERY	1015	1430	4.25	Y	
7/21/99	EQUIPMENT SETUP AND LEAK CHECK	09:00	10:15	1.25	Y	
7/21/99	MSD-MM5-R3	10:15	16:35	6.25	Y	

03/17/94

ETS, Inc.
FIELD LOG

Client: EPA / Battelle / Cincinnati MSD
ETS Contract No.: 99-487-LU2

Client Contact: Gene Riley / Tony Wrobith
Acknowledgement:

Date	Task	Start Time	End Time	Hours	On Scope?	Reason
7/21/99	LEAK CHECK, SECURE EQUIPMENT,	16:35	17:15	0.75	Y	
	FPC/CBD LEAVE @ 17:15					
	RECOVER MSD-MM5-R3	17:15	19:15	2.0	Y	
	RELINQUISH SAMPLES AH/LU LEAVE @ 19:15					
7/22/99	ARRIVE ON SITE, PRETEST PREP. -	06:30	08:15	1.75	Y	
	ETS METHOD 3A/10 GAS AUDIT					
	(07:10-07:40) -					
	MSD-MM5-R4	08:15	14:35	6.25	Y	
	LEAK CHECK, BEGIN DISMANTLING	14:35	16:15	1.75	Y	
	MSD THC MONITOR CGA (1430-1515)					
	METER BOX POST-TEST AUDIT (15:00-1610)					
	(FPC/CBD LEAVE @ 18:30)					
	DISMANTLE, SAMPLE RECOVERY	16:15	19:00	2.75	Y	
	(FPC/CBD LEAVE @ 18:30)					
7/23/99	TRANSFER SAMPLES / RETURN TO ROANOKE	07:30	16:00	8.5	Y	

D-2
Chain-of-Custody Records

MSD-MM5-R1
VOID

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 99-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

VOIDED RUN HOLD FOR FURTHER INSTRUCTIONS

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-R1-101			UNIT 6	~~PROOF MT~~	FILTER	NA		AAH	7/20/99	
				~~BLANK MT~~						
MSD-MM5-R1-102				MSD-	ACETONE/MEOH FRONT RINSE	200 (est)		AAH	7/20/99	
				MM5-						
MSD-MM5-R1-103				R1	TOLUENE FRONT RINSE	100 (est.)		AAH	7/20/99	
MSD-MM5-R1-104 A BES					ACETONE/MEOH BACK RINSE	800 (est)		AAH	7/20/99	
MSD-MM5-R1-105					TOLUENE BACK RINSE	400 (est)		AAH	7/20/99	CONTAINS D.I. WATER
MSD-MM5-R1-106					XAD II RESIN	NA		AAH	7/20/99	
MSD-MM5-R1-107 A BES					IMPINGER CATCH	350 (est)		AAH	7/20/99	
MSD-MM5-R1-108					IMPINGER ACETONE/MEOH RINSE			AAH	7/20/99	

CHAIN OF CUSTODY				
Collected by: AAHerz/W.T. Underwood	Date/Time 7/20/99 15:30			
Relinquished by: ETS	Date/Time 7/21/99 10:30	Received by:	Date/Time 7/21/99 1030	
Relinquished by:	Date/Time 7/21/99 1330	Received by:	Date/Time 7/21/99 BES	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

RUN 2 SAMPLES

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 99-482-02
JOB I.D.: CINCINNATI MSD
TEST METHOD: Modified M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-M	MS-R2-201		UNIT 6	RUN NO.	FILTER	NA		AA	7/20/94	
			FINOMELATOR	2						
MSD-M	MS-R2-202		"	"	FRONT HALF ACETONE/MECL	200(ot)		AA	" "	
MSD-M	MS-R2-203		"	"	FRONT HALF TOLUENE RINSE	110(ot)		AA	" "	
MSD-M	MS-R2-204		"	"	BACK HALF ACETONE/MECL	580(ot)		AA	" "	
	BES 204A									
MSD-M	MS-R2-205		"	"	BACK HALF TOLUENE RINSE	350(ot.)		AA	" "	
MSD-M	MS-R2-206		"	"	XAD-2 RESIN	NA		AA	" "	
MSD-M	MS-R2-207		"	"	IMPINGER CONTENTS	356ml		AA	" "	
	BES 207A									
MSD-M	MS-R2-208		"	"	IMPINGER ACETONE/MECL	240ml		AA	" "	

CHAIN OF CUSTODY				
Collected by: AA Harr/L.T. Underwood	Date/Time 7/20/94 23:00			
Relinquished by: [signature] ETS	Date/Time 7/21/94 10:30	Received by: [signature]	Date/Time	
Relinquished by: [signature]	Date/Time 7/21/94 1100	Received by: [signature]	Date/Time 7/21/94 BES	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

D8

MSD-MM5-R3

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 97-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-R3-301			UNIT 6 INCINERATOR	MSD-MM5-R3	FILTER	NA		AAA	7/21/99	LIGHT GREY
MSD-MM5-R3-302			"	(RUN 3)	FRONT HALF ACETONE/MECL	300 (est.)		AAA	7/21/99	
MSD-MM5-R3-303			"	"	FRONT HALF TOLUENE	130 (est)		AAA	7/21/99	
MSD-MM5-R3-304			"	"	BACK HALF ACETONE/MECL	970 (est)		AAA	7/21/99	
MSD-MM5-R3-305			"	"	BACK HALF TOLUENE	450 (est)		AAA	7/21/99	
MSD-MM5-R3-306			"	"	XAD II RESIN	NA		AAA	7/21/99	70% YELLOW COLOR
MSD-MM5-R3-307			"	"	IMPINGER CONTENTS	382 ml		AAA	7/21/99	
MSD-MM5-R3-308			"	"	IMPINGER ACETONE/MECL	250 ml		AAA	7/21/99	

CHAIN OF CUSTODY				
Collected by: A.A. Hale / WT Underwood	Date/Time 7/21/99 10:40			
Relinquished by: ETS	Date/Time 7/21/99 / 1900	Received by:	Date/Time 7-21-99 1900	
Relinquished by:	Date/Time	Received by:	Date/Time 7-21-99 10:30pm	
Relinquished by:	Date/Time	Received by:	Date/Time	

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 91-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: M 29 DIFFER M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM	5-R4-401		UNIT 6	MSD-	FILTER	NA		AA	7/22/94	
			INCINERATOR	MM5-						
MSD-MM	5-R4-402		"	RUN 4	FRONT HALF ACETONE/MECL	150(gt)		AA	7/22/94	
MSD-MM	5-R4-403		"	"	FRONT HALF TOLUENE	125(gt)		AA	7/22/94	
MSD-MM	5-R4-404		"	"	BACK HALF ACETONE/MECL	850(gt)		AA	7/22/94	
MSD-MM	5-R4-405		"	"	BACK HALF TOLUNE RINSE	450(gt)		AA	7/22/94	
MSD-MM	5-R4-406		"	"	XAD II RESIN	NA		AA	7/22/94	
MSD-MM	5-R4-407		"	"	IMPINGER CONTENTS	488 ml		AA	7/22/94	
MSD-MM	5-R4-408		"	"	IMPINGER ACETONE/MECL	265 ml		AA	7/22/94	

CHAIN OF CUSTODY				
Collected by: AA Herz / W.T. Underwood	Date/Time 7/22/94 / 1800			
Relinquished by: [signature] ETS	Date/Time 7/23/94 / 0800	Received by: [signature]	Date/Time 7-23/94 800	
Relinquished by: [signature]	Date/Time 7/23/94 1335	Received by: David B. Davis	Date/Time 7-23-94 1335	
Relinquished by:	Date/Time	Received by:	Date/Time	

PROOF BLANK #1

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 9C-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: MODIFIED M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5	-RBI-1001		UNIT 6	REAGENT BLANK	FILTER	NA		AAH	7/19/99	
MSD-MM5	-RBI-1002		"	"	XAD II RESIN	NA		AA	7/19/99	
MSD-MM5	-RBI-1003		"	"	WATER	←	500ml	AAA	7/19/99	
MSD-MM5	-RBI-1004		"	"	ACETONE	←	500ml	AAH	7/19/99	
MSD-MM5	-RBI-1005		"	"	METHYLENE CHLORIDE	←	500ml	AAH	7/19/99	
MSD-MM5	-RBI-1006		"	"	TOLUENE	←	500ml	AAH	7/19/99	

CHAIN OF CUSTODY				
Collected by: A.A. Hetz	Date/Time 7/19/99 19:30			
Relinquished by: ETS	Date/Time 7/21/99 10:00	Received by:	Date/Time 7-21-99 1020	
Relinquished by:	Date/Time 7/21/99 13:[illegible]	Received by:	Date/Time 7/21/99 BE	10:30
Relinquished by:	Date/Time	Received by:	Date/Time	

FIELD EBLANK #1

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 97-487-WZ
JOB I.D.: CINCINNATI MSD
TEST METHOD: M ~~DIRECT~~ M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5-FBI-1301			UNIT 6	FIELD	FILTER	NA		AAH	7/21/99	
MSD-MM5-FBI-1302			INCINERATOR	BLANK	FRONT HALF ACETONE/MEC	200ml (est)		AAH	7/21/99	
MSD-MM5-FBI-1303			"	"	FRONT HALF TOLUENE	110 (est)		AAH	7/21/99	
MSD-MM5-FBI-1304			"	"	BACK HALF ACETONE/MEC	800 (est.)		AAH	7/21/99	
MSD-MM5-FBI-1305			"	"	BACK HALF TOLUENE	400 (est.)		AAH	7/21/99	
MSD-MM5-FBI-1306			"	"	XAD RESIN	NA		AAH	7/21/99	
MSD-MM5-FBI-1307			"	"	IMPINGER DI WATER	200ml		AAH	7/21/99	
MSD-MM5-FBI-1308			"	"	IMPINGER ACETONE/MEC	250ml		AAH	7/21/99	

CHAIN OF CUSTODY				
	Collected by: AA. Hetz / W. Underwood	Date/Time 7/21/99 15:00		
	Relinquished by: [illegible] ETS	Date/Time 7/21/99 [illegible]	Received by: [illegible]	Date/Time 7/21/99 1910
	Relinquished by:	Date/Time	Received by: [illegible]	Date/Time 7-21-99 [illegible]
	Relinquished by:	Date/Time	Received by:	Date/Time

REAGENT BLANK

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 95-487-02
JOB I.D.: CINCINNATI, MSD
TEST METHOD: M 001 FED MS

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME (ml)	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MMS	-PB1-1101		UNIT 6	PROOF	FILTER	NA		AAH	7/19/99	
MSD-MMS	-PB1 -1102		"	BLANK	ACETONE/MECL FRONT RINSE	200(est)		AAH	7/19/99	
MSD-MMS	-PB1 -1103		"	NO. 1	TOLUENE FRONT RINSE	125 ml		AAH	7/19/99	
MSD-MMS	-PB1 -1104 A BES		"	"	ACETONE/MECL BACK RINSE	875(est.)		AAH	7/19/99	
MSD-MMS	-PB1 -1105		"	"	TOLUENE BACK RINSE	300(est)		AAH	7/19/99	
MSD-MMS	-PB1 -1106		"	"	XAD II RESIN	NA		AAH	7/19/99	
MSD-MMS	-PB1 -1107 A BES		"	"	REAGENT GRADE H_2O IN TRAP	200 ml		AAH	7/19/99	
MSD-MMS	-PB1 -1108		"	"	ACETONE/MECL IMPINGER RINSE	240(est.)		AAH	7/19/99	

CHAIN OF CUSTODY				
Collected by: AA. Hatz / W.T. Wardwell	Date/Time 7/19/99 2000			
Relinquished by: ETS	Date/Time 7/21/99 1030	Received by:	Date/Time 7-21-99 1030	
Relinquished by:	Date/Time 7/21/99 1330	Received by:	Date/Time 7/21/99 BES 10:30	
Relinquished by:	Date/Time	Received by:	Date/Time	

PROOF BLANK #2

FIELD SAMPLE LOG

ETS, INC.

CONTRACT NO: 98-487-W2
JOB I.D.: CINCINNATI MSD
TEST METHOD: M DIRECT M5

SAMPLE NO.	CONTAINER NO.	OTHER I.D.	TEST LOCATION	RUN I.D.	SAMPLE TYPE	TOTAL SAMPLE VOLUME	ALIQUOT VOLUME	INITIALS	DATE	COMMENTS
MSD-MM5	-PB2-1201		UNIT 6	PROOF	FILTER	NA		AAH	7/20/99	
MSD-MM5	-PB2-1202		"	BLANK	ACETONE/HCl FRONT RINSE	300ml (est)		AAH	7/21/99	
MSD-MM5	-PB2-1203		"	NO. 2	TOLUENE FRONT RINSE	110 (est)		AAH	7/21/99	
MSD-MM5	-PB2-1204 A		"	"	ACETONE/HCl BACK RINSE	850ml (est)		AAH	7/21/99	
MSD-MM5	-PB2-1205		"	"	TOLUENE BACK RINSE	200		AAH	7/21/99	
MSD-MM5	-PB2-1206		"	"	XAD II RESIN	NA		AAH	7/21/99	
MSD-MM5	-PB2-1207 A		"	"	REAGENT GRADE H_2O	200ml		AAH	7/20/99	
MSD-MM5	-PB2-1208		"	"	ACETONE/HCl IMPINGER RINSE	192ml		AAH	7/20/99	

CHAIN OF CUSTODY				
Collected by: AA.H ETS/WJ Underwood	Date/Time 7/20/99/08:00			
Relinquished by: [illegible] ETS	Date/Time 7/21/99 10:30	Received by: [illegible]	Date/Time 7/21/99 10:30	
Relinquished by: [illegible]	Date/Time 7/21/99 1530	Received by: [illegible]	Date/Time 7/21/99 BES 10:30	
Relinquished by:	Date/Time	Received by:	Date/Time	

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB
CHAIN OF CUSTODY RECORD

~~№ 000280~~

Client: EPA/OHQPS

Project Description: MSU- Sewage Sludge Incinerator

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-W1-R2-211E MSD W1 R2 211 A MSD-W1 R2 211 B	7/20/99	Comp	Scrubber Water in	3	
MSD-W0-R2-212E MSD-W0-R2-212B MSD-W0-R2-212A	7/20/99	Comp	Scrubber water out	3	
MSD-S-R2-213B MSD S R2 213P	7/20/99	Comp	Sludge feed	4	
MSD S R2 213A MSD-S R2 213C	7/20/99	Comp			

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	7/21/99	1030	[signature]	7/21/99	1030	[signature]	7/21/99	1330
(Printed) Anthony S. Wisbith			(Printed) Susan J. Abbey			(Printed) Susan J. Abbey		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	7/21/99	10:30			
(Printed)			Method of Disposal:		

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

~~PCDD/PCDF/PCB~~

CHAIN OF CUSTODY RECORD

~~NB-010280~~

Client: EPA/OHQPS

Project Description: Sewage Sludge Incineration

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-S-RZ-213D	7/20/99	comp	Sludge	1	1000 cc
MSD-WI-RZ-214D	7/20/99	comp	Scrubber inlet water	1	1000 cc Disposed of 7/23/99 MMR
MSD-WO-RT-215D	7/20/99	comp	Scrubber outlet water	1	1000 cc Disposed of 7/23/99 RC

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
Anthony S. Wisbith	7/21/99	1000						
(Printed) Anthony S. Wisbith			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
	7/21/99	10:00			
(Printed) Robin Richardson			Method of Disposal:		

White-With Samples, Yellow-Laboratory, Pink-Field

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB
CHAIN OF CUSTODY RECORD

~~Nº 000280~~

Client: EPA / OAQPS

Project Description: MSD Sewage Sludge Incinerator

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-S-R3-313A	7-21-99	Comp		1	Dioxin / Furan
MSD-S-R3-313B	7-21-99	Comp		1	PCB's
MSD-S-R3-313E	7-21-99	Comp		1	Archives
MSD-S-R3-313F	7-21-99	Comp		1	Ultimate and Proximate Analysis
MSD-WO-R3-312A	7-21-99	Comp		1	Dioxin / Furans
MSD-WO-R3-312B	7-21-99	Comp		1	PCB's
MSD-WO-R3-312E	7-21-99	Comp		1	Archives
MSD-WI-R3-311A	7-21-99	Comp		1	Dioxin / Furan
MSD-WI-R311B	7-21-99	Comp		1	PCB's
MSD-WI-R311E	7-21-99	Comp		1	Archives

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	7-21-99	1900	[signature]	7-21-99	19:01			
(Printed) Arthur J Wisbitz			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	7-21-99	10:30 pm			
(Printed) MARK F. MIJA			Method of Disposal:		

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000280

Client: EPA/OAQPS

Project Description: MSD - Sewage Sludge Incineration

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-S-R3-313D/313C	7-21-99	comp		1	Percent Solids/ Chlorine
MSD-~~S~~WI-R3-311C -3WD	7-21-99	comp	Disposed of 7/23/99 RR	4	Percent Solids/ Chlorine
MSD-WO-R3-311C 3WD	7-21-99	comp	Disposed of 7/23/99 RR	4	Percent Solids/ Chlorine

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	7/22/99	9:15						
(Printed) Anthony S. Wisbith			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	7/22/99	9:15			
(Printed) ROBIN RICHARDSON			Method of Disposal:		

White - With Samples, Yellow - Laboratory, Pink - Field

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000280

Client: EPA/OAQPS

Project Description: MSD - Sewage Sludge Incinerator

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-WO-R4-412B	7-22-99	Comp		1	PCB
MSD-WO-R4-412A	7-22-99	Comp		1	D/F Sample
MSD-WO-R4-412E	7-22-99	Comp		1	Archive
MSD-WI-R4-411A	7-22-99	Comp		1	D/F Sample
MSD-WI-R4-411B	7-22-99	Comp		1	PCB
MSD-WI-R4-411E	7-22-99	Comp		1	Archive
MSD-S-R4-413A	7-22-99	Comp		1	D/F Sample no acid added
MSD-S-R4-413B	7-22-99	Comp		1	PCB no acid added
MSD-S-R4-413F	7-22-99	Comp		1	Ultimate & Proximate Analysis no acid added
MSD-S-R4-413E	7-22-99	Comp		1	Archive (20mL 1:1 HNO_3 Added)

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
Anthony S. Wisbitt	7/23/99	1335						
(Printed) Anthony S. Wisbitt			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
David B. Davis	7-23-99	1335			
(Printed) DAVID B. DAVIS			Method of Disposal:		

White-With Samples, Yellow-Laboratory, Pink-Field

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 3201-2693
(614) 424-4247

PCDD/PCDF/PCB
CHAIN OF CUSTODY RECORD

№ 000280

Client:

Project Description:

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
MSD-S-R4- 411C 411D	7-22-99			1	Chlorine/Percent Solids
MSDWD- R4- 412D 412C	7-22-99		Disposed of 7/23/99 AM AR	1	Chlorine/Percent Solids
MSD-WJ-R4- 413D 413C	7-22-99		Disposed of 7/23/99 AM AR	1	Chlorine/Percent Solids

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
Brian Canterbury	7-22-99	4:30PM						
(Printed) Brian Canterbury			(Printed)			(Printed)		
Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date		Analyses Requested:		
Robin Richardson	7/22/99	4:30 pm						
(Printed) ROBIN RICHARDSON			Method of Disposal:					

[redacted]

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-6767

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000282

Client:

Project Description: G469005-06 WA-105 Train

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
48200-51-02	7/14/99	11:00	PAH Fraction in Dichloromethane 30mL	1	XAD/Filter Blk
48200-51-03	7/14/99	11:00	PAH Fraction in Dichloromethane 30mL	1	Method Blank
			As per July 7, 99 Fax:		
			both Above Samples spiked		
			w/P 200ul [200ng/Sample]		
			PAH IS		
					rec'd in good cond.
					7-16-99

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	7-15-99	1710						
(Printed) MARK F. Mizita			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	7/16/99	1530			
(Printed) Cathy Trek			Method of Disposal:		

White-With Samples, Yellow-Laboratory, Pink-Field

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424 4247

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000288

Client: WF-105

Project Description: G4b9005-06

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
4b190-09-02			BH Run #2	1	~38 mL DCM
03			BH Run #3	1	
04			BH Run #4	1	
05			Proof Blank #1 BH	1	
06			Proof Blank #2 BH	1	
07			Field Blank #1 BH	1	
09			LCS BH	1	
10			LCS Dup BH	1	
11			LAB Blank BH	1	

RECEIVED IN GOOD CONDITION UNDER COC
AUG 11 1999
BY: [illegible]

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	8-36	8:10AM						
(Printed) MARK F. MISITA			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	8/11/99	1:30pm		8-11-99	
(Printed) [illegible]			Method of Disposal:		

White-With Samples, Yellow-Laboratory, Pink-Field

Z

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-424

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000290

Client: WA-105

Project Description: 649005-06

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
48190-11-02			FH Run#2	1	~30mm OCM
-03			FH Run#3	1	
-04			FH Run#4	1	
-05			Prep# blank #1 FH	1	
-06			Prep# blank #2 FH	1	
-07			Field Blank #1 FH	1	
-08			LCS FH	1	
-09			LCS Dup FH	1	
-10			Lab Blank FH	1	

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	8-10-99	1630						
(Printed) MARK F. MISITA			(Printed)			(Printed)		
Received for Laboratory by (Signature) [signature]	Date 8/11/99	Time 17:30	Samples Disposed of by:		Date	Analyses Requested:		
(Printed) PHIL NGUYEN			Method of Disposal:					

RECEIVED IN GOOD CONDITION UNDER COC
AUG 11 [illegible]
INI: _____

White-With Samples, Yellow-Laboratory, Pink-Field

D-23

D-3
Process Sampling Logs

Scrubber Solution Sample Collection

Plant: [redacted]
Date: 7-20-99 Day 1 trial #2
Sample Collection Point:
Sampler: Brian Canterbury
Volume Collected: H_2O = 1000mL × 2 (in + out) Sludge - 500mL for each sample period

COMMENTS:
"WI" = water input into scrubber
"WO" = water output - drainage from scrubber

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge #2-1	3:09	
WI #2-1	3:17	30°C 7.27 pH
WO #2-1	3:21	46°C 6.53 pH
Sludge #2-2	4:00	
WI #2-2	4:07	31°C 7.37 pH
WO #2-2	4:11	48°C 6.35 pH
Sludge #2-3	5:05	
WI #2-3	5:11	31°C 7.45 pH
WO #2-3	5:14	47°C 6.47 pH
Sludge #2-4	6:06	
WI #2-4	6:09	31°C 7.44 pH
WO #2-4	6:13	47°C 6.50 pH
Sludge #2-5	7:16	
WI #2-5	7:22	30°C 7.36 pH
WO #2-5	7:24	46°C 6.54 pH
Sludge #2-6	8:40	
WI #2-6	8:48	30°C 7.36 pH
WO #2-6	8:50	46°C 6.55 pH

troubleshooting. delay filter ~~port~~ change

filter port change

Scrubber Solution Sample Collection

Plant: MSD
Date: 7-21-99
Sample Collection Point:
Sampler: Brian Canterbury
Volume Collected: 100ml WI; 1000 ml WO; 500 cc sludge
COMMENTS:

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge 3-1	10:19	
WI 3-1	10:25	30°C 7.51 pH
WO 3-1	10:29	46°C 6.60 pH
Sludge 3-2	11:16	
WI 3-2	11:22	31°C 7.47 pH
WO 3-2	11:27	47°C 6.89 pH
Sludge 3-3	12:17	
WI 3-3	12:22	30°C 7.46 pH
WO 3-3	12:27	50°C 6.55 pH
port change @ 1:15 Sludge 3-4	1:36	
WI 3-4	1:42	30°C 7.47 pH
WO 3-4	1:46	49°C 6.63 pH
Sludge 3-5	2:35	
WI 3-5	2:40	30°C 7.49 pH
WO 3-5	2:43	49°C 6.45 pH
Sludge 3-6	3:37	
WI 3-6	3:43	31°C 7.48 pH
WO 3-6	3:48	51°C 6.50 pH

Scrubber Solution Sample Collection

Plant: MSD
Date: 7-22-99
Sample Collection Point:
Sampler: Brian Canterbury
Volume Collected: 1000 mL WI, 1000 mL WO 500 cc sludge

COMMENTS:

SAMPLE NUMBER	TIME OF SAMPLE COLLECTION	ROOM TEMPERATURE pH
Sludge 4-1	8:15	
WI 4-1	8:23	30°C pH 7.46
WO 4-1	8:26	51°C pH 6.45
Sludge 4-2	9:17	
WI 4-2	9:23	30°C pH 7.55
WO 4-2	9:25	49°C pH 6.58
Sludge 4-3	10:17	
WI 4-3	10:22	31°C pH 7.40
Port change @ 11:15 → WO 4-3	10:25	51°C pH 6.46
Sludge 4-4	11:45	
WI 4-4	11:51	30°C pH 7.27
WO 4-4	11:54	51°C pH 6.45
Sludge 4-5	12:45	
WI 4-5	12:53	31°C pH 7.49
WO 4-5	12:55	49°C pH 6.66
Sludge 4-6	1:45	
WI 4-6	1:51	31°C pH 7.41
WO 4-6	1:54	51°C pH 6.49

D-4
Laboratory Record Book
Sample Log In

BATTELLE LABORATORY RECORD BOOK NO. 47904

Work Performed by: Misita/Stockert Project No. 04604 CSF-CCC Date of Work: 21 July 99

Title or Purpose: WA-105 Sample Log-IN (04/1) Continued from: —

BCO Log-IN #	Sample ID				Condition
47904-72-02	~~MS~~ MSD-WI-R2-211A	DIF Sample			
03	211B	PCB Sample	Tel. Seal (Wet Label)	Ice Wet	0.0°C (No Tube)
04	211E	Archive			
05	MSD-WO-R2-212A	DIF Sample			
06	212B	PCB Sample			
07	212E	Archive			
08	~~MS~~ MSD-S-R2-213A	DIF Sample			
09	213B	PCB Sample			
10	MSD-WI-R2-213E	Archive			
SENT OUT 8-5-99 DZO 11	213F	ULTIMATE + PROXIMATE	ANALYSIS		
12	MSD-MMS-R1-101		Tel. Seal	Blue Ice	13.3°C (No Tube)
13	102				
14	103				
15	104A				
16	105				
17	106				
18	107A				
19	108				
20	MSD-MMS-RB1-100i		Wet Label	Seal Tape	Wet/Blue Ice 7.9°C (Tube)
21	100i2				
22	100i3				
23	100i4				
24	100i5				
25	100i6				

Sample 47904-72-02 thru 72-11 COC was hard to read so the sample numbers were read off the bottle labels

~~MS~~ Samples stored in RM 8218-A, Freezer BES 7/21/99

All other Samples stored in RM 8218, Frig DEF 7/21/99

Entered by: [signature] Date: 21 July 99 Continued to: 73

Performances of this work observed by:	Disclosed to and understood by me:
Date:	[signature] Date: 8/9/99
Date:	Date:

Work Performed by: M. SILA / Student Project No. 64466.5-001 Date of Work: 21 July 99

Title or Purpose: WA-105 Sample Log-In (DAY 1) Continued from: 72

BCD Log-In #	Sample ID								Condition
47904-73-02	MSD-MM5-R2-201								
03				202	WET LEAK	TAPE SEAL	WET/BLUE ICE	4.4°C (TUBE)	
04				203					
05				204A					
06				205					
07				206					
08				207A					
09				208					
10	MSD-MM5-PB2-1201					TAPE SEAL	ICE BLUE	13.3°C (NO TUBE)	
11				1202					
12				1203					
13				1204A					
14				1205					
15				1206					
16				1207A					
17				1208					
18	MSD-MM5-PB1-1101				WET LEAK	TAPE SEAL	WET/BLUE ICE	2.9°C (TUBE)	
19				1102					
20				1103		NO TAPE SEAL			
21				1104A					
22				1105					
23				1106					
24				1107A					
25				1108					

All samples stored in RM 5218-A, Freezer

All other samples stored in RM 5218, Freezer

Entered by: [signature] Date: 21 July 99 Continued to: —

Performances of this work observed by:	Disclosed to and understood by me:
Date:	[signature] Date: 8/9/99
Date:	Date:

BATTELLE LABORATORY RECORD BOOK NO. 47904

Work Performed by: [illegible] Project No. [illegible] Date of Work: 21 July 99

Title or Purpose: WA-105 Sample Log-in (DAY 2) Continued from: —

47BED Log-In #	Sample ID	Condition
47904-74-02	MSD-S-R3-313A DIF	~~Condition~~
03	313B PCB	Wet Ice, Teflon Seal, Wet Ice, 1.2°C, No Tube
04	313E Archive	
05	313F Ultimate & Proximate Analysis	
06	MSD-WT-R3-311A DIF	2.0°C Tube
07	311B PCB	
08	311E Archive	
09	MSD-WO-R3-312A DIF	
10	312B PCB	
11	312E Archive	
12	MSD-MM5-FB1-1304 (XAD)	Wet/Dive Ice, No Teflon Seal at one end. 3.0°C Tube
13	-1301 (Filter)	Wet/Dive Ice, Teflon Seal, 3.0°C, Tube
14	-1302	
15	-1303	
16	-1308	
17	-1307	
18	-1305	
19	MSD-MM5-R3-308	
20	305	
21	302	
22	307	
23	-306 (XAD)	
24	-301 (Filter)	
25	MSD-MM5-FB1-1304	
26	MSD-MM5-R3-303	
27	304	

XAD samples stored in RM Sample Freezer

All other samples stored in RM Sample Frig.

Entered by: [signature] Date: 21 July 99 Continued to: —

Performances of this work observed by:	Disclosed to and understood by me:
Date:	Karen Bowie Date: 8/9/99
Date:	Date:

Work Performed by: DAVID B. DAVIS Project No. G469005-06 Date of Work: 23 JULY 1999

Title or Purpose: WA-109 SAMPLE LOG-IN Continued from:

BCP LOGIN #	SAMPLE ID		CONDITION	
47904-75-02	MSD-WO-R4-412A	D/F	WET ICE	NO TUBE
-03	MSD-WI-R4-411B	PCB	LABELS FADING	T = 5.4°C
-04	MSD-WI-R4-411E	ARCHIVE		
-05	MSD-WI-R4-411A	D/F		
-06	MSD-WO-R4-412B	PCB		
-07	MSD-WO-R4-412E	ARCHIVE		
("NO ACID") -08	MSD-S-R4-413B	PCB	WET ICE - NO TUBE	
("NO ACID") -09	MSD-S-R4-413A	D/F		T = 0.2°C
-10	MSD-S-R4-413E	ARCHIVE		
("NO ACID") -11	MSD-S-R4-413F	ULTIMATE + PROXIMATE		
-12	MSD-MM5-R4-405	BACK HALF TOLUENE	BLUE ICE - TUBE	
-13	MSD-MM5-R4-404	BACK HALF ACETONE/DCM		T = 0.2°C
-14	MSD-MM5-R4-402	FRONT HALF ACETONE/DCM		
-15	MSD-MM5-R4-408	IMPINGER ACETONE/DCM		
-16	MSD-MM5-R4-407	IMPINGER LIQUID CATCH		
-17	MSD-MM5-R4-403	FRONT HALF TOLUENE		
-18	MSD-MM5-R4-406	XAD		
-19	MSD-MM5-R4-401	FILTER		

On 26 July 1999, fresh 1:1 nitric acid was prepared in glass container. 40 ml was added to 47904-75-08 and 47904-75-09. No acid was added to the sample for ultimate and proximate analysis. An additional 20 ml was added to 47904-75-10, to which 20 ml had been added in the field. Per instructions per meeting with Tony Undrich at 9:00 AM. The remaining nitric acid was stored in the dispin lab 5-2-18 as an archive material.
— David B. Davis 7-26-99.

The three samples for ultimate/proximate were shipped 8-5-99 to:
JOE HOUSER at COMMERCIAL TESTING 16130 VAN DENNEN RD
SOUTH HOLLAND IL 60473 Shipper Number: K-9457

Entered by: David B. Davis Date: 23 JULY 1999 Continued to:

Performances of this work observed by: Date:

Date:

Disclosed to and understood by me: Date: 7/26/99

Date:

Work Performed by: Ben Combs Project No. 46 46005-00 Date of Work: 8/17/99

Title or Purpose: WA 105 Continued from:

RCD Log In #	Sample ID	matrix	Condition
47904-78-02	X1091	DCM	Intact RT.
47904-78-03	X1092	DCM	Intact RT.
47904-78-04	X1093	DCM	
47904-78-05	X1094		
47904-78-06	X1095		
47904-78-07	X1096		

These samples were recived on this date 8-17-99 by FedEx intact and at Room Temperature Also includes the samples logged in below and were stored in Freezer R-43 in room 5215-A

DCM Intact @ R.T.

EE 8/17/99

Date: 17 Aug 1999 Continued to:

Disclosed to and understood by me:

Karen Bennett Date: 12 31 99

Date:

Chain of Custody

Battelle

DATE	TIME	BATTELLE ID	CLIENT ID	ANALYSIS REQUESTED → NUMBER OF CONTAINERS	SAMPLE DESCRIPTION	VOC	SVOC	PCB	TPH	PHENOLS	PAH	VOA	TRP	METALS	OTHER	ACID/GRO	PESTICIDES	Total Number of Containers
8/16/99		X1091	WA-X-1		Manual Sample collected at the Intake	X												1
		X1092	WA-X-2			X												1
		X1093	WA-X-3			X												1
		X1094	WA-X-4			X												1
		X1095	WA-X-5			X												1
		X1096	WA-X-6			X												1
8/16/99		X1097	WA-X-7		Manual Backwash collected at the Intake													1
		X1098	WA-X-8															1
		X1099	WA-X-9															1
		X1100	WA-X-10															1
		X1101	WA-X-11															1
		X1102	WA-X-12															1

Relinquished by: Date/Time 8/16/99 5:00p Received by: Ben Combs

Relinquished by: Date/Time Received by: Date/Time

Relinquished by: Date/Time 8/17/99 4:00 pm Received by: Date/Time

Comments: All samples in Cooler

ORIGINAL

D-5
Field Test Log

Table D-1. Field Test Log -- Cincinnati MSD (July 1999)

Test Location	Activity	Test Parameter(s)	Date	Start Time	End Time
CEMS Outlet	Pre-Test Cylinder Gas Audit	Total Hydrocarbons	7/19/99	1100	1130
Outlet Stack Inlet	Cyclonic Flow Check/Preliminary Flowrate	Flowrate		1430	1530
Outlet Stack	RM Response Time	$CO/CO_2/O_2$		1435	1545
Outlet Stack	Stratification Check	$CO/CO_2/O_2$		1540	1630
Sample Recovery Laboratory	Reagent Blanks	PCBs D/Fs PAHs		1530	1700
Sample Recovery Laboratory	Proof Blank #1	PCBs D/Fs PAHs		1700	2000
Stack Outlet	MSD-MM5-R1[a] (invalidated)	PCBs D/Fs PAHs	7/20/99	0930	1230
Stack Outlet	MSD-CEMS-R1	$CO/CO_2/O_2$		0930	1230
Stack Outlet	MSD-MM5-R2	PCBs D/Fs PAHs		1500	2130
Stack Outlet	MSD-CEMS-R2	$CO/CO_2/O_2$		1500	2130
Scrubber Water Inlet	MSD- Process-R2	pH, Temperature		1500	2130
Scrubber Water Outlet	MSD- Process-R2	pH, Temperature		1500	2130
Sample Recovery Laboratory	MSD-Process-R2 (Sludge)	Chlorine, % Solids, Ultimate/Proximate		1500	2130

Table D-1. (Continued)

Test Location	Activity	Test Parameter(s)	Date	Start Time	End Time
Sample Recovery Laboratory	Proof Blank #2	PCBs D/Fs PAHs		0700	0900
Stack Outlet	MSD-MM5-R3	PCBs D/Fs PAHs		1015	1635
Stack Outlet	MSD-CEMS-R3	$CO/CO_2/O_2$		1015	1635
Stack Outlet	Field Blank #1	PCBs D/Fs PAHs		1015	1430
Scrubber Water Inlet	MSD-Process-R3	pH, Temperature	7/21/99	1015	1635
Scrubber Water Outlet	MSD-Process-R3	pH, Temperature		1015	1635
Sample Recovery Laboratory	MSD-Process-R3 (Sludge)	Chlorine, % Solids, Ultimate/Proximate		1015	1635
Mobile Laboratory	Reference Method CEMS Gas Audit	$CO/CO_2/O_2$		0710	0740
Stack Outlet	MSD-MM5-R4	PCBs D/Fs PAHs		0815	1435
Stack Outlet	MSD-CEMS-R4	$CO/CO_2/O_2$		0815	1435
Scrubber Water Inlet	MSD-Process-R4	pH, Temperature	7/22/99	0815	1435
Scrubber Water Outlet	MSD-Process-R4	pH, Temperature		0815	1435
Sample Recovery Laboratory	MSD-Process-R4 (Sludge)	Chlorine, % Solids, Ultimate/Proximate		0815	1435
CEMS	Post-Test Cylinder Gas Audit	Total Hydrocarbons		1430	1515
Stack Outlet	Post-Test Meter Box Audit	Critical Orifice		1500	1610

[a] R1, R2, R3, R4 = Run 1, 2, 3, 4, respectively.

APPENDIX E

PCB Analytical Lab Raw Data Results

E-1
PCB Analytical Summaries

Table E-1T Run 2 PCB Results - Stack Gas Concentrations (ng/dscm, as measured)

PCB Congener	Concentration (ng/dscm, as measured)[a]		
	FH	BH	Total
3,3',4,4'-tetrachlorobiphenyl (TCB) (PCB-77)	0.129	15.5[b]	15.6
2,3,3',4,4'-pentachlorobiphenyl (PeCB) (PCB-105)	0.107 B	2.56	2.67
2,3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-114)	0.016 B	0.373	0.389
2,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-118)	0.222 B	5.50	5.72
2',3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-123)	0.007 B	0.114	0.121
3,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-126)	0.006 B	0.694	0.700
2,3,3',4,4',5-hexachlorobiphenyl (HxCB) (PCB-156)	0.022 B	0.623	0.645
2,3,3',4,4',5'-hexachlorobiphenyl (HxCB) (PCB-157)	0.006 B	0.215	0.221
2,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-167)	0.011 B	0.377	0.388
3,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-169)	0.010 B	0.549	0.559
2,2',3,3',4,4',5-heptachlorobiphenyl (HpCB) (PCB-170)	0.025 B	1.06	1.08
2,2',3,4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-180)	0.052 B	2.64	2.69
2,3,3',4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-189)	0.003 B	0.092	0.095

[a] ng/dscm; nanogram per dry standard cubic meter.
Standard conditions: temperature - 20°C; pressure - 1 atm (760 mm Hg).
[b] extract was diluted with additional internal standard and re-analyzed to bring PCB-77 concentration within calibration range. Concentration has been corrected for original extract PCB-77 recovery.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
E = value above calibration range.
B = congener found in blank at greater than 20% of the concentration found in the samples.

Table E-2T Run 3 PCB Results - Stack Gas Concentrations (ng/dscm, as measured)

PCB Congener	Concentration (ng/dscm, as measured)[a]		
	FH	BH	Total
3,3',4,4'-tetrachlorobiphenyl (TCB) (PCB-77)	0.104	10.6[b]	10.7
2,3,3',4,4'-pentachlorobiphenyl (PeCB) (PCB-105)	0.094 B	2.36	2.45
2,3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-114)	0.012 B	0.328	0.340
2,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-118)	0.203 B	5.07	5.27
2',3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-123)	0.006 B	0.105	0.111
3,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-126)	0.004 B	0.580	0.584
2,3,3',4,4',5-hexachlorobiphenyl (HxCB) (PCB-156)	0.018 B	0.547	0.565
2,3,3',4,4',5'-hexachlorobiphenyl (HxCB) (PCB-157)	0.005 B	0.174	0.179
2,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-167)	0.009 B	0.328	0.337
3,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-169)	0.005 B	0.462	0.467
2,2',3,3',4,4',5-heptachlorobiphenyl (HpCB) (PCB-170)	0.017 B	0.949	0.966
2,2',3,4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-180)	0.038 B	2.34	2.37
2,3,3',4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-189)	0.002 B	0.074	0.076

[a] ng/dscm; nanogram per dry standard cubic meter.
Standard conditions: temperature - 20°C; pressure - 1 atm (760 mm Hg).
[b] extract was diluted with additional internal standard and re-analyzed to bring PCB-77 concentration within calibration range. Concentration has been corrected for original extract PCB-77 recovery.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
E = value above calibration range.
B = congener found in blank at greater than 20% of the concentration found in the samples.

Table E-3T Run 4 PCB Results - Stack Gas Concentrations (ng/dscm, as measured)

PCB Congener	Concentration (ng/dscm, as measured)[a]		
	FH	BH	Total
3,3',4,4'-tetrachlorobiphenyl (TCB) (PCB-77)	0.083	4.19[b]	4.27
2,3,3',4,4'-pentachlorobiphenyl (PeCB) (PCB-105)	0.078 B	0.867	0.945
2,3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-114)	0.009 B	0.128	0.137
2,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-118)	0.168 B	2.04	2.21
2',3,4,4',5-pentachlorobiphenyl (PeCB) (PCB-123)	0.004 B	0.034	0.038
3,3',4,4',5-pentachlorobiphenyl (PeCB) (PCB-126)	0.003 B	0.207	0.210
2,3,3',4,4',5-hexachlorobiphenyl (HxCB) (PCB-156)	0.016 B	0.197	0.213
2,3,3',4,4',5'-hexachlorobiphenyl (HxCB) (PCB-157)	0.004 B	0.074	0.078
2,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-167)	0.008 B	0.128	0.136
3,3',4,4',5,5'-hexachlorobiphenyl (HxCB) (PCB-169)	0.006 B	0.135	0.141
2,2',3,3',4,4',5-heptachlorobiphenyl (HpCB) (PCB-170)	0.017 B	0.420	0.437
2,2',3,4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-180)	0.038 B	0.818	0.856
2,3,3',4,4',5,5'-heptachlorobiphenyl (HpCB) (PCB-189)	0.003 B	0.041	0.044

[a] ng/dscm; nanogram per dry standard cubic meter.
Standard conditions: temperature - 20°C; pressure - 1 atm (760 mm Hg).
[b] extract was diluted with additional internal standard and re-analyzed to bring PCB-77 concentration within calibration range. Concentration has been corrected for original extract PCB-77 recovery.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
E = value above calibration range.
B = congener found in blank at greater than 20% of the concentration found in the samples.

E-2
PCB Lab Raw Data Sheets

E-2-1
Air Samples

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-21-99

Ext. Date: 08-01-99

Analysis Date: 21-AUG-99 Time: 06:49:31

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-02 FH-R2-PCB

Sample Wt/Vol: 2.9240 g or mL: M3

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807889A

Blank Data Filename: 4807889A #1

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	129.20	0.00	0.75
PCB-123	6.56	0.88	1.39
PCB-118	222.15	0.64	1.51
PCB-114	15.67	1.14	1.66
PCB-105	106.79	1.16	1.55
PCB-126	6.07	0.50	1.34
PCB-167	11.26	0.99	1.19
PCB-156	12.72	0.80	1.25
PCB-157	12.72	0.80	1.25
PCB-169	10.57	0.46	1.33
PCB-180	52.42	0.92	1.01
PCB-170	25.37	0.41	1.07
PCB-189	2.97	0.66	0.94

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1332	67	0.75
13C-PCB-118	2000	917	46	1.58
13C-PCB-105	2000	955	48	1.52
13C-PCB-126	2000	1142	57	1.55
13C-PCB-167	2000	911	46	1.26
13C-PCB-156	2000	934	47	1.25
13C-PCB-157	2000	934	47	1.25
13C-PCB-169	2000	1086	54	1.23
13C-PCB-180	2000	1180	59	1.04
13C-PCB-189	2000	1173	59	1.04
13C-PCB-209	4000	1428	36	1.20

CLEANUP STANDARD			
13C-PCB-81	1000	646	65
13C-PCB-111	5000	2844	57

MES 11/29/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-02 FH-R2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 06:49:31

GC Column ID: 30m SPB

Extract Volume (uL):20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	749.71	0.00	0.75
PCB-123	38.36	5.15	1.39
PCB-118	1,299.13	3.74	1.51
PCB-114	91.64	6.67	1.66
PCB-105	624.51	6.78	1.55
PCB-126	35.50	2.92	1.34
PCB-167	65.85	5.79	1.19
PCB-156	74.39	4.68	1.25
PCB-157	74.39	4.68	1.25
PCB-169	61.81	2.69	1.33
PCB-180	306.55	5.38	1.01
PCB-170	148.36	2.40	1.07
PCB-189	17.37	3.86	0.94

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2664	67	0.75
13c-PCB-118	4000	1834	46	1.58
13c-PCB-105	4000	1910	48	1.52
13c-PCB-126	4000	2284	57	1.55
13c-PCB-167	4000	1822	46	1.26
13c-PCB-156	4000	1868	47	1.25
13c-PCB-157	4000	1868	47	1.25
13c-PCB-169	4000	2172	54	1.23
13c-PCB-180	4000	2360	59	1.04
13c-PCB-189	4000	2346	59	1.04
13c-PCB-209	8000	2856	36	1.20

Cleanup Stds

13c-PCB-81	2000	1292	65
13c-PCB-111	10000	5688	57

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-02 FH-R2-PCB

Matrix: A R

Sample Wt/Vol: 2.9240 g or mL: M3

Sample Re eipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 02:06:17

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1392	70	1.25
PCB-126	*	*	*	13C-PCB-156	2000	1548	77	1.25
PCB-167	11.52	2.53	1.15	13C-PCB-157	2000	1378	69	1.25
PCB-156	22.43	2.58	1.26	13C-PCB-169	2000	1901	95	1.26
PCB-157	6.44	2.49	1.19	13C-PCB-180	2000	*	*	*
PCB-169	8.19	1.13	1.22	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					
				CLEANUP STANDARD				
				13C-PCB-81	1000	*	*	
				13C-PCB-111	5000	*	*	

9/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-02 FH-R2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 02:06:17

GC Column ID: 30m DB1

Extract Volume (uL):20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	67.37	14.80	1.15
PCB-156	131.17	15.09	1.26
PCB-157	37.66	14.56	1.19
PCB-169	47.90	6.61	1.22
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2784	70	1.25
13c-PCB-156	4000	3096	77	1.25
13c-PCB-157	4000	2756	69	1.25
13c-PCB-169	4000	3802	95	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-03 FH-R3-PCB

Matrix: AIR

Sample Wt/Vol: 3.1100 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 07:53:24

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	104.45	0.00	0.75	13C-PCB-77	2000	1101	55	0.77
PCB-123	6.23	1.02	1.45	13C-PCB-118	2000	695	35	1.60
PCB-118	202.84	0.74	1.57	13C-PCB-105	2000	736	37	1.54
PCB-114	11.72	1.30	1.62	13C-PCB-126	2000	886	44	1.56
PCB-105	94.03	1.32	1.61	13C-PCB-167	2000	723	36	1.25
PCB-126	3.97	0.57	1.74	13C-PCB-156	2000	763	38	1.24
PCB-167	9.43	1.07	1.14	13C-PCB-157	2000	763	38	1.24
PCB-156	10.48	0.88	1.33	13C-PCB-169	2000	875	44	1.26
PCB-157	10.48	0.88	1.33	13C-PCB-180	2000	962	48	1.02
PCB-169	4.91	0.50	1.12	13C-PCB-189	2000	1013	51	1.03
PCB-180	38.02	0.98	0.95	13C-PCB-209	4000	1571	39	1.19
PCB-170	17.10	0.44	0.98					
PCB-189	2.00	0.67	1.15					
				CLEANUP STANDARD				
				13C-PCB-81	1000	526	53	
				13C-PCB-111	5000	2043	41	

MCS 11/29/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-03 FH-R3-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2[illegible]-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 07:53:24

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	649.68	0.00	0.75
PCB-123	38.75	6.34	1.45
PCB-118	1,261.56	4.60	1.57
PCB-114	72.90	8.09	1.62
PCB-105	584.97	8.21	1.61
PCB-126	24.69	3.55	1.74
PCB-167	58.65	6.66	1.14
PCB-156	65.19	5.47	1.33
PCB-157	65.19	5.47	1.33
PCB-169	30.54	3.11	1.12
PCB-180	236.48	6.10	0.95
PCB-170	106.36	2.74	0.98
PCB-189	12.44	4.17	1.15

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2202	55	0.77
13c-PCB-118	4000	1390	35	1.6
13c-PCB-105	4000	1472	37	1.54
13c-PCB-126	4000	1772	44	1.56
13c-PCB-167	4000	1446	36	1.25
13c-PCB-156	4000	1526	38	1.24
13c-PCB-157	4000	1526	38	1.24
13c-PCB-169	4000	1750	44	1.26
13c-PCB-180	4000	1924	48	1.02
13c-PCB-189	4000	2026	51	1.03
13c-PCB-209	8000	3142	39	1.19

Cleanup Stds			
13c-PCB-81	2000	1052	53
13c-PCB-111	10000	4086	41

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: A R

Sample Receipt Date: 07-21-99

Ext. Date: 08-01-99

Analysis Date: 25-AUG-99 Time: 02:52:33

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-03 FH-R3-PCB

Sample Wt/Vol: 3.1100 g or mL: M3

Initial Calibration Date: 08-24-99

Instrument ID: AutoSpec

GC Column ID: 30m DB1

Sample Data Filename: 4807892

Blank Data Filename: 4807892 #7

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	9.36	2.89	1.41
PCB-156	18.00	2.99	1.22
PCB-157	4.57	2.76	1.20
PCB-169	*	1.31	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1082	54	1.28
13C-PCB-156	2000	1202	60	1.27
13C-PCB-157	2000	1103	55	1.27
13C-PCB-169	2000	1483	74	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MES 9/1/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-11-03 FH-R3-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2[illegible]-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 02:52:33

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	58.22	17.98	1.41
PCB-156	111.96	18.60	1.22
PCB-157	28.48	17.17	1.2
PCB-169	*	8.15	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2164	54	1.28
13c-PCB-156	4000	2404	60	1.27
13c-PCB-157	4000	2206	55	1.27
13c-PCB-169	4000	2966	74	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	6000	*	*	*

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-23-99

Ext. Date: 08-01-99

Analysis Date: 21-AUG-99 Time: 08:57:14

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-04 FH-R4-PCB

Sample Wt/Vol: 3.3500 g or mL: M3

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807889A

Blank Data Filename: 4807889A #1

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	82.91	0.00	0.75
PCB-123	4.25	1.08	1.54
PCB-118	167.95	0.79	1.56
PCB-114	9.32	1.46	1.71
PCB-105	78.18	1.48	1.56
PCB-126	3.46	0.61	1.48
PCB-167	7.75	1.24	1.29
PCB-156	8.78	1.03	1.33
PCB-157	8.78	1.03	1.33
PCB-169	5.72	0.54	1.39
PCB-180	38.30	1.15	0.91
PCB-170	16.79	0.51	1.10
PCB-189	2.95	0.78	0.98

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1106	55	0.78
13C-PCB-118	2000	727	36	1.56
13C-PCB-105	2000	722	36	1.59
13C-PCB-126	2000	909	45	1.55
13C-PCB-167	2000	732	37	1.26
13C-PCB-156	2000	756	38	1.25
13C-PCB-157	2000	756	38	1.25
13C-PCB-169	2000	951	48	1.25
13C-PCB-180	2000	931	47	1.03
13C-PCB-189	2000	978	49	1.03
13C-PCB-209	4000	1590	40	1.19

CLEANUP STANDARD			
13C-PCB-81	1000	575	58
13C-PCB-111	5000	2425	48

MES 12/19

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-11-04 FH-R4-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-23 99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 08:57:14

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	555.50	0.00	0.75
PCB-123	28.48	7.24	1.54
PCB-118	1,125.27	5.29	1.56
PCB-114	62.44	9.78	1.71
PCB-105	523.81	9.92	1.56
PCB-126	23.18	4.09	1.48
PCB-167	51.93	8.31	1.29
PCB-156	58.93	6.90	1.33
PCB-157	58.83	6.90	1.33
PCB-169	38.32	3.62	1.39
PCB-180	256.61	7.71	0.91
PCB-170	112.49	3.42	1.1
PCB-189	19.77	5.23	0.98

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2212	55	0.78
13c-PCB-118	4000	1454	36	1.56
13c-PCB-105	4000	1444	36	1.59
13c-PCB-126	4000	1818	45	1.55
13c-PCB-167	4000	1464	37	1.26
13c-PCB-156	4000	1512	38	1.25
13c-PCB-157	4000	1512	38	1.25
13c-PCB-169	4000	1902	48	1.25
13c-PCB-180	4000	1862	47	1.03
13c-PCB-189	4000	1956	49	1.03
13c-PCB-209	8000	3180	40	1.19

Cleanup Stds			
13c-PCB-81	2000	1150	58
13c-PCB-111	10000	4850	48

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-04 FH-R4-PCB

Matrix: A R

Sample Wt/Vol: 3.3500 g or mL: M3

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 03:38:55

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	973	49	1.25
PCB-126	*	*	*	13C-PCB-156	2000	1011	51	1.26
PCB-167	7.78	3.94	1.07	13C-PCB-157	2000	897	45	1.25
PCB-156	15.92	4.29	1.27	13C-PCB-169	2000	1283	64	1.26
PCB-157	4.11	3.99	1.21	13C-PCB-180	2000	*	*	*
PCB-169	2.40	1.87	1.38	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MES 9/1/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-11-04 FH-R4-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-23-99

Initial Calabration Date: 0824-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 03:38:55

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	52.[illegible]3	26.40	1.07
PCB-156	106.[illegible]6	28.74	1.27
PCB-157	27.[illegible]4	26.73	1.21
PCB-169	16.[illegible]8	12.53	1.38
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	1946	49	1.25
13c-PCB-156	4000	2022	51	1.26
13c-PCB-157	4000	1794	45	1.25
13c-PCB-169	4000	2566	64	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-02 BH-R2-PCB

Matrix: AIR

Sample Wt/Vol: 2.9240 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 20:10:44

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	25001.14✓	0.00	0.77	13C-PCB-77	2000	1257	63	0.79
PCB-123	113.76	2.28	1.43	13C-PCB-118	2000	1180	59	1.60
PCB-118	5498.35	1.66	1.54	13C-PCB-105	2000	1241	62	1.59
PCB-114	372.94	4.06	1.60	13C-PCB-126	2000	981	49	1.63
PCB-105	2562.06	1.92	1.70	13C-PCB-167	2000	1269	63	1.25
PCB-126	694.07	1.30	1.52	13C-PCB-156	2000	1264	63	1.27
PCB-167	377.09	0.81	1.24	13C-PCB-157	2000	1264	63	1.27
PCB-156	407.39	1.54	1.24	13C-PCB-169	2000	1061	53	1.28
PCB-157	407.39	1.54	1.24	13C-PCB-180	2000	1083	54	1.03
PCB-169	549.01	0.65	1.27	13C-PCB-189	2000	1201	60	1.02
PCB-180	2637.74	1.71	1.02	13C-PCB-209	4000	2406	60	1.19
PCB-170	1055.27	1.08	1.01					
PCB-189	92.03	0.89	0.98					

✓ above calibration range

Pre-sampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	537	54
13C-PCB-111	5000	2618	52

pts 1/20/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-02 BH-R2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2 -99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 20:10:44

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	146,206.67	0.00	
PCB-123	665.27	13.33	
PCB-118	32,154.35	9.71	
PCB-114	2,180.95	23.74	
PCB-105	14,982.93	11.23	
PCB-126	4,058.92	7.60	
PCB-167	2,205.22	4.74	
PCB-156	2,382.42	9.01	
PCB-157	2,382.42	9.01	
PCB-169	3,210.61	3.80	
PCB-180	15,425.50	10.00	
PCB-170	6,171.22	6.32	
PCB-189	538.19	5.20	

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2514	63	0.79
13c-PCB-118	4000	2360	59	1.6
13c-PCB-105	4000	2482	62	1.59
13c-PCB-126	4000	1962	49	1.63
13c-PCB-167	4000	2538	63	1.25
13c-PCB-156	4000	2528	63	1.27
13c-PCB-157	4000	2528	63	1.27
13c-PCB-169	4000	2122	53	1.28
13c-PCB-180	4000	2166	54	1.03
13c-PCB-189	4000	2402	60	1.02
13c-PCB-209	8000	4812	60	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	1074	54
13c-PCB-111	10000	5236	52

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-21-99

Ext. Date: 07-28-99

Analysis Date: 25-AUG-99 Time: 10:35:47

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: 1:2

Lab Sample ID: 48190-09-02 BH-R2-PCB

Sample Wt/Vol: 2.9240 g or mL: M3

Initial Calibration Date: 08-24-99

Instrument ID: Autospec

GC Column ID: 30m DB1

Sample Data Filename: 4807892

Blank Data Filename: 4807892 #7

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	332.53	7.39	1.28
PCB-156	623.12	7.44	1.25
PCB-157	214.58	6.23	1.18
PCB-169	520.72	4.01	1.27
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1489	74	1.26
13C-PCB-156	2000	1645	82	1.27
13C-PCB-157	2000	1679	84	1.25
13C-PCB-169	2000	1674	84	1.24
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MCS 9/1/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-02 BH-R2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2 -99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 10:35:47

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807892 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	1,944.64	43.22	1.28
PCB-156	3,644.01	43.51	1.25
PCB-157	1,254.86	36.43	1.18
PCB-169	3,045.17	23.45	1.27
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2978	74	1.26
13c-PCB-156	4000	3290	82	1.27
13c-PCB-157	4000	3358	84	1.25
13c-PCB-169	4000	3348	84	1.24
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-02 BH-R2-PCB

Matrix: AIR

Sample Wt/Vol: 2.9240 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 20-SEP-99 Time: 23:04:27

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:25

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	9761.28	0.00	0.79
PCB-123	59.21	13.92	1.47
PCB-118	2483.12	10.12	1.53
PCB-114	170.24	26.86	1.61
PCB-105	1176.57	12.68	1.70
PCB-126	243.47	6.96	1.73
PCB-167	203.52	7.36	1.24
PCB-156	234.96	14.57	1.22
PCB-157	234.96	14.57	1.22
PCB-169	254.02	5.73	1.36
PCB-180	1553.13	14.71	1.02
PCB-170	523.75	9.33	1.01
PCB-189	64.40	9.91	0.95

Not applicable PCB 77 is the only analyte brought within cal range by dilution

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	70776	142	0.73
13C-PCB-118	2000	52015	104	1.58
13C-PCB-105	2000	51067	102	1.54
13C-PCB-126	2000	48706	97	1.55
13C-PCB-167	2000	44034	88	1.23
13C-PCB-156	2000	43903	88	1.23
13C-PCB-157	2000	43903	88	1.23
13C-PCB-169	2000	37944	76	1.23
13C-PCB-180	2000	41967	84	1.02
13C-PCB-189	2000	35817	72	1.03
13C-PCB-209	4000	53535	54	1.20
CLEANUP STANDARD				
13C-PCB-81	1000	605	60	
13C-PCB-111	5000	2450	49	

Not applicable - with addition of internal the ratio of internal to recovery is no longer same as in calibration.

NCS 9/23/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-02 BH-R2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21 99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 20-SEP-99 Time: 23:04:27

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:25

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	57,083.97	0.00	0.79
PCB-123			
PCB-118			
PCB-114			
PCB-105			
PCB-126			
PCB-167			
PCB-156			
PCB-157			
PCB-169			
PCB-180			
PCB-170			
PCB-189			

*This is a sample rerun at a higher dilution factor to bring PCB-77 into range.

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77				
13c-PCB-118				
13c-PCB-105				
13c-PCB-126				
13c-PCB-167				
13c-PCB-156				
13c-PCB-157				
13c-PCB-169				
13c-PCB-180				
13c-PCB-189				
13c-PCB-209				

Pre-Sampling Surrogate Slds

13c-PCB-81

13c-PCB-111

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: AQ

Sample Wt/Vol: 3.1100 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 21:14:32

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	21592.74 ✓	0.00	0.77	13C-PCB-77	2000	1391	70	0.79
PCB-123	105.48	1.77	1.48	13C-PCB-118	2000	1226	61	1.57
PCB-118	5065.39	1.28	1.54	13C-PCB-105	2000	1323	66	1.58
PCB-114	328.35	3.06	1.60	13C-PCB-126	2000	1136	57	1.59
PCB-105	2361.00	1.44	1.68	13C-PCB-167	2000	1274	64	1.28
PCB-126	579.93	0.91	1.56	13C-PCB-156	2000	1289	64	1.27
PCB-167	327.86	0.64	1.26	13C-PCB-157	2000	1289	64	1.27
PCB-156	351.51	1.22	1.25	13C-PCB-169	2000	1019	51	1.24
PCB-157	351.51	1.22	1.25	13C-PCB-180	2000	1182	59	1.03
PCB-169	461.97	0.54	1.30	13C-PCB-189	2000	1289	64	1.02
PCB-180	2336.41	1.38	1.03	13C-PCB-209	4000	2572	64	1.20
PCB-170	949.30	0.88	1.04					
PCB-189	73.57	0.73	1.01					

Presampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	606	61
13C-PCB-111	5000	2546	51

✓ above calibration range

NES 9/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 21:14:32

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	126,274.34	0.00	0.77
PCB-123	616.85	10.35	1.48
PCB-118	29,622.40	7.49	1.54
PCB-114	1,921.36	17.89	1.6
PCB-105	13,807.13	8.42	1.68
PCB-126	3,391.43	5.32	1.56
PCB-167	1,917.33	3.74	1.26
PCB-156	2,055.63	7.13	1.25
PCB-157	2,055.63	7.13	1.25
PCB-169	2,701.60	3.16	1.3
PCB-180	13,663.33	8.07	1.03
PCB-170	5,551.51	5.15	1.04
PCB-189	430.24	4.27	1.01

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2782	70	0.79
13c-PCB-118	4000	2452	61	1.57
13c-PCB-105	4000	2646	66	1.58
13c-PCB-126	4000	2272	57	1.59
13c-PCB-167	4000	2548	64	1.28
13c-PCB-156	4000	2578	64	1.27
13c-PCB-157	4000	2578	64	1.27
13c-PCB-169	4000	2038	51	1.24
13c-PCB-180	4000	2364	59	1.03
13c-PCB-189	4000	2578	64	1.02
13c-PCB-209	8000	5144	64	1.20

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	1212	61
13c-PCB-111	10000	5092	51

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: AIR

Sample Wt/Vol: 3.1100 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 25-AUG-99 Time: 11:22:08

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1434	72	1.24
PCB-126	*	*	*	13C-PCB-156	2000	1633	82	1.26
PCB-167	295.40	6.72	1.24	13C-PCB-157	2000	1666	83	1.23
PCB-156	547.35	6.57	1.21	13C-PCB-169	2000	1555	78	1.22
PCB-157	174.03	5.29	1.22	13C-PCB-180	2000	*	*	*
PCB-169	453.84	3.90	1.34	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

WBS 11/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 11:22:08

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	1,837.39	41.80	1.24
PCB-156	3,404.52	40.87	1.21
PCB-157	1,082.47	32.90	1.22
PCB-169	2,822.88	24.26	1.34
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2868	72	1.24
13c-PCB-156	4000	3266	82	1.6
13c-PCB-157	4000	3332	83	1.23
13c-PCB-169	4000	3110	78	1.22
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: AIR

Sample Wt/Vol: 3.1100 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 00:08:21

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: ~~1:2~~ 1:25

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	7404.40	0.00	0.78
PCB-123	42.03	13.27	1.50
PCB-118	2036.43	9.65	1.56
PCB-114	132.19	26.12	1.53
PCB-105	943.89	12.33	1.71
PCB-126	191.20	6.91	1.75
PCB-167	163.82	7.24	1.26
PCB-156	181.17	14.82	1.31
PCB-157	181.17	14.82	1.31
PCB-169	167.20	6.00	1.34
PCB-180	1172.98	14.76	1.05
PCB-170	377.31	9.37	1.02
PCB-189	41.50	10.40	1.25

Not Applicable

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	91529	183	0.74
13C-PCB-118	2000	61469	123	1.55
13C-PCB-105	2000	59585	119	1.56
13C-PCB-126	2000	56053	112	1.54
13C-PCB-167	2000	46353	93	1.24
13C-PCB-156	2000	45160	90	1.24
13C-PCB-157	2000	45160	90	1.24
13C-PCB-169	2000	37800	76	1.21
13C-PCB-180	2000	45171	90	1.02
13C-PCB-189	2000	36628	73	1.02
13C-PCB-209	4000	53605	54	1.19
CLEANUP STANDARD				
13C-PCB-81	1000	582	58	
13C-PCB-111	5000	2429	49	

Not applicable

MES 9/23/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-23-99

Ext. Date: 07-28-99

Analysis Date: 23-AUG-99 Time: 22:18:22

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: 1:2

Lab Sample ID: 48190-09-04 BH-R4-PCB

Sample Wt/Vol: 3.3500 g or mL: M3

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807891

Blank Data Filename: 4807891 #3

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	7068.71✓	0.00	0.78	13C-PCB-77	2000	1039	52	0.79
PCB-123	34.16	1.57	1.43	13C-PCB-118	2000	1304	65	1.57
PCB-118	2042.63	1.14	1.55	13C-PCB-105	2000	1456	73	1.56
PCB-114	127.58	2.72	1.66	13C-PCB-126	2000	1100	55	1.59
PCB-105	866.79	1.28	1.63	13C-PCB-167	2000	1311	66	1.29
PCB-126	207.19	0.90	1.54	13C-PCB-156	2000	1352	68	1.27
PCB-167	128.05	0.61	1.27	13C-PCB-157	2000	1352	68	1.27
PCB-156	134.36	1.12	1.23	13C-PCB-169	2000	1328	66	1.25
PCB-157	134.36	1.12	1.23	13C-PCB-180	2000	1173	59	1.00
PCB-169	134.60	0.40	1.31	13C-PCB-189	2000	1251	63	1.02
PCB-180	817.78	1.33	1.04	13C-PCB-209	4000	2691	67	1.19
PCB-170	420.28	0.85	1.17					
PCB-189	40.65	0.71	1.07					

Pre-sampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	207	21
13C-PCB-111	5000	1381	28

✓ above calibration range

E-30

NES 12/20/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-03 BH-R3-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 0721 99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 00:08:21

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:25

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	46,055.37	0.00	0.78
PCB-123			
PCB-118			
PCB-114			
PCB-105			
PCB-126			
PCB-167			
PCB-156			
PCB-157			
PCB-169			
PCB-180			
PCB-170			
PCB-189			

*This is a sample rerun at a higher dilution factor to bring PCB-77 into range

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77				
13c-PCB-118				
13c-PCB-105				
13c-PCB-126				
13c-PCB-167				
13c-PCB-156				
13c-PCB-157				
13c-PCB-169				
13c-PCB-180				
13c-PCB-189				
13c-PCB-209				

Pre-Sampling Surrogate Stds

13c-PCB-81

13c-PCB-111

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-04 BH-R4-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-23 99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 22:18:22

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	47,360.36	0.00	0.78
PCB-123	228.87	10.52	1.43
PCB-118	13,685.62	7.64	1.55
PCB-114	854.79	18.22	1.66
PCB-105	5,807.49	8.58	1.63
PCB-126	1,388.17	6.03	1.54
PCB-167	857.94	4.09	1.27
PCB-156	900.21	7.50	1.23
PCB-157	900.21	7.50	1.23
PCB-169	901.82	2.68	1.31
PCB-180	5,479.13	8.91	1.04
PCB-170	2,815.88	5.70	1.17
PCB-189	272.36	4.76	1.07

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2078	52	0.79
13c-PCB-118	4000	2608	65	1.57
13c-PCB-105	4000	2912	73	1.56
13c-PCB-126	4000	2200	55	1.59
13c-PCB-167	4000	2622	66	1.29
13c-PCB-156	4000	2704	68	1.27
13c-PCB-157	4000	2704	68	1.27
13c-PCB-169	4000	2656	66	1.25
13c-PCB-180	4000	2346	59	1
13c-PCB-189	4000	2502	63	1.02
13c-PCB-209	8000	5382	67	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	414	21
13c-PCB-111	10000	2762	28

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-04 BH-R4-PCB

Matrix: AIR

Sample Wt/Vol: 3.3500 g or mL: M3

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 25-AUG-99 Time: 12:08:28

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1537	77	1.25
PCB-126	*	*	*	13C-PCB-156	2000	1676	84	1.28
PCB-167	109.38	5.22	1.20	13C-PCB-157	2000	1648	82	1.23
PCB-156	196.50	5.40	1.25	13C-PCB-169	2000	2019	101	1.24
PCB-157	74.42	4.77	1.22	13C-PCB-180	2000	*	*	*
PCB-169	130.63	2.43	1.25	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

WES 9/1/99

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48190-09-04 BH-R4-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-23 99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-Aug-99 Time: 12:08:28

GC Column ID: 30m DB1

Extract Volume (ul.): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: 1:2

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	732.85	34.97	1.2
PCB-156	1,316.35	36.18	1.25
PCB-157	498.61	31.96	1.22
PCB-169	875.22	16.28	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	3074	77	1.25
13c-PCB-156	4000	3352	84	1.28
13c-PCB-157	4000	3296	82	1.23
13c-PCB-169	4000	4038	101	1.24
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: Battelle

Lab Sample ID: 48091-09-04 BH-R4-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-23-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 01:12:18

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: 1:25

Cal. Ver. Data Filename: 4808971 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	14,606.13	0.00	0.78
PCB-123			
PCB-118			
PCB-114			
PCB-105			
PCB-126			
PCB-167			
PCB-156			
PCB-157			
PCB-169			
PCB-180			
PCB-170			
PCB-189			

*This is a sample rerun at a higher dilution factor to bring PCB-77 into range

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77				
13c-PCB-118				
13c-PCB-105				
13c-PCB-126				
13c-PCB-167				
13c-PCB-156				
13c-PCB-157				
13c-PCB-169				
13c-PCB-180				
13c-PCB-189				
13c-PCB-209				

Pre-Sampling Surrogate Stds

13c-PCB-81

13c-PCB-111

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-04 BH-R4-PCB

Matrix: AIR

Sample Wt/Vol: 3.3500 g or mL: M3

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 01:12:18

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: ~~1~~ 1:25

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	2180.02	0.00	0.78
PCB-123	20.38	13.89	1.54
PCB-118	950.30	10.09	1.59
PCB-114	73.23	26.81	1.56
PCB-105	415.89	12.65	1.56
PCB-126	70.66	7.37	1.32
PCB-167	74.18	7.77	1.23
PCB-156	82.32	15.83	1.29
PCB-157	82.32	15.83	1.29
PCB-169	77.37	6.53	1.19
PCB-180	463.69	15.79	1.04
PCB-170	196.91	10.02	1.15
PCB-189	26.60	11.30	1.01

Not Applicable

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	66142	132	0.74
13C-PCB-118	2000	52623	105	1.55
13C-PCB-105	2000	50516	101	1.58
13C-PCB-126	2000	46083	92	1.54
13C-PCB-167	2000	41120	82	1.23
13C-PCB-156	2000	39464	79	1.24
13C-PCB-157	2000	39464	79	1.24
13C-PCB-169	2000	32889	66	1.24
13C-PCB-180	2000	36906	74	1.01
13C-PCB-189	2000	29028	58	1.02
13C-PCB-209	4000	42871	43	1.20
CLEANUP STANDARD				
13C-PCB-81	1000	305	30	
13C-PCB-111	5000	1333	27	

Not Applicable

E-2-2
Sewage Sludge Fractions

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-08 S-R2-213B

Matrix: SLUDGE

Sample Wt/Vol: 0.1561 g or mL: g

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 22-AUG-99 Time: 20:44:31

GC Column ID: 30m SPB

Extract Volume (uL): 150

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	40898.90	0.00	0.77	13C-PCB-77	~~2000~~	7330	49	0.76
PCB-123	231.41	105.45	1.45	13C-PCB-118	2000	6921	46	1.56
PCB-118	12250.28	76.64	1.56	13C-PCB-105	2000	7085	47	1.54
PCB-114	691.47	132.38	1.63	13C-PCB-126	2000 } 15,000	5986	40	1.55
PCB-105	7014.72	101.16	1.69	13C-PCB-167	2000 ea	6616	44	1.26
PCB-126	1118.20	89.61	1.57	13C-PCB-156	2000	6527	44	1.24
PCB-167	878.21	81.94	1.18	13C-PCB-157	2000	6527	44	1.24
PCB-156	1122.17	65.77	1.24	13C-PCB-169	2000	5256	35	1.23
PCB-157	1122.17	65.77	1.24	13C-PCB-180	2000	7419	49	1.02
PCB-169	452.55	50.47	1.18	13C-PCB-189	~~2000~~	7181	48	1.03
PCB-180	6002.29	68.61	1.05	13C-PCB-209	~~4000~~ 30,000	12653	42	1.20
PCB-170	2526.24	82.90	1.04					
PCB-189	180.52	45.13	1.09					

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ 6,000	2371	40
13C-PCB-111	~~5000~~ 30,000	13937	46

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-08 S-R2-213B

Matrix: SLUDGE

Sample Wt/Vol: 0.1561 g or mL: g

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 26-AUG-99 Time: 02:41:34

GC Column ID: 30m DB1

Extract Volume (uL): 150

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	912.08	134.03	1.38
PCB-156	1772.47	179.52	1.24
PCB-157	472.44	168.73	1.25
PCB-169	*	155.59	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	8666	58	1.26
13C-PCB-156	2000	9335	62	1.27
13C-PCB-157	2000	9191	61	1.27
13C-PCB-169	2000	8977	60	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-09 S-R2-313B

Matrix: SLUDGE

Sample Wt/Vol: 0.1307 g or mL: g

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 22-AUG-99 Time: 21:48:16

GC Column ID: 30m SPB

Extract Volume (uL): 150

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	41095.68	0.00	0.79	13C-PCB-77	~~2000~~	6913	46	0.74
PCB-123	276.46	138.12	1.50	13C-PCB-118	2000	7229	48	1.57
PCB-118	13496.60	100.38	1.57	13C-PCB-105	2000	7370	49	1.55
PCB-114	674.09	169.24	1.66	13C-PCB-126	2000 15,000	6120	41	1.54
PCB-105	7389.05	129.33	1.72	13C-PCB-167	2000	6609	44	1.25
PCB-126	1213.53	115.30	1.46	13C-PCB-156	2000	6576	44	1.25
PCB-167	967.83	104.01	1.27	13C-PCB-157	2000	6576	44	1.25
PCB-156	1186.88	82.78	1.18	13C-PCB-169	2000	5049	34	1.25
PCB-157	1186.88	82.78	1.18	13C-PCB-180	2000	7464	50	1.04
PCB-169	600.79	67.43	1.28	13C-PCB-189	~~2000~~	7231	48	1.03
PCB-180	6780.09	85.40	1.01	13C-PCB-209	~~4000~~ 30,000	13435	45	1.19
PCB-170	2572.23	103.18	1.03					
PCB-189	197.58	56.43	1.00					

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ 6,000	2179	36
13C-PCB-111	~~5000~~ 30,000	13270	44

S 199

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-09 S-R3-313B

Matrix: SLUDGE

Sample Wt/Vol: 0.1307 g or mL: g

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 26-AUG-99 Time: 03:27:52

GC Column ID: 30m DB1

Extract Volume (uL): 150

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	8039	54	1.27
PCB-126	*	*	*	13C-PCB-156	2000	8865	59	1.27
PCB-167	993.93	159.12	1.36	13C-PCB-157	2000	8542	57	1.25
PCB-156	1882.59	209.09	1.30	13C-PCB-169	2000	8408	56	1.26
PCB-157	564.55	204.51	1.13	13C-PCB-180	2000	*	*	*
PCB-169	*	181.32	*	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MES 9/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-10 S-R4-413B

Matrix: SLUDGE

Sample Wt/Vol: 0.1425 g or mL: g

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 22-AUG-99 Time: 22:52:03

GC Column ID: 30m SPB

Extract Volume (uL): 150

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	45385.81	0.00	0.79	13C-PCB-77	~~2000~~	7298	49	0.74
PCB-123	241.49	131.19	1.61	13C-PCB-118	2000	7384	49	1.57
PCB-118	12856.01	95.35	1.53	13C-PCB-105	2000 15,000	7536	50	1.57
PCB-114	737.80	162.43	1.70	13C-PCB-126	2000	6253	42	1.54
PCB-105	7288.98	124.13	1.68	13C-PCB-167	2000	7221	48	1.25
PCB-126	1479.39	112.41	1.69	13C-PCB-156	2000	7140	48	1.26
PCB-167	959.36	100.59	1.22	13C-PCB-157	2000	7140	48	1.26
PCB-156	1177.55	81.09	1.33	13C-PCB-169	2000	5495	37	1.23
PCB-157	1177.55	81.09	1.33	13C-PCB-180	2000	7964	53	1.04
PCB-169	655.78	64.95	1.23	13C-PCB-189	~~2000~~	7685	51	1.03
PCB-180	6711.30	86.79	1.06	13C-PCB-209	~~4000~~ 30,000	14559	49	1.20
PCB-170	2776.46	104.86	1.08					
PCB-189	217.61	56.30	1.01					

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ 6000	2415	40
13C-PCB-111	~~5000~~ 30000	13926	46

MBS 1/30/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-10 S-R4-413B

Matrix: SEDIMENT

Sample Wt/Vol: 0.1425 g or mL: g

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 26-AUG-99 Time: 04:14:11

GC Column ID: 30m DB1

Extract Volume (uL): 150

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	8407	56	1.29
PCB-126	*	*	*	13C-PCB-156	2000	8997	60	1.29
PCB-167	971.88	140.68	1.27	13C-PCB-157	2000	8801	59	1.26
PCB-156	1875.97	193.19	1.23	13C-PCB-169	2000	8498	57	1.28
PCB-157	536.21	181.24	1.16	13C-PCB-180	2000	*	*	*
PCB-169	546.81	168.28	1.32	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MB 1/1/99

E-2-3
Scrubber Water Inlet Fractions

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-03 WI-R2-211B

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 22-AUG-99 Time: 09:02:42

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	158.49	0.00	0.80	13C-PCB-77	2000	952	48	0.77
PCB-123	177.42	5.95	1.52	13C-PCB-118	2000	910	45	1.60
PCB-118	1200.85	4.32	1.55	13C-PCB-105	2000	996	50	1.55
PCB-114	232.78	6.84	1.72	13C-PCB-126	2000	1149	57	1.56
PCB-105	689.92	5.23	1.54	13C-PCB-167	2000	1057	53	1.25
PCB-126	23.98	3.42	1.74	13C-PCB-156	2000	1086	54	1.23
PCB-167	185.96	3.49	1.24	13C-PCB-157	2000	1086	54	1.23
PCB-156	197.55	2.75	1.25	13C-PCB-169	2000	1207	60	1.23
PCB-157	197.55	2.75	1.25	13C-PCB-180	2000	1180	59	1.02
PCB-169	26.76	1.49	1.13	13C-PCB-189	2000	1268	63	1.03
PCB-180	338.28	2.87	1.01	13C-PCB-209	4000	2533	63	1.20
PCB-170	105.22	3.46	1.07					
PCB-189	29.03	1.71	1.04					

CLEANUP STANDARD			
13C-PCB-81	1000	585	58
13C-PCB-111	5000	2715	54

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-03 WI-R2-211B

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 19:44:18

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	191.13	5.34	1.26
PCB-156	242.90	6.85	1.29
PCB-157	165.65	6.28	1.22
PCB-169	22.72	0.00	1.23
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1180	59	1.28
13C-PCB-156	2000	1306	65	1.27
13C-PCB-157	2000	1323	66	1.27
13C-PCB-169	2000	1675	84	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-05 WI-R3-311B

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 22-AUG-99 Time: 11:10:12

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	166.40	0.00	0.79	13C-PCB-77	2000	1234	62	0.76
PCB-123	31.55	6.21	1.52	13C-PCB-118	2000	1174	59	1.58
PCB-118	1064.73	4.52	1.56	13C-PCB-105	2000	1183	59	1.58
PCB-114	67.98	7.76	1.59	13C-PCB-126	2000	1427	71	1.56
PCB-105	490.59	5.93	1.58	13C-PCB-167	2000	1251	63	1.26
PCB-126	6.91	3.66	1.47	13C-PCB-156	2000	1226	61	1.25
PCB-167	44.38	4.05	1.31	13C-PCB-157	2000	1226	61	1.25
PCB-156	55.81	3.28	1.30	13C-PCB-169	2000	1404	70	1.25
PCB-157	55.81	3.28	1.30	13C-PCB-180	2000	1511	76	1.02
PCB-169	5.81	1.73	1.28	13C-PCB-189	2000	1511	76	1.03
PCB-180	189.56	3.23	1.00	13C-PCB-209	4000	3014	75	1.20
PCB-170	79.88	3.91	1.07					
PCB-189	9.14	2.12	1.11					

CLEANUP STANDARD			
13C-PCB-81	1000	735	74
13C-PCB-111	5000	3382	68

NBS 12/20/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-05 WI-R3-311B

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 21:17:01

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	42.16	6.06	1.35
PCB-156	85.25	8.10	1.21
PCB-157	28.49	0.00	1.09
PCB-169	*	5.29	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1444	72	1.29
13C-PCB-156	2000	1571	79	1.25
13C-PCB-157	2000	1456	73	1.28
13C-PCB-169	2000	2081	104	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MB 9/11/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-07 WI-R4-411B - ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 20-SEP-99 Time: 22:00:33

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	138.01	0.00	0.77	13C-PCB-77	2000	1662	83	0.74
PCB-123	17.76	5.07	1.75	13C-PCB-118	2000	1187	59	1.56
PCB-118	1059.00	3.68	1.58	13C-PCB-105	2000	1174	59	1.56
PCB-114	45.12	6.55	1.55	13C-PCB-126	2000	1347	67	1.56
PCB-105	504.35	5.01	1.58	13C-PCB-167	2000	1146	57	1.23
PCB-126	3.66	3.18	1.58	13C-PCB-156	2000	1122	56	1.23
PCB-167	36.08	3.86	1.19	13C-PCB-157	2000	1122	56	1.23
PCB-156	47.76	3.13	1.20	13C-PCB-169	2000	1178	59	1.23
PCB-157	47.76	3.13	1.20	13C-PCB-180	2000	1104	55	1.01
PCB-169	1.97	1.84	1.15	13C-PCB-189	2000	1074	54	1.03
PCB-180	176.56	3.12	1.00	13C-PCB-209	4000	1670	42	1.19
PCB-170	78.25	3.76	1.01					
PCB-189	5.12-EMPC	2.03	1.04					

CLEANUP STANDARD				
13C-PCB-81	1000	1071	~~134~~	107
13C-PCB-111	5000	4236	~~106~~	85

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-07 WI-R4-411B — ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.4950 g or mL: L

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 18:38:08

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807897A

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	~~1329~~	~~66~~	~~1.25~~ ①
PCB-126	*	*	*	13C-PCB-156	2000	1334	67	1.25
PCB-167	~~35.65~~	~~6.72~~	~~1.16~~ ①	13C-PCB-157	2000	1299	65	1.28
PCB-156	80.47	0.00	1.30	13C-PCB-169	2000	~~1475~~	~~74~~	~~1.25~~ ①
PCB-157	19.56	9.27	1.19	13C-PCB-180	2000	*	*	*
PCB-169	~~3.17~~	~~7.36~~	~~1.33~~ ①	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

① Not applicable

MCS 9/23/99

E-2-4
Scrubber Water Outlet Fractions

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: WATER

Sample Receipt Date: 07-21-99

Ext. Date: 07-28-99

Analysis Date: 22-AUG-99 Time: 10:06:28

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48200-56-04 WO-R2-212B

Sample Wt/Vol: 0.5000 g or mL: L

Initial Calibration Date: 08-22-99

Instrument ID: Autospec

GC Column ID: 30m SPB

Sample Data Filename: 4807890

Blank Data Filename: 4807890 #7

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	4185.25	0.00	0.78
PCB-123	85.79	4.48	1.69
PCB-118	1675.82	3.26	1.54
PCB-114	156.58	5.30	1.62
PCB-105	945.62	4.05	1.61
PCB-126	134.52	2.58	1.54
PCB-167	158.39	2.75	1.24
PCB-156	179.21	2.09	1.24
PCB-157	179.21	2.09	1.24
PCB-169	113.49	1.21	1.39
PCB-180	685.99	2.38	1.02
PCB-170	264.31	2.88	1.02
PCB-189	30.12	1.35	1.07

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1336	67	0.77
13C-PCB-118	2000	1139	57	1.59
13C-PCB-105	2000	1222	61	1.56
13C-PCB-126	2000	1419	71	1.55
13C-PCB-167	2000	1285	64	1.25
13C-PCB-156	2000	1349	67	1.25
13C-PCB-157	2000	1349	67	1.25
13C-PCB-169	2000	1428	71	1.23
13C-PCB-180	2000	1356	68	1.03
13C-PCB-189	2000	1501	75	1.03
13C-PCB-209	4000	2928	73	1.21

CLEANUP STANDARD			
13C-PCB-81	1000	662	66
13C-PCB-111	5000	2635	53

MCS 10/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-04 WO-R2-212B

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 20:30:40

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1357	68	1.26
PCB-126	*	*	*	13C-PCB-156	2000	1514	76	1.26
PCB-167	148.74	4.78	1.28	13C-PCB-157	2000	1520	76	1.27
PCB-156	249.32	5.87	1.32	13C-PCB-169	2000	1974	99	1.24
PCB-157	119.44	5.56	1.23	13C-PCB-180	2000	*	*	*
PCB-169	110.28	4.01	1.40	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MBS 9/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-06 WO-R3-312B - ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.4975 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 20-SEP-99 Time: 20:56:43

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	3634.16	0.00	0.78	13C-PCB-77	2000	1441	72	0.75
PCB-123	65.12	4.96	1.56	13C-PCB-118	2000	1132	57	1.56
PCB-118	3523.67	3.60	1.54	13C-PCB-105	2000	1172	59	1.58
PCB-114	154.91	6.15	1.73	13C-PCB-126	2000	1253	63	1.57
PCB-105	1873.63	4.70	1.60	13C-PCB-167	2000	1083	54	1.23
PCB-126	118.21	3.24	1.54	13C-PCB-156	2000	1083	54	1.24
PCB-167	164.00	3.98	1.25	13C-PCB-157	2000	1083	54	1.24
PCB-156	239.38	3.11	1.27	13C-PCB-169	2000	1099	55	1.23
PCB-157	239.38	3.11	1.27	13C-PCB-180	2000	1016	51	1.01
PCB-169	80.69	1.88	1.33	13C-PCB-189	2000	1004	50	1.03
PCB-180	1000.09	3.30	1.02	13C-PCB-209	4000	1519	38	1.20
PCB-170	413.95	3.99	0.99					
PCB-189	23.82	2.13	0.97					

CLEANUP STANDARD			
13C-PCB-81	1000	845	~~106~~ 85
13C-PCB-111	5000	3666	~~92~~ 73

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-06 WO-R3-312B - ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.4975 g or mL: L

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 17:51:50

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807897A

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	~~178.87~~	~~8.28~~	~~1.20~~ ①
PCB-156	412.99	10.19	1.18
PCB-157	109.85	10.24	1.31
PCB-169	~~57.46~~	~~8.65~~	~~1.39~~ ①
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	~~2000~~	~~1333~~	~~67~~	~~1.30~~ ①
13C-PCB-156	2000	1364	68	1.29
13C-PCB-157	2000	1302	65	1.27
13C-PCB-169	~~2000~~	~~1453~~	~~73~~	~~1.27~~ ①
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

① not applicable

MCS 9/23/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-08 WO-R4-412B

Matrix: WATER

Sample Wt/Vol: 0.4975 g or mL: L

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 22-AUG-99 Time: 14:21:35

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	2520.01	0.00	0.78	13C-PCB-77	2000	1110	55	0.76
PCB-123	50.24	6.18	1.56	13C-PCB-118	2000	1011	51	1.56
PCB-118	1621.37	4.49	1.57	13C-PCB-105	2000	1106	55	1.57
PCB-114	123.94	7.25	1.53	13C-PCB-126	2000	1303	65	1.54
PCB-105	854.45	5.54	1.59	13C-PCB-167	2000	1100	55	1.25
PCB-126	98.28	3.54	1.55	13C-PCB-156	2000	1139	57	1.25
PCB-167	124.62	4.05	1.17	13C-PCB-157	2000	1139	57	1.25
PCB-156	157.11	3.05	1.26	13C-PCB-169	2000	1255	63	1.24
PCB-157	157.11	3.05	1.26	13C-PCB-180	2000	1251	63	1.03
PCB-169	97.65	1.71	1.30	13C-PCB-189	2000	1300	65	1.02
PCB-180	653.05	3.27	1.04	13C-PCB-209	4000	2279	57	1.20
PCB-170	297.77	3.96	1.03					
PCB-189	44.40	2.00	1.03					

CLEANUP STANDARD			
13C-PCB-81	1000	684	68
13C-PCB-111	5000	3077	62

MED 10/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-08 WO-R4-412B

Matrix: WATER

Sample Wt/Vol: 0.4975 g or mL: L

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 23:36:05

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1277	64	1.26
PCB-126	*	*	*	13C-PCB-156	2000	1387	69	1.25
PCB-167	115.76	6.16	1.37	13C-PCB-157	2000	1369	68	1.27
PCB-156	236.47	8.09	1.23	13C-PCB-169	2000	1920	96	1.24
PCB-157	83.33	7.71	1.30	13C-PCB-180	2000	*	*	*
PCB-169	94.54	5.15	1.33	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MES 9/1/

E-3
PCB Blanks Lab Raw Data

E-3-1
Air Sampling Train

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-07 FH-FB1-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 01:30:34

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	10.84	0.00	0.74
PCB-123	5.36	0.57	1.55
PCB-118	232.78	0.41	1.53
PCB-114	9.80	0.71	1.65
PCB-105	104.72	0.73	1.52
PCB-126	0.72	0.35	1.50
PCB-167	6.01	0.65	1.18
PCB-156	8.01	0.55	1.23
PCB-157	8.01	0.55	1.23
PCB-169	*	0.34	*
PCB-180	26.02	0.68	1.02
PCB-170	10.74	0.31	1.03
PCB-189	*	0.55	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1289	64	0.75
13C-PCB-118	2000	961	48	1.57
13C-PCB-105	2000	1029	51	1.58
13C-PCB-126	2000	1134	57	1.58
13C-PCB-167	2000	961	48	1.25
13C-PCB-156	2000	973	49	1.25
13C-PCB-157	2000	973	49	1.25
13C-PCB-169	2000	1032	52	1.25
13C-PCB-180	2000	1104	55	1.03
13C-PCB-189	2000	1013	51	1.04
13C-PCB-209	4000	965	24 ✓	1.20

CLEANUP STANDARD			
13C-PCB-81	1000	684	68
13C-PCB-111	5000	2940	59

✓ outside DQO, but PCB 209 is not used in any calculations for this study. MES 8/29/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-07 FH-FB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 01:30:34

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889A #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	67.82	0.00	0.74
PCB-123	33.53	3.57	1.55
PCB-118	1,456.27	2.56	1.53
PCB-114	61.[illegible]1	4.[illegible]4	1.65
PCB-105	655.[illegible]3	4.57	1.52
PCB-126	4.[illegible]0	2.19	1.50
PCB-167	37.60	4.07	1.18
PCB-156	50.[illegible]1	3.44	1.23
PCB-157	50.[illegible]1	3.44	1.23
PCB-169	*	2.13	*
PCB-180	162.78	4.25	1.02
PCB-170	67.[illegible]9	1.94	1.03
PCB-189	*	3.44	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2578	64	0.75
13c-PCB-118	4000	1922	48	1.57
13c-PCB-105	4000	2058	51	1.58
13c-PCB-126	4000	2268	57	1.58
13c-PCB-167	4000	1922	48	1.25
13c-PCB-156	4000	1946	49	1.25
13c-PCB-157	4000	1946	49	1.25
13c-PCB-169	4000	2064	52	1.25
13c-PCB-180	4000	2208	55	1.03
13c-PCB-189	4000	2026	51	1.04
13c-PCB-209	8000	1930	24	1.20

Cleanup Stds

13c-PCB-81	2000	1368	68
13c-PCB-111	10000	5880	59

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: A R

Sample Receipt Date: 07-21-99

Ext. Date: 08-01-99

Analysis Date: 24-AUG-99 Time: 22:14:48

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-07 FH-FB1-PCB

Sample Wt/Vol: 3.1280 g or mL: M3

Initial Calibration Date: 08-24-99

Instrument ID: AutoSpec

GC Column ID: 30m DB1

Sample Data Filename: 4807892

Blank Data Filename: 4807892 #7

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	6.09	3.29	1.16
PCB-156	13.70	3.64	1.17
PCB-157	2.84	0.00	1.20
PCB-169	*	1.63	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1371	69	1.25
13C-PCB-156	2000	1429	71	1.25
13C-PCB-157	2000	1346	67	1.24
13C-PCB-169	2000	1750	87	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

NBS 9/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-07 FH-FB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 22:14:48

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	38.10	20.58	1.16
PCB-156	85.71	22.77	1.17
PCB-157	17.77	10.20	1.20
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2742	69	1.25
13c-PCB-156	4000	2858	71	1.25
13c-PCB-157	4000	2692	67	1.24
13c-PCB-169	4000	3500	87	1.25
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-21-99

Ext. Date: 08-01-99

Analysis Date: 21-AUG-99 Time: 02:34:25

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-05 FH-PB1-PCB

Sample Wt/Vol: 3.1280 g or mL: M3

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807889A

Blank Data Filename: 4807889A #1

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	12.40	0.00	0.68
PCB-123	4.86	0.67	1.44
PCB-118	210.11	0.49	1.53
PCB-114	8.56	0.83	1.57
PCB-105	94.16	0.85	1.58
PCB-126	0.99	0.40	1.62
PCB-167	6.54	0.74	1.18
PCB-156	7.84	0.61	1.28
PCB-157	7.84	0.61	1.28
PCB-169	*	0.37	*
PCB-180	29.78	0.75	1.02
PCB-170	11.63	0.34	0.97
PCB-189	0.78	0.57	1.09

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1222	61	0.77
13C-PCB-118	2000	841	42	1.58
13C-PCB-105	2000	912	46	1.59
13C-PCB-126	2000	1027	51	1.54
13C-PCB-167	2000	847	42	1.25
13C-PCB-156	2000	885	44	1.24
13C-PCB-157	2000	885	44	1.24
13C-PCB-169	2000	965	48	1.25
13C-PCB-180	2000	984	49	1.03
13C-PCB-189	2000	963	48	1.03
13C-PCB-209	4000	1466	37	1.19

CLEANUP STANDARD			
13C-PCB-81	1000	621	62
13C-PCB-111	5000	2581	52

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-05 FH-PB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2 -99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 02:34:25

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	77.57	0.00	0.68
PCB-123	30.40	4.19	1.44
PCB-118	1,314.45	3.07	1.53
PCB-114	53.55	5.19	1.57
PCB-105	589.06	5.32	1.58
PCB-126	6.19	2.50	1.62
PCB-167	40.91	4.63	1.18
PCB-156	49.05	3.82	1.28
PCB-157	49.05	3.82	1.28
PCB-169	*	2.31	*
PCB-180	186.30	4.69	1.02
PCB-170	72.76	2.13	0.97
PCB-189	4.88	3.57	1.09

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2444	61	0.77
13c-PCB-118	4000	1682	42	1.58
13c-PCB-105	4000	1824	46	1.59
13c-PCB-126	4000	2054	51	1.54
13c-PCB-167	4000	1694	42	1.25
13c-PCB-156	4000	1770	44	1.24
13c-PCB-157	4000	1770	44	1.24
13c-PCB-169	4000	1930	48	1.25
13c-PCB-180	4000	1968	49	1.03
13c-PCB-189	4000	1926	48	1.03
13c-PCB-209	8000	2932	37	1.19
Cleanup Stds				
13c-PCB-81	2000	1242	62	
13c-PCB-111	10000	5162	52	

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-21-99

Ext. Date: 08-01-99

Analysis Date: 24-AUG-99 Time: 23:01:09

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-11-05 FH-PB1-PCB

Sample Wt/Vol: 3.1280 g or mL: M3

Initial Calibration Date: 08-24-99

Instrument ID: AutoSpec

GC Column ID: 30m DB1

Sample Data Filename: 4807892

Blank Data Filename: 4807892 #7

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	5.92	3.55	1.27
PCB-156	13.68	3.79	1.40
PCB-157	2.80	0.00	1.17
PCB-169	*	1.60	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1244	62	1.27
13C-PCB-156	2000	1321	66	1.23
13C-PCB-157	2000	1288	64	1.23
13C-PCB-169	2000	1713	86	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*
CLEANUP STANDARD				
13C-PCB-81	1000	*	*	
13C-PCB-111	5000	*	*	

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-05 FH-PB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-2 -99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 23:01:09

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	37 04	22.21	1.27
PCB-156	85 58	23.71	1.40
PCB-157	17 52	10.01	1.17
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2488	62	1.27
13c-PCB-156	4000	2642	66	1.23
13c-PCB-157	4000	2576	64	1.23
13c-PCB-169	4000	3426	86	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-06 FH-PB2-PCB

Matrix: AQ

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 03:38:10

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	29.75	0.00	0.80	13C-PCB-77	2000	912	46	0.77
PCB-123	32.86	1.36	1.52	13C-PCB-118	2000	546	27	1.58
PCB-118	870.98	0.98	1.52	13C-PCB-105	2000	590	29	1.57
PCB-114	51.37	1.69	1.50	13C-PCB-126	2000	784	39	1.55
PCB-105	420.87	1.71	1.54	13C-PCB-167	2000	572	29	1.23
PCB-126	2.09	0.66	1.41	13C-PCB-156	2000	590	30	1.25
PCB-167	33.30	1.39	1.09	13C-PCB-157	2000	590	30	1.25
PCB-156	41.06	1.14	1.25	13C-PCB-169	2000	764	38	1.26
PCB-157	41.06	1.14	1.25	13C-PCB-180	2000	756	38	1.03
PCB-169	2.12	0.59	1.32	13C-PCB-189	2000	764	38	1.03
PCB-180	88.79	1.27	1.02	13C-PCB-209	4000	1008	25	1.20
PCB-170	32.57	0.57	0.95					
PCB-189	2.92	0.91	1.11					

CLEANUP STANDARD			
13C-PCB-81	1000	465	46
13C-PCB-111	5000	1735	35

Outside 30-150% MES 11/9/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-06 FH-PB2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21 99

Initial Calabration Date: 08-22-99

Ext. Date: 08-21-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 T me: 03:38:10

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	186.12	0.00	0.80
PCB-123	205.57	8.51	1.52
PCB-118	5,448.85	6.13	1.52
PCB-114	321.37	10.57	1.50
PCB-105	2,632.96	10.70	1.54
PCB-126	13.08	4.13	1.41
PCB-167	208.32	8.70	1.09
PCB-156	256.37	7.13	1.25
PCB-157	256.87	7.13	1.25
PCB-169	13.26	3.69	1.32
PCB-180	555.47	7.95	1.02
PCB-170	203.76	3.57	0.95
PCB-189	18.27	5.69	1.11

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	1824	46	0.77
13c-PCB-118	4000	1092	27	1.58
13c-PCB-105	4000	1180	29	1.57
13c-PCB-126	4000	1568	39	1.55
13c-PCB-167	4000	1144	29	1.23
13c-PCB-156	4000	1180	30	1.25
13c-PCB-157	4000	1180	30	1.25
13c-PCB-169	4000	1528	38	1.26
13c-PCB-180	4000	1512	38	1.03
13c-PCB-189	4000	1528	38	1.03
13c-PCB-209	8000	2016	25	1.20

Cleanup Stds			
13c-PCB-81	2000	930	46
13c-PCB-111	10000	3470	35

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-06 FH-PB2-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 23:47:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	34.49	4.34	1.24
PCB-156	62.88	4.01	1.34
PCB-157	24.62	0.00	1.29
PCB-169	*	1.55	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	848	42	1.25
13C-PCB-156	2000	1025	51	1.27
13C-PCB-157	2000	915	46	1.25
13C-PCB-169	2000	1443	72	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-06 FH-PB2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 23:47:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	215.77	27.15	1.24
PCB-156	393.38	25.09	1.34
PCB-157	154.02	9.70	1.29
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	1696	42	1.25
13c-PCB-156	4000	2050	51	1.27
13c-PCB-157	4000	1830	46	1.25
13c-PCB-169	4000	2886	72	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-10 FH-LB-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 00:26:44

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	11.45	0.00	0.66	13C-PCB-77	2000	582	29 ✓	0.78
PCB-123	91.18	4.27	1.54	13C-PCB-118	2000	176	9 ✓	1.61
PCB-118	321.27	3.11	1.50	13C-PCB-105	2000	199	10 ✓	1.60
PCB-114	122.59	5.03	1.66	13C-PCB-126	2000	455	23 ✓	1.55
PCB-105	224.40	5.11	1.49	13C-PCB-167	2000	218	11 ✓	1.26
PCB-126	5.11	1.17	1.59	13C-PCB-156	2000	245	12 ✓	1.24
PCB-167	74.48	3.22	1.21	13C-PCB-157	2000	245	12 ✓	1.24
PCB-156	76.57	2.47	1.24	13C-PCB-169	2000	506	25 ✓	1.23
PCB-157	76.57	2.47	1.24	13C-PCB-180	2000	469	23 ✓	1.04
PCB-169	5.89	0.80	1.21	13C-PCB-189	2000	371	19 ✓	1.03
PCB-180	59.58	1.83	1.00	13C-PCB-209	4000	849	21 ✓	1.19
PCB-170	19.56	0.82	1.02					
PCB-189	8.49	1.63	1.21					

CLEANUP STANDARD			
13C-PCB-81	1000	286	29
13C-PCB-111	5000	797	16 ✓

✓ outside DQO
WBS 8/26/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-10 FH-LB-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 00:26:44

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	71.63	0.00	0.66
PCB-123	570.42	26.71	1.54
PCB-118	2,009.87	19.46	1.50
PCB-114	766.92	31.47	1.66
PCB-105	1,403.85	31.97	1.49
PCB-126	31.97	7.32	1.59
PCB-167	465.95	20.14	1.21
PCB-156	479.02	15.45	1.24
PCB-157	479.02	15.45	1.24
PCB-169	36.85	5.00	1.21
PCB-180	372.73	11.45	1.00
PCB-170	122.37	5.13	1.02
PCB-189	53.11	10.20	1.21

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	1164	29	0.78
13c-PCB-118	4000	352	9	1.61
13c-PCB-105	4000	398	10	1.60
13c-PCB-126	4000	910	23	1.55
13c-PCB-167	4000	436	11	1.26
13c-PCB-156	4000	490	12	1.24
13c-PCB-157	4000	490	12	1.24
13c-PCB-169	4000	1012	25	1.23
13c-PCB-180	4000	938	23	1.04
13c-PCB-189	4000	742	19	1.03
13c-PCB-209	8000	1698	21	1.19

Cleanup Stds

13c-PCB-81	2000	572	29
13c-PCB-111	10000	1594	16

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-10 FH-LB-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 21:28:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	77.32	13.25	1.29
PCB-156	94.74	14.16	1.31
PCB-157	78.18	11.39	1.22
PCB-169	6.86	0.00	1.30
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	316	16	1.28
13C-PCB-156	2000	338	17	1.28
13C-PCB-157	2000	341	17	1.25
13C-PCB-169	2000	733	37	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

✓ outside 30-150% DQO

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-10 FH-LB-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 24-AUG-99 Time: 21:28:99

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	483.71	82.89	1.29
PCB-156	592.69	88.58	1.31
PCB-157	489.09	71.26	1.22
PCB-169	42.92	0.00	1.3
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	632	16	1.28
13c-PCB-156	4000	676	17	1.28
13c-PCB-157	4000	682	17	1.25
13c-PCB-169	4000	1466	37	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Cleanup Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-08 FH-LCS-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 04:42:00

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	171.83	0.00	0.76	13C-PCB-77	2000	1180	59	0.74
PCB-123	7261.84	1.17	1.52	13C-PCB-118	2000	654	33	1.60
PCB-118	5616.17	0.85	1.51	13C-PCB-105	2000	711	36	1.56
PCB-114	9451.86	1.45	1.51	13C-PCB-126	2000	869	43	1.57
PCB-105	7385.38	1.48	1.51	13C-PCB-167	2000	670	33	1.25
PCB-126	752.14	0.63	1.54	13C-PCB-156	2000	702	35	1.23
PCB-167	7309.17	1.19	1.24	13C-PCB-157	2000	702	35	1.23
PCB-156	7452.76	0.99	1.23	13C-PCB-169	2000	853	43	1.25
PCB-157	7452.76	0.99	1.23	13C-PCB-180	2000	844	42	1.02
PCB-169	1277.04	0.53	1.23	13C-PCB-189	2000	926	46	1.04
PCB-180	7262.23	1.16	0.99	13C-PCB-209	4000	1434	36	1.19
PCB-170	1598.52	0.52	1.00					
PCB-189	1378.66	0.75	1.01					

CLEANUP STANDARD			
13C-PCB-81	1000	629	63
13C-PCB-111	5000	2078	42

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-08 FH-LCS-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 04:42:00

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	1,074.97	0.00	0.76
PCB-123	45,430.07	7.32	1.52
PCB-118	35,134.76	5.32	1.51
PCB-114	59,130.84	9.07	1.51
PCB-105	46,202.94	9.26	1.51
PCB-126	4,705.39	3.94	1.54
PCB-167	45,726.17	7.44	1.24
PCB-156	46,624.47	6.19	1.23
PCB-157	46,624.47	6.19	1.23
PCB-169	7,989.16	3.32	1.23
PCB-180	45,432.51	7.26	1.99
PCB-170	10,000.34	3.25	1.00
PCB-189	8,624.90	4.69	1.01

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	2360	59
13c-PCB-118	4000	1308	33
13c-PCB-105	4000	1422	36
13c-PCB-126	4000	1738	43
13c-PCB-167	4000	1340	33
13c-PCB-156	4000	1404	35
13c-PCB-157	4000	1404	35
13c-PCB-169	4000	1706	43
13c-PCB-180	4000	1688	42
13c-PCB-189	4000	1852	46
13c-PCB-209	8000	2868	36
Cleanup Stds			
13c-PCB-81	2000	1258	63
13c-PCB-111	10000	4156	42

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-08 FH-LCS-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 00:33:43

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1004	50	1.27
PCB-126	*	*	*	13C-PCB-156	2000	1061	53	1.27
PCB-167	7629.33	3.11	1.24	13C-PCB-157	2000	999	50	1.28
PCB-156	8184.13	3.36	1.26	13C-PCB-169	2000	1355	68	1.27
PCB-157	7840.98	2.97	1.24	13C-PCB-180	2000	*	*	*
PCB-169	1368.82	0.00	1.25	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					
				CLEANUP STANDARD				
				13C-PCB-81	1000	*	*	
				13C-PCB-111	5000	*	*	

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Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-08 FH-LCS-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 00:33:43

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	47,729.09	19.46	1.24
PCB-156	51,199.92	21.02	1.26
PCB-157	49,053.17	18.58	1.24
PCB-169	8,563.34	0.00	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	*	*
13c-PCB-118	4000	*	*
13c-PCB-105	4000	*	*
13c-PCB-126	4000	*	*
13c-PCB-167	4000	2008	50
13c-PCB-156	4000	2122	53
13c-PCB-157	4000	1998	50
13c-PCB-169	4000	2710	68
13c-PCB-180	4000	*	*
13c-PCB-189	4000	*	*
13c-PCB-209	8000	*	*
Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-09 FH-LCSDUP-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 05:45:46

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	165.73	0.00	0.75	13C-PCB-77	2000	1105	55	0.76
PCB-123	7191.69	1.10	1.50	13C-PCB-118	2000	668	33	1.57
PCB-118	5649.73	0.80	1.51	13C-PCB-105	2000	704	35	1.61
PCB-114	9439.68	1.41	1.51	13C-PCB-126	2000	915	46	1.54
PCB-105	7300.30	1.43	1.51	13C-PCB-167	2000	732	37	1.25
PCB-126	733.39	0.57	1.52	13C-PCB-156	2000	780	39	1.24
PCB-167	7298.48	1.10	1.24	13C-PCB-157	2000	780	39	1.24
PCB-156	7329.92	0.87	1.24	13C-PCB-169	2000	883	44	1.25
PCB-157	7329.92	0.87	1.24	13C-PCB-180	2000	912	46	1.03
PCB-169	1272.48	0.51	1.25	13C-PCB-189	2000	958	48	1.03
PCB-180	7169.97	1.06	1.01	13C-PCB-209	4000	1526	38	1.19
PCB-170	1501.77	0.48	1.01					
PCB-189	1385.25	0.73	1.01					

CLEANUP STANDARD			
13C-PCB-81	1000	611	61
13C-PCB-111	5000	2230	45

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Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-09 FH-LCSDUP-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-22-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 21-AUG-99 Time: 05:45:46

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807889A

Injection Volume (uL): 1

Blank Data Filename: 4807889A #1

Dilution Factor: None

Cal. Ver. Data Filename: 4807889 #3

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	1,036.81	0.00	0.75
PCB-123	44,991.21	6.88	1.50
PCB-118	35,344.71	5.00	1.51
PCB-114	59,054.64	8.82	1.51
PCB-105	45,670.68	8.95	1.51
PCB-126	4,588.09	3.57	1.52
PCB-167	45,659.29	6.88	1.24
PCB-156	45,855.98	5.44	1.24
PCB-157	45,855.98	5.44	1.24
PCB-169	7,960.63	3.19	1.25
PCB-180	44,855.33	6.63	1.01
PCB-170	9,395.08	3.00	1.01
PCB-189	8,666.12	4.57	1.01

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	2210	55
13c-PCB-118	4000	1336	33
13c-PCB-105	4000	1408	35
13c-PCB-126	4000	1830	46
13c-PCB-167	4000	1464	37
13c-PCB-156	4000	1560	39
13c-PCB-157	4000	1560	39
13c-PCB-169	4000	1766	44
13c-PCB-180	4000	1824	46
13c-PCB-189	4000	1916	48
13c-PCB-209	8000	3052	38
Cleanup Stds			
13c-PCB-81	2000	1222	61
13c-PCB-111	10000	4460	45

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-09 FH-LCSDUP-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 08-01-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 01:20:00

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1093	55	1.28
PCB-126	*	*	*	13C-PCB-156	2000	1242	62	1.26
PCB-167	7734.87	3.29	1.24	13C-PCB-157	2000	1192	60	1.28
PCB-156	8204.13	3.31	1.24	13C-PCB-169	2000	1664	83	1.27
PCB-157	7847.80	2.83	1.24	13C-PCB-180	2000	*	*	*
PCB-169	1341.57	0.00	1.25	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-11-09 FH-LCSDUP-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 08-01-99

Initial Calabration Date: 08-24-99

Ext. Date: 08-01-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 01:20:00

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	48,389.35	20.58	1.24
PCB-156	51,325.04	20.71	1.24
PCB-157	49,095.84	17.70	1.24
PCB-169	8,392.86	0.00	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	*	*
13c-PCB-118	4000	*	*
13c-PCB-105	4000	*	*
13c-PCB-126	4000	*	*
13c-PCB-167	4000	2186	55
13c-PCB-156	4000	2484	62
13c-PCB-157	4000	2384	60
13c-PCB-169	4000	3328	83
13c-PCB-180	4000	*	*
13c-PCB-189	4000	*	*
13c-PCB-209	8000	*	*

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-07 BH-FB1-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 14:51:23

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	28.45	0.00	0.78
PCB-123	11.51	1.19	1.55
PCB-118	284.49	0.86	1.57
PCB-114	20.73	2.07	1.74
PCB-105	139.50	0.98	1.58
PCB-126	2.59	0.47	1.42
PCB-167	14.82	0.43	1.19
PCB-156	17.45	0.81	1.26
PCB-157	17.45	0.81	1.26
PCB-169	1.20	0.27	1.12
PCB-180	45.55	0.88	1.04
PCB-170	18.59	0.56	1.07
PCB-189	1.62	0.49	1.07

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1572	79	0.77
13C-PCB-118	2000	991	50	1.52
13C-PCB-105	2000	1060	53	1.57
13C-PCB-126	2000	1183	59	1.56
13C-PCB-167	2000	1142	57	1.27
13C-PCB-156	2000	1207	60	1.26
13C-PCB-157	2000	1207	60	1.26
13C-PCB-169	2000	1254	63	1.26
13C-PCB-180	2000	1100	55	1.02
13C-PCB-189	2000	1127	56	1.00
13C-PCB-209	4000	2584	65	1.20

Pre-Sampling Surrogate

~~CLEANUP~~ STANDARD			
13C-PCB-81	1000	719	72
13C-PCB-111	5000	2459	49

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-07 BH-FB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 14:51:23

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	177.98	0.00	0.78
PCB-123	72.01	7.44	1.55
PCB-118	1,779.77	5.38	1.57
PCB-114	129.69	12.95	1.74
PCB-105	872.71	6.13	1.58
PCB-126	16.20	2.94	1.42
PCB-167	92.71	2.69	1.19
PCB-156	109.17	5.07	1.26
PCB-157	109.17	5.07	1.26
PCB-169	7.51	1.69	1.12
PCB-180	284.96	5.51	1.04
PCB-170	116.30	3.50	1.07
PCB-189	10.13	3.07	1.07

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	3144	79	0.77
13c-PCB-118	4000	1982	50	1.52
13c-PCB-105	4000	2120	53	1.57
13c-PCB-126	4000	2366	59	1.56
13c-PCB-167	4000	2284	57	1.27
13c-PCB-156	4000	2414	60	1.26
13c-PCB-157	4000	2414	60	1.26
13c-PCB-169	4000	2508	63	1.26
13c-PCB-180	4000	2200	55	1.02
13c-PCB-189	4000	2254	56	1.00
13c-PCB-209	8000	5168	65	1.20

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	1438	72
13c-PCB-111	10000	4918	49

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-07 BH-FB1-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 06:44:08

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	14.80	3.46	1.19
PCB-156	24.73	3.89	1.26
PCB-157	9.84	0.00	1.22
PCB-169	*	1.72	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1383	69	1.26
13C-PCB-156	2000	1451	73	1.26
13C-PCB-157	2000	1409	70	1.24
13C-PCB-169	2000	1777	89	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-07 BH-FB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 06:44:08

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	92.59	21.65	1.19
PCB-156	154.71	24.34	1.26
PCB-157	61.56	10.76	1.22
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2766	69	1.26
13c-PCB-156	4000	2902	73	1.26
13c-PCB-157	4000	2818	70	1.24
13c-PCB-169	4000	3554	89	1.25
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-05 BH-PB1-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 15:55:17

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	29.08	0.00	0.75	13C-PCB-77	2000	1368	68	0.78
PCB-123	5.13	0.93	1.48	13C-PCB-118	2000	932	47	1.54
PCB-118	278.45	0.67	1.56	13C-PCB-105	2000	971	49	1.50
PCB-114	12.35	1.67	1.67	13C-PCB-126	2000	1217	61	1.54
PCB-105	133.46	0.79	1.56	13C-PCB-167	2000	1030	52	1.24
PCB-126	1.90	0.34	1.73	13C-PCB-156	2000	1082	54	1.26
PCB-167	8.86	0.32	1.29	13C-PCB-157	2000	1082	54	1.26
PCB-156	12.02	0.60	1.23	13C-PCB-169	2000	1250	62	1.25
PCB-157	12.02	0.60	1.23	13C-PCB-180	2000	1011	51	1.03
PCB-169	0.23 + EMPC	0.18	*1.24	13C-PCB-189	2000	1102	55	1.02
PCB-180	41.30	0.64	1.03	13C-PCB-209	4000	2394	60	1.19
PCB-170	19.32	0.40	1.02					
PCB-189	1.11	0.33	0.93					

Pre-sampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	653	65
13C-PCB-111	5000	2306	46

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-05 BH-PB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 15:55:17

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 448047891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found		Detection Limit	Ion Ratio
PCB-77	181.92		0.00	0.75
PCB-123	32.09		5.82	1.48
PCB-118	1,741.98		4.19	1.56
PCB-114	77.26		10.45	1.67
PCB-105	834.93		4.94	1.56
PCB-126	11.89		2.13	1.73
PCB-167	55.43		2.00	1.29
PCB-156	75.20		3.75	1.23
PCB-157	75.20		3.75	1.23
PCB-169	1.44	EMPC	1.13	1.24
PCB-180	258.37		4.00	1.03
PCB-170	120.87		2.50	1.02
PCB-189	6.94		2.06	0.93

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2736	68	0.78
13c-PCB-118	4000	1864	47	1.54
13c-PCB-105	4000	1942	49	1.50
13c-PCB-126	4000	2434	61	1.54
13c-PCB-167	4000	2060	52	1.24
13c-PCB-156	4000	2164	54	1.26
13c-PCB-157	4000	2164	54	1.26
13c-PCB-169	4000	2500	62	1.25
13c-PCB-180	4000	2022	51	1.03
13c-PCB-189	4000	2204	55	1.02
13c-PCB-209	8000	4788	60	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	1306	65
13c-PCB-111	10000	4612	46

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-05 BH-PB1-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 07:30:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	1274	64	1.25
PCB-126	*	*	*	13C-PCB-156	2000	1382	69	1.25
PCB-167	8.53	2.28	1.20	13C-PCB-157	2000	1363	68	1.28
PCB-156	19.70	0.00	1.29	13C-PCB-169	2000	1870	93	1.26
PCB-157	4.59	2.07	1.36	13C-PCB-180	2000	*	*	*
PCB-169	*	1.02	*	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					
				CLEANUP STANDARD				
				13C-PCB-81	1000	*	*	
				13C-PCB-111	5000	*	*	

MB 9/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-05 BH-PB1-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 07:30:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	53.36	14.26	1.20
PCB-156	123.24	12.95	1.29
PCB-157	28.72	6.38	1.36
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2548	64	1.25
13c-PCB-156	4000	2764	69	1.25
13c-PCB-157	4000	2726	68	1.28
13c-PCB-169	4000	3740	93	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-06 BH-PB2-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 16:59:11

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	73.94	0.00	0.76	13C-PCB-77	2000	1073	54	0.76
PCB-123	26.71	1.19	1.56	13C-PCB-118	2000	887	44	1.62
PCB-118	1281.02	0.86	1.54	13C-PCB-105	2000	979	49	1.57
PCB-114	51.76	2.05	1.45	13C-PCB-126	2000	1154	58	1.55
PCB-105	539.15	0.97	1.55	13C-PCB-167	2000	951	48	1.25
PCB-126	1.99	0.44	1.69	13C-PCB-156	2000	1049	52	1.27
PCB-167	21.56	0.41	1.20	13C-PCB-157	2000	1049	52	1.27
PCB-156	28.84	0.74	1.31	13C-PCB-169	2000	1148	57	1.23
PCB-157	28.84	0.74	1.31	13C-PCB-180	2000	1045	52	1.02
PCB-169	0.49	0.23	1.24	13C-PCB-189	2000	1194	60	1.02
PCB-180	85.68	0.74	1.02	13C-PCB-209	4000	2473	62	1.19
PCB-170	31.91	0.47	1.06					
PCB-189	0.98	0.37	1.19					

Pre-sampling surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	482	48
13C-PCB-111	5000	2093	42

VES 1/20/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-06 BH-PB2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 16:59:11

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	462.57	0.00	0.76
PCB-123	167.10	7.44	1.56
PCB-118	8,014.06	5.38	1.54
PCB-114	323.81	12.82	1.45
PCB-105	3,372.92	6.07	1.55
PCB-126	12.45	2.75	1.69
PCB-167	134.88	2.56	1.20
PCB-156	180.42	4.63	1.31
PCB-157	180.42	4.63	1.31
PCB-169	3.07	1.44	1.24
PCB-180	536.01	4.63	1.02
PCB-170	199.63	2.94	1.06
PCB-189	6.13	2.31	1.19

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2146	54	0.76
13c-PCB-118	4000	1774	44	1.62
13c-PCB-105	4000	1958	49	1.57
13c-PCB-126	4000	2308	58	1.55
13c-PCB-167	4000	1902	48	1.25
13c-PCB-156	4000	2098	52	1.27
13c-PCB-157	4000	2098	52	1.27
13c-PCB-169	4000	2296	57	1.23
13c-PCB-180	4000	2090	52	1.02
13c-PCB-189	4000	2388	60	1.02
13c-PCB-209	8000	4946	62	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	964	48
13c-PCB-111	10000	4186	42

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-06 BH-PB2-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-21-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 08:16:44

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	20.65	3.24	1.22
PCB-156	50.48	0.00	1.23
PCB-157	9.50	2.68	1.20
PCB-169	*	1.35	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1211	61	1.26
13C-PCB-156	2000	1368	68	1.24
13C-PCB-157	2000	1405	70	1.25
13C-PCB-169	2000	1837	92	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-06 BH-PB2-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-21-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 08:16:44

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	129.19	20.27	1.22
PCB-156	315.80	16.77	1.23
PCB-157	59.43	8.45	1.20
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2422	61	1.26
13c-PCB-156	4000	2736	68	1.24
13c-PCB-157	4000	2810	70	1.25
13c-PCB-169	4000	3674	92	1.26
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-28-99

Ext. Date: 07-28-99

Analysis Date: 23-AUG-99 Time: 13:47:33

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-09-11 BH-LB-PCB

Sample Wt/Vol: 3.1280 g or mL: M3

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807891

Blank Data Filename: 4807891 #3

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	8.00	0.00	0.70
PCB-123	6.44	1.52	1.40
PCB-118	197.27	1.10	1.52
PCB-114	13.06	2.66	1.76
PCB-105	91.52	1.26	1.62
PCB-126	0.68	0.62	1.32
PCB-167	8.05	0.56	1.38
PCB-156	11.13	1.08	1.22
PCB-157	11.13	1.08	1.22
PCB-169	0.72	0.37	1.19
PCB-180	28.93	1.13	1.01
PCB-170	12.33 * ①	0.72	*
PCB-189	0.96	0.65	1.08

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	1153	58	0.77
13C-PCB-118	2000	736	37	1.60
13C-PCB-105	2000	788	39	1.55
13C-PCB-126	2000	861	43	1.58
13C-PCB-167	2000	841	42	1.26
13C-PCB-156	2000	867	43	1.25
13C-PCB-157	2000	867	43	1.25
13C-PCB-169	2000	842	42	1.25
13C-PCB-180	2000	782	39	1.04
13C-PCB-189	2000	783	39	1.03
13C-PCB-209	4000	1959	49	1.19

Pre-sampling Surrogate
~~CLEANUP~~ STANDARD

13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

not added - Spiked only in XAD that went to the field.

① Added from manual calculation MES 8/30/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-11 BH-LB-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 13:47:33

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	50.05	0.00	0.70
PCB-123	40.29	9.51	1.40
PCB-118	1,234.12	6.88	1.52
PCB-114	81.70	16.64	1.76
PCB-105	572.55	7.88	1.62
PCB-126	4.25	3.88	1.32
PCB-167	50.36	3.50	1.38
PCB-156	69.63	6.76	1.22
PCB-157	69.63	6.76	1.22
PCB-169	4.50	2.31	1.19
PCB-180	180.99	7.07	1.01
PCB-170	77.14	4.50	
PCB-189	6.01	4.07	1.08

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2306	58	0.77
13c-PCB-118	4000	1472	37	1.60
13c-PCB-105	4000	1576	39	1.55
13c-PCB-126	4000	1722	43	1.58
13c-PCB-167	4000	1682	42	1.26
13c-PCB-156	4000	1734	43	1.25
13c-PCB-157	4000	1734	43	1.25
13c-PCB-169	4000	1684	42	1.25
13c-PCB-180	4000	1564	39	1.04
13c-PCB-189	4000	1566	39	1.03
13c-PCB-209	8000	3918	49	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: AIR

Sample Receipt Date: 07-28-99

Ext. Date: 07-28-99

Analysis Date: 25-AUG-99 Time: 05:57:50

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-09-11 BH-LB-PCB

Sample Wt/Vol: 3.1280 g or mL: M3

Initial Calibration Date: 08-24-99

Instrument ID: AutoSpec

GC Column ID: 30m DB1

Sample Data Filename: 4807892

Blank Data Filename: 4807892 #7

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	6.92	5.68	1.12
PCB-156	15.28	6.23	1.26
PCB-157	5.16	0.00	1.32
PCB-169	*	2.89	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1040	52	1.25
13C-PCB-156	2000	1109	55	1.25
13C-PCB-157	2000	1078	54	1.25
13C-PCB-169	2000	1252	63	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

MES 1/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-11 BH-LB-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 05:57:50

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	43.29	35.53	1.12
PCB-156	95.59	38.97	1.26
PCB-157	32.28	18.08	1.32
PCB-169	*	*	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2080	52	1.25
13c-PCB-156	4000	2218	55	1.25
13c-PCB-157	4000	2156	54	1.25
13c-PCB-169	4000	2504	63	1.25
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-09 BH-LCS-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 18:03:05

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	170.32	0.00	0.76	13C-PCB-77	2000	800	40	0.77
PCB-123	7192.15✓	1.35	1.53	13C-PCB-118	2000	682	34	1.55
PCB-118	5669.69	0.98	1.55	13C-PCB-105	2000	762	38	1.56
PCB-114	9877.87✓	2.28	1.55	13C-PCB-126	2000	832	42	1.56
PCB-105	7537.10✓	1.08	1.54	13C-PCB-167	2000	821	41	1.26
PCB-126	748.67	0.52	1.56	13C-PCB-156	2000	880	44	1.25
PCB-167	7179.14	0.50	1.24	13C-PCB-157	2000	880	44	1.25
PCB-156	7326.28	0.90	1.24	13C-PCB-169	2000	915	46	1.24
PCB-157	7326.28	0.90	1.24	13C-PCB-180	2000	758	38	1.01
PCB-169	1257.97	0.30	1.25	13C-PCB-189	2000	830	41	1.02
PCB-180	7037.52	1.05	1.02	13C-PCB-209	4000	1731	43	1.19
PCB-170	1540.53	0.67	1.02					
PCB-189	1336.36	0.54	1.02					

Pre-sampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

> spiked only in XAD that went to the field.

✓= above calibration range

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-09 BH-LCS-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time:

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	1,065.52	0.00	0.76
PCB-123	44,994.09	8.45	1.53
PCB-118	35,469.58	6.13	1.55
PCB-114	61,795.95	14.26	1.55
PCB-105	47,152.10	6.76	1.54
PCB-126	4,683.68	3.25	1.56
PCB-167	44,912.70	3.13	1.24
PCB-156	45,833.21	5.63	1.24
PCB-157	45,833.21	5.63	1.24
PCB-169	7,869.86	1.88	1.25
PCB-180	44,026.73	6.57	1.02
PCB-170	9,637.56	4.19	1.02
PCB-189	8,360.27	3.38	1.02

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	1600	40
13c-PCB-118	4000	1364	34
13c-PCB-105	4000	1524	38
13c-PCB-126	4000	1664	42
13c-PCB-167	4000	1642	41
13c-PCB-156	4000	1760	44
13c-PCB-157	4000	1760	44
13c-PCB-169	4000	1830	46
13c-PCB-180	4000	1516	38
13c-PCB-189	4000	1660	41
13c-PCB-209	8000	3462	43

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-09 BH-LCS-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 09:03:05

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	7373.62	2.83	1.24
PCB-156	7577.08	2.92	1.25
PCB-157	7303.64	2.30	1.25
PCB-169	1259.71	0.00	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1088	54	1.27
13C-PCB-156	2000	1245	62	1.26
13C-PCB-157	2000	1264	63	1.27
13C-PCB-169	2000	1682	84	1.24
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-09 BH-LCS-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 09:03:05

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	46,129.37	17.70	1.24
PCB-156	47,402.21	18.27	1.25
PCB-157	45,691.57	14.39	1.25
PCB-169	7,880.75	0.00	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)
13c-PCB-77	4000	*	*
13c-PCB-118	4000	*	*
13c-PCB-105	4000	*	*
13c-PCB-126	4000	*	*
13c-PCB-167	4000	2176	54
13c-PCB-156	4000	2490	62
13c-PCB-157	4000	2528	63
13c-PCB-169	4000	3364	84
13c-PCB-180	4000	*	*
13c-PCB-189	4000	*	*
13c-PCB-209	8000	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-10 BH-LCSDUP-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 19:06:49

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/dscm

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	179.60	1.49	0.77	13C-PCB-77	2000	2276	114	0.74
PCB-123	7504.49✓	2.05	1.55	13C-PCB-118	2000	993	50	1.55
PCB-118	5843.53	1.49	1.54	13C-PCB-105	2000	1090	54	1.57
PCB-114	10712.94✓	3.51	1.53	13C-PCB-126	2000	1205	60	1.53
PCB-105	7713.59✓	1.66	1.54	13C-PCB-167	2000	990	50	1.24
PCB-126	759.16	0.80	1.54	13C-PCB-156	2000	1047	52	1.26
PCB-167	7587.49	0.76	1.24	13C-PCB-157	2000	1047	52	1.26
PCB-156	7587.64	1.41	1.24	13C-PCB-169	2000	1053	53	1.23
PCB-157	7587.64	1.41	1.24	13C-PCB-180	2000	936	47	1.03
PCB-169	1293.36	0.48	1.25	13C-PCB-189	2000	966	48	1.03
PCB-180	7445.01	1.49	1.02	13C-PCB-209	4000	1909	48	1.19
PCB-170	1534.49	0.94	1.00					
PCB-189	1386.97	0.82	1.02					

Pre-Sampling Surrogate

~~CLEANUP~~ STANDARD

13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

> spiked only in XAD that went to the field.

✓ above calibration range

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-10 BH-LCSDUP-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 23-AUG-99 Time: 19:06:49

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807891

Injection Volume (uL): 1

Blank Data Filename: 4807891 #3

Dilution Factor: None

Cal. Ver. Data Filename: 4807891 #2

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	1123.58	9.32	0.77
PCB-123	46948.09	12.82	1.55
PCB-118	36557.12	9.32	1.54
PCB-114	67020.15	21.96	1.53
PCB-105	48256.22	10.38	1.54
PCB-126	4749.30	5.00	1.54
PCB-167	47467.34	4.75	1.24
PCB-156	47468.28	8.82	1.24
PCB-157	47468.28	8.82	1.24
PCB-169	8091.26	3.00	1.25
PCB-180	46575.98	9.32	1.02
PCB-170	9599.77	5.88	1.00
PCB-189	8676.88	5.13	1.02

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	4552	114	0.74
13c-PCB-118	4000	1986	50	1.55
13c-PCB-105	4000	2180	54	1.57
13c-PCB-126	4000	2410	60	1.53
13c-PCB-167	4000	1980	50	1.24
13c-PCB-156	4000	2094	52	1.26
13c-PCB-157	4000	2094	52	1.26
13c-PCB-169	4000	2106	53	1.23
13c-PCB-180	4000	1872	47	1.03
13c-PCB-189	4000	1932	48	1.03
13c-PCB-209	8000	3818	48	1.19

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-10 BH-LCSDUP-PCB

Matrix: AIR

Sample Wt/Vol: 3.1280 g or mL: M3

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 09:49:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/dscm

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	7472.86	3.85	1.24
PCB-156	7938.92	4.06	1.24
PCB-157	7534.87	3.29	1.24
PCB-169	1287.43	0.00	1.24
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	1337	67	1.25
13C-PCB-156	2000	1438	72	1.25
13C-PCB-157	2000	1435	72	1.24
13C-PCB-169	2000	1701	85	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-09-10 BH-LCSDUP-PCB

Matrix: Air

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-28-99

Initial Calabration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 09:49:26

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807892

Injection Volume (uL): 1

Blank Data Filename: 4807892 #7

Dilution Factor: None

Cal. Ver. Data Filename: 4807892 #4

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	46750.21	24.09	1.24
PCB-156	49665.88	25.40	1.24
PCB-157	47138.15	20.58	1.24
PCB-169	8054.16	0.00	1.24
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	*	*	*
13c-PCB-118	4000	*	*	*
13c-PCB-105	4000	*	*	*
13c-PCB-126	4000	*	*	*
13c-PCB-167	4000	2674	67	1.25
13c-PCB-156	4000	2876	72	1.25
13c-PCB-157	4000	2870	72	1.24
13c-PCB-169	4000	3402	85	1.25
13c-PCB-180	4000	*	*	*
13c-PCB-189	4000	*	*	*
13c-PCB-209	8000	*	*	*

Pre-Sampling Surrogate Stds

13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-51-03 METHOD BLANK

Matrix: SOLVENT

Sample Wt/Vol: 1.0000 g or mL: ea

Sample Receipt Date: 07-10-99

Initial Calibration Date: 06-23-99

Ext. Date: 07-10-99

Instrument ID: AutoSpec

Analysis Date: 14-JUL-99 Time: 13:52:03

GC Column ID: 50m HT8

Extract Volume (uL): 20

Sample Data Filename: 4807866B

Injection Volume (uL): 1

Blank Data Filename: 4807866B #2

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807866B #1

Concentration Units: pg/sample

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	4.92	0.53	0.77	13C-PCB-77	2000	3565	178	0.78
PCB-123	*	16.95	*	13C-PCB-118	2000	1777	89	1.62
PCB-118	134.02	3.57	1.51	13C-PCB-105	2000	1603	80	1.61
PCB-114	5.09	4.88	1.46	13C-PCB-126	2000	2214	111	1.57
PCB-105	66.96	4.03	1.47	13C-PCB-167	2000	1965	98	1.29
PCB-126	*	2.32	*	13C-PCB-156	2000	1720	86	1.26
PCB-167	4.73	2.36	1.16	13C-PCB-157	2000	1619	81	1.27
PCB-156	11.42	2.13	1.33	13C-PCB-169	2000	1717	86	1.25
PCB-157	2.86	2.10	1.27	13C-PCB-180	2000	1292	65	1.04
PCB-169	0.59	1.28	1.12	13C-PCB-189	2000	1385	69	1.04
PCB-180	21.58	2.89	1.00	13C-PCB-209	4000	3614	90	1.20
PCB-170	*	11.96	*					
PCB-189	*	11.52	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-51-03 METHOD BLANK

Matrix: Solvent

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-10-99

Initial Calabration Date: 06-23-99

Ext. Date: 07-10-99

Instrument ID: AutoSpec

Analysis Date: 14-JUL-99 Time: 13:52:03

GC Column ID: 50m HT8

Extract Volume (uL): 20

Sample Data Filename: 4807866B

Injection Volume (uL): 1

Blank Data Filename: 4807866B #2

Dilution Factor: None

Cal. Ver. Data Filename: 4807866B #1

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	4.92	0.53	0.77
PCB-123	*	16.95	*
PCB-118	134.02	3.57	1.51
PCB-114	5.09	4.88	1.46
PCB-105	66.96	4.03	1.47
PCB-126	*	2.32	*
PCB-167	4.73	2.36	1.16
PCB-156	11.42	2.13	1.33
PCB-157	2.86	2.10	1.27
PCB-169	0.59	1.28	1.12
PCB-180	21.58	2.89	1.00
PCB-170	*	11.96	*
PCB-189	*	11.52	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	3565	89.1	0.78
13c-PCB-118	4000	1777	44.4	1.62
13c-PCB-105	4000	1603	40	1.61
13c-PCB-126	4000	2214	55.3	1.57
13c-PCB-167	4000	1965	49.1	1.29
13c-PCB-156	4000	1720	43	1.26
13c-PCB-157	4000	1619	40.5	1.27
13c-PCB-169	4000	1717	42.9	1.25
13c-PCB-180	4000	1292	32.3	1.04
13c-PCB-189	4000	1385	34.6	1.04
13c-PCB-209	8000	3614	45.2	1.20

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-51-02 XAD BKGD

Matrix: XAD

Sample Wt/Vol: 1.0000 g or mL: ea

Sample Receipt Date: 07-10-99

Initial Calibration Date: 06-23-99

Ext. Date: 07-10-99

Instrument ID: AutoSpec

Analysis Date: 14-JUL-99 Time: 14:57:16

GC Column ID: 50m HT8

Extract Volume (uL): 20

Sample Data Filename: 4807866B

Injection Volume (uL): 1

Blank Data Filename: 4807866B #2

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807866B #1

Concentration Units: pg/sample

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	12.96	0.69	0.88
PCB-123	*	19.70	*
PCB-118	301.06	4.15	1.54
PCB-114	*	6.02	*
PCB-105	138.58	4.97	1.49
PCB-126	*	3.09	*
PCB-167	12.14	3.07	1.41
PCB-156	27.65	2.73	1.30
PCB-157	*	2.77	*
PCB-169	*	1.67	*
PCB-180	213.49	3.58	1.03
PCB-170	115.31	14.78	1.01
PCB-189	*	15.05	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	2815	141	0.75
13C-PCB-118	2000	1785	89	1.61
13C-PCB-105	2000	1540	77	1.58
13C-PCB-126	2000	2005	100	1.58
13C-PCB-167	2000	1930	97	1.27
13C-PCB-156	2000	1753	88	1.28
13C-PCB-157	2000	1610	80	1.27
13C-PCB-169	2000	1721	86	1.23
13C-PCB-180	2000	1472	74	1.02
13C-PCB-189	2000	1539	77	1.04
13C-PCB-209	4000	3761	94	1.20

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-51-02 XAD BKGD

Matrix: XAD

Sample Wt/Vol: 1.00

Sample Receipt Date: 07-10-99

Initial Calabration Date: 06-23-99

Ext. Date: 07-10-99

Instrument ID: AutoSpec

Analysis Date: 14-JUL-99 Time: 14:57:16

GC Column ID: 50m HT8

Extract Volume (uL): 20

Sample Data Filename: 4807866B

Injection Volume (uL): 1

Blank Data Filename: 4807866B #2

Dilution Factor: None

Cal. Ver. Data Filename: 4807866B #1

Concentration Units: pg/sample

Analyte	Conc. Found	Detection Limit	Ion Ratio
PCB-77	12.96	0.69	0.88
PCB-123	*	19.70	*
PCB-118	301.06	4.15	1.54
PCB-114	*	6.02	*
PCB-105	138.58	4.97	1.49
PCB-126	*	3.09	*
PCB-167	12.14	3.07	1.41
PCB-156	27.65	2.73	1.30
PCB-157	*	2.77	*
PCB-169	*	1.67	*
PCB-180	213.49	3.58	1.03
PCB-170	115.31	14.78	1.01
PCB-189	*	15.05	*

Concentration units (pg)

Labeled Compounds	Spike Conc.	Conc. Found	R(%)	Ion Ratio
13c-PCB-77	4000	2815	70.4	0.75
13c-PCB-118	4000	1785	44.6	1.61
13c-PCB-105	4000	1540	38.5	1.58
13c-PCB-126	4000	2005	50.1	1.58
13c-PCB-167	4000	1930	48.2	1.27
13c-PCB-156	4000	1753	43.8	1.28
13c-PCB-157	4000	1610	40.2	1.27
13c-PCB-169	4000	1721	43	1.23
13c-PCB-180	4000	1472	36.8	1.02
13c-PCB-189	4000	1539	38.5	1.04
13c-PCB-209	8000	3761	47	1.20

Cleanup Stds			
13c-PCB-81	2000	*	*
13c-PCB-111	10000	*	*

E-3-2
Sewage Sludge Blank Fractions

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-15 LB-PCB

Matrix: SLUDGE

Sample Wt/Vol: 0.1445 g or mL: g

Sample Receipt Date: 08-08-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 22-AUG-99 Time: 19:40:45

GC Column ID: 30m SPB

Extract Volume (uL): 150

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	237.70	250.73	0.75	13C-PCB-77	~~2000~~ 15,000 pg each	2394	16 ✓	0.77
PCB-123	121.90	395.03	1.53	13C-PCB-118	2000	2037	14 ✓	1.58
PCB-118	4695.96	287.09	1.48	13C-PCB-105	2000	2303	15 ✓	1.59
PCB-114	252.94	437.48	1.06	13C-PCB-126	2000	3290	22	1.58
PCB-105	2131.98	334.33	1.42	13C-PCB-167	2000	3162	21	1.27
PCB-126	*	176.11	*	13C-PCB-156	2000	3358	22	1.25
PCB-167	308.77	190.31	1.34	13C-PCB-157	2000	3358	22	1.25
PCB-156	260.56	143.82	1.26	13C-PCB-169	2000	4380	29	1.24
PCB-157	260.56	143.82	1.26	13C-PCB-180	2000	4163	28	1.01
PCB-169	*	67.89	*	13C-PCB-189	~~2000~~	4896	33	1.01
PCB-180	724.16	127.90	1.05	13C-PCB-209	~~4000~~ - 30,000 pg	10561	35	1.20
PCB-170	319.46	154.53	1.04					
PCB-189	91.88	68.60	1.11					

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ ~~3000~~ 6,000	872	15 ✓
13C-PCB-111	~~5000~~ ~~15,000~~ 30,000	3978	13 ✓

✓ outside DQO

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: SLUDGE

Sample Receipt Date: 08-08-99

Ext. Date: 08-08-99

Analysis Date: 26-AUG-99 Time: 01:55:08

Extract Volume (uL): 150

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-15-15 LB-PCB

Sample Wt/Vol: 0.1445 g or mL: g

Initial Calibration Date: 08-24-99

Instrument ID: AutoSpec

GC Column ID: 30m DB1

Sample Data Filename: 4807893

Blank Data Filename: 4807893 #3

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	276.02	310.20	1.11
PCB-156	295.70	382.67	1.36
PCB-157	89.49	400.49	1.15
PCB-169	*	233.77	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	3804	25	1.26
13C-PCB-156	2000	4355	29	1.25
13C-PCB-157	2000	4032	27	1.27
13C-PCB-169	2000	6186	41	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-11 S-R4-413B MS

Matrix: SLUDGE

Sample Wt/Vol: 0.1425 g or mL: g

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-22-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 22-AUG-99 Time: 23:55:48

GC Column ID: 30m SPB

Extract Volume (uL): 150

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	130297.35	0.00	0.77
PCB-123	100086.12	123.65	1.56
PCB-118	102574.29	89.87	1.54
PCB-114	135315.50	157.09	1.54
PCB-105	116561.92	120.05	1.55
PCB-126	11043.47	116.03	1.46
PCB-167	98448.43	92.57	1.24
PCB-156	100861.18	74.85	1.23
PCB-157	100861.18	74.85	1.23
PCB-169	16753.08	64.06	1.27
PCB-180	112451.92	79.58	1.01
PCB-170	23615.32	96.16	1.00
PCB-189	18821.24	52.80	1.05

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	~~2000~~	7467	50	0.74
13C-PCB-118	2000	7874	52	1.57
13C-PCB-105	2000	7899	53	1.57
13C-PCB-126	2000	6154	41	1.52
13C-PCB-167	2000	7772	52	1.26
13C-PCB-156	2000	7683	51	1.23
13C-PCB-157	2000	7683	51	1.23
13C-PCB-169	2000	5555	37	1.22
13C-PCB-180	2000	7958	53	1.04
13C-PCB-189	2000	7537	50	1.02
13C-PCB-209	~~4000~~ 30,000	14469	48	1.19

15,000

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ 6,000	2499	42
13C-PCB-111	~~5000~~ 30,000	14992	50

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-11 S-R4-413B MS

Matrix: SLUDGE

Sample Wt/Vol: 0.1425 g or mL: g

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 26-AUG-99 Time: 05:00:29

GC Column ID: 30m DB1

Extract Volume (uL): 150

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	100180.85	122.35	1.23
PCB-156	109534.40	166.34	1.26
PCB-157	100062.80	153.79	1.23
PCB-169	17108.83	0.00	1.21
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	9051	60	1.26
13C-PCB-156	2000	9628	64	1.25
13C-PCB-157	2000	9596	64	1.27
13C-PCB-169	2000	8471	56	1.26
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

185 .192

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: SLUDGE

Sample Receipt Date: 07-23-99

Ext. Date: 08-08-99

Analysis Date: 23-AUG-99 Time: 00:59:35

Extract Volume (uL): 150

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48190-15-12 S-R4-413B MSD

Sample Wt/Vol: 0.1426 g or mL: g

Initial Calibration Date: 08-22-99

Instrument ID: AutoSpec

GC Column ID: 30m SPB

Sample Data Filename: 4807890

Blank Data Filename: 4807890 #7

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	114960.08	0.00	0.77
PCB-123	99390.50	126.98	1.52
PCB-118	88027.30	92.28	1.57
PCB-114	132840.75	152.99	1.55
PCB-105	107742.15	116.91	1.58
PCB-126	10421.38	107.59	1.59
PCB-167	99020.74	93.97	1.24
PCB-156	101280.29	73.63	1.23
PCB-157	101280.29	73.63	1.23
PCB-169	17059.59	60.43	1.22
PCB-180	107589.07	77.33	1.01
PCB-170	21557.10	93.43	1.01
PCB-189	19116.21	54.31	1.04

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	~~2000~~	7833	52	0.77
13C-PCB-118	2000	7971	53	1.53
13C-PCB-105	2000	8238	55	1.54
13C-PCB-126	2000	6637	44	1.54
13C-PCB-167	2000	7491	50	1.23
13C-PCB-156	2000	7433	50	1.23
13C-PCB-157	2000	7433	50	1.23
13C-PCB-169	2000	5644	38	1.26
13C-PCB-180	2000	8154	54	1.01
13C-PCB-189	~~2000~~	7566	50	1.03
13C-PCB-209	~~4000~~ 30,000	14874	50	1.19

151,000

CLEANUP STANDARD			
13C-PCB-81	~~1000~~ 6000	2399	40
13C-PCB-111	~~5000~~ 30,000	15759	53

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48190-15-12 S-R4-413B MSD

Matrix: SLUDGE

Sample Wt/Vol: 0.1426 g or mL: g

Sample Receipt Date: 07-23-99

Initial Calibration Date: 08-24-99

Ext. Date: 08-08-99

Instrument ID: AutoSpec

Analysis Date: 26-AUG-99 Time: 05:46:51

GC Column ID: 30m DB1

Extract Volume (uL): 150

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/g dry

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	102105.42	122.38	1.23
PCB-156	106249.19	160.11	1.25
PCB-157	102138.85	158.60	1.25
PCB-169	17392.28	0.00	1.25
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	8948	60	1.26
13C-PCB-156	2000	9728	65	1.25
13C-PCB-157	2000	9384	63	1.26
13C-PCB-169	2000	8835	59	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

E-3-3
Scrubber Water Fractions

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Matrix: WATER

Sample Receipt Date: 07-28-99

Ext. Date: 07-28-99

Analysis Date: 22-AUG-99 Time: 07:58:52

Extract Volume (uL): 20

Injection Volume (uL): 1

Dilution Factor: NONE

Lab Sample ID: 48200-56-11 LB-PCB

Sample Wt/Vol: 0.5000 g or mL: L

Initial Calibration Date: 08-22-99

Instrument ID: Autospec

GC Column ID: 30m SPB

Sample Data Filename: 4807890

Blank Data Filename: 4807890 #7

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	38.75	0.00	0.88
PCB-123	83.01	11.56	1.62
PCB-118	984.75	8.40	1.58
PCB-114	151.89	14.89	1.69
PCB-105	480.37	11.38	1.58
PCB-126	8.25	5.98	1.77
PCB-167	93.00	7.26	1.39
PCB-156	92.99	5.54	1.22
PCB-157	92.99	5.54	1.22
PCB-169	8.97	2.64	1.25
PCB-180	172.70	4.94	1.02
PCB-170	60.54	5.97	0.90
PCB-189	13.74	3.08	1.13

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	821	41	0.73
13C-PCB-118	2000	628	31	1.58
13C-PCB-105	2000	617	31	1.56
13C-PCB-126	2000	878	44	1.55
13C-PCB-167	2000	712	36	1.24
13C-PCB-156	2000	743	37	1.25
13C-PCB-157	2000	743	37	1.25
13C-PCB-169	2000	972	49	1.25
13C-PCB-180	2000	940	47	1.02
13C-PCB-189	2000	973	49	1.04
13C-PCB-209	4000	2220	56	1.19

CLEANUP STANDARD			
13C-PCB-81	1000	540	54
13C-PCB-111	5000	2240	45

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-11 LB-PCB

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 17:25:13

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	89.25	9.84	1.28
PCB-156	123.93	12.27	1.24
PCB-157	70.60	0.00	1.39
PCB-169	*	7.12	*
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	829	41	1.28
13C-PCB-156	2000	919	46	1.23
13C-PCB-157	2000	800	40	1.26
13C-PCB-169	2000	1348	67	1.25
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-09 LCS-PCB

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 22-AUG-99 Time: 15:25:29

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	1365.34	0.00	0.78	13C-PCB-77	2000	53	3	0.77
PCB-123	31814.49	262.89	1.48	13C-PCB-118	2000	32	2	1.50
PCB-118	40739.29	191.06	1.54	13C-PCB-105	2000	35	2	1.60
PCB-114	56625.84	320.05	1.56	13C-PCB-126	2000	50	3	1.59
PCB-105	36456.35	244.59	1.57	13C-PCB-167	2000	29	1	1.24
PCB-126	2772.58	126.04	1.48	13C-PCB-156	2000	31	2	1.20
PCB-167	27630.92	234.17	1.23	13C-PCB-157	2000	31	2	1.20
PCB-156	27231.08	160.38	1.26	13C-PCB-169	2000	46	2	1.15
PCB-157	27231.08	160.38	1.26	13C-PCB-180	2000	39	2	0.98
PCB-169	4423.48	69.11	1.18	13C-PCB-189	2000	31	2	1.09
PCB-180	27897.85	150.46	1.04	13C-PCB-209	4000	58	1	1.16
PCB-170	6382.57	181.79	1.04					
PCB-189	4677.54	115.71	1.13					

✓ outside calibration range

CLEANUP STANDARD			
13C-PCB-81	1000	475	48
13C-PCB-111	5000	1928	39

/ Outside DQO

E-122

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-09 LCS-PCB

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 18:11:35

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
PCB-77	*	*	*
PCB-123	*	*	*
PCB-118	*	*	*
PCB-114	*	*	*
PCB-105	*	*	*
PCB-126	*	*	*
PCB-167	33544.28	266.83	1.23
PCB-156	30289.71	354.29	1.25
PCB-157	27741.84	403.63	1.29
PCB-169	*	*	1.31
PCB-180	*	*	*
PCB-170	*	*	*
PCB-189	*	*	*

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-PCB-77	2000	*	*	*
13C-PCB-118	2000	*	*	*
13C-PCB-105	2000	*	*	*
13C-PCB-126	2000	*	*	*
13C-PCB-167	2000	32	2	1.19
13C-PCB-156	2000	41	2	1.38
13C-PCB-157	2000	37	2	1.15
13C-PCB-169	2000	*	*	*
13C-PCB-180	2000	*	*	*
13C-PCB-189	2000	*	*	*
13C-PCB-209	4000	*	*	*

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

✓ outside 20-160 DQO

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-10 LCSDUP-PCB

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: Autospec

Analysis Date: 22-AUG-99 Time: 16:29:17

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807890

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	853.05	0.00	0.77	13C-PCB-77	2000	1057	53	0.77
PCB-123	31444.11	9.35	1.53	13C-PCB-118	2000	657	33	1.61
PCB-118	25972.56	6.80	1.53	13C-PCB-105	2000	650	33	1.60
PCB-114	48740.48	11.91	1.53	13C-PCB-126	2000	809	40	1.53
PCB-105	33082.28	9.10	1.54	13C-PCB-167	2000	572	29	1.26
PCB-126	3266.07	5.51	1.54	13C-PCB-156	2000	587	29	1.22
PCB-167	28320.22	6.97	1.24	13C-PCB-157	2000	587	29	1.22
PCB-156	27930.75	5.40	1.24	13C-PCB-169	2000	677	34	1.25
PCB-157	27930.75	5.40	1.24	13C-PCB-180	2000	727	36	1.02
PCB-169	4694.26	2.90	1.26	13C-PCB-189	2000	726	36	1.04
PCB-180	24662.56	5.11	1.01	13C-PCB-209	4000	1243	31	1.19
PCB-170	4784.90	6.17	1.01					
PCB-189	4300.75	3.33	0.99					

✓ outside calibration range

CLEANUP STANDARD			
13C-PCB-81	1000	743	74
13C-PCB-111	5000	2820	56

OK for water 20-160% in DQO range

~~outside DQO~~

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-10 LCSDUP-PCB

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 25-AUG-99 Time: 18:57:57

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807893

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	*	*	*	13C-PCB-77	2000	*	*	*
PCB-123	*	*	*	13C-PCB-118	2000	*	*	*
PCB-118	*	*	*	13C-PCB-105	2000	*	*	*
PCB-114	*	*	*	13C-PCB-126	2000	*	*	*
PCB-105	*	*	*	13C-PCB-167	2000	725	36	1.25
PCB-126	*	*	*	13C-PCB-156	2000	835	42	1.25
PCB-167	29525.55	9.22	1.24	13C-PCB-157	2000	752	38	1.27
PCB-156	30463.53	11.49	1.24	13C-PCB-169	2000	1082	54	1.27
PCB-157	28562.51	12.00	1.24	13C-PCB-180	2000	*	*	*
PCB-169	4772.90	0.00	1.21	13C-PCB-189	2000	*	*	*
PCB-180	*	*	*	13C-PCB-209	4000	*	*	*
PCB-170	*	*	*					
PCB-189	*	*	*					

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-11 LAB BLANK - ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-22-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 20-SEP-99 Time: 19:52:45

GC Column ID: 30m SPB

Extract Volume (uL): 20

Sample Data Filename: 4807897

Injection Volume (uL): 1

Blank Data Filename: 4807890 #7

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807890 #3

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
PCB-77	26.85	0.00	0.79	13C-PCB-77	2000	1290	65	0.76
PCB-123	41.04	10.14	1.70	13C-PCB-118	2000	729	36	1.60
PCB-118	857.61	7.37	1.60	13C-PCB-105	2000	659	33	1.59
PCB-114	91.34	14.09	1.45	13C-PCB-126	2000	1084	54	1.57
PCB-105	396.21	10.77	1.54	13C-PCB-167	2000	749	37	1.25
PCB-126	4.19 J	4.82	1.52	13C-PCB-156	2000	674	34	1.23
PCB-167	45.45	7.07	1.10	13C-PCB-157	2000	674	34	1.23
PCB-156	54.39	6.23	1.29	13C-PCB-169	2000	912	46	1.23
PCB-157	54.39	6.23	1.29	13C-PCB-180	2000	859	43	1.03
PCB-169	5.14	2.83	1.41	13C-PCB-189	2000	684	34	1.04
PCB-180	131.23	4.51	1.07	13C-PCB-209	4000	1140	29	1.19
PCB-170	46.13	5.45	1.19					
PCB-189	10.43	3.60	1.17					
				CLEANUP STANDARD				
				13C-PCB-81	1000	843	~~105~~ 84	
				13C-PCB-111	5000	3357	~~84~~ 67	

5/1/99

Method 1668 PCB Data Sheet

Lab Name: BATTELLE

Lab Sample ID: 48200-56-11 LAB BLANK - ARCHIVE

Matrix: WATER

Sample Wt/Vol: 0.5000 g or mL: L

Sample Receipt Date: 07-28-99

Initial Calibration Date: 08-24-99

Ext. Date: 07-28-99

Instrument ID: AutoSpec

Analysis Date: 21-SEP-99 Time: 17:05:31

GC Column ID: 30m DB1

Extract Volume (uL): 20

Sample Data Filename: 4807897A

Injection Volume (uL): 1

Blank Data Filename: 4807893 #3

Dilution Factor: NONE

Cal. Ver. Data Filename: 4807893 #2

Concentration Units: pg/L

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	
PCB-77	*	*	*	
PCB-123	*	*	*	
PCB-118	*	*	*	
PCB-114	*	*	*	
PCB-105	*	*	*	
PCB-126	*	*	*	
PCB-167	~~46.25~~	~~15.14~~	~~1.15~~	①
PCB-156	73.75	22.57	1.23	
PCB-157	33.82	0.00	1.33	
PCB-169	~~*~~	~~14.26~~	~~*~~	①
PCB-180	*	*	*	
PCB-170	*	*	*	
PCB-189	*	*	*	

① Not Applicable

Concentration Units (pg)

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO	
13C-PCB-77	2000	*	*	*	
13C-PCB-118	2000	*	*	*	
13C-PCB-105	2000	*	*	*	
13C-PCB-126	2000	*	*	*	
13C-PCB-167	~~2000~~	~~925~~	~~46~~	~~1.26~~	①
13C-PCB-156	2000	890	44	1.25	
13C-PCB-157	2000	720	36	1.27	
13C-PCB-169	~~2000~~	~~1191~~	~~60~~	~~1.29~~	①
13C-PCB-180	2000	*	*	*	
13C-PCB-189	2000	*	*	*	
13C-PCB-209	4000	*	*	*	

CLEANUP STANDARD			
13C-PCB-81	1000	*	*
13C-PCB-111	5000	*	*

WA1-05 Front Half Ains
pg/dscm

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/dscm)	48190-11-10 Lab Blank Conc. (pg/dscm)	48190-11-08 LCS Conc. Found (pg/dscm)	Recovery (%)		LCS Dup Spike Conc. (pg/dscm)	48190-11-10 Lab Blank Conc. (pg/dscm)	48190-11-09 LCS Dup. Conc. Found (pg/dscm)	Recovery (%)		Recovery RPD (%)
PCB-77	127.88	11.45	171.83	125		127.88	11.45	165.73	121		3.9
PCB-123	6393.86	91.18	7261.84	112		6393.86	91.18	7191.69	111		1.0
PCB-118	6393.86	321.27	5616.17	83		6393.86	321.27	5649.73	83		0.6
PCB-114	6393.86	122.59	9451.86	146	&	6393.86	122.59	9439.68	146	&	0.1
PCB-105	6393.86	224.40	7385.38	112		6393.86	224.40	7300.30	111		1.2
PCB-126	639.39	5.11	752.14	117		639.39	5.11	733.39	114		2.5
PCB-167	6393.86	74.48	7309.17	113		6393.86	74.48	7298.48	113		0.1
PCB-156 #	6393.86	94.74	8184.13	127		6393.86	94.74	8204.13	127		0.2
PCB-157 #	6393.86	78.18	7840.98	121		6393.86	78.18	7847.80	122		0.1
PCB-169	1278.77	5.89	1277.04	99		1278.77	5.89	1272.48	99		0.4
PCB-180	6393.86	59.58	7262.23	113		6393.86	59.58	7169.97	111		1.3
PCB-170	1278.77	19.56	1598.52	123		1278.77	19.56	1501.77	116		6.3
PCB-189	1278.77	8.49	1378.66	107		1278.77	8.49	1385.25	108		0.5

Recovery is calculated as((conc. found-blank conc.)/spike conc.)*100
& = outside DQO of 70-130%
# = value from DB1 confirmation.

WA1-05 Back Half Alns
pg/dscm

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/dscm)	48190-09-11 Lab Blank Conc. (pg/dscm)	48190-09-09 LCS Conc. Found (pg/dscm)	Recovery (%)		LCS Dup Spike Conc. (pg/dscm)	48190-09-11 Lab Blank Conc. (pg/dscm)	48190-09-10 LCS Dup. Conc. Found (pg/dscm)	Recovery (%)		Recovery RPD (%)
PCB-77	127.88	8.00	170.32	127		127.88	8.00	179.60	134	&	5.6
PCB-123	6393.86	6.44	7192.15	112		6393.86	6.44	7504.49	117		4.3
PCB-118	6393.86	197.27	5669.69	86		6393.86	197.27	5843.53	88		3.1
PCB-114	6393.86	13.06	9877.87	154	&	6393.86	13.06	10712.94	167	&	8.1
PCB-105	6393.86	91.52	7537.10	116		6393.86	91.52	7713.59	119		2.3
PCB-126	639.39	0.68	748.67	117		639.39	0.68	759.16	119		1.4
PCB-167	6393.86	8.05	7179.14	112		6393.86	8.05	7587.49	119		5.5
PCB-156 #	6393.86	15.28	7577.08	118		6393.86	15.28	7938.92	124		4.7
PCB-157 #	6393.86	5.16	7303.64	114		6393.86	5.16	7534.87	118		3.1
PCB-169	1278.77	0.72	1257.97	98		1278.77	0.72	1293.36	101		2.8
PCB-180	6393.86	28.93	7037.52	110		6393.86	28.93	7445.01	116		5.6
PCB-170	1278.77	12.33	1540.53	120		1278.77	12.33	1534.49	119		0.4
PCB-189	1278.77	0.96	1336.36	104		1278.77	0.96	1386.97	108		3.7

Recovery is calculated as((conc. found-blank conc.)/spike conc.)*100
& = outside DQO of 70-130%
# = value from DB1 confirmation.

WA1-05 Waters
pg/L

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/L)	48200-56-11 Lab Blank Conc. (pg/L)	48200-56-09 LCS Conc. Found (pg/L)	Recovery (%)		LCS Dup Spike Conc. (pg/L)	48200-56-11 Lab Blank Conc. (pg/L)	48200-56-10 LCS Dup. Conc. Found (pg/L)	Recovery (%)	Recovery RPD (%)
PCB-77	800.00	38.75	1365.34	166	&	800.00	38.75	853.05	102	48
PCB-123	40000.00	83.01	31814.49	79		40000.00	83.01	31444.11	78	1
PCB-118	40000.00	984.75	40739.29	99		40000.00	984.75	25972.56	62	46
PCB-114	40000.00	151.89	56625.84	141		40000.00	151.89	48740.48	121	15
PCB-105	40000.00	480.37	36456.35	90		40000.00	480.37	33082.28	82	10
PCB-126	4000.00	8.25	2772.68	69		4000.00	8.25	3266.07	81	16
PCB-167	40000.00	93.00	27630.92	69		40000.00	93.00	28320.22	71	2
PCB-156 #	40000.00	123.93	30289.71	75		40000.00	123.93	30463.53	76	1
PCB-157 #	40000.00	70.60	27741.84	69		40000.00	70.60	28562.51	71	3
PCB-169	8000.00	8.97	4423.48	55		8000.00	8.97	4694.26	59	6
PCB-180	40000.00	172.70	27897.85	69		40000.00	172.70	24662.58	61	12
PCB-170	8000.00	60.54	6382.57	79		8000.00	60.54	4784.90	59	29
PCB-189	8000.00	13.74	4677.54	58		8000.00	13.74	4300.75	54	8

Recovery is calculated as((conc. found-blank conc.)/spike conc.)*100
& = outside DQO of 40-160%
# = value from DB1 confirmation.

WA1-05 Sludge
pg/g dry

MS/MS Duplicate Results
S-R4-413B

ANALYTE	MS Spike Conc. (pg/g dry)	48190-15-10 Background Conc. (pg/g dry)	48190-15-11 MS Conc. Found (pg/g dry)	Recovery (%)	MS Dup Spike Conc. (pg/g dry)	48190-15-10 Background Conc. (pg/g dry)	48190-15-12 MS Dup. Conc. Found (pg/g dry)	Recovery (%)	Recovery RPD (%)
PCB-77	84210.53	45385.81	130297.35	101	84151.47	45385.81	114960.08	83	20
PCB-123	84210.53	241.49	100086.12	119	84151.47	241.49	99390.50	118	1
PCB-118	84210.53	12856.01	102574.29	107	84151.47	12856.01	88027.30	89	18
PCB-114	84210.53	737.80	135315.50	160	84151.47	737.80	132840.75	157	2
PCB-105	84210.53	7288.98	116561.92	130	84151.47	7288.98	107742.15	119	8
PCB-126	8421.05	1479.39	11043.47	114	8415.15	1479.39	10421.38	106	7
PCB-167	84210.53	959.36	98448.43	116	84151.47	959.36	99020.74	117	1
PCB-156 #	84210.53	1875.97	109534.40	128	84151.47	1875.97	106249.19	124	3
PCB-157 #	84210.53	536.21	100062.80	118	84151.47	536.21	102138.85	121	2
PCB-169	16842.11	655.78	16753.08	96	16830.29	655.78	17059.59	97	2
PCB-180	84210.53	6711.30	112451.92	126	84151.47	6711.30	107589.07	120	5
PCB-170	16842.11	2776.46	23615.32	124	16830.29	2776.46	21557.10	112	10
PCB-189	16842.11	217.61	18821.24	110	16830.29	217.61	19116.21	112	2

Recovery is calculated as((conc. found-background conc.)/spike conc.)*100
& = outside DQO of 40-160%
# = values from DB1 confirmation

APPENDIX F

Dioxin/Furan Analytical Lab Raw Data Results

F-1
D/F Results Summary

F-1-1
Air Sample Fractions

Table F-1T. Run 2 Dioxin/Furan Results - Stack Gas Concentrations (ng/dscm, as measured)

Congener	Concentration (ng/dscm, as measured)*		
	FH	BH	TOTAL
Dioxins			
2,3,7,8-TCDD #	0.001	0.097	0.098
Total TCDD	0.055	2.969	3.024
1,2,3,7,8-PCDD	ND<0.0026	0.017	0.017
Total PCDD	0.012	0.694	0.706
1,2,3,4,7,8-HxCDD	0.001	0.014	0.015
1,2,3,6,7,8-HxCDD	0.002	0.036	0.038
1,2,3,7,8,9-HxCDD	0.004	{0.035}	0.039
Total HxCDD	0.041	0.565	0.606
1,2,3,4,6,7,8-HpCDD	0.035	0.169	0.204
Total HpCDD	0.074	0.385	0.459
Octa CDD	0.118	0.199	0.317
Total CDD	0.300	4.813	5.113
Furans			
2,3,7,8-TCDF #	0.019	1.564	1.583
Total TCDF	0.119	5.488	5.607
1,2,3,7,8-PCDF	0.004	0.191	0.195
2,3,4,7,8-PCDF	0.014	0.375	0.389
Total PCDF	0.107	4.826	4.933
1,2,3,4,7,8-HxCDF	{0.013}	0.213	0.226
1,2,3,6,7,8-HxCDF	0.005	0.076	0.081
2,3,4,6,7,8-HxCDF	0.013	0.113	0.126
1,2,3,7,8,9-HxCDF	ND<0.001	ND<0.001	ND<0.001
Total HxCDF	0.062	1.064	1.126
1,2,3,4,6,7,8-HpCDF	0.027	0.197	0.224
1,2,3,4,7,8,9-HpCDF	0.004	0.019	0.023
Total HpCDF	0.042	0.287	0.329
Octa CDF	0.022	0.068	0.090
Total CDF	0.351	11.733	12.084
Total CDD + CDF	0.651	16.545	17.196

* ng/dscm; nanogram per dry standard cubic meter.
Standard conditions, pressure and temperature defined as 1 atm (760 mm Hg) and 20°C.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
ND< = Non Detect, value is detection limit.
= value from confirmation column.
Non Detect and {EMPC} values not included in totals.
Numbers rounded before summing, totals may vary from report table in Section 2.

Table F-2T. Run 3 Dioxin/Furan Results - Stack Gas Concentrations (ng/dscm, as measured)

Congener	Concentration (ng/dscm, as measured)*		
	FH	BH	TOTAL
Dioxins			
2,3,7,8-TCDD #	ND<0.0005	0.067	0.067
Total TCDD	0.029	3.505	3.534
1,2,3,7,8-PCDD	ND<0.0024	0.013	0.013
Total PCDD	0.003	0.655	0.658
1,2,3,4,7,8-HxCDD	ND<0.0008	0.015	0.015
1,2,3,6,7,8-HxCDD	0.002	0.038	0.040
1,2,3,7,8,9-HxCDD	ND<0.0005	0.035	0.035
Total HxCDD	0.023	0.561	0.584
1,2,3,4,6,7,8-HpCDD	0.022	0.180	0.202
Total HpCDD	0.050	1.402	1.452
Octa CDD	0.069	0.234	0.303
Total CDD	0.174	6.357	6.531
Furans			
2,3,7,8-TCDF #	0.010	1.227	1.237
Total TCDF	0.064	4.815	4.879
1,2,3,7,8-PCDF	0.002	0.148	0.150
2,3,4,7,8-PCDF	0.006	0.277	0.283
Total PCDF	0.042	3.624	3.666
1,2,3,4,7,8-HxCDF	{0.005}	0.172	0.177
1,2,3,6,7,8-HxCDF	0.003	0.064	0.067
2,3,4,6,7,8-HxCDF	0.006	0.091	0.097
1,2,3,7,8,9-HxCDF	ND<0.001	ND<0.002	ND<0.003
Total HxCDF	0.022	0.858	0.880
1,2,3,4,6,7,8-HpCDF	0.014	0.171	0.185
1,2,3,4,7,8,9-HpCDF	(0.001)	0.016	0.017
Total HpCDF	0.015	0.246	0.261
Octa CDF	0.016	0.066	0.082
Total CDF	0.159	9.610	9.769
Total CDD + CDF	0.333	15.966	16.299

* ng/dscm; nanogram per dry standard cubic meter.
Standard conditions, pressure and temperature defined as 1 atm (760 mm Hg) and 20°C.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
ND< = Non Detect, value is detection limit.
= value from confirmation column.
Non Detect and {EMPC} values not included in totals.
Numbers rounded before summing, totals may vary from report table in Section 2.

Table F-3T. Run 4 Dioxin/Furan Results - Stack Gas Concentrations (ng/dscm, as measured)

Congener	Concentration (ng/dscm, as measured)[a]		
	FH	BH	TOTAL
Dioxins			
2,3,7,8-TCDD #	ND<0.0007	0.034	0.034
Total TCDD	0.021	0.698	0.719
1,2,3,7,8-PCDD	ND<0.0027	(0.005)	(0.005)
Total PCDD	0.002	0.185	0.187
1,2,3,4,7,8-HxCDD	ND<0.0008	0.006	0.006
1,2,3,6,7,8-HxCDD	0.002	0.011	0.013
1,2,3,7,8,9-HxCDD	0.002	0.016	0.018
Total HxCDD	0.027	0.297	0.324
1,2,3,4,6,7,8-HpCDD	0.019	0.074	0.093
Total HpCDD	0.044	0.193	0.237
Octa CDD	0.060	0.080	0.140
Total CDD	0.155	1.453	1.608
Furans			
2,3,7,8-TCDF #	0.013	0.520	0.533
Total TCDF	0.089	2.482	2.571
1,2,3,7,8-PCDF	{0.003}	0.065	0.068
2,3,4,7,8-PCDF	0.007	0.116	0.123
Total PCDF	0.057	1.479	1.536
1,2,3,4,7,8-HxCDF	{0.006}	0.086	0.092
1,2,3,6,7,8-HxCDF	0.003	0.032	0.035
2,3,4,6,7,8-HxCDF	0.006	0.045	0.051
1,2,3,7,8,9-HxCDF	ND<0.001	ND<0.002	ND<0.003
Total HxCDF	0.029	0.381	0.410
1,2,3,4,6,7,8-HpCDF	0.014	0.089	0.103
1,2,3,4,7,8,9-HpCDF	{0.002}	0.007	0.009
Total HpCDF	0.015	0.122	0.137
Octa CDF	0.012	0.029	0.041
Total CDF	0.201	4.494	4.695
Total CDD + CDF	0.356	5.947	6.303

[a] ng/dscm; nanogram per dry standard cubic meter.
Standard conditions, pressure and temperature defined as 1 atm (760 mm Hg) and 20°C.

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
ND< = Non Detect, value is detection limit.
= value from confirmation column.
Non Detect and {EMPC} values not included in totals.
Numbers rounded before summing, totals may vary from report table in Section 2.

F-1-2
D/F EPA Audit Sample

D/F Laboratory Air Results Sample Table F-3
D/F Audit Sample ng/Sample (X4)

Battelle ID Audit Sample No.	Audit Sample BH 48190-09-08 M23-031			
Analysis date	8-16-99			
Congener	Concen. /%Recov.	Q	TEQ	Detection Limit
2378-TCDD	0.50428		0.5042744	0.00752
12378-PeCDD	0.48120		0.2405988	0.01656
123478-HxCDD	0.46556		0.0465564	0.006
123678-HxCDD	0.53732		0.0537308	0.0056
123789-HxCDD	0.56408		0.0564100	0.00368
1234678-HpCDD	1.1332		0.0113320	0.00488
OCDD	1.30096		0.0013008	0.0028
2378-TCDF	0.66164	#	0.0165409	0.00137
12378-PeCDF	0.58612		0.0293060	0.00816
23478-PeCDF	0.56764		0.2838184	0.00684
123478-HxCDF	0.58852		0.0588512	0.00716
123678-HxCDF	0.62472		0.0624732	0.00624
123789-HxCDF	0.52908		0.0529072	0.0072
234678-HxCDF	0.60404		0.0604040	0.00696
1234678-HpCDF	1.19208		0.0119208	0.00256
1234789-HpCDF	0.95272		0.0095272	0.01136
OCDF	0.61492		0.0006148	0.01956
Total TEQ			1.5472232	
Total Tetra-Furans	1.67676			0.00944
Total Tetra -Dioxins	1.2134			0.01304

D/F Laboratory Air Results Sample Table F-3
D/F Audit Sample ng/Sample (X4)

	BH-AUDIT			
Total Penta-Furans	2.21468			0.01388
Total Penta-Dioxins	1.77212			0.01880
Total Hexa-Furans	3.62032			0.01368
Total Hexa-Dioxins	2.63392			0.00904
Total Hepta-Furans	2.1448			0.00316
Total Hepta-Dioxins	1.75472			0.02212
13C-2378TCDF	65			
13C-12378-PeCDF	75			
13C-123678-HxCDF	60			
13C-1234678-HPCDF	71			
13C-2378-TCDD	65	#		
13C-12378-PeCDD	81			
13C-123678-HxCDD	67			
13C-1234678-HpCDD	76			
13C-OCDD	75			
37Cl-2378-TCDD	NA			
13C-123478-HxCDD	NA			
13C-23478-PeCDF	NA			
13C-123478-HxCDF	NA			
13C-1234789-HpCDF	NA			

NA = Not applicable.
# = value from confirmation column.

F-2
D/F Lab Raw Data Sheets

F-2-1
Air Emission Runs

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 00:09:13
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-02 FH-R2-DIOX
Sample Wt/Vol: 1.4620 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	2.52	1.31	2.5167
12378-PeCDD	*	2.57	*
123478-HxCDD	0.93	0.88	0.0932
123678-HxCDD	2.35	0.81	0.2351
123789-HxCDD	4.26	0.54	0.4264
1234678-HpCDD	35.02	0.71	0.3502
OCDD	117.85	0.41	0.1178
2378-TCDF	27.00	0.78	2.7003
12378-PeCDF	4.00	1.31	0.1998
23478-PeCDF	13.53	1.10	6.7674
123478-HxCDF -EMPC	13.01	1.07	1.3006
123678-HxCDF	5.06	0.94	0.5058
123789-HxCDF	*	1.08	*
234678-HxCDF	12.89	1.04	1.2894
1234678-HpCDF	26.71	0.38	0.2671
1234789-HpCDF	3.52	1.66	0.0352
OCDF	22.00	2.86	0.0220
Total Tetra-Furans	119.39	1.58	
Total Tetra-Dioxins	55.44	2.26	
Total Penta-Furans	106.72	2.23	
Total Penta-Dioxins	11.95	2.92	
Total Hexa-Furans	61.54	2.05	
Total Hexa-Dioxins	40.91	1.32	
Total Hepta-Furans	41.69	0.46	
Total Hepta-Dioxins	73.76	3.25	
Total TEQ			16.8269

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1379	69
13C-12378-PeCDF	2000	1690	84
13C-123678-HxCDF	2000	1310	65
13C-1234678-HpCDF	2000	1584	79
13C-2378-TCDD	2000	1448	72
13C-12378-PeCDD	2000	1909	95
13C-123678-HxCDD	2000	1495	75
13C-1234678-HpCDD	2000	1664	83
13C-OCDD	4000	3242	81
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	203	102 -clean-up Std.
13C-123478-HxCDD	~~2000~~ NA	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~ 4/9/1999	*	*

18/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 08-01-99
Analysis Date: 18-AUG-99 Time: 09:28:21
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-02 FH-R2-DIOX
Sample Wt/Vol: 1.4620 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	1.04	0.53	1.0444
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	18.54	0.90	1.8536
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	117.25	1.31	
Total Tetra-Dioxins	55.66	5.58	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			2.8980

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1292	65
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1395	70
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
37Cl-2378-TCDD	~~2000~~ 200	205	103 — Clean-up std
13C-123478-HxCDD	~~2000~~	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

NA 14/9/8/99

NA 14/9/8/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-02 FH-R2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 12:09:13 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	14.74	7.66	14.72
12378-PeCDD	*	15.03	*
123478-HxCDD	5.44	5.15	0.55
123678-HxCDD	13.74	4.74	1.37
123789-HxCDD	24.91	3.16	2.49
1234678-HpCDD	204.80	4.15	2.05
OCDD	689.19	2.40	0.69
2378-TCDF	157.90	4.56	15.79
12378-PeCDF	23.39	7.66	1.17
23478-PeCDF	79.12	6.43	39.58
123478-HxCDF	76.08	6.26	7.61
123678-HxCDF	29.59	5.50	2.96
123789-HxCDF	*	6.32	*
234678-HxCDF	75.38	6.08	7.54
1234678-HpCDF	156.20	2.22	1.56
1234789-HpCDF	20.58	9.71	0.21
OCDF	128.66	16.73	0.13
Total Tetra-Furans	698.19	9.24	
Total Tetra-Dioxins	324.21	13.22	
Total Penta-Furans	624.10	13.04	
Total Penta-Dioxins	69.88	17.08	
Total Hexa-Furans	359.89	11.99	
Total Hexa-Dioxins	239.24	7.72	
Total Hepta-Furans	243.80	2.69	
Total Hepta-Dioxins	431.35	19.01	
Total TEQ			98.40

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5516	69
13C-12378-PeCDF	8000	6760	84
13C-123678	8000	5240	65
13C-1234678-HpCDF	8000	6336	79
13C-2378-TCDD	8000	5792	72
13C-12378-PeCDD	8000	7636	95
13C-123678-HxCDD	8000	5980	75
13C-1234678-HpCDD	8000	6656	83
13C-OCDD	16000	12968	81
Cleanup Stds			
37Cl-2378-TCDD	800	812	102
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-02 FH-R2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	0.03367	Initial Calibration Date:	04/22/99
Ext. Date:	08/01/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 9:28:21 AM	GC Column ID:	30M DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	6.08	3.10	6.11
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	108.42	5.26	10.84
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	685.68	7.66	
Total Tetra-Dioxins	325.50	32.63	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			16.95

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5168	65
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	5580	70
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Cleanup Stds			
37Cl-2378-TCDD	800	820	103
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 01:15:15
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-03 FH-R3-DIOX
Sample Wt/Vol: 1.5550 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.21	*
12378-PeCDD	*	2.44	*
123478-HxCDD	*	0.82	*
123678-HxCDD	1.54	0.76	0.1536
123789-HxCDD	*	0.50	*
1234678-HpCDD	22.16	0.68	0.2216
OCDD	68.90	0.35	0.0689
2378-TCDF	13.67	0.74	1.3669
12378-PeCDF	2.28	1.25	0.1142
23478-PeCDF	5.49	1.05	2.7431
123478-HxCDF - EMPC	5.19	1.00	0.5192
123678-HxCDF	2.58	0.87	0.2581
123789-HxCDF	*	1.01	*
234678-HxCDF	5.96	0.97	0.5957
1234678-HpCDF	13.48	0.36	0.1348
1234789-HpCDF	1.23 J	1.57	0.0123
OCDF	16.38	2.70	0.0164
Total Tetra-Furans - EMPC	63.47	1.50	
Total Tetra-Dioxins	29.15	2.10	
Total Penta-Furans	42.24	2.13	
Total Penta-Dioxins	3.42	2.77	
Total Hexa-Furans	21.88	1.91	
Total Hexa-Dioxins	22.50	1.23	
Total Hepta-Furans	14.71	0.44	
Total Hepta-Dioxins	50.42	3.08	
Total TEQ			6.2047

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1413	71
13C-12378-PeCDF	2000	1731	87
13C-123678-HxCDF	2000	1350	67
13C-1234678-HpCDF	2000	1621	81
13C-2378-TCDD	2000	1531	77
13C-12378-PeCDD	2000	1967	98
13C-123678-HxCDD	2000	1512	76
13C-1234678-HpCDD	2000	1713	86
13C-OCDD	4000	3656	91

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	203	101 - Clean-up Std.
13C-123478-HxCDD	~~2000~~ NA	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

H918FA

H8138FA

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 08-01-99
Analysis Date: 18-AUG-99 Time: 10:16:23
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-03 FH-R3-DIOX
Sample Wt/Vol: 1.5550 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.51	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	9.50	0.88	0.9499
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	48.79	1.28	
Total Tetra-Dioxins	27.20	5.35	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.9499

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1384	69
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1503	75
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
37Cl-2378-TCDD	~~2000~~ 200	201	100 - Clean-up Std
13C-123478-HxCDD	~~2000~~	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

NA NA

12/18/99

12/31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-03 FH-R3-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	Autospec
Analysis Date:	********** Time: 1:15:15 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	7.53	*
12378-PeCDD	*	15.18	*
123478-HxCDD	*	5.10	*
123678-HxCDD	9.58	4.73	0.24
123789-HxCDD	*	3.11	*
1234678-HpCDD	137.84	4.23	0.34
OCDD	428.56	2.18	0.11
2378-TCDF	85.03	4.60	2.13
12378-PeCDF	14.18	7.78	0.18
23478-PeCDF	34.15	6.53	4.27
123478-HxCDF	32.28	6.22	0.81
123678-HxCDF	16.05	5.41	0.40
123789-HxCDF	*	6.28	*
234678-HxCDF	37.07	6.03	0.93
1234678-HpCDF	83.85	2.24	0.21
1234789-HpCDF	7.65 J	9.77	0.02
OCDF	101.88	16.79	0.03
Total Tetra-Furans	394.78	9.33	
Total Tetra-Dioxins	181.31	13.06	
Total Penta-Furans	262.73	13.25	
Total Penta-Dioxins	21.27	17.23	
Total Hexa-Furans	136.09	11.88	
Total Hexa-Dioxins	139.95	7.65	
Total Hepta-Furans	91.50	2.74	
Total Hepta-Dioxins	313.61	19.16	
Total TEQ			38.59

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5652	71
13C-12378-PeCDF	8000	6924	87
13C-123678	8000	5400	67
13C-1234678-HpCDF	8000	6484	81
13C-2378-TCDD	8000	6124	77
13C-12378-PeCDD	8000	7868	98
13C-123678-HxCDD	8000	6048	76
13C-1234678-HpCDD	8000	6852	86
13C-OCDD	16000	14624	91
Cleanup Stds			
37Cl-2378-TCDD	800	812	101
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-03 FH-R3-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/21/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/01/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 10:16:23 AM	GC Column ID:	30M DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	2.98	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	55.56	5.15	5.56
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	285.32	7.49	
Total Tetra-Dioxins	159.07	31.29	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			5.56

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5536	69
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	6012	75
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Cleanup Stds			
	B	B	
37Cl-2378-TCDD	~~2~~00	~~2~~01	100
13C-123478HxCDD	*	*	*
13C-23478-PeCDF	*	*	*
13C-123478-HxCDF	*	*	*
13C-1234789-HpCDF	*	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 02:21:17
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-04 FH-R4-DIOX
Sample Wt/Vol: 1.6750 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.48	*
12378-PeCDD	*	2.66	*
123478-HxCDD	*	0.82	*
123678-HxCDD	1.54	0.77	0.1536
123789-HxCDD	2.38	0.50	0.2381
1234678-HpCDD	18.93	0.65	0.1893
OCDD	60.23	0.33	0.0602
2378-TCDF	19.04	0.88	1.9042
12378-PeCDF -EMPC	2.50	1.42	0.1250
23478-PeCDF	7.04	1.19	3.5220
123478-HxCDF -EMPC	6.12	1.06	0.6121
123678-HxCDF	2.68	0.92	0.2678
123789-HxCDF	*	1.07	*
234678-HxCDF	6.01	1.03	0.6011
1234678-HpCDF	13.50	0.37	0.1350
1234789-HpCDF -EMPC	1.55 J	1.64	0.0155
OCDF	12.26	2.83	0.0123
Total Tetra-Furans	88.63	1.80	
Total Tetra-Dioxins	21.24	2.57	
Total Penta-Furans	56.66	2.41	
Total Penta-Dioxins	2.38	3.02	
Total Hexa-Furans	28.99	2.02	
Total Hexa-Dioxins	27.23	1.24	
Total Hepta-Furans	14.70	0.46	
Total Hepta-Dioxins	44.16	2.94	
Total TEQ			7.8362

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1149	57
13C-12378-PeCDF	2000	1427	71
13C-123678-HxCDF	2000	1268	63
13C-1234678-HpCDF	2000	1593	80
13C-2378-TCDD	2000	1152	58
13C-12378-PeCDD	2000	1696	85
13C-123678-HxCDD	2000	1515	76
13C-1234678-HpCDD	2000	1791	90
13C-OCDD	4000	3884	97
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	198	99 -clean-up Std.
13C-123478-HxCDD	~~2000~~	*	*
13C-23478-PeCDF	~~2000~~ NA	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

4/9/1999

18/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-23-99
Ext. Date: 08-01-99
Analysis Date: 18-AUG-99 Time: 11:04:22
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-04 FH-R4-DIOX
Sample Wt/Vol: 1.6750 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.67	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	12.81	1.07	1.2813
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	79.18	1.56	
Total Tetra-Dioxins	23.11	6.99	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			1.2813

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1074	54
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1128	56
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	199	100 – Clean-up Std.
13C-123478-HxCDD	~~2000~~	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

NA 11/9/1999

NA 11/9/1999

9/13/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-04 FH-R4-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	Autospec
Analysis Date:	16-Aug-99 Time: 2:21:17 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	9.92	*
12378-PeCDD	*	17.82	*
123478-HxCDD	*	5.49	*
123678-HxCDD	10.32	5.16	1.03
123789-HxCDD	15.95	3.35	1.60
1234678-HpCDD	126.83	4.36	1.27
OCDD	403.54	2.21	0.40
2378-TCDF	127.57	5.90	12.76
12378-PeCDF	16.75	9.51	0.84
23478-PeCDF	47.17	7.97	23.60
123478-HxCDF	41.00	7.10	4.10
123678-HxCDF	17.96	6.16	1.79
123789-HxCDF	*	7.17	*
234678-HxCDF	40.27	6.90	4.03
1234678-HpCDF	90.45	2.48	0.90
1234789-HpCDF	10.39 J	10.99	0.10
OCDF	82.14	18.96	0.08
Total Tetra-Furans	593.82	12.06	
Total Tetra-Dioxins	142.31	17.22	
Total Penta-Furans	379.62	16.15	
Total Penta-Dioxins	15.95	20.23	
Total Hexa-Furans	194.23	13.53	
Total Hexa-Dioxins	182.44	8.31	
Total Hepta-Furans	98.49	3.08	
Total Hepta-Dioxins	295.87	19.70	
Total TEQ			52.50

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4596	57
13C-12378-PeCDF	8000	5708	71
13C-123678	8000	5072	63
13C-1234678-HpCDF	8000	6372	80
13C-2378-TCDD	8000	4608	58
13C-12378-PeCDD	8000	6784	85
13C-123678-HxCDD	8000	6060	76
13C-1234678-HpCDD	8000	7164	90
13C-OCDD	16000	15536	97
Cleanup Stds			
37Cl-2378-TCDD	800	792	99
13C-123478HxCDD	*	*	*
13C-23478-PeCDF	*	*	*
13C-123478-HxCDF	*	*	*
13C-1234789-HpCDF	*	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-04 FH-R4-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	07/23/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/01/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 11:04:22 AM	GC Column ID:	30M DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	4.49	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	85.83	7.17	8.58
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	530.51	10.45	
Total Tetra-Dioxins	154.84	46.83	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			8.58

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4296	54
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	4512	56
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Cleanup Stds			
37Cl-2378-TCDD	800	796	100
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 15:34:29
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-02 BH-R2-DIOX
Sample Wt/Vol: 1.4620 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	2.71	*
12378-PeCDD	16.74	6.02	8.3677
123478-HxCDD	13.94	1.73	1.3939
123678-HxCDD	35.69	1.61	3.5689
123789-HxCDD	34.79 EMPC	1.06	3.4785
1234678-HpCDD	169.42	1.37	1.6942
OCDD	198.99	0.68	0.1990
2378-TCDF	1749.93	2.01	174.9932
12378-PeCDF	190.64	2.98	9.5320
23478-PeCDF	375.10	2.50	187.5498
123478-HxCDF	212.82	2.08	21.2817
123678-HxCDF	76.39	1.81	7.6392
123789-HxCDF	*	2.09	*
234678-HxCDF	113.04	2.02	11.3044
1234678-HpCDF	196.52	0.73	1.9652
1234789-HpCDF	18.57	3.21	0.1857
OCDF	67.93	5.54	0.0679
Total Tetra-Furans	5487.98	4.10	
Total Tetra-Dioxins	2969.39	4.70	
Total Penta-Furans	4825.95	5.06	
Total Penta-Dioxins	693.93	6.84	
Total Hexa-Furans	1064.33	3.97	
Total Hexa-Dioxins	565.11	2.61	
Total Hepta-Furans	286.67	0.89	
Total Hepta-Dioxins	385.09	6.25	
Total TEQ			433.2212

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	996	50
13C-12378-PeCDF	2000	1400	70
13C-123678-HxCDF	2000	1221	61
13C-1234678-HpCDF	2000	1432	72
13C-2378-TCDD	2000	1289	64
13C-12378-PeCDD	2000	1547	77
13C-123678-HxCDD	2000	1377	69
13C-1234678-HpCDD	2000	1493	75
13C-OCDD	4000	3527	88
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	1992	100
13C-123478-HxCDD	2000	2079	104
13C-23478-PeCDF	2000	1939	97
13C-123478-HxCDF	2000	1959	98
13C-1234789-HpCDF	2000	1514	76

11/8/23/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 11:52:19
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-02 BH-R2-DIOX
Sample Wt/Vol: 1.4620 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	96.69	1.26	96.6893
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	1564.11	2.53	156.4114
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	5643.85	3.69	
Total Tetra-Dioxins	2970.83	13.18	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			253.1008

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	961	48
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1241	62
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 2000	2111	~~1055~~ 106% 9/18/99 pre-field spike
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000 9/18/99	*	*

-13/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-02 BH-R2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 3:34:29 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	1:2	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample		Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*		15.85	*
12378-PeCDD	97.90		35.20	48.93
123478-HxCDD	81.52		10.12	8.15
123678-HxCDD	208.72		9.42	20.87
123789-HxCDD	203.45	EMPC	6.20	20.34
1234678-HpCDD	990.77		8.01	9.91
OCDD	1163.69		3.98	1.16
2378-TCDF	10233.59		11.75	1023.36
12378-PeCDF	1114.86		17.43	55.74
23478-PeCDF	2193.58		14.62	1096.79
123478-HxCDF	1244.57		12.16	124.46
123678-HxCDF	446.73		10.58	44.67
123789-HxCDF	*		12.22	*
234678-HxCDF	661.06		11.81	66.11
1234678-HpCDF	1149.25		4.27	11.49
1234789-HpCDF	108.60		18.77	1.09
OCDF	397.25		32.40	0.40
Total Tetra-Furans	32093.71		23.98	
Total Tetra-Dioxins	17364.99		27.49	
Total Penta-Furans	28222.16		29.59	
Total Penta-Dioxins	4058.10		40.00	
Total Hexa-Furans	6224.20		23.22	
Total Hexa-Dioxins	3304.76		15.26	
Total Hepta-Furans	1676.45		5.20	
Total Hepta-Dioxins	2251.83		36.55	
Total TEQ				2533.48

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3984	50
13C-12378-PeCDF	8000	5600	70
13C-123678	8000	4884	61
13C-1234678-HpCDF	8000	5728	72
13C-2378-TCDD	8000	5156	64
13C-12378-PeCDD	8000	6188	77
13C-123678-HxCDD	8000	5508	69
13C-1234678-HpCDD	8000	5972	75
13C-OCDD	16000	14108	88

Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	7968	100
13C-123478HxCDD	8000	8316	104
13C-23478-PeCDF	8000	7756	97
13C-123478-HxCDF	8000	7836	98
13C-1234789-HpCDF	8000	6056	76

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-02 BH-R2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/21/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 11:52:19 AM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	1:2	Cal. Ver. Data Filename:	48078887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	565.44	7.37	565.44
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	9146.92	14.80	914.69
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	33005.23	21.58	
Total Tetra-Dioxins	17373.41	77.08	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			370.03

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3844	48
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	4964	62
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	8444	106
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 16:40:39
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-03 BH-R3-DIOX
Sample Wt/Vol: 1.5550 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	3.16	*
12378-PeCDD	12.60	5.91	6.3006
123478-HxCDD	14.48	1.87	1.4476
123678-HxCDD	37.85	1.74	3.7848
123789-HxCDD	34.92	1.14	3.4922
1234678-HpCDD	180.41	1.50	1.8041
OCDD	234.40	0.73	0.2344
2378-TCDF	1366.89	1.99	136.6886
12378-PeCDF	147.96	2.83	7.3981
23478-PeCDF	276.59	2.37	138.2949
123478-HxCDF	172.43	2.25	17.2429
123678-HxCDF	63.69	1.96	6.3689
123789-HxCDF	*	2.27	*
234678-HxCDF	90.51	2.18	9.0515
1234678-HpCDF	170.86	0.80	1.7086
1234789-HpCDF	16.05	3.52	0.1605
OCDF	66.25	6.06	0.0662
Total Tetra-Furans	4815.43	4.05	
Total Tetra-Dioxins	3504.47	5.47	
Total Penta-Furans	3623.92	4.81	
Total Penta-Dioxins	654.90	6.71	
Total Hexa-Furans	857.48	4.30	
Total Hexa-Dioxins	560.61	2.81	
Total Hepta-Furans	246.41	0.98	
Total Hepta-Dioxins	402.30	6.85	
Total TEQ			334.0438

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	997	50
13C-12378-PeCDF	2000	1432	72
13C-123678-HxCDF	2000	1344	67
13C-1234678-HpCDF	2000	1562	78
13C-2378-TCDD	2000	1096	55
13C-12378-PeCDD	2000	1554	78
13C-123678-HxCDD	2000	1454	73
13C-1234678-HpCDD	2000	1645	82
13C-OCDD	4000	3786	95
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2125	106
13C-123478-HxCDD	2000	2432	122
13C-23478-PeCDF	2000	2123	106
13C-123478-HxCDF	2000	2132	107
13C-1234789-HpCDF	2000	1903	95

48/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 12:40:16
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-03 BH-R3-DIOX
Sample Wt/Vol: 1.5550 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	67.21	1.36	67.2091
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	1226.67	2.53	122.6669
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	5163.92	3.69	
Total Tetra-Dioxins	3421.42	14.23	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			189.8760

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	936	47
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1105	55
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2184	~~1092~~ 109
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

MB9181991 pre-field spike
MB9181991

'31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-03 BH-R3-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 4:40:39 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	1:2	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	19.66	*
12378-PeCDD	78.37	36.76	39.19
123478-HxCDD	90.07	11.63	9.00
123678-HxCDD	235.43	10.82	23.54
123789-HxCDD	217.20	7.07	21.72
1234678-HpCDD	1122.15	9.33	11.22
OCDD	1457.97	4.54	0.36
2378-TCDF	8502.06	12.38	850.20
12378-PeCDF	920.31	17.60	46.02
23478-PeCDF	1720.39	14.74	860.19
123478-HxCDF	1072.51	14.00	107.25
123678-HxCDF	396.15	12.19	39.61
123789-HxCDF	*	14.12	*
234678-HxCDF	562.97	13.56	56.30
1234678-HpCDF	1062.75	4.98	10.63
1234789-HpCDF	99.83	21.89	1.00
OCDF	412.08	37.69	0.41
Total Tetra-Furans	29951.97	25.19	
Total Tetra-Dioxins	21797.80	34.02	
Total Penta-Furans	22540.78	29.92	
Total Penta-Dioxins	4073.48	41.74	
Total Hexa-Furans	5333.53	26.75	
Total Hexa-Dioxins	3486.99	17.48	
Total Hepta-Furans	1532.67	6.10	
Total Hepta-Dioxins	2502.31	42.61	
Total TEQ			2077.75

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3988	50
13C-12378-PeCDF	8000	5728	72
13C-123678	8000	5376	67
13C-1234678-HpCDF	8000	6248	78
13C-2378-TCDD	8000	4384	55
13C-12378-PeCDD	8000	6216	78
13C-123678-HxCDD	8000	5816	73
13C-1234678-HpCDD	8000	6580	82
13C-OCDD	16000	15144	95
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	8500	106
13C-123478HxCDD	8000	9728	122
13C-23478-PeCDF	8000	8492	106
13C-123478-HxCDF	8000	8528	107
13C-1234789-HpCDF	8000	7612	95

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-03 BH-R3-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/21/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 12:40:16 PM	GC Column ID:	30M DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	1:2	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	418.05	8.46	418.04
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	7629.89	15.74	762.99
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	32119.58	22.95	
Total Tetra-Dioxins	21281.23	88.51	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			1181.03

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3744	47
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	4420	55
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	8736	109
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 17:46:53
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-04 BH-R4-DIOX
Sample Wt/Vol: 1.6750 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	3.03	*
12378-PeCDD	4.95	6.09	2.4743
123478-HxCDD	5.73	1.97	0.5727
123678-HxCDD	11.36	1.83	1.1359
123789-HxCDD	15.81	1.20	1.5812
1234678-HpCDD	74.05	1.52	0.7405
OCDD	79.68	0.78	0.0797
2378-TCDF	617.81	1.89	61.7808
12378-PeCDF	64.58	3.04	3.2290
23478-PeCDF	115.66	2.55	57.8300
123478-HxCDF	85.80	2.33	8.5799
123678-HxCDF	31.79	2.02	3.1788
123789-HxCDF	*	2.34	*
234678-HxCDF	45.18	2.26	4.5181
1234678-HpCDF	88.48	0.84	0.8848
1234789-HpCDF	6.93	3.73	0.0693
OCDF	29.38	6.42	0.0294
Total Tetra-Furans	2482.36	3.86	
Total Tetra-Dioxins	698.07	5.26	
Total Penta-Furans	1479.33	5.16	
Total Penta-Dioxins	185.23	6.92	
Total Hexa-Furans	380.84	4.44	
Total Hexa-Dioxins	296.88	2.97	
Total Hepta-Furans	121.65	1.03	
Total Hepta-Dioxins	193.03	6.93	
Total TEQ			146.6845

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1009	50
13C-12378-PeCDF	2000	1334	67
13C-123678-HxCDF	2000	1241	62
13C-1234678-HpCDF	2000	1409	70
13C-2378-TCDD	2000	1088	54
13C-12378-PeCDD	2000	1469	73
13C-123678-HxCDD	2000	1372	69
13C-1234678-HpCDD	2000	1540	77
13C-OCDD	4000	3584	90

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	902	45 ✓
13C-123478-HxCDD	2000	1070	53 ✓
13C-23478-PeCDF	2000	905	45 ✓
13C-123478-HxCDF	2000	1027	51 ✓
13C-1234789-HpCDF	2000	865	43 ✓

All low.

KJ 8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-23-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 13:28:15
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:2

Lab Sample ID: 48190-09-04 BH-R4-DIOX
Sample Wt/Vol: 1.6750 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	33.53	1.27	33.5295
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	520.40	2.22	52.0396
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	2595.62	3.23	
Total Tetra-Dioxins	713.44	13.33	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			85.5691

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	993	50
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1116	56
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	959	~~170~~ 48. > pre-field spike
13C-123478-HxCDD	2000	*	* 8/18/99
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-04 BH-R4-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	********** Time: 5:46:53 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	1:2	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	20.30	*
12378-PeCDD	33.17	40.80	16.58
123478-HxCDD	38.39	13.20	3.84
123678-HxCDD	76.11	12.26	7.61
123789-HxCDD	105.93	8.04	10.59
1234678-HpCDD	496.14	10.18	4.96
OCDD	533.86	5.23	0.53
2378-TCDF	4139.33	12.66	413.93
12378-PeCDF	432.69	20.37	21.63
23478-PeCDF	774.92	17.09	387.46
123478-HxCDF	574.86	15.61	57.49
123678-HxCDF	212.99	13.53	21.30
123789-HxCDF	*	15.68	*
234678-HxCDF	302.71	15.14	30.27
1234678-HpCDF	592.82	5.63	5.93
1234789-HpCDF	46.43	24.99	0.46
OCDF	196.85	43.01	0.20
Total Tetra-Furans	16631.81	25.86	
Total Tetra-Dioxins	4677.07	35.24	
Total Penta-Furans	9911.51	34.57	
Total Penta-Dioxins	1241.04	46.36	
Total Hexa-Furans	2551.63	29.75	
Total Hexa-Dioxins	1989.10	19.90	
Total Hepta-Furans	815.06	6.90	
Total Hepta-Dioxins	1293.30	46.43	
Total TEQ			982.79

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4036	50
13C-12378-PeCDF	8000	5336	67
13C-123678	8000	4964	62
13C-1234678-HpCDF	8000	5636	70
13C-2378-TCDD	8000	4352	54
13C-12378-PeCDD	8000	5876	73
13C-123678-HxCDD	8000	5488	69
13C-1234678-HpCDD	8000	6160	77
13C-OCDD	16000	14336	90
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	3608	45
13C-123478HxCDD	8000	4280	53
13C-23478-PeCDF	8000	3620	45
13C-123478-HxCDF	8000	4108	51
13C-1234789-HpCDF	8000	3460	43

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-04 BH-R4-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/23/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 1:28:15 PM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	1:2	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	224.65	8.51	224.65
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	3486.68	14.87	348.67
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	17390.65	21.64	
Total Tetra-Dioxins	4780.05	89.31	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			573.31

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3972	50
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	4464	56
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	3836	48
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

F-2-2
EPA Audit Sample

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 12:16:07
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-08 BH-AUDIT-DIOX
Sample Wt/Vol: 1.0000 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/sample	DETECTION LIMIT pg/sample	TEQ
2378-TCDD	126.07	1.88	126.0686
12378-PeCDD	120.30	4.14	60.1497
123478-HxCDD	116.39	1.50	11.6391
123678-HxCDD	134.33	1.40	13.4327
123789-HxCDD — EMPC	141.02	0.92	14.1025
1234678-HpCDD	283.30	1.22	2.8330
OCDD	325.24	0.70	0.3252
2378-TCDF	158.00	1.16	15.7995
12378-PeCDF	146.53	2.04	7.3265
23478-PeCDF	141.91	1.71	70.9543
123478-HxCDF	147.13	1.79	14.7128
123678-HxCDF	156.18	1.56	15.6183
123789-HxCDF	132.27	1.80	13.2268
234678-HxCDF	151.01	1.74	15.1010
1234678-HpCDF	298.02	0.64	2.9802
1234789-HpCDF	238.18	2.84	2.3818
OCDF	153.73	4.89	0.1537
Total Tetra-Furans	419.19	2.36	
Total Tetra-Dioxins	303.35	3.26	
Total Penta-Furans	553.67	3.47	
Total Penta-Dioxins	443.03	4.70	
Total Hexa-Furans	905.08	3.42	
Total Hexa-Dioxins	658.48	2.26	
Total Hepta-Furans	536.20	0.79	
Total Hepta-Dioxins	438.68	5.53	
Total TEQ			386.8058

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1303	65
13C-12378-PeCDF	2000	1490	75
13C-123678-HxCDF	2000	1193	60
13C-1234678-HpCDF	2000	1424	71
13C-2378-TCDD	2000	1371	69
13C-12378-PeCDD	2000	1617	81
13C-123678-HxCDD	2000	1335	67
13C-1234678-HpCDD	2000	1527	76
13C-OCDD	4000	3005	75
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2	0
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

Not added.

10/28/1

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-09-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 08:40:23
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-08 BH-AUDIT-DIOX
Sample Wt/Vol: 1.0000 units: ea
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/sample	DETECTION LIMIT pg/sample	TEQ
2378-TCDD	121.67	0.81	121.6737
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	165.41	1.37	16.5409
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	169.20	2.00	
Total Tetra-Dioxins	305.15	8.48	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			138.2146

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1211	61
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1301	65
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2	1
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

NA not analyzed

12/31/99

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

NOV 1 1999

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Results from Method 23 Audit Sample - #23-031

FROM: Gary D. McAlister CER for GM
Emission Measurement Center (MD-19)

TO: Clyde E. Riley
Emission Measurement Center (MD-19)

This letter represents EPA's official evaluation of the Method 23 audit results which were submitted by Ms. Karen Lesniak of Battelle Memorial Institute Laboratories, Columbus, Ohio. The audit sample was originally received by Mr. Tony Wisbith of Battelle on July 9, 1999 and analyzed by Battelle August 16, 1999.

In summary, for the reported data, 9 of 11 dibenzodioxins are within the 90 percent confidence limit including the 2378-TCDD isomer . For the dibenzofurans, 11 of 14 dibenzofurans are within the 90 percent confidence limit. Battelle documented that confirmation analysis was performed for the 2378-TCDF isomer. The reported data meet the acceptable performance limits for the target analytes. For additional information, please see the enclosed USEPA Dioxin/Furan Audit Form. If you have any questions, please contact me at (919) 541-1062.

Attachment

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US EPA DIOXIN/FURAN AUDIT FORM

Auditor:	Clyde E (Gene) Riley	**Auditee Company:**	Battelle Memorial Institute
Agency:	EMAD, OAQPS, EPA	**Auditee's Name:**	Karen Lesniak
Agency Address:	MD 19 RTP, NC 27711	**Auditee Address:**	505 King Ave Columbus, OH 43201-2693
Agency Phone #:	(919) 541-5239	**Date Audit Sam Rec'd:**	7/9/99
Audit Sample #:	M23-031	**Confirmation Analysis Used:**	Yes
Date Analyzed:	8/16/99		

Compound	Auditee Result (ng/sample)	Compound	Auditee Result (ng/sample)
2378-TCDD	0.504	2378-TCDF	0.662
Other TCDD	7.09	Other TCDF	1.015
12378-PeCDD	0.481	12378-PCDF	0.586
Other PeCDD	1.291	23478-PCDF	0.568
123478-HxCDD	0.466	Other PCDF	1.061
123678-HxCDD	0.537	123478-HxCDF	0.589
123789-HxCDD	0.564	123678-HxCDF	0.625
Other HxCDD	1.067	123789-HxCDF	0.529
1234678-HpCDD	1.133	234678-HxCDF	0.604
Other HpCDD	0.622	Other HxCDF	1.274
OCDD	1.301	1234678-HpCDF	1.192
		1234789-HpCDF	0.953
		Other HpCDF	0
		OCDF	0.615

The results of the above performance audit sample will be calculated as follows:

Results of the **Polychlorinated Dibenzodioxins (CDD):**

9 of the 11 different CDD are within the 90% confidence
10 of the 11 different CDD are within the 50% of the 90% confidence

Results of the **Polychlorinated Dibenzofurans (CDF):**

11 of the 14 different CDF are within the 90% confidence
13 of the 14 different CDF are within the 50% of the 90% confidence

F-2-3
Sewage Sludge

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PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 05:31:45
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-02 S-R2-213A
Sample Wt/Vol: 0.2665 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ
2378-TCDD	*	4.853	*	*
12378-PeCDD	*	15.018	*	*
123478-HxCDD	*	4.714	*	*
123678-HxCDD	15.034	5.292	1.16	1.5034
123789-HxCDD	27.278	4.935	1.06	2.7278
1234678-HpCDD	229.242	10.539	1.02	2.2924
OCDD	2510.045	6.195	0.85	2.5100
2378-TCDF	27.672	4.346	0.80	2.7672
12378-PeCDF	*	7.751	*	*
23478-PeCDF	8.089	3.545	1.51	4.0444
123478-HxCDF	13.703	5.262	1.24	1.3703
123678-HxCDF	*	5.043	*	*
123789-HxCDF	*	5.878	*	*
234678-HxCDF	6.211	5.089	1.23	0.6211
1234678-HpCDF	134.485	2.890	0.98	1.3449
1234789-HpCDF	*	11.665	*	*
OCDF	313.466	14.915	0.90	0.3135
Total Tetra-Furans	76.483	10.260	0.72	
Total Tetra-Dioxins	67.723	11.039	0.80	
Total Penta-Furans	90.162	13.411	1.58	
Total Penta-Dioxins	30.287	25.172	1.30	
Total Hexa-Furans	97.680	19.543	1.36	
Total Hexa-Dioxins	128.323	11.179	1.12	
Total Hepta-Furans	238.639	3.476	0.98	
Total Hepta-Dioxins	430.793	31.677	0.99	

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-2378-TCDD	2000	1469	73	0.78
13C-12378-PeCDD	2000	1596	80	1.55
13C-123478-HxCDD	2000	1467	73	1.24
13C-123678-HxCDD	2000	1550	77	1.25
13C-1234678-HpCDD	2000	1374	69	1.03
13C-OCDD	4000	2468	62	0.88
13C-2378-TCDF	2000	1271	64	0.76
13C-12378-PeCDF	2000	1517	76	1.55
13C-23478-PeCDF	2000	1443	72	1.53
13C-123478-HxCDF	2000	1414	71	0.52
13C-123678-HxCDF	2000	1457	73	0.50
13C-123789-HxCDF	2000	1361	68	0.51
13C-234678-HxCDF	2000	1489	74	0.52
13C-1234678-HpCDF	2000	1332	67	0.44
13C-1234789-HpCDF	2000	1202	60	0.44
CLEANUP STANDARD				
37Cl-2378-TCDD	200	121	61	

Total TEQ 19.49»

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 06:37:49
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-03 S-R3-313A
Sample Wt/Vol: 0.2316 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	5.392	*	*	13C-2378-TCDD	2000	1623	81	0.77
12378-PeCDD	*	17.029	*	*	13C-12378-PeCDD	2000	1742	87	1.54
123478-HxCDD	*	5.402	*	*	13C-123478-HxCDD	2000	1589	79	1.25
123678-HxCDD	17.940	5.971	1.30	1.7940	13C-123678-HxCDD	2000	1577	79	1.25
123789-HxCDD	24.345	5.618	1.19	2.4345	13C-1234678-HpCDD	2000	1435	72	1.02
1234678-HpCDD	281.146	11.927	1.03	2.8115	13C-OCDD	4000	2716	68	0.88
OCDD	2687.554	6.779	0.89	2.6876	13C-2378-TCDF	2000	1447	72	0.76
2378-TCDF	29.950	4.661	0.70	2.9950	13C-12378-PeCDF	2000	1675	84	1.55
12378-PeCDF	*	8.480	*	*	13C-23478-PeCDF	2000	1635	82	1.55
23478-PeCDF	9.207	3.752	1.40	4.6035	13C-123478-HxCDF	2000	1512	76	0.51
123478-HxCDF	19.302	5.855	1.23	1.9302	13C-123678-HxCDF	2000	1543	77	0.51
123678-HxCDF	7.512	5.565	1.31	0.7512	13C-123789-HxCDF	2000	1440	72	0.51
123789-HxCDF	*	6.644	*	*	13C-234678-HxCDF	2000	1535	77	0.51
234678-HxCDF	8.433	5.781	1.24	0.8433	13C-1234678-HpCDF	2000	1415	71	0.44
1234678-HpCDF	159.218	3.222	1.02	1.5922	13C-1234789-HpCDF	2000	1257	63	0.45
1234789-HpCDF	*	12.624	*	*					
OCDF	339.723	16.322	0.88	0.3397					
Total Tetra-Furans	95.881	11.004	0.71		CLEANUP STANDARD				
Total Tetra-Dioxins	82.584	12.264	0.80		37Cl-2378-TCDD	200	131	65	
Total Penta-Furans	95.195	14.442	1.51						
Total Penta-Dioxins	23.349	28.544	1.53						
Total Hexa-Furans	117.436	21.896	1.08						
Total Hexa-Dioxins	134.831	12.726	1.23						
Total Hepta-Furans	283.917	3.812	1.02						
Total Hepta-Dioxins	520.175	35.849	0.93						

Total TEQ 22.78*

18/30/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 07:43:55
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-04 S-R4-413A
Sample Wt/Vol: 0.2326 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	5.327	*	*	13C-2378-TCDD	2000	1642	82	0.77
12378-PeCDD	*	17.356	*	*	13C-12378-PeCDD	2000	1698	85	1.54
123478-HxCDD	8.237	5.420	1.19	0.8237	13C-123478-HxCDD	2000	1571	79	1.22
123678-HxCDD	30.717	6.167	1.40	3.0717	13C-123678-HxCDD	2000	1646	82	1.23
123789-HxCDD	39.949	5.715	1.09	3.9949	13C-1234678-HpCDD	2000	1474	74	1.04
1234678-HpCDD	383.542	11.915	1.11	3.8354	13C-OCDD	4000	2900	72	0.87
OCDD	3689.092	6.465	0.87	3.6891	13C-2378-TCDF	2000	1351	68	0.76
2378-TCDF	38.620	4.995	0.75	3.8620	13C-12378-PeCDF	2000	1669	83	1.55
12378-PeCDF	12.749	8.562	1.45	0.6375	13C-23478-PeCDF	2000	1531	77	1.55
23478-PeCDF	13.427	4.078	1.38	6.7136	13C-123478-HxCDF	2000	1562	78	0.53
123478-HxCDF	29.630	5.758	1.32	2.9630	13C-123678-HxCDF	2000	1589	79	0.51
123678-HxCDF	10.008	5.681	1.26	1.0008	13C-123789-HxCDF	2000	1449	72	0.50
123789-HxCDF	*	6.993	*	*	13C-234678-HxCDF	2000	1609	80	0.52
234678-HxCDF	13.309	5.611	1.24	1.3309	13C-1234678-HpCDF	2000	1440	72	0.45
1234678-HpCDF	222.086	3.279	1.02	2.2209	13C-1234789-HpCDF	2000	1289	64	0.44
1234789-HpCDF	*	13.024	*	*					
OCDF	441.203	15.567	0.88	0.4412					
					CLEANUP STANDARD				
Total Tetra-Furans	120.041	11.791	0.69		37Cl-2378-TCDD	200	134	67	
Total Tetra-Dioxins	95.069	12.117	0.81						
Total Penta-Furans	162.687	15.096	1.46						
Total Penta-Dioxins	29.574	29.091	1.58						
Total Hexa-Furans	170.701	22.004	1.27						
Total Hexa-Dioxins	203.750	12.945	1.15						
Total Hepta-Furans	376.603	3.910	1.02						
Total Hepta-Dioxins	701.939	35.813	1.12						

Total TEQ 34.58»

'30/55

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SLUDGE
Sample Receipt Date: 07-21-99
Ext. Date: 08-08-99
Analysis Date: 18-AUG-99 Time: 00:40:37
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-02 S-R2-213A
Sample Wt/Vol: 0.2665 units: g
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	2.751	14.556	0.68	2.7506	13C-2378-TCDD	2000	1469	73	0.80
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	1392	70	0.80
2378-TCDF	20.553	3.309	0.76	2.0553	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	61.246	10.403	0.74		CLEANUP STANDARD				
Total Tetra-Dioxins	67.476	2920.794	0.78		37Cl-2378-TCDD	200	124	62	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 4.8058

10/21/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SLUDGE
Sample Receipt Date: 07-21-99
Ext. Date: 08-08-99
Analysis Date: 18-AUG-99 Time: 01:28:39
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-03 S-R3-313A
Sample Wt/Vol: 0.2316 units: g
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	2.871	15.580	0.72	2.8705	13C-2378-TCDD	2000	1589	79	0.79
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	1545	77	0.79
2378-TCDF	24.064	3.475	0.77	2.4064	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	60.282	10.924	0.67		CLEANUP STANDARD				
Total Tetra-Dioxins	80.217	3126.236	0.82		37Cl-2378-TCDD	200	133	67	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 5.2769

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SLUDGE
Sample Receipt Date: 07-23-99
Ext. Date: 08-08-99
Analysis Date: 18-AUG-99 Time: 02:16:37
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-04 S-R4-413A
Sample Wt/Vol: 0.2326 units: g
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	5.139	14.492	0.74	5.1387	13C-2378-TCDD	2000	1604	80	0.79
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	1415	71	0.78
2378-TCDF	35.056	3.564	0.72	3.5056	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	109.289	11.205	0.75		CLEANUP STANDARD				
Total Tetra-Dioxins	30.725	2908.012	0.82		37Cl-2378-TCDD	200	137	68	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 8.6443

11/31/99

F-2-4
Scrubber Water Inlet

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-29-99
Analysis Date: 15-AUG-99 Time: 13:50:51
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:5

Lab Sample ID: 48200-57-02 WI-R2-211A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885B
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	12.603	*	*	13C-2378-TCDD	2000	1176	59	0.78
12378-PeCDD	*	27.354	*	*	13C-12378-PeCDD	2000	1483	74	1.58
123478-HxCDD	*	12.703	*	*	13C-123478-HxCDD	2000	1068	53	1.35
123678-HxCDD	*	13.459	*	*	13C-123678-HxCDD	2000	1160	58	1.13
123789-HxCDD	*	12.893	*	*	13C-1234678-HpCDD	2000	860	43	1.03
1234678-HpCDD	*	32.831	*	*	13C-OCDD	4000	1538	38	0.89
OCDD	40.146	19.376	0.79	0.0401	13C-2378-TCDF	2000	1222	61	0.79
2378-TCDF	*	9.492	*	*	13C-12378-PeCDF	2000	1197	60	1.50
12378-PeCDF	*	17.656	*	*	13C-23478-PeCDF	2000	959	48	1.56
23478-PeCDF	*	11.090	*	*	13C-123478-HxCDF	2000	1007	50	0.52
123478-HxCDF	*	14.409	*	*	13C-123678-HxCDF	2000	1095	55	0.53
123678-HxCDF	*	12.698	*	*	13C-123789-HxCDF	2000	916	46	0.52
123789-HxCDF	*	17.486	*	*	13C-234678-HxCDF	2000	1029	51	0.50
234678-HxCDF	*	14.150	*	*	13C-1234678-HpCDF	2000	818	41	0.44
1234678-HpCDF	*	9.313	*	*	13C-1234789-HpCDF	2000	763	38	0.43
1234789-HpCDF	*	35.004	*	*					
OCDF	*	46.654	*	*					
Total Tetra-Furans	91.760	22.408	0.86		CLEANUP STANDARD				
Total Tetra-Dioxins	*	28.667	*		37Cl-2378-TCDD	200	121	60	
Total Penta-Furans	*	35.495	*						
Total Penta-Dioxins	*	45.850	*						
Total Hexa-Furans	*	53.368	*						
Total Hexa-Dioxins	*	29.208	*						
Total Hepta-Furans	*	79.065	*						
Total Hepta-Dioxins	*	98.682	*						
Total TEQ				0.0401					

1/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-29-99
Analysis Date: 14-AUG-99 Time: 20:43:21
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-04 WI-R3-311A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	2.587	*	*	13C-2378-TCDD	2000	670	33	0.79
12378-PeCDD	*	7.055	*	*	13C-12378-PeCDD	2000	792	40	1.53
123478-HxCDD	*	2.060	*	*	13C-123478-HxCDD	2000	698	35	1.22
123678-HxCDD	*	2.216	*	*	13C-123678-HxCDD	2000	797	40	1.24
123789-HxCDD	*	2.105	*	*	13C-1234678-HpCDD	2000	726	36	1.05
1234678-HpCDD	*	4.315	*	*	13C-OCDD	4000	1312	33	0.88
OCDD	11.713	2.439	0.79	0.0117	13C-2378-TCDF	2000	633	32	0.77
2378-TCDF	*	2.067	*	*	13C-12378-PeCDF	2000	720	36	1.56
12378-PeCDF	*	3.788	*	*	13C-23478-PeCDF	2000	756	38	1.55
23478-PeCDF	*	1.581	*	*	13C-123478-HxCDF	2000	690	35	0.51
123478-HxCDF	*	2.294	*	*	13C-123678-HxCDF	2000	717	36	0.51
123678-HxCDF	*	2.251	*	*	13C-123789-HxCDF	2000	703	35	0.51
123789-HxCDF	*	2.503	*	*	13C-234678-HxCDF	2000	713	36	0.51
234678-HxCDF	*	2.257	*	*	13C-1234678-HpCDF	2000	680	34	0.45
1234678-HpCDF	1.365	1.210	0.91	0.0136	13C-1234789-HpCDF	2000	623	31	0.43
1234789-HpCDF	*	4.723	*	*					
OCDF	*	5.872	*	*					
Total Tetra-Furans	1.191	4.879	0.82		CLEANUP STANDARD				
Total Tetra-Dioxins	1.723	5.885	0.74		37Cl-2378-TCDD	200	132	66	
Total Penta-Furans	*	6.272	*						
Total Penta-Dioxins	*	11.824	*						
Total Hexa-Furans	*	2.259	*						
Total Hexa-Dioxins	*	4.767	*						
Total Hepta-Furans	3.708	10.453	*						
Total Hepta-Dioxins	*	12.971	*						

Total TEQ 0.0254

.01/26/95

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 07-29-99
Analysis Date: 14-AUG-99 Time: 22:55:25
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-06 WI-R4-411A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	7.658	*	*	13C-2378-TCDD	2000	714	36 ✓	0.80
12378-PeCDD	*	23.154	*	*	13C-12378-PeCDD	2000	802	40	1.56
123478-HxCDD	*	6.093	*	*	13C-123478-HxCDD	2000	773	39 ✓	1.25
123678-HxCDD	*	6.488	*	*	13C-123678-HxCDD	2000	902	45	1.27
123789-HxCDD	*	6.186	*	*	13C-1234678-HpCDD	2000	830	41	1.05
1234678-HpCDD	*	12.210	*	*	13C-OCDD	4000	1581	40	0.87
OCDD	15.696	6.562	0.78	0.0157	13C-2378-TCDF	2000	666	33 ✓	0.75
2378-TCDF	*	6.334	*	*	13C-12378-PeCDF	2000	761	38 ✓	1.56
12378-PeCDF	*	11.434	*	*	13C-23478-PeCDF	2000	753	38 ✓	1.56
23478-PeCDF	*	5.023	*	*	13C-123478-HxCDF	2000	788	39 ✓	0.50
123478-HxCDF	*	6.419	*	*	13C-123678-HxCDF	2000	862	43	0.53
123678-HxCDF	*	6.172	*	*	13C-123789-HxCDF	2000	765	38 ✓	0.49
123789-HxCDF	*	7.697	*	*	13C-234678-HxCDF	2000	793	40	0.50
234678-HxCDF	*	6.771	*	*	13C-1234678-HpCDF	2000	798	40	0.41
1234678-HpCDF	*	3.354	*	*	13C-1234789-HpCDF	2000	725	36 ✓	0.45
1234789-HpCDF	*	13.514	*	*					
OCDF	*	15.799	*	*					
Total Tetra-Furans	*	14.952	*		CLEANUP STANDARD				
Total Tetra-Dioxins	*	17.420	*		37Cl-2378-TCDD	200	140	70	
Total Penta-Furans	*	19.408	*						
Total Penta-Dioxins	*	38.810	*						
Total Hexa-Furans	*	24.782	*						
Total Hexa-Dioxins	*	14.012	*						
Total Hepta-Furans	2.928	29.426	*						
Total Hepta-Dioxins	*	36.699	*						
Total TEQ				0.0157					

8/29/99

F-2-5
Scrubber Water Outlet

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-29-99
Analysis Date: 14-AUG-99 Time: 19:37:14
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-03 WO-R2-212A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	1.746	*	*	13C-2378-TCDD	2000	1016	51	0.80
12378-PeCDD	*	4.937	*	*	13C-12378-PeCDD	2000	1216	61	1.55
123478-HxCDD	1.477	1.468	1.30	0.1477	13C-123478-HxCDD	2000	1103	55	1.25
123678-HxCDD	2.823	1.674	1.38	0.2823	13C-123678-HxCDD	2000	1107	55	1.24
123789-HxCDD	2.781	1.550	1.17	0.2781	13C-1234678-HpCDD	2000	1064	53	1.04
1234678-HpCDD	11.004	3.085	1.00	0.1100	13C-OCDD	4000	2044	51	0.88
OCDD	29.490	1.699	0.86	0.0295	13C-2378-TCDF	2000	981	49	0.77
2378-TCDF	209.868	1.374	0.77	20.98»	13C-12378-PeCDF	2000	1104	55	1.53
12378-PeCDF	14.289	2.599	1.59	0.7144	13C-23478-PeCDF	2000	1122	56	1.57
23478-PeCDF	29.413	1.117	1.58	14.70»	13C-123478-HxCDF	2000	1017	51	0.52
123478-HxCDF	11.458	1.640	1.22	1.1458	13C-123678-HxCDF	2000	1059	53	0.51
123678-HxCDF	4.558	1.591	1.28	0.4558	13C-123789-HxCDF	2000	1071	54	0.52
123789-HxCDF	*	1.765	*	*	13C-234678-HxCDF	2000	1051	53	0.52
234678-HxCDF	6.229	1.591	1.24	0.6229	13C-1234678-HpCDF	2000	1013	51	0.45
1234678-HpCDF	12.400	0.884	1.02	0.1240	13C-1234789-HpCDF	2000	976	49	0.44
1234789-HpCDF	*	3.244	*	*					
OCDF	6.194	4.091	0.89	0.0062					
Total Tetra-Furans	824.161	3.244	0.72		CLEANUP STANDARD				
Total Tetra-Dioxins	475.310	3.972	0.77		37Cl-2378-TCDD	200	127	63	
Total Penta-Furans	317.554	4.366	1.56						
Total Penta-Dioxins	46.427	8.276	1.54						
Total Hexa-Furans	48.103	6.088	1.19						
Total Hexa-Dioxins	29.479	1.537	1.30						
Total Hepta-Furans	17.305	1.019	1.02						
Total Hepta-Dioxins	27.438	9.274	0.96						

Total TEQ 39.61»

12/29/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-29-99
Analysis Date: 14-AUG-99 Time: 21:49:22
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-05 WO-R3-312A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	4.378	*	*	13C-2378-TCDD	2000	396	20✓	0.80
12378-PeCDD	*	13.130	*	*	13C-12378-PeCDD	2000	457	23✓	1.57
123478-HxCDD	*	3.896	*	*	13C-123478-HxCDD	2000	404	20✓	1.23
123678-HxCDD	*	4.022	*	*	13C-123678-HxCDD	2000	466	23✓	1.24
123789-HxCDD	*	3.893	*	*	13C-1234678-HpCDD	2000	449	22✓	1.02
1234678-HpCDD	24.567	7.548	0.99	0.2457	13C-OCDD	4000	813	20✓	0.88
OCDD	58.692	4.312	1.00	0.0587	13C-2378-TCDF	2000	402	20✓	0.77
2378-TCDF	272.660	3.199	0.73	27.26»	13C-12378-PeCDF	2000	408	20✓	1.55
12378-PeCDF	24.494	6.817	1.41	1.2247	13C-23478-PeCDF	2000	423	21✓	1.58
23478-PeCDF	45.403	2.925	1.61	22.70»	13C-123478-HxCDF	2000	408	20✓	0.51
123478-HxCDF	16.429	4.201	1.22	1.6429	13C-123678-HxCDF	2000	425	21✓	0.51
123678-HxCDF	6.655	4.107	1.10	0.6655	13C-123789-HxCDF	2000	412	21✓	0.49
123789-HxCDF	*	4.827	*	*	13C-234678-HxCDF	2000	418	21✓	0.50
234678-HxCDF	12.829	4.257	1.34	1.2829	13C-1234678-HpCDF	2000	403	20✓	0.44
1234678-HpCDF	19.642	2.285	1.13	0.1964	13C-1234789-HpCDF	2000	382	19✓	0.43
1234789-HpCDF	*	8.331	*	*					
OCDF	10.396	10.381	0.98	0.0104					
Total Tetra-Furans	1120.038	7.552	0.66		CLEANUP STANDARD				
Total Tetra-Dioxins	820.823	9.958	0.77		37Cl-2378-TCDD	200	131	65	
Total Penta-Furans	493.077	11.440	1.41						
Total Penta-Dioxins	57.284	22.008	1.57						
Total Hexa-Furans	80.161	16.021	1.30						
Total Hexa-Dioxins	53.507	8.818	1.06						
Total Hepta-Furans	28.854	2.623	1.13						
Total Hepta-Dioxins	52.930	22.687	*						

Total TEQ 55.29»

2/29/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 07-29-99
Analysis Date: 15-AUG-99 Time: 00:01:27
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-07 WO-R4-412A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	1.364	*	*	13C-2378-TCDD	2000	1312	66	0.79
12378-PeCDD	*	4.121	*	*	13C-12378-PeCDD	2000	1423	71	1.56
123478-HxCDD	2.613	1.335	1.19	0.2613	13C-123478-HxCDD	2000	1224	61	1.21
123678-HxCDD	6.070	1.497	1.37	0.6070	13C-123678-HxCDD	2000	1344	67	1.24
123789-HxCDD	5.734	1.396	1.39	0.5734	13C-1234678-HpCDD	2000	1129	56	1.05
1234678-HpCDD	31.894	3.124	0.95	0.3189	13C-OCDD	4000	1965	49	0.87
OCDD	46.961	1.886	0.87	0.0470	13C-2378-TCDF	2000	1249	62	0.77
2378-TCDF	266.408	1.039	0.77	26.64»	13C-12378-PeCDF	2000	1300	65	1.53
12378-PeCDF	25.395	2.179	1.44	1.2698	13C-23478-PeCDF	2000	1297	65	1.52
23478-PeCDF	53.099	0.974	1.57	26.54»	13C-123478-HxCDF	2000	1197	60	0.51
123478-HxCDF	24.890	1.481	1.17	2.4890	13C-123678-HxCDF	2000	1214	61	0.51
123678-HxCDF	10.727	1.435	1.21	1.0727	13C-123789-HxCDF	2000	1158	58	0.51
123789-HxCDF	*	1.682	*	*	13C-234678-HxCDF	2000	1246	62	0.51
234678-HxCDF	16.528	1.446	1.18	1.6528	13C-1234678-HpCDF	2000	1078	54	0.44
1234678-HpCDF	24.999	0.866	0.96	0.2500	13C-1234789-HpCDF	2000	988	49	0.43
1234789-HpCDF	*	3.335	*	*					
OCDF	8.158	4.540	0.77	0.0082					
Total Tetra-Furans	865.770	2.454	0.84		CLEANUP STANDARD				
Total Tetra-Dioxins	276.622	3.103	0.75		37Cl-2378-TCDD	200	139	69	
Total Penta-Furans	495.070	3.730	1.55						
Total Penta-Dioxins	65.606	6.907	1.54						
Total Hexa-Furans	113.274	5.556	1.09						
Total Hexa-Dioxins	102.339	3.161	1.34						
Total Hepta-Furans	35.343	1.019	0.96						
Total Hepta-Dioxins	73.558	9.391	1.11						

Total TEQ 61.74»

11/29/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 17-AUG-99 Time: 22:16:40
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-03 WO-R2-212A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	9.056	5.821	0.73	9.0561	13C-2378-TCDD	2000	1009	50	0.79
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	1018	51	0.78
2378-TCDF	180.942	1.258	0.75	18.09»	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	811.076	3.956	0.78		CLEANUP STANDARD				
Total Tetra-Dioxins	476.367	1167.960	0.72		37Cl-2378-TCDD	200	130	65	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 27.15»

-131165

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 17-AUG-99 Time: 23:04:38
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-05 WO-R3-312A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	13.328	13.640	0.70	13.32»	13C-2378-TCDD	2000	384	19 ✓	0.80
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	406	20 ✓	0.80
2378-TCDF	222.024	2.940	0.74	22.20»	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	1228.479	9.243	0.85		CLEANUP STANDARD				
Total Tetra-Dioxins	859.881	2736.931	0.84		37Cl-2378-TCDD	200	136	68	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 35.53»

8/31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 07-28-99
Analysis Date: 17-AUG-99 Time: 23:52:36
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-07 WO-R4-412A
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	13.517	3.909	0.68	13.51»	13C-2378-TCDD	2000	1324	66	0.79
12378-PeCDD	*	*	*	*	13C-12378-PeCDD	2000	*	*	*
123478-HxCDD	*	*	*	*	13C-123478-HxCDD	2000	*	*	*
123678-HxCDD	*	*	*	*	13C-123678-HxCDD	2000	*	*	*
123789-HxCDD	*	*	*	*	13C-1234678-HpCDD	2000	*	*	*
1234678-HpCDD	*	*	*	*	13C-OCDD	4000	*	*	*
OCDD	*	*	*	*	13C-2378-TCDF	2000	1310	65	0.79
2378-TCDF	255.880	0.865	0.75	25.58»	13C-12378-PeCDF	2000	*	*	*
12378-PeCDF	*	*	*	*	13C-23478-PeCDF	2000	*	*	*
23478-PeCDF	*	*	*	*	13C-123478-HxCDF	2000	*	*	*
123478-HxCDF	*	*	*	*	13C-123678-HxCDF	2000	*	*	*
123678-HxCDF	*	*	*	*	13C-123789-HxCDF	2000	*	*	*
123789-HxCDF	*	*	*	*	13C-234678-HxCDF	2000	*	*	*
234678-HxCDF	*	*	*	*	13C-1234678-HpCDF	2000	*	*	*
1234678-HpCDF	*	*	*	*	13C-1234789-HpCDF	2000	*	*	*
1234789-HpCDF	*	*	*	*					
OCDF	*	*	*	*					
Total Tetra-Furans	994.114	2.721	0.69		CLEANUP STANDARD				
Total Tetra-Dioxins	275.177	784.467	0.87		37Cl-2378-TCDD	200	142	71	
Total Penta-Furans	*	*	*						
Total Penta-Dioxins	*	*	*						
Total Hexa-Furans	*	*	*						
Total Hexa-Dioxins	*	*	*						
Total Hepta-Furans	*	*	*						
Total Hepta-Dioxins	*	*	*						

Total TEQ 39.10»

F-3
D/F Blank Lab Raw Data Sheets

F-3-1
Air Sampling Train and Proof Blanks, Lab Spikes, and Spike Dups

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 15-AUG-99 Time: 19:44:50
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-10 FH-LB-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.38	*
12378-PeCDD	*	2.82	*
123478-HxCDD	*	0.95	*
123678-HxCDD	*	0.88	*
123789-HxCDD	*	0.58	*
1234678-HpCDD	*	0.79	*
OCDD	5.10	0.42	0.0051
2378-TCDF	*	0.84	*
12378-PeCDF	*	1.39	*
23478-PeCDF	*	1.16	*
123478-HxCDF	*	1.18	*
123678-HxCDF	*	1.03	*
123789-HxCDF	*	1.19	*
234678-HxCDF	*	1.14	*
1234678-HpCDF	*	0.42	*
1234789-HpCDF	*	1.87	*
OCDF	*	3.23	*
Total Tetra-Furans	*	1.71	
Total Tetra-Dioxins	*	2.39	
Total Penta-Furans	*	2.36	
Total Penta-Dioxins	*	3.21	
Total Hexa-Furans	*	2.25	
Total Hexa-Dioxins	*	1.43	
Total Hepta-Furans	*	3.43	
Total Hepta-Dioxins	*	3.59	
Total TEQ			0.0051

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1274	64
13C-12378-PeCDF	2000	1503	75
13C-123678-HxCDF	2000	1286	64
13C-1234678-HpCDF	2000	1498	75
13C-2378-TCDD	2000	1292	65
13C-12378-PeCDD	2000	1742	87
13C-123678-HxCDD	2000	1455	73
13C-1234678-HpCDD	2000	1626	81
13C-OCDD	4000	3442	86
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	203	102 - Clean up Std.
13C-123478-HxCDD	~~2000~~	*	*
13C-23478-PeCDF	~~2000~~ NA	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

M 9/8/99
M 9/8/99

8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-01-99
Ext. Date: 08-01-99
Analysis Date: 18-AUG-99 Time: 05:28:28
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-10 FH-LB-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.60	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	*	0.98	*
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	0.06	1.43	
Total Tetra-Dioxins	0.36	6.31	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.0000

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1233	62
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1277	64
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*

PRE-FIELD SURROGATES	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
37Cl-2378-TCDD	~~2000~~ 200	202	101 - clean-up std
13C-123478-HxCDD	~~2000~~ NA	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

NA 9/8/99

2/1/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-10 FH-LB-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	15-Aug-99 Time: 7:44:50 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	8.63	*
12378-PeCDD	*	17.64	*
123478-HxCDD	*	5.94	*
123678-HxCDD	*	5.51	*
123789-HxCDD	*	3.63	*
1234678-HpCDD	*	4.94	*
OCDD	31.91	2.63	0.0319
2378-TCDF	*	5.26	*
12378-PeCDF	*	8.70	*
23478-PeCDF	*	7.26	*
123478-HxCDF	*	7.38	*
123678-HxCDF	*	6.44	*
123789-HxCDF	*	7.44	*
234678-HxCDF	*	7.13	*
1234678-HpCDF	*	2.63	*
1234789-HpCDF	*	11.70	*
OCDF	*	20.21	*
Total Tetra-Furans	*	10.70	
Total Tetra-Dioxins	*	14.95	
Total Penta-Furans	*	14.76	
Total Penta-Dioxins	*	20.08	
Total Hexa-Furans	*	14.08	
Total Hexa-Dioxins	*	8.95	
Total Hepta-Furans	*	21.46	
Total Hepta-Dioxins	*	22.46	
Total TEQ			0.0319

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5096	64
13C-12378-PeCDF	8000	6012	75
13C-123678	8000	5144	64
13C-1234678-HpCDF	8000	5992	75
13C-2378-TCDD	8000	5168	65
13C-12378-PeCDD	8000	6968	87
13C-123678-HxCDD	8000	5820	73
13C-1234678-HpCDD	8000	6504	81
13C-OCDD	16000	13768	86
Cleanup Stds			
37Cl-2378-TCDD	800	812	102
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-10 FH-LB-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/01/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/01/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 5:28:28 AM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	3.75	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	*	6.13	*
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	0.38	8.95	
Total Tetra-Dioxins	2.25	39.48	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.00

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4932	62
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	5108	64
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Cleanup Stds			
37Cl-2378-TCDD	800	808	101
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 07:51:39
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-11 BH-LB-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.73	*
12378-PeCDD	*	1.61	*
123478-HxCDD	*	0.51	*
123678-HxCDD	*	0.47	*
123789-HxCDD	*	0.31	*
1234678-HpCDD	0.51 EMPC	0.41	0.0051
OCDD	3.91	0.20	0.0039
2378-TCDF	0.71	0.45	0.0714
12378-PeCDF	*	0.80	*
23478-PeCDF	*	0.67	*
123478-HxCDF	*	0.65	*
123678-HxCDF	*	0.56	*
123789-HxCDF	*	0.65	*
234678-HxCDF	*	0.63	*
1234678-HpCDF	0.54	0.21	0.0054
1234789-HpCDF	*	0.92	*
OCDF	1.22 J	1.59	0.0012
Total Tetra-Furans	0.71	0.91	
Total Tetra-Dioxins	1.98	1.26	
Total Penta-Furans	*	1.35	
Total Penta-Dioxins	*	1.83	
Total Hexa-Furans	0.48	1.24	
Total Hexa-Dioxins	*	0.77	
Total Hepta-Furans	1.36	1.69	
Total Hepta-Dioxins	3.55 EMPC	1.84	
Total TEQ			0.0870

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1227	61
13C-12378-PeCDF	2000	1392	70
13C-123678-HxCDF	2000	1102	55
13C-1234678-HpCDF	2000	1452	73
13C-2378-TCDD	2000	1238	62
13C-12378-PeCDD	2000	1567	78
13C-123678-HxCDD	2000	1277	64
13C-1234678-HpCDD	2000	1512	76
13C-OCDD	4000	3517	88

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000 ~~200~~ 1/29/1/55	2	0
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

NA (Not added)

NA 4/9/1/99

F-65

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PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-28-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 06:16:26
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-11 BH-LB-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	0.24	0.29	0.2440
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	0.82	0.46	0.0815
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	0.15	0.67	
Total Tetra-Dioxins	0.76	2.99	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.3255

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1166	58
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1227	61
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	1	1
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

NA

NOT calculated

KJ 9/8/99

9/3/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-11 BH-LB-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 7:51:39 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	4.56688	*
12378-PeCDD	*	10.07216	*
123478-HxCDD	*	3.19056	*
123678-HxCDD	*	2.94032	*
123789-HxCDD	*	1.93936	*
1234678-HpCDD	3.19056 EMPC	2.56496	0.0319
OCDD	24.46096	1.2512	0.0244
2378-TCDF	4.44176	2.8152	0.4467
12378-PeCDF	*	5.0048	*
23478-PeCDF	*	4.19152	*
123478-HxCDF	*	4.0664	*
123678-HxCDF	*	3.50336	*
123789-HxCDF	*	4.0664	*
234678-HxCDF	*	3.94128	*
1234678-HpCDF	3.37824	1.31376	0.0338
1234789-HpCDF	*	5.75552	*
OCDF	7.63232 J	9.94704	0.0075
Total Tetra-Furans	4.44176	5.69296	
Total Tetra-Dioxins	12.38688	7.88256	
Total Penta-Furans	*	8.4456	
Total Penta-Dioxins	*	11.44848	
Total Hexa-Furans	3.00288	7.75744	
Total Hexa-Dioxins	*	4.81712	
Total Hepta-Furans	8.50816	10.57264	
Total Hepta-Dioxins	22.2088 EMPC	11.51104	
Total TEQ			0.5443

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4908	61
13C-12378-PeCDF	8000	5568	70
13C-123678	8000	4408	55
13C-1234678-HpCDF	8000	5808	73
13C-2378-TCDD	8000	4952	62
13C-12378-PeCDD	8000	6268	78
13C-123678-HxCDD	8000	5108	64
13C-1234678-HpCDD	8000	6048	76
13C-OCDD	16000	14068	88
Pre-Field Surrogate			
37Cl-2378-TCDD	800	8	0
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-11 BH-LB-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/28/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 6:16:26 AM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	Ion Ratio
2378-TCDD	1.50	1.81	0.38
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	5.13	2.88	0.13
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	0.94	4.19	
Total Tetra-Dioxins	4.75	18.71	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			2.04

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4664	58
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	4908	61
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Pre-Field Surrogate Stds			
37Cl-2378-TCDD	800	4	1
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 15-AUG-99 Time: 23:03:03
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-07 FH-FB1-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.69	*
12378-PeCDD	*	3.12	*
123478-HxCDD	*	0.97	*
123678-HxCDD	*	0.91	*
123789-HxCDD	*	0.60	*
1234678-HpCDD	*	0.73	*
OCDD	3.72	0.38	0.0037
2378-TCDF	*	1.06	*
12378-PeCDF	*	1.75	*
23478-PeCDF	*	1.47	*
123478-HxCDF	*	1.25	*
123678-HxCDF	*	1.09	*
123789-HxCDF	*	1.26	*
234678-HxCDF	*	1.21	*
1234678-HpCDF	*	0.41	*
1234789-HpCDF	*	1.79	*
OCDF	*	3.09	*
Total Tetra-Furans	*	2.16	
Total Tetra-Dioxins	*	2.94	
Total Penta-Furans	*	2.97	
Total Penta-Dioxins	*	3.55	
Total Hexa-Furans	*	2.38	
Total Hexa-Dioxins	*	1.47	
Total Hepta-Furans	*	0.50	
Total Hepta-Dioxins	*	3.33	
Total TEQ			0.0037

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1070	53
13C-12378-PeCDF	2000	1297	65
13C-123678-HxCDF	2000	1141	57
13C-1234678-HpCDF	2000	1508	75
13C-2378-TCDD	2000	1096	55
13C-12378-PeCDD	2000	1610	81
13C-123678-HxCDD	2000	1371	69
13C-1234678-HpCDD	2000	1672	84
13C-OCDD	4000	3554	89

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	201	101 -clean-up std.
13C-123478-HxCDD	~~2000~~ NA	*	*
13C-23478-PeCDF	~~2000~~ NA	*	*
13C-123478-HxCDF	~~2000~~ NA	*	*
13C-1234789-HpCDF	~~2000~~ NA	*	*

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PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-07 FH-FB1-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	15-Aug-99 Time: 11:03:03 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	10.57	*
12378-PeCDD	*	19.52	*
123478-HxCDD	*	6.07	*
123678-HxCDD	*	5.69	*
123789-HxCDD	*	3.75	*
1234678-HpCDD	*	4.57	*
OCDD	23.27	2.38	0.0231
2378-TCDF	*	6.63	*
12378-PeCDF	*	10.95	*
23478-PeCDF	*	9.20	*
123478-HxCDF	*	7.82	*
123678-HxCDF	*	6.82	*
123789-HxCDF	*	7.88	*
234678-HxCDF	*	7.57	*
1234678-HpCDF	*	2.56	*
1234789-HpCDF	*	11.20	*
OCDF	*	19.33	*
Total Tetra-Furans	*	13.51	
Total Tetra-Dioxins	*	18.39	
Total Penta-Furans	*	18.58	
Total Penta-Dioxins	*	22.21	
Total Hexa-Furans	*	14.89	
Total Hexa-Dioxins	*	9.20	
Total Hepta-Furans	*	3.13	
Total Hepta-Dioxins	*	20.83	
Total TEQ			0.0231

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4280	53
13C-12378-PeCDF	8000	5188	65
13C-123678	8000	4564	57
13C-1234678-HpCDF	8000	6032	75
13C-2378-TCDD	8000	4384	55
13C-12378-PeCDD	8000	6440	81
13C-123678-HxCDD	8000	5484	69
13C-1234678-HpCDD	8000	6688	84
13C-OCDD	16000	14216	89

Cleanup Stds			
37Cl-2378-TCDD	800	804	101
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 15-AUG-99 Time: 20:50:56
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-05 FH-PB1-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.02	*
12378-PeCDD	*	1.75	*
123478-HxCDD	*	0.63	*
123678-HxCDD	*	0.59	*
123789-HxCDD	*	0.39	*
1234678-HpCDD	*	0.48	*
OCDD	3.43	0.25	0.0034
2378-TCDF	*	0.63	*
12378-PeCDF	*	1.00	*
23478-PeCDF	*	0.84	*
123478-HxCDF	*	0.80	*
123678-HxCDF	*	0.69	*
123789-HxCDF	*	0.80	*
234678-HxCDF	*	0.77	*
1234678-HpCDF	0.60	0.27	0.0060
1234789-HpCDF	*	1.21	*
OCDF	*	2.09	*
Total Tetra-Furans	2.37	1.29	
Total Tetra-Dioxins	*	1.77	
Total Penta-Furans	*	1.69	
Total Penta-Dioxins	*	1.99	
Total Hexa-Furans	*	1.52	
Total Hexa-Dioxins	*	0.95	
Total Hepta-Furans	0.60	2.22	
Total Hepta-Dioxins	0.81	2.20	
Total TEQ			0.0094

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1280	64
13C-12378-PeCDF	2000	1583	79
13C-123678-HxCDF	2000	1322	66
13C-1234678-HpCDF	2000	1673	84
13C-2378-TCDD	2000	1345	67
13C-12378-PeCDD	2000	1905	95
13C-123678-HxCDD	2000	1538	77
13C-1234678-HpCDD	2000	1841	92
13C-OCDD	4000	3944	99

PRE-FIELD SURROGATES				
37Cl-2378-TCDD	~~2000~~ 200	192	96	- Clean-up Std
13C-123478-HxCDD	~~2000~~	*	*	
13C-23478-PeCDF	~~2000~~	*	*	
13C-123478-HxCDF	~~2000~~ NA	*	*	
13C-1234789-HpCDF	~~2000~~	*	*	

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PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-05 FH-PB1-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	15-Aug-99 Time: 8:50:56 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	6.38	*
12378-PeCDD	*	10.95	*
123478-HxCDD	*	3.94	*
123678-HxCDD	*	3.69	*
123789-HxCDD	*	2.44	*
1234678-HpCDD	*	3.00	*
OCDD	21.46	1.56	0.0213
2378-TCDF	*	3.94	*
12378-PeCDF	*	6.26	*
23478-PeCDF	*	5.26	*
123478-HxCDF	*	5.00	*
123678-HxCDF	*	4.32	*
123789-HxCDF	*	5.00	*
234678-HxCDF	*	4.82	*
1234678-HpCDF	3.75	1.69	0.0375
1234789-HpCDF	*	7.57	*
OCDF	*	13.08	*
Total Tetra-Furans	14.83	8.07	
Total Tetra-Dioxins	*	11.07	
Total Penta-Furans	*	10.57	
Total Penta-Dioxins	*	12.45	
Total Hexa-Furans	*	9.51	
Total Hexa-Dioxins	*	5.94	
Total Hepta-Furans	3.75	13.89	
Total Hepta-Dioxins	5.07	13.76	
Total TEQ			0.0588

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5120	64
13C-12378-PeCDF	8000	6332	79
13C-123678	8000	5288	66
13C-1234678-HpCDF	8000	6692	84
13C-2378-TCDD	8000	5380	67
13C-12378-PeCDD	8000	7620	95
13C-123678-HxCDD	8000	6152	77
13C-1234678-HpCDD	8000	7364	92
13C-OCDD	16000	15776	99
Cleanup Stds			
37Cl-2378-TCDD	800	768	96
13C-123478HxCDD	NA	*	
13C-23478-PeCDF	NA	*	
13C-123478-HxCDF	NA	*	
13C-1234789-HpCDF	NA	*	

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 15-AUG-99 Time: 21:56:57
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-06 FH-PB2-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	2.02	*
12378-PeCDD	*	3.02	*
123478-HxCDD	*	0.85	*
123678-HxCDD	*	0.79	*
123789-HxCDD	*	0.52	*
1234678-HpCDD	*	0.65	*
OCDD	3.21	0.34	0.0032
2378-TCDF	*	1.18	*
12378-PeCDF	*	1.63	*
23478-PeCDF	*	1.36	*
123478-HxCDF	*	1.14	*
123678-HxCDF	*	0.99	*
123789-HxCDF	*	1.15	*
234678-HxCDF	*	1.11	*
1234678-HpCDF	*	0.37	*
1234789-HpCDF	*	1.62	*
OCDF	*	2.78	*
Total Tetra-Furans	*	2.40	
Total Tetra-Dioxins	*	3.50	
Total Penta-Furans	*	2.76	
Total Penta-Dioxins	*	3.43	
Total Hexa-Furans	*	2.18	
Total Hexa-Dioxins	*	1.28	
Total Hepta-Furans	*	2.96	
Total Hepta-Dioxins	*	2.97	
Total TEQ			0.0032

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	793	40
13C-12378-PeCDF	2000	1112	56
13C-123678-HxCDF	2000	1068	53
13C-1234678-HpCDF	2000	1424	71
13C-2378-TCDD	2000	797	40
13C-12378-PeCDD	2000	1363	68
13C-123678-HxCDD	2000	1288	64
13C-1234678-HpCDD	2000	1588	79
13C-OCDD	4000	3397	85
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	198	99 - clean-up std
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000 NA	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

4/9/8PA

8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-06 FH-PB2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	InstrumentID:	AutoSpec
Analysis Date:	15-Aug-99 Time: 9:56:57 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample	Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
2378-TCDD	*	12.64	*	13C-2378-TCDF	8000	3172	40
12378-PeCDD	*	18.89	*	13C-12378-PeCDF	8000	4448	56
123478-HxCDD	*	5.32	*	13C-123678	8000	4272	53
123678-HxCDD	*	4.94	*	13C-1234678-HpCDF	8000	5696	71
123789-HxCDD	*	3.25	*	13C-2378-TCDD	8000	3188	40
1234678-HpCDD	*	4.07	*	13C-12378-PeCDD	8000	5452	68
OCDD	20.08	2.13	0.023147	13C-123678-HxCDD	8000	5152	64
2378-TCDF	*	7.38	*	13C-1234678-HpCDD	8000	6352	79
12378-PeCDF	*	10.20	*	13C-OCDD	16000	13588	85
23478-PeCDF	*	8.51	*				
123478-HxCDF	*	7.13	*				
123678-HxCDF	*	6.19	*				
123789-HxCDF	*	7.19	*				
234678-HxCDF	*	6.94	*				
1234678-HpCDF	*	2.31	*				
1234789-HpCDF	*	10.13	*				
OCDF	*	17.39	*				
Total Tetra-Furans	*	15.01		Cleanup Stds			
Total Tetra-Dioxins	*	21.90					
Total Penta-Furans	*	17.27		37Cl-2378-TCDD	800	792	99
Total Penta-Dioxins	*	21.46		13C-123478HxCDD	NA	*	*
Total Hexa-Furans	*	13.64		13C-23478-PeCDF	NA	*	*
Total Hexa-Dioxins	*	8.01		13C-123478-HxCDF	NA	*	*
Total Hepta-Furans	*	18.52		13C-1234789-HpCDF	NA	*	*
Total Hepta-Dioxins	*	18.58					
Total TEQ			0.020019				

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 03:27:22
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-11-08 FH-LCS-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	148.66	1.44	148.6565
12378-PeCDD	661.86	2.11	330.9298
123478-HxCDD	617.29	0.71	61.7291
123678-HxCDD	655.28	0.66	65.5276
123789-HxCDD	682.75	0.43	68.2754
1234678-HpCDD	649.49	0.54	6.4949
OCDD	1325.11	0.28	1.3251
2378-TCDF	149.12	0.95	14.9116
12378-PeCDF	711.76	1.30	35.5881
23478-PeCDF	760.17	1.09	380.0865
123478-HxCDF	750.39	0.92	75.0387
123678-HxCDF	723.70	0.80	72.3696
123789-HxCDF	866.07	0.93	86.6071
234678-HxCDF	885.27	0.89	88.5272
1234678-HpCDF	672.78	0.30	6.7278
1234789-HpCDF	735.13	1.31	7.3513
OCDF	1640.82	2.25	1.6408
Total Tetra-Furans	149.12	0.95	
Total Tetra-Dioxins	148.66	1.44	
Total Penta-Furans	1471.94	1.32	
Total Penta-Dioxins	661.86	2.11	
Total Hexa-Furans	3225.43	0.99	
Total Hexa-Dioxins	1955.32	0.67	
Total Hepta-Furans	1407.91	0.36	
Total Hepta-Dioxins	649.49	0.54	
Total TEQ			1451.7874

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	995	50
13C-12378-PeCDF	2000	1377	69
13C-123678-HxCDF	2000	1213	61
13C-1234678-HpCDF	2000	1594	80
13C-2378-TCDD	2000	1067	53
13C-12378-PeCDD	2000	1811	91
13C-123678-HxCDD	2000	1458	73
13C-1234678-HpCDD	2000	1762	88
13C-OCDD	4000	3819	95
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	~~2000~~ 200	205	102 - Clean-up Std.
13C-123478-HxCDD	~~2000~~ NA	*	*
13C-23478-PeCDF	~~2000~~	*	*
13C-123478-HxCDF	~~2000~~	*	*
13C-1234789-HpCDF	~~2000~~	*	*

14/8/99

8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-08 FH-LCS-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 3:27:22 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	930.02	9.01	930.00
12378-PeCDD	4140.60	13.20	2070.30
123478-HxCDD	3861.77	4.44	386.18
123678-HxCDD	4099.43	4.13	409.94
123789-HxCDD	4271.28	2.69	427.13
1234678-HpCDD	4063.21	3.38	40.63
OCDD	8289.89	1.75	8.29
2378-TCDF	932.89	5.94	93.29
12378-PeCDF	4452.77	8.13	222.64
23478-PeCDF	4755.62	6.82	2377.82
123478-HxCDF	4694.44	5.76	469.44
123678-HxCDF	4527.47	5.00	452.74
123789-HxCDF	5418.13	5.82	541.81
234678-HxCDF	5538.25	5.57	553.83
1234678-HpCDF	4208.91	1.88	42.09
1234789-HpCDF	4598.97	8.20	45.99
OCDF	10264.97	14.08	10.26
Total Tetra-Furans	932.89	5.94	
Total Tetra-Dioxins	930.02	9.01	
Total Penta-Furans	9208.46	8.26	
Total Penta-Dioxins	4140.60	13.20	
Total Hexa-Furans	20178.29	6.19	
Total Hexa-Dioxins	12232.48	4.19	
Total Hepta-Furans	8807.88	2.25	
Total Hepta-Dioxins	4063.21	3.38	
Total TEQ			9082.38

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	3980	50
13C-12378-PeCDF	8000	5508	69
13C-123678	8000	4852	61
13C-1234678-HpCDF	8000	6376	80
13C-2378-TCDD	8000	4268	53
13C-12378-PeCDD	8000	7244	91
13C-123678-HxCDD	8000	5832	73
13C-1234678-HpCDD	8000	7048	88
13C-OCDD	16000	15276	95
Cleanup Stds			
37Cl-2378-TCDD	800	820	102
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 21:13:15
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: 1:5

Lab Sample ID: 48190-11-09 FH-LCSDUP-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886B
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	127.20	3.92	127.2035
12378-PeCDD	630.01	5.00	315.0026
123478-HxCDD	612.87	1.84	61.2868
123678-HxCDD	657.57	1.71	65.7568
123789-HxCDD	633.53	1.12	63.3526
1234678-HpCDD	622.93	1.42	6.2293
OCDD	1258.71	0.75	1.2587
2378-TCDF	136.06	2.84	13.6064
12378-PeCDF	687.84	2.97	34.3919
23478-PeCDF	506.88	2.49	253.4395
123478-HxCDF	752.33	2.47	75.2330
123678-HxCDF	716.46	2.15	71.6458
123789-HxCDF	902.67	2.49	90.2669
234678-HxCDF	882.98	2.40	88.2976
1234678-HpCDF	665.01	0.78	6.6501
1234789-HpCDF	818.02	3.44	8.1802
OCDF	1734.90	5.93	1.7349
Total Tetra-Furans	136.06	2.84	
Total Tetra-Dioxins	127.20	3.92	
Total Penta-Furans	1194.72	3.02	
Total Penta-Dioxins	630.01	5.00	
Total Hexa-Furans	3254.43	2.67	
Total Hexa-Dioxins	1903.96	1.74	
Total Hepta-Furans	1483.03	0.96	
Total Hepta-Dioxins	622.93	1.42	
Total TEQ			1283.5366

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1260	63
13C-12378-PeCDF	2000	1476	74
13C-123678-HxCDF	2000	1235	62
13C-1234678-HpCDF	2000	1677	84
13C-2378-TCDD	2000	1478	74
13C-12378-PeCDD	2000	1767	88
13C-123678-HxCDD	2000	1494	75
13C-1234678-HpCDD	2000	1892	95
13C-OCDD	4000	4235	106
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	165	8
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

not added.

12/28/6

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-11-09 FH-LCSDUP-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 9:13:15 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886B
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	1:5	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	795.76	24.52	795.79
12378-PeCDD	3941.34	31.28	1970.66
123478-HxCDD	3834.11	11.51	383.41
123678-HxCDD	4113.76	10.70	411.37
123789-HxCDD	3963.36	7.01	396.33
1234678-HpCDD	3897.05	8.88	38.97
OCDD	7874.49	4.69	7.87
2378-TCDF	851.19	17.77	85.12
12378-PeCDF	4303.13	18.58	215.16
23478-PeCDF	3171.04	15.58	1585.52
123478-HxCDF	4706.58	15.45	470.66
123678-HxCDF	4482.17	13.45	448.22
123789-HxCDF	5647.10	15.58	564.71
234678-HxCDF	5523.92	15.01	552.39
1234678-HpCDF	4160.30	4.88	41.60
1234789-HpCDF	5117.53	21.52	51.18
OCDF	10853.53	37.10	10.85
Total Tetra-Furans	851.19	17.77	
Total Tetra-Dioxins	795.76	24.52	
Total Penta-Furans	7474.17	18.89	
Total Penta-Dioxins	3941.34	31.28	
Total Hexa-Furans	20359.71	16.70	
Total Hexa-Dioxins	11911.17	10.89	
Total Hepta-Furans	9277.84	6.01	
Total Hepta-Dioxins	3897.05	8.88	
Total TEQ			8029.80

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5040	63
13C-12378-PeCDF	8000	5904	74
13C-123678	8000	4940	62
13C-1234678-HpCDF	8000	6708	84
13C-2378-TCDD	8000	5912	74
13C-12378-PeCDD	8000	7068	88
13C-123678-HxCDD	8000	5976	75
13C-1234678-HpCDD	8000	7568	95
13C-OCDD	16000	16940	106
Pre-Field Surrogate Stds			
37Cl-2378-TCDD	8000	660	8
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 08:57:48
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-05 BH-PB1-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.11	*
12378-PeCDD	*	2.62	*
123478-HxCDD	*	0.85	*
123678-HxCDD	*	0.79	*
123789-HxCDD	*	0.52	*
1234678-HpCDD	2.29	0.69	0.0229
OCDD	11.77	0.35	0.0118
2378-TCDF	1.06	0.73	0.1058
12378-PeCDF	*	1.30	*
23478-PeCDF	*	1.09	*
123478-HxCDF	*	1.06	*
123678-HxCDF	*	0.92	*
123789-HxCDF	*	1.06	*
234678-HxCDF	*	1.02	*
1234678-HpCDF	1.78	0.38	0.0178
1234789-HpCDF	*	1.68	*
OCDF	2.24 J	2.89	0.0022
Total Tetra-Furans	1.06 J	1.50	
Total Tetra-Dioxins	*	1.93	
Total Penta-Furans	*	2.21	
Total Penta-Dioxins	*	2.98	
Total Hexa-Furans	*	2.02	
Total Hexa-Dioxins	0.95 J	1.28	
Total Hepta-Furans	3.14	0.47	
Total Hepta-Dioxins	3.97	0.69	
Total TEQ			0.1606

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1251	63
13C-12378-PeCDF	2000	1413	71
13C-123678-HxCDF	2000	1219	61
13C-1234678-HpCDF	2000	1361	68
13C-2378-TCDD	2000	1348	67
13C-12378-PeCDD	2000	1583	79
13C-123678-HxCDD	2000	1346	67
13C-1234678-HpCDD	2000	1507	75
13C-OCDD	4000	3358	84
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2250	112
13C-123478-HxCDD	2000	2543	127
13C-23478-PeCDF	2000	2535	127
13C-123478-HxCDF	2000	2360	118
13C-1234789-HpCDF	2000	2513	126

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 07:04:26
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-05 BH-PB1-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.47	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	0.65 J	0.78	0.0651
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	2.38	1.14	
Total Tetra-Dioxins	1.32	4.98	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.0651

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1210	61
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1292	65
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2265	113
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

12/9/99 Pre-field spike

12/8/99

12/31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-05 BH-PB1-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/21/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 7:04:26 AM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	2.94	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	4.07	4.88	0.4072656
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	14.89	7.13	
Total Tetra-Dioxins	8.26	31.15	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.4072656

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4840	61
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	5168	65
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*

Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	9060	113
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 10:03:56
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-06 BH-PB2-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.07	*
12378-PeCDD	*	2.59	*
123478-HxCDD	*	0.83	*
123678-HxCDD	*	0.78	*
123789-HxCDD	*	0.51	*
1234678-HpCDD	1.09 EMPC	0.70	0.0109
OCDD	5.44 EMPC	0.35	0.0054
2378-TCDF	3.25	0.71	0.3247
12378-PeCDF	*	1.30	*
23478-PeCDF	*	1.09	*
123478-HxCDF	*	1.06	*
123678-HxCDF	*	0.93	*
123789-HxCDF	*	1.07	*
234678-HxCDF	*	1.03	*
1234678-HpCDF	0.92	0.39	0.0092
1234789-HpCDF	*	1.72	*
OCDF	1.53 J	2.97	0.0015
Total Tetra-Furans	11.82	1.45	
Total Tetra-Dioxins	6.58	1.86	
Total Penta-Furans	2.35	2.21	
Total Penta-Dioxins	0.77 J	2.94	
Total Hexa-Furans	1.02 J	2.03	
Total Hexa-Dioxins	*	1.26	
Total Hepta-Furans	2.29	0.48	
Total Hepta-Dioxins	2.37	3.18	
Total TEQ			0.3518

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1298	65
13C-12378-PeCDF	2000	1442	72
13C-123678-HxCDF	2000	1281	64
13C-1234678-HpCDF	2000	1400	70
13C-2378-TCDD	2000	1420	71
13C-12378-PeCDD	2000	1668	83
13C-123678-HxCDD	2000	1502	75
13C-1234678-HpCDD	2000	1557	78
13C-OCDD	4000	3476	87

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2208	110
13C-123478-HxCDD	2000	2259	113
13C-23478-PeCDF	2000	2500	125
13C-123478-HxCDF	2000	2310	115
13C-1234789-HpCDF	2000	2414	121

128/141

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 07-21-99
Ext. Date: 07-28-99
Analysis Date: 18-AUG-99 Time: 07:52:24
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-06 BH-PB2-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: AutoSpec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #13
Cal. Ver. Data Filename: 4807887 #12

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	0.44	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	2.28	0.74	0.2278
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	12.64	1.08	
Total Tetra-Dioxins	9.93	4.58	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			0.2278

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1216	61
13C-12378-PeCDF	2000	*	*
13C-123678-HxCDF	2000	*	*
13C-1234678-HpCDF	2000	*	*
13C-2378-TCDD	2000	1325	66
13C-12378-PeCDD	2000	*	*
13C-123678-HxCDD	2000	*	*
13C-1234678-HpCDD	2000	*	*
13C-OCDD	4000	*	*
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2232	112. ~~1110~~ 8/18/99 pre-field spike
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

8/18/99

8/31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-06 BH-PB2-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	07/21/99	Initial Calibration Date:	04/22/99
Ext. Date:	07/28/99	Instrument ID:	AutoSpec
Analysis Date:	18-Aug-99 Time: 7:52:24 AM	GC Column ID:	30m DB225
Extract Volume (uL):	20	Sample Data Filename:	4807887
Injection Volume (uL):	1	Blank Data Filename:	4807887 #13
Dilution Factor:	None	Cal. Ver. Data Filename:	4807887 #12

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	2.75	*
12378-PeCDD	*	*	*
123478-HxCDD	*	*	*
123678-HxCDD	*	*	*
123789-HxCDD	*	*	*
1234678-HpCDD	*	*	*
OCDD	*	*	*
2378-TCDF	14.26	4.63	1.43
12378-PeCDF	*	*	*
23478-PeCDF	*	*	*
123478-HxCDF	*	*	*
123678-HxCDF	*	*	*
123789-HxCDF	*	*	*
234678-HxCDF	*	*	*
1234678-HpCDF	*	*	*
1234789-HpCDF	*	*	*
OCDF	*	*	*
Total Tetra-Furans	79.08	6.76	
Total Tetra-Dioxins	62.12	28.65	
Total Penta-Furans	*	*	
Total Penta-Dioxins	*	*	
Total Hexa-Furans	*	*	
Total Hexa-Dioxins	*	*	
Total Hepta-Furans	*	*	
Total Hepta-Dioxins	*	*	
Total TEQ			1.43

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4864	61
13C-12378-PeCDF	8000	*	*
13C-123678	8000	*	*
13C-1234678-HpCDF	8000	*	*
13C-2378-TCDD	8000	5300	66
13C-12378-PeCDD	8000	*	*
13C-123678-HxCDD	8000	*	*
13C-1234678-HpCDD	8000	*	*
13C-OCDD	16000	*	*
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	8928	112
13C-123478HxCDD	NA	*	*
13C-23478-PeCDF	NA	*	*
13C-123478-HxCDF	NA	*	*
13C-1234789-HpCDF	NA	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 11:10:01
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-07 BH-FB1-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	*	1.08	*
12378-PeCDD	*	2.55	*
123478-HxCDD	*	0.88	*
123678-HxCDD	*	0.82	*
123789-HxCDD	*	0.54	*
1234678-HpCDD	1.90 EMPC	0.75	0.0190
OCDD	8.63	0.39	0.0086
2378-TCDF	0.75	0.71	0.0748
12378-PeCDF	*	1.29	*
23478-PeCDF	*	1.08	*
123478-HxCDF	*	0.99	*
123678-HxCDF	*	0.86	*
123789-HxCDF	*	1.00	*
234678-HxCDF	*	0.96	*
1234678-HpCDF	1.56	0.40	0.0156
1234789-HpCDF	*	1.76	*
OCDF	*	3.03	*
Total Tetra-Furans	0.75 J	1.44	
Total Tetra-Dioxins	*	1.88	
Total Penta-Furans	*	2.18	
Total Penta-Dioxins	*	2.90	
Total Hexa-Furans	0.87 J	1.89	
Total Hexa-Dioxins	*	1.33	
Total Hepta-Furans	3.15 J	0.49	
Total Hepta-Dioxins	1.90 J	3.39	
Total TEQ			0.1180

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1395	70
13C-12378-PeCDF	2000	1554	78
13C-123678-HxCDF	2000	1422	71
13C-1234678-HpCDF	2000	1453	73
13C-2378-TCDD	2000	1496	75
13C-12378-PeCDD	2000	1775	89
13C-123678-HxCDD	2000	1516	76
13C-1234678-HpCDD	2000	1554	78
13C-OCDD	4000	3406	85
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	2064	103
13C-123478-HxCDD	2000	2244	112
13C-23478-PeCDF	2000	2339	117
13C-123478-HxCDF	2000	2021	101
13C-1234789-HpCDF	2000	1816	91

8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-07 BH-FB1-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 11:10:01 AM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	6.76	*
12378-PeCDD	*	15.95	*
123478-HxCDD	*	5.51	*
123678-HxCDD	*	5.13	*
123789-HxCDD	*	3.38	*
1234678-HpCDD	11.89	4.69	0.12
OCDD	53.99	2.44	0.05
2378-TCDF	4.69	4.44	0.47
12378-PeCDF	*	8.07	*
23478-PeCDF	*	6.76	*
123478-HxCDF	*	6.19	*
123678-HxCDF	*	5.38	*
123789-HxCDF	*	6.26	*
234678-HxCDF	*	6.01	*
1234678-HpCDF	2.44	2.50	0.10
1234789-HpCDF	*	11.01	*
OCDF	*	18.96	*
Total Tetra-Furans	1.17	9.01	
Total Tetra-Dioxins	*	11.76	
Total Penta-Furans	*	13.64	
Total Penta-Dioxins	*	18.14	
Total Hexa-Furans	1.36	11.82	
Total Hexa-Dioxins	*	8.32	
Total Hepta-Furans	4.93	3.07	
Total Hepta-Dioxins	2.97	21.21	
Total TEQ			0.74

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5580	70
13C-12378-PeCDF	8000	6216	78
13C-123678	8000	5688	71
13C-1234678-HpCDF	8000	5812	73
13C-2378-TCDD	8000	5984	75
13C-12378-PeCDD	8000	7100	89
13C-123678-HxCDD	8000	6064	76
13C-1234678-HpCDD	8000	6216	78
13C-OCDD	16000	13624	85
Pre-Field Surrogates			
37Cl-2378-TCDD	8000	8256	103
13C-123478HxCDD	8000	8976	112
13C-23478-PeCDF	8000	9356	117
13C-123478-HxCDF	8000	8084	101
13C-1234789-HpCDF	8000	7264	91

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 13:22:18
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-09 BH-LCS-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	134.17	1.18	134.1735
12378-PeCDD	646.51	1.46	323.2569
123478-HxCDD	615.85	0.48	61.5853
123678-HxCDD	618.61	0.45	61.8612
123789-HxCDD	650.60	0.29	65.0600
1234678-HpCDD	625.52	0.36	6.2552
OCDD	1262.44	0.18	1.2624
2378-TCDF	138.04	0.79	13.8036
12378-PeCDF	666.93	0.76	33.3466
23478-PeCDF	662.49	0.64	331.2429
123478-HxCDF	728.03	0.60	72.8031
123678-HxCDF	693.85	0.52	69.3849
123789-HxCDF	831.11	0.60	83.1108
234678-HxCDF	816.63	0.58	81.6633
1234678-HpCDF	626.00	0.20	6.2600
1234789-HpCDF	734.06	0.87	7.3406
OCDF	1536.19	1.50	1.5362
Total Tetra-Furans	141.35	1.61	
Total Tetra-Dioxins	134.17	1.18	
Total Penta-Furans	1329.42	0.78	
Total Penta-Dioxins	646.51	1.46	
Total Hexa-Furans	3069.62	0.65	
Total Hexa-Dioxins	1885.07	0.46	
Total Hepta-Furans	1360.06	0.24	
Total Hepta-Dioxins	625.52	0.36	
Total TEQ			1353.9466

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1316	66
13C-12378-PeCDF	2000	1581	79
13C-123678-HxCDF	2000	1221	61
13C-1234678-HpCDF	2000	1627	81
13C-2378-TCDD	2000	1431	72
13C-12378-PeCDD	2000	1888	94
13C-123678-HxCDD	2000	1430	71
13C-1234678-HpCDD	2000	1774	89
13C-OCDD	4000	4248	106

PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	*	*
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

Not added.

18/28/15

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-09 BH-LCS-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 1:22:18 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	839.37	7.38	839.39
12378-PeCDD	4044.57	9.13	2022.30
123478-HxCDD	3852.76	3.00	385.28
123678-HxCDD	3870.02	2.82	387.00
123789-HxCDD	4070.15	1.81	407.02
1234678-HpCDD	3913.25	2.25	39.13
OCDD	7897.82	1.13	7.90
2378-TCDF	863.58	4.94	86.36
12378-PeCDF	4172.31	4.75	209.18
23478-PeCDF	4144.54	4.00	2072.26
123478-HxCDF	4554.56	3.75	455.46
123678-HxCDF	4340.73	3.25	434.07
123789-HxCDF	5199.42	3.75	519.94
234678-HxCDF	5108.84	3.63	510.89
1234678-HpCDF	3916.26	1.25	39.16
1234789-HpCDF	4592.28	5.44	45.92
OCDF	9610.40	9.38	9.61
Total Tetra-Furans	884.29	10.07	
Total Tetra-Dioxins	839.37	7.38	
Total Penta-Furans	8316.85	4.88	
Total Penta-Dioxins	4044.57	9.13	
Total Hexa-Furans	19203.54	4.07	
Total Hexa-Dioxins	11793.00	2.88	
Total Hepta-Furans	8508.54	1.50	
Total Hepta-Dioxins	3913.25	2.25	
Total TEQ			8470.29

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	5264	66
13C-12378-PeCDF	8000	6324	79
13C-123678	8000	4884	61
13C-1234678-HpCDF	8000	6508	81
13C-2378-TCDD	8000	5724	72
13C-12378-PeCDD	8000	7552	94
13C-123678-HxCDD	8000	5720	71
13C-1234678-HpCDD	8000	7096	89
13C-OCDD	16000	16992	106
Pre-Field Surrogates Stds			
37Cl-2378-TCDD	8000	*	*
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: AIR
Sample Receipt Date: 08-07-99
Ext. Date: 08-07-99
Analysis Date: 16-AUG-99 Time: 14:28:23
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-09-10 BH-LCSDUP-DIOX
Sample Wt/Vol: 1.5640 units: M3
Initial Calibration Date: 04-22-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807886A
Blank Data Filename: 4807886A #1
Cal. Ver. Data Filename: 4807886 #2

ANALYTE	CONC. FOUND pg/dscm	DETECTION LIMIT pg/dscm	TEQ
2378-TCDD	138.95	1.15	138.9537
12378-PeCDD	667.93	2.23	333.9669
123478-HxCDD	626.15	0.68	62.6146
123678-HxCDD	669.26	0.64	66.9258
123789-HxCDD	654.83	0.42	65.4828
1234678-HpCDD	654.31	0.52	6.5431
OCDD	1319.82	0.25	1.3198
2378-TCDF	144.84	0.74	14.4838
12378-PeCDF	708.62	1.15	35.4312
23478-PeCDF	723.47	0.97	361.7329
123478-HxCDF	774.36	0.87	77.4356
123678-HxCDF	726.00	0.76	72.6001
123789-HxCDF	938.61	0.87	93.8615
234678-HxCDF	855.57	0.84	85.5569
1234678-HpCDF	670.11	0.28	6.7011
1234789-HpCDF	737.40	1.24	7.3740
OCDF	1833.52	2.14	1.8335
Total Tetra-Furans	144.84	0.74	
Total Tetra-Dioxins	138.95	1.15	
Total Penta-Furans	1432.09	1.17	
Total Penta-Dioxins	667.93	2.23	
Total Hexa-Furans	3294.54	0.94	
Total Hexa-Dioxins	1950.23	0.65	
Total Hepta-Furans	1407.51	0.34	
Total Hepta-Dioxins	654.31	0.52	
Total TEQ			1432.8173

LABELED COMPOUNDS	SPIKE CONC. (pg)	CONC. FOUND (pg)	RECOVERY (%)
13C-2378-TCDF	2000	1240	62
13C-12378-PeCDF	2000	1399	70
13C-123678-HxCDF	2000	1180	59
13C-1234678-HpCDF	2000	1599	80
13C-2378-TCDD	2000	1341	67
13C-12378-PeCDD	2000	1704	85
13C-123678-HxCDD	2000	1398	70
13C-1234678-HpCDD	2000	1781	89
13C-OCDD	4000	4201	105
PRE-FIELD SURROGATES			
37Cl-2378-TCDD	2000	*	*
13C-123478-HxCDD	2000	*	*
13C-23478-PeCDF	2000	*	*
13C-123478-HxCDF	2000	*	*
13C-1234789-HpCDF	2000	*	*

Not added.

8/28/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48190-09-10 BH-LCSDUP-DIOX
Matrix:	Air	Sample Wt/Vol:	1 units:
Sample Receipt Date:	08/07/99	Initial Calibration Date:	04/22/99
Ext. Date:	08/07/99	Instrument ID:	AutoSpec
Analysis Date:	16-Aug-99 Time: 2:28:23 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807886A
Injection Volume (uL):	1	Blank Data Filename:	4807886A #1
Dilution Factor:	None	Cal. Ver. Data Filename:	4807886 #2

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	869.27	7.19	869.29
12378-PeCDD	4178.57	13.95	2089.30
123478-HxCDD	3917.19	4.25	391.72
123678-HxCDD	4186.89	4.00	418.69
123789-HxCDD	4096.62	2.63	409.66
1234678-HpCDD	4093.36	3.25	40.93
OCDD	8256.79	1.56	8.26
2378-TCDF	906.12	4.63	90.61
12378-PeCDF	4433.13	7.19	221.66
23478-PeCDF	4526.03	6.07	2263.00
123478-HxCDF	4844.40	5.44	484.44
123678-HxCDF	4541.86	4.75	454.19
123789-HxCDF	5671.94	5.44	587.20
234678-HxCDF	5352.45	5.26	535.24
1234678-HpCDF	4192.21	1.75	41.92
1234789-HpCDF	4613.17	7.76	46.13
OCDF	11470.50	13.39	11.47
Total Tetra-Furans	906.12	4.63	
Total Tetra-Dioxins	869.27	7.19	
Total Penta-Furans	8959.16	7.32	
Total Penta-Dioxins	4178.57	13.95	
Total Hexa-Furans	20610.64	5.88	
Total Hexa-Dioxins	12200.64	4.07	
Total Hepta-Furans	8805.38	2.13	
Total Hepta-Dioxins	4093.36	3.25	
Total TEQ			8963.71

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)
13C-2378-TCDF	8000	4960	62
13C-12378-PeCDF	8000	5596	70
13C-123678	8000	4720	59
13C-1234678-HpCDF	8000	6396	80
13C-2378-TCDD	8000	5364	67
13C-12378-PeCDD	8000	6816	85
13C-123678-HxCDD	8000	5592	70
13C-1234678-HpCDD	8000	7124	89
13C-OCDD	16000	16804	105

Pre-Field Surrogate Stds			
37Cl-2378-TCDD	8000	*	*
13C-123478HxCDD	8000	*	*
13C-23478-PeCDF	8000	*	*
13C-123478-HxCDF	8000	*	*
13C-1234789-HpCDF	8000	*	*

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SOLVENT
Sample Receipt Date: 07-10-99
Ext. Date: 07-10-99
Analysis Date: 13-JUL-99 Time: 21:06:24
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-51-03 METHOD BLANK
Sample Wt/Vol: 1.0000 units: ea
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807866A
Blank Data Filename: 4807866A #2
Cal. Ver. Data Filename: 4807866A #1

Concentration Units: pg/sample

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
2378-TCDD	*	1.74	*
12378-PeCDD	*	4.60	*
123478-HxCDD	*	2.35	*
123678-HxCDD	*	2.71	*
123789-HxCDD	*	3.25	*
1234678-HpCDD	*	1.88	*
OCDD	3.38	3.21	0.76
2378-TCDF	*	2.58	*
12378-PeCDF	*	1.53	*
23478-PeCDF	*	2.62	*
123478-HxCDF	*	1.80	*
123678-HxCDF	*	1.77	*
123789-HxCDF	*	1.55	*
234678-HxCDF	*	1.96	*
1234678-HpCDF	*	1.53	*
1234789-HpCDF	*	2.74	*
OCDF	*	7.56	*
Total Tetra-Furans	5.22	11.00	0.67
Total Tetra-Dioxins	0.13	4.38	0.76
Total Penta-Furans	*	3.24	*
Total Penta-Dioxins	*	47.10	*
Total Hexa-Furans	0.60	3.98	1.23
Total Hexa-Dioxins	*	3.84	*
Total Hepta-Furans	*	4.94	*
Total Hepta-Dioxins	0.64	5.68	1.16

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-2378-TCDD	2000	1681	84	0.80
13C-12378-PeCDD	2000	2121	106	1.53
13C-123478-HxCDD	2000	1592	80	1.26
13C-123678-HxCDD	2000	1600	80	1.26
13C-1234678-HpCDD	2000	1545	77	1.05
13C-OCDD	4000	2576	64	0.90
13C-2378-TCDF	2000	1769	88	0.79
13C-12378-PeCDF	2000	1920	96	1.53
13C-23478-PeCDF	2000	2291	115	1.58
13C-123478-HxCDF	2000	1741	87	0.52
13C-123678-HxCDF	2000	1671	84	0.52
13C-123789-HxCDF	2000	1545	77	0.52
13C-234678-HxCDF	2000	1807	90	0.51
13C-1234678-HpCDF	2000	1630	81	0.45
13C-1234789-HpCDF	2000	1247	62	0.44
CLEANUP STANDARD				
37Cl-2378-TCDD	200	*	*	

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48200-51-03 METHOD BLANK
Matrix:	Solvent	Sample Wt/Vol:	1 units: M3
Sample Receipt Date	07/10/99	Initial Calibration Date:	02/08/99
Ext. Date:	07/10/99	Instrument ID:	AutoSpec
Analysis Date:	13-Jul-99 Time: 9:06:24 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807866A
Injection Volume (uL):	1	Blank Data Filename:	4807866A #2
Dilution Factor:	None	Cal. Ver. Data Filename:	4807866A #1

Concentration Units: pg/sample

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	TEQ pg/sample
2378-TCDD	*	1.74	*
12378-PeCDD	*	4.60	*
123478-HxCDD	*	2.35	*
123678-HxCDD	*	2.71	*
123789-HxCDD	*	3.25	*
1234678-HpCDD	*	1.68	*
OCDD	3.38	3.21	0.76
2378-TCDF	*	2.58	*
12378-PeCDF	*	1.53	*
23478-PeCDF	*	2.62	*
123478-HxCDF	*	1.80	*
123678-HxCDF	*	1.77	*
123789-HxCDF	*	1.55	*
234678-HxCDF	*	1.96	*
1234678-HpCDF	*	1.53	*
1234789-HpCDF	*	2.74	*
OCDF	*	7.56	*
Total Tetra-Furans	5.22	11.00	0.67
Total Tetra-Dioxins	0.13	4.38	0.76
Total Penta-Furans	*	3.24	*
Total Penta-Dioxins	*	47.10	*
Total Hexa-Furans	0.60	3.98	1.23
Total Hexa-Dioxins	*	3.84	*
Total Hepta-Furans	*	4.94	*
Total Hepta-Dioxins	0.64	5.68	1.16

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)	Ion Ratio
13C-2378-TCDD	8000	6724	84	0.80
13C-12378-PeCDD	8000	8484	106	1.53
13C-123478-HxCDD	8000	6368	80	1.26
13C-123678-HxCDD	8000	6400	80	1.26
13C-1234678-HpCDD	8000	6180	77	1.05
13C-OCDD	16000	10304	64	0.90
13C-2378-TCDF	8000	7076	88	0.79
13C-12378-PeCDF	8000	7680	96	1.53
13C-23478-PeCDF	8000	9164	115	1.58
13C-123478-HxCDF	8000	6964	87	0.52
13C-123678-HxCDF	8000	6684	84	0.52
13C-123789-HxCDF	8000	6180	77	0.52
13C-234678-HxCDF	8000	7228	90	0.51
13C-1234678-HpCDF	8000	6520	81	0.45
13C-1234789-HpCDF	8000	4988	62	0.44
Cleanup Stds				
37Cl-2378-TCDD	800	*	*	

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SOLVENT
Sample Receipt Date: 07-10-99
Ext. Date: 07-10-99
Analysis Date: 13-JUL-99 Time: 22:12:38
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-51-02 XAD BKGD
Sample Wt/Vol: 1.0000 units: ea
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807866A
Blank Data Filename: 4807866A #2
Cal. Ver. Data Filename: 4807866A #1

Concentration Units: pg/sample

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO
2378-TCDD	*	2.46	*
12378-PeCDD	*	7.80	*
123478-HxCDD	*	2.93	*
123678-HxCDD	*	3.30	*
123789-HxCDD	*	4.01	*
1234678-HpCDD	1.42	1.91	1.19
OCDD	3.09	3.66	0.88
2378-TCDF	*	3.49	*
12378-PeCDF	*	2.08	*
23478-PeCDF	*	3.61	*
123478-HxCDF	*	2.25	*
123678-HxCDF	*	2.20	*
123789-HxCDF	*	1.79	*
234678-HxCDF	*	2.43	*
1234678-HpCDF	*	1.77	*
1234789-HpCDF	*	3.05	*
OCDF	*	8.62	*
Total Tetra-Furans	0.95	14.87	0.73
Total Tetra-Dioxins	0.31	6.20	0.80
Total Penta-Furans	0.24	4.46	1.56
Total Penta-Dioxins	*	79.92	*
Total Hexa-Furans	0.17	4.87	1.14
Total Hexa-Dioxins	*	4.73	*
Total Hepta-Furans	0.49	5.60	0.98
Total Hepta-Dioxins	1.52	4.98	1.19

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-2378-TCDD	2000	1729	86	0.80
13C-12378-PeCDD	2000	2023	101	1.56
13C-123478-HxCDD	2000	1657	83	1.24
13C-123678-HxCDD	2000	1626	81	1.26
13C-1234678-HpCDD	2000	1717	86	1.06
13C-OCDD	4000	2988	75	0.90
13C-2378-TCDF	2000	1820	91	0.80
13C-12378-PeCDF	2000	2081	104	1.56
13C-23478-PeCDF	2000	2298	115	1.59
13C-123478-HxCDF	2000	1767	88	0.52
13C-123678-HxCDF	2000	1734	87	0.53
13C-123789-HxCDF	2000	1707	85	0.51
13C-234678-HxCDF	2000	1864	93	0.52
13C-1234678-HpCDF	2000	1826	91	0.45
13C-1234789-HpCDF	2000	1400	70	0.44
CLEANUP STANDARD				
37Cl-2378-TCDD	200	*	*	

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name:	Battelle	Lab Sample ID:	48200-51-02 XAD BKGD
Matrix:	Solvent	Sample Wt/Vol:	1 units: M3
Sample Receipt Date	07/10/99	Initial Calibration Date:	02/08/99
Ext. Date:	07/10/99	Instrument ID:	AutoSpec
Analysis Date:	13-Jul-99 Time: 10:12:38 PM	GC Column ID:	60m DB5
Extract Volume (uL):	20	Sample Data Filename:	4807866A
Injection Volume (uL):	1	Blank Data Filename:	4807866A #2
Dilution Factor:	None	Cal. Ver. Data Filename:	4807866A #1

Concentration Units: pg/sample

Analyte	Conc. Found pg/sample	Detection Limit pg/sample	Ion Ratio
2378-TCDD	*	2.46	*
12378-PeCDD	*	7.8	*
123478-HxCDD	*	2.93	*
123678-HxCDD	*	3.3	*
123789-HxCDD	*	4.01	*
1234678-HpCDD	1.42	1.91	1.19
OCDD	3.09	3.66	0.88
2378-TCDF	*	3.49	*
12378-PeCDF	*	2.08	*
23478-PeCDF	*	3.61	*
123478-HxCDF	*	2.25	*
123678-HxCDF	*	2.2	*
123789-HxCDF	*	1.79	*
234678-HxCDF	*	2.43	*
1234678-HpCDF	*	1.77	*
1234789-HpCDF	*	3.05	*
OCDF	*	8.62	*
Total Tetra-Furans	0.95	14.87	0.73
Total Tetra-Dioxins	0.31	6.2	0.8
Total Penta-Furans	0.24	4.46	1.56
Total Penta-Dioxins	*	79.92	*
Total Hexa-Furans	0.17	4.87	1.14
Total Hexa-Dioxins	*	4.73	*
Total Hepta-Furans	0.49	5.6	0.98
Total Hepta-Dioxins	1.52	4.98	1.19

Labeled Compounds	Spike Conc. (pg)	Conc. Found (pg)	Recovery (%)	Ion Ratio
13C-2378-TCDD	8000	6916	86	0.8
13C-12378-PeCDD	8000	8092	101	1.56
13C-123478-HxCDD	8000	6628	83	1.24
13C-123678-HxCDD	8000	6504	81	1.26
13C-1234678-HpCDD	8000	6868	86	1.06
13C-OCDD	16000	11952	75	0.9
13C-2378-TCDF	8000	7280	91	0.8
13C-12378-PeCDF	8000	8324	104	1.56
13C-23478-PeCDF	8000	9192	115	1.59
13C-123478-HxCDF	8000	7068	88	0.52
13C-123678-HxCDF	8000	6936	87	0.53
13C-123789-HxCDF	8000	6828	85	0.51
13C-234678-HxCDF	8000	7456	93	0.52
13C-1234678-HpCDF	8000	7304	91	0.45
13C-1234789-HpCDF	8000	5600	70	0.44
Pre-Field Surrogate Stds				
37Cl-2378-TCDD	800	*	*	

F-3-2
Sewage Sludge Blank Fractions

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER SLUDGE
Sample Receipt Date: 07-29-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 04:25:44
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-14 LAB BLANK
Sample Wt/Vol: 0.2409 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	10.616	*	*	13C-2378-TCDD	2000	1175	59	0.78
12378-PeCDD	*	28.439	*	*	13C-12378-PeCDD	2000	1468	73	1.54
123478-HxCDD	*	8.501	*	*	13C-123478-HxCDD	2000	1365	68	1.33
123678-HxCDD	*	9.258	*	*	13C-123678-HxCDD	2000	1460	73	1.18
123789-HxCDD	*	8.756	*	*	13C-1234678-HpCDD	2000	1249	62	1.02
1234678-HpCDD	*	19.476	*	*	13C-OCDD	4000	2245	56	0.88
OCDD	32.240	11.279	0.88	0.0322	13C-2378-TCDF	2000	1222	61	0.75
2378-TCDF	*	7.705	*	*	13C-12378-PeCDF	2000	1367	68	1.55
12378-PeCDF	*	14.407	*	*	13C-23478-PeCDF	2000	1487	74	1.55
23478-PeCDF	*	5.954	*	*	13C-123478-HxCDF	2000	1290	65	0.51
123478-HxCDF	*	9.564	*	*	13C-123678-HxCDF	2000	1357	68	0.51
123678-HxCDF	*	9.135	*	*	13C-123789-HxCDF	2000	1252	63	0.51
123789-HxCDF	*	10.872	*	*	13C-234678-HxCDF	2000	1402	70	0.51
234678-HxCDF	*	9.017	*	*	13C-1234678-HpCDF	2000	1211	61	0.44
1234678-HpCDF	*	5.375	*	*	13C-1234789-HpCDF	2000	1083	54	0.43
1234789-HpCDF	*	20.516	*	*					
OCDF	*	27.157	*	*					
Total Tetra-Furans	*	18.188	*		CLEANUP STANDARD				
Total Tetra-Dioxins	*	24.148	*		37Cl-2378-TCDD	200	94	47	
Total Penta-Furans	*	23.730	*						
Total Penta-Dioxins	*	47.668	*						
Total Hexa-Furans	8.688	35.396	*						
Total Hexa-Dioxins	*	19.836	*						
Total Hepta-Furans	*	45.825	*						
Total Hepta-Dioxins	19.133	58.540	0.97						

Total TEQ 0.0322

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: SLUDGE
Sample Receipt Date: 08-08-99
Ext. Date: 08-08-99
Analysis Date: 17-AUG-99 Time: 21:28:38
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-14 LAB BLANK
Sample Wt/Vol: 0.2409 units: g
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 30mDB225
Sample Data Filename: 4807887
Blank Data Filename: 4807887 #3
Cal. Ver. Data Filename: 4807887 #2

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ
2378-TCDD	*	26.267	*	*
12378-PeCDD	*	*	*	*
123478-HxCDD	*	*	*	*
123678-HxCDD	*	*	*	*
123789-HxCDD	*	*	*	*
1234678-HpCDD	*	*	*	*
OCDD	*	*	*	*
2378-TCDF	*	5.106	*	*
12378-PeCDF	*	*	*	*
23478-PeCDF	*	*	*	*
123478-HxCDF	*	*	*	*
123678-HxCDF	*	*	*	*
123789-HxCDF	*	*	*	*
234678-HxCDF	*	*	*	*
1234678-HpCDF	*	*	*	*
1234789-HpCDF	*	*	*	*
OCDF	*	*	*	*
Total Tetra-Furans	4.437	16.051	0.67	
Total Tetra-Dioxins	*	5270.759	*	
Total Penta-Furans	*	*	*	
Total Penta-Dioxins	*	*	*	
Total Hexa-Furans	*	*	*	
Total Hexa-Dioxins	*	*	*	
Total Hepta-Furans	*	*	*	
Total Hepta-Dioxins	*	*	*	
Total TEQ				0.0000

LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
13C-2378-TCDD	2000	1171	59	0.77
13C-12378-PeCDD	2000	*	*	*
13C-123478-HxCDD	2000	*	*	*
13C-123678-HxCDD	2000	*	*	*
13C-1234678-HpCDD	2000	*	*	*
13C-OCDD	4000	*	*	*
13C-2378-TCDF	2000	1342	67	0.80
13C-12378-PeCDF	2000	*	*	*
13C-23478-PeCDF	2000	*	*	*
13C-123478-HxCDF	2000	*	*	*
13C-123678-HxCDF	2000	*	*	*
13C-123789-HxCDF	2000	*	*	*
13C-234678-HxCDF	2000	*	*	*
13C-1234678-HpCDF	2000	*	*	*
13C-1234789-HpCDF	2000	*	*	*
CLEANUP STANDARD				
37Cl-2378-TCDD	200	99	50	

8/31/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 08:50:01
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-05 S-R4-413A MS
Sample Wt/Vol: 0.2326 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	897.929	5.695	0.74	897.9»	13C-2378-TCDD	2000	1571	79	0.79
12378-PeCDD	4217.885	17.566	1.55	2108.»	13C-12378-PeCDD	2000	1681	84	1.51
123478-HxCDD	3472.676	5.573	1.22	347.2»	13C-123478-HxCDD	2000	1492	75	1.23
123678-HxCDD	4216.993	6.246	1.26	421.6»	13C-123678-HxCDD	2000	1465	73	1.23
123789-HxCDD	4217.715	5.838	1.26	421.7»	13C-1234678-HpCDD	2000	1421	71	1.02
1234678-HpCDD	4460.865	11.954	1.03	44.60»	13C-OCDD	4000	2763	69	0.88
OCDD	10665.425	6.513	0.86	10.66»	13C-2378-TCDF	2000	1391	70	0.78
2378-TCDF	827.726	4.857	0.75	82.77»	13C-12378-PeCDF	2000	1592	80	1.56
12378-PeCDF	4323.959	8.758	1.57	216.1»	13C-23478-PeCDF	2000	1536	77	1.54
23478-PeCDF	4105.178	4.069	1.55	2052.»	13C-123478-HxCDF	2000	1392	70	0.51
123478-HxCDF	4207.435	6.251	1.23	420.7»	13C-123678-HxCDF	2000	1428	71	0.51
123678-HxCDF	4162.805	6.016	1.24	416.2»	13C-123789-HxCDF	2000	1366	68	0.50
123789-HxCDF	4024.493	6.778	1.23	402.4»	13C-234678-HxCDF	2000	1410	71	0.51
234678-HxCDF	4423.698	6.062	1.22	442.3»	13C-1234678-HpCDF	2000	1309	65	0.44
1234678-HpCDF	4431.840	3.442	1.04	44.31»	13C-1234789-HpCDF	2000	1209	60	0.43
1234789-HpCDF	4231.286	12.863	1.02	42.31»					
OCDF	7537.168	15.683	0.88	7.5372					
Total Tetra-Furans	864.700	11.465	0.72		CLEANUP STANDARD				
Total Tetra-Dioxins	967.392	5.695	0.74		37Cl-2378-TCDD	200	132	66	
Total Penta-Furans	8429.137	8.688	1.57						
Total Penta-Dioxins	4217.885	17.566	1.55						
Total Hexa-Furans	16818.432	6.590	1.23						
Total Hexa-Dioxins	11907.384	5.788	1.22						
Total Hepta-Furans	8765.309	3.992	1.04						
Total Hepta-Dioxins	4670.553	35.930	1.03						

Total TEQ 8380.»

130/55

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-23-99
Ext. Date: 08-08-99
Analysis Date: 15-AUG-99 Time: 09:56:03
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48190-15-06 SR4413A MSD
Sample Wt/Vol: 0.2323 units: L
Initial Calibration Date: 02-08-99
Instrument ID: AutoSpec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/g dry

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	922.180	5.556	0.76	922.1»	13C-2378-TCDD	2000	1610	80	0.79
12378-PeCDD	4265.763	16.618	1.59	2132.»	13C-12378-PeCDD	2000	1741	87	1.55
123478-HxCDD	3756.664	5.338	1.23	375.6»	13C-123478-HxCDD	2000	1526	76	1.23
123678-HxCDD	4045.160	5.998	1.23	404.5»	13C-123678-HxCDD	2000	1619	81	1.24
123789-HxCDD	4003.540	5.590	1.24	400.3»	13C-1234678-HpCDD	2000	1448	72	1.03
1234678-HpCDD	4453.906	12.045	1.03	44.53»	13C-OCDD	4000	2846	71	0.87
OCDD	10804.678	6.578	0.88	10.80»	13C-2378-TCDF	2000	1497	75	0.76
2378-TCDF	862.242	4.481	0.78	86.22»	13C-12378-PeCDF	2000	1631	82	1.53
12378-PeCDF	4321.081	8.588	1.56	216.0»	13C-23478-PeCDF	2000	1628	81	1.54
23478-PeCDF	4138.867	3.818	1.52	2069.»	13C-123478-HxCDF	2000	1440	72	0.50
123478-HxCDF	4256.619	6.085	1.23	425.6»	13C-123678-HxCDF	2000	1464	73	0.50
123678-HxCDF	4211.970	5.754	1.22	421.1»	13C-123789-HxCDF	2000	1364	68	0.50
123789-HxCDF	4073.521	6.979	1.22	407.3»	13C-234678-HxCDF	2000	1511	76	0.51
234678-HxCDF	4407.371	5.841	1.22	440.7»	13C-1234678-HpCDF	2000	1369	68	0.44
1234678-HpCDF	4441.289	3.303	1.03	44.41»	13C-1234789-HpCDF	2000	1234	62	0.44
1234789-HpCDF	4306.817	12.885	1.04	43.06»					
OCDF	7568.202	15.839	0.90	7.5682					
Total Tetra-Furans	883.971	10.578	0.67		CLEANUP STANDARD				
Total Tetra-Dioxins	984.523	12.639	0.81		37Cl-2378-TCDD	200	141	70	
Total Penta-Furans	8459.949	8.340	1.56						
Total Penta-Dioxins	4265.763	16.618	1.59						
Total Hexa-Furans	16949.481	6.443	1.23						
Total Hexa-Dioxins	11805.364	5.542	1.23						
Total Hepta-Furans	8853.513	3.906	1.03						
Total Hepta-Dioxins	4664.607	36.204	1.00						
Total TEQ				8452.»					

09/30/99

F-3-3
Scrubber Water Fractions

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-29-99
Ext. Date: 07-29-99
Analysis Date: 14-AUG-99 Time: 17:25:11
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-28 LAB BLANK
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	*	1.522	*	*	13C-2378-TCDD	2000	1063	53	0.79
12378-PeCDD	*	3.959	*	*	13C-12378-PeCDD	2000	1363	68	1.56
123478-HxCDD	*	1.115	*	*	13C-123478-HxCDD	2000	1282	64	1.22
123678-HxCDD	*	1.216	*	*	13C-123678-HxCDD	2000	1385	69	1.24
123789-HxCDD	*	1.149	*	*	13C-1234678-HpCDD	2000	1390	70	1.03
1234678-HpCDD	*	2.083	*	*	13C-OCDD	4000	2772	69	0.88
OCDD	5.304	1.106	0.83	0.0053	13C-2378-TCDF	2000	1144	57	0.78
2378-TCDF	*	1.093	*	*	13C-12378-PeCDF	2000	1259	63	1.54
12378-PeCDF	*	2.057	*	*	13C-23478-PeCDF	2000	1393	70	1.56
23478-PeCDF	*	0.828	*	*	13C-123478-HxCDF	2000	1222	61	0.52
123478-HxCDF	*	1.226	*	*	13C-123678-HxCDF	2000	1228	61	0.52
123678-HxCDF	*	1.214	*	*	13C-123789-HxCDF	2000	1342	67	0.52
123789-HxCDF	*	1.252	*	*	13C-234678-HxCDF	2000	1318	66	0.52
234678-HxCDF	*	1.159	*	*	13C-1234678-HpCDF	2000	1263	63	0.44
1234678-HpCDF	*	0.620	*	*	13C-1234789-HpCDF	2000	1291	65	0.44
1234789-HpCDF	*	2.121	*	*					
OCDF	*	2.664	*	*					
Total Tetra-Furans	*	2.580	*		CLEANUP STANDARD				
Total Tetra-Dioxins	*	3.463	*		37Cl-2378-TCDD	200	117	59	
Total Penta-Furans	*	3.345	*						
Total Penta-Dioxins	*	6.635	*						
Total Hexa-Furans	*	4.497	*						
Total Hexa-Dioxins	*	2.602	*						
Total Hepta-Furans	*	5.052	*						
Total Hepta-Dioxins	*	6.262	*						
Total TEQ				0.0053					

8/29/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-29-99
Ext. Date: 07-29-99
Analysis Date: 15-AUG-99 Time: 01:07:28
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-08 LCS
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	222.918	1.575	0.76	222.9»	13C-2378-TCDD	2000	1188	59	0.80
12378-PeCDD	1046.610	3.506	1.58	523.3»	13C-12378-PeCDD	2000	1481	74	1.55
123478-HxCDD	963.987	1.153	1.24	96.39»	13C-123478-HxCDD	2000	1360	68	1.22
123678-HxCDD	1015.200	1.253	1.25	101.5»	13C-123678-HxCDD	2000	1442	72	1.22
123789-HxCDD	984.797	1.187	1.23	98.47»	13C-1234678-HpCDD	2000	1363	68	1.03
1234678-HpCDD	1018.390	2.319	1.06	10.18»	13C-OCDD	4000	2556	64	0.88
OCDD	2027.844	1.288	0.87	2.0278	13C-2378-TCDF	2000	1269	63	0.75
2378-TCDF	206.749	1.154	0.74	20.67»	13C-12378-PeCDF	2000	1342	67	1.53
12378-PeCDF	1093.386	1.981	1.56	54.66»	13C-23478-PeCDF	2000	932	47	1.58
23478-PeCDF	1093.502	1.377	1.56	546.7»	13C-123478-HxCDF	2000	1309	65	0.52
123478-HxCDF	1043.670	1.219	1.23	104.3»	13C-123678-HxCDF	2000	1280	64	0.52
123678-HxCDF	1052.468	1.219	1.25	105.2»	13C-123789-HxCDF	2000	1374	69	0.51
123789-HxCDF	1020.109	1.271	1.25	102.0»	13C-234678-HxCDF	2000	1416	71	0.52
234678-HxCDF	1108.978	1.161	1.22	110.8»	13C-1234678-HpCDF	2000	1258	63	0.44
1234678-HpCDF	1075.949	0.659	1.03	10.75»	13C-1234789-HpCDF	2000	1262	63	0.44
1234789-HpCDF	1063.871	2.443	1.02	10.63»					
OCDF	1944.671	3.101	0.89	1.9447					
Total Tetra-Furans	210.389	2.724	0.85		CLEANUP STANDARD				
Total Tetra-Dioxins	222.918	1.575	0.76		37Cl-2378-TCDD	200	127	64	
Total Penta-Furans	2186.889	2.351	1.56						
Total Penta-Dioxins	1046.610	3.506	1.58						
Total Hexa-Furans	4225.226	1.284	1.23						
Total Hexa-Dioxins	2963.954	1.176	1.24						
Total Hepta-Furans	2139.820	0.766	1.03						
Total Hepta-Dioxins	1018.390	2.319	1.06						

Total TEQ 2122.»

F-102

.29/99

PCDD/PCDF ANALYSIS DATA SHEET

Lab Name: BATTELLE
Matrix: WATER
Sample Receipt Date: 07-29-99
Ext. Date: 07-29-99
Analysis Date: 15-AUG-99 Time: 02:13:34
Extract Volume (uL): 20
Injection Volume (uL): 1
Dilution Factor: NONE

Lab Sample ID: 48200-57-09 LCS DUP
Sample Wt/Vol: 1.0000 units: L
Initial Calibration Date: 02-08-99
Instrument ID: Autospec
GC Column ID: 60m DB5
Sample Data Filename: 4807885A
Blank Data Filename: 4807885A #1
Cal. Ver. Data Filename: 4807885 #1

Concentration Units: pg/L

Concentration Units (pg)

ANALYTE	CONC. FOUND	DETECTION LIMIT	ION RATIO	TEQ	LABELED COMPOUNDS	SPIKE CONC.	CONC. FOUND	R(%)	ION RATIO
2378-TCDD	210.478	1.761	0.75	210.4»	13C-2378-TCDD	2000	1090	54	0.80
12378-PeCDD	1032.118	4.573	1.55	516.0»	13C-12378-PeCDD	2000	1364	68	1.51
123478-HxCDD	889.180	1.247	1.21	88.91»	13C-123478-HxCDD	2000	1332	67	1.31
123678-HxCDD	996.409	1.379	1.24	99.64»	13C-123678-HxCDD	2000	1383	69	1.19
123789-HxCDD	973.892	1.296	1.23	97.38»	13C-1234678-HpCDD	2000	1310	66	1.02
1234678-HpCDD	981.497	2.589	1.05	9.8150	13C-OCDD	4000	2173	54	0.88
OCDD	1931.914	1.656	0.87	1.9319	13C-2378-TCDF	2000	1173	59	0.76
2378-TCDF	197.060	1.225	0.76	19.70»	13C-12378-PeCDF	2000	1264	63	1.55
12378-PeCDF	1061.499	2.346	1.58	53.07»	13C-23478-PeCDF	2000	1429	71	1.53
23478-PeCDF	1014.366	0.922	1.53	507.1»	13C-123478-HxCDF	2000	1267	63	0.51
123478-HxCDF	1014.343	1.406	1.24	101.4»	13C-123678-HxCDF	2000	1278	64	0.51
123678-HxCDF	1029.222	1.351	1.23	102.9»	13C-123789-HxCDF	2000	1262	63	0.51
123789-HxCDF	960.692	1.501	1.24	96.06»	13C-234678-HxCDF	2000	1374	69	0.51
234678-HxCDF	1055.456	1.270	1.22	105.5»	13C-1234678-HpCDF	2000	1239	62	0.45
1234678-HpCDF	1039.521	0.750	1.03	10.39»	13C-1234789-HpCDF	2000	1050	53	0.44
1234789-HpCDF	1013.004	3.028	1.05	10.13»					
OCDF	1083.742	3.987	0.90	1.0837					
Total Tetra-Furans	197.060	1.225	0.76		CLEANUP STANDARD				
Total Tetra-Dioxins	210.478	1.761	0.75		37Cl-2378-TCDD	200	125	62	
Total Penta-Furans	2075.865	2.143	1.58						
Total Penta-Dioxins	1032.118	4.573	1.55						
Total Hexa-Furans	4059.713	1.451	1.24						
Total Hexa-Dioxins	2859.481	1.285	1.21						
Total Hepta-Furans	2052.524	0.897	1.03						
Total Hepta-Dioxins	981.497	2.589	1.05						

Total TEQ 2031.»

28/29/99

WA2-01 Front Half Airs
pg/dscm

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/dscm)	48190-11-10 Lab Blank Conc. (pg/dscm)	48190-11-08 LCS Conc. Found (pg/dscm)	Recovery (%)		LCS Dup Spike Conc. (pg/dscm)	46190-11-10 Field Blank Conc. (pg/dscm)	48190-11-09 LCS Dup. Conc. Found (pg/dscm)	Recovery (%)		Recovery RPD (%)	
2378-TCDD	128	0.00	148.66	116		128	0.00	127.20	99		15.6	
12378-PeCDD	639	0.00	661.86	104		639	0.00	630.01	99		4.9	
123478-HxCDD	639	0.00	617.29	97		639	0.00	612.87	96		0.7	
123678-HxCDD	639	0.00	655.38	103		639	0.00	657.57	103		0.3	
123789-HxCDD	639	0.00	682.75	107		639	0.00	633.53	99		7.5	
1234678-HpCDD	639	0.00	649.49	102		639	0.00	622.93	97		4.2	
OCDD	1279	5.10	1325.11	103		1279	5.10	1258.71	98		5.2	
2378-TCDF	128	0.00	149.12	117		128	0.00	136.06	106		9.2	
12378-PeCDF	639	0.00	711.76	111		639	0.00	687.84	108		3.4	
23478-PeCDF	639	0.00	760.17	119		639	0.00	506.88	79		40.0	&
123478-HxCDF	639	0.00	750.39	117		639	0.00	753.33	118		0.4	
123678-HxCDF	639	0.00	723.7	113		639	0.00	716.46	112		1.0	
123789-HxCDF	639	0.00	866.07	135		639	0.00	902.67	141	&	4.1	
234678-HxCDF	639	0.00	885.27	138	&	639	0.00	862.98	138	&	0.3	
1234678-HpCDF	639	0.00	672.78	105		639	0.00	665.01	104		1.2	
1234789-HpCDF	639	0.00	735.13	115		639	0.00	818.02	128		10.7	
OCDF	1279	0.00	1640.82	128		1279	0.00	1734.90	136	&	5.6	

Recovery is calculated as((conc. found-background conc.)/spike conc.)*100
& = outside QC range.

WA2-01 Back Half Airs
pg/dscm

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/dscm)	48190-09-11 Lab Blank Conc. (pg/dscm)	48190-09-09 LCS Conc. Found (pg/dscm)	Recovery (%)	LCS Dup Spike Conc. (pg/dscm)	48190-09-11 Field Blank Conc. (pg/dscm)	48190-09-10 LCS Dup. Conc. Found (pg/dscm)	Recovery (%)		Recovery RPD (%)
2378-TCDD	128	0	134.17	105	128	0	138.95	109		4
12378-PeCDD	639	0	646.51	101	639	0	667.93	104		3
123478-HxCDD	639	0	615.85	96	639	0	626.15	98		2
123678-HxCDD	639	0	618.61	97	639	0	669.26	105		8
123789-HxCDD	639	0	650.6	102	639	0	654.83	102		1
1234678-HpCDD	639	0	625.52	98	639	0	654.31	102		4
OCDD	1279	0.51	1262.44	99	1279	0.51	1319.82	103		4
2378-TCDF	128	3.91	138.04	105	128	3.91	144.84	110		5
12378-PeCDF	639	0.71	666.93	104	639	0.71	708.62	111		6
23478-PeCDF	639	0	662.49	104	639	0	723.47	113		9
123478-HxCDF	639	0	728.03	114	639	0	774.36	121		6
123678-HxCDF	639	0	693.85	109	639	0	726.00	114		5
123789-HxCDF	639	0	831.11	130	639	0	938.61	147	&	12
234678-HxCDF	639	0	816.63	128	639	0	855.57	134		5
1234678-HpCDF	639	0.54	626	98	639	0.54	670.11	105		7
1234789-HpCDF	639	0	734.06	115	639	0	737.40	115		0
OCDF	1279	1.22	1536.19	120	1279	1.22	1833.52	143	&	18

Recovery is calculated as((conc. found-background conc.)/spike conc.)*100
& = outside QC range.

WA1-05 Waters
pg/L

LCS/LCS Duplicate Results

ANALYTE	LCS Spike Conc. (pg/L)	48200-57-28 Lab Blank Conc. (pg/L)	48200-57-08 LCS Conc. Found (pg/L)	Recovery (%)	LCS Dup Spike Conc. (pg/L)	48200-57-28 Lab Blank Conc. (pg/L)	48200-57-09 LCS Dup. Conc. Found (pg/L)	Recovery (%)	Recovery RPD (%)	
2378-TCDD	200	0.00	222.92	111	200	0.00	210.48	105	8	
12378-PeCDD	1000	0.00	1046.61	105	1000	0.00	1032.12	103	1	
123478-HxCDD	1000	0.00	963.96	96	1000	0.00	889.18	89	8	
123678-HxCDD	1000	0.00	1018.20	102	1000	0.00	996.41	100	2	
123789-HxCDD	1000	0.00	984.80	98	1000	0.00	973.89	97	1	
1234678-HpCDD	1000	0.00	1018.39	102	1000	0.00	981.50	98	4	
OCDD	2000	0.00	2027.84	101	2000	0.00	1931.91	97	5	
2378-TCDF	200	5.30	206.75	101	200	5.30	197.06	96	5	
12378-PeCDF	1000	0.00	1093.39	109	1000	0.00	1061.50	106	3	
23478-PeCDF	1000	0.00	1093.50	109	1000	0.00	1014.37	101	8	
123478-HxCDF	1000	0.00	1043.67	104	1000	0.00	1014.34	101	3	
123678-HxCDF	1000	0.00	1052.47	105	1000	0.00	1029.22	103	2	
123789-HxCDF	1000	0.00	1020.11	102	1000	0.00	960.69	96	6	
234678-HxCDF	1000	0.00	1108.98	111	1000	0.00	1055.46	106	5	
1234678-HpCDF	1000	0.00	1075.95	108	1000	0.00	1039.52	104	3	
1234789-HpCDF	1000	0.00	1063.87	106	1000	0.00	1013.00	101	5	
OCDF	2000	0.00	1944.67	97	2000	0.00	1083.74	54	57	&

Recovery is calculated as((conc. found-background conc.)/spike conc.)*100
& = outside QC range.

WA1-05 Sludge
pg/g dry

MS/MS Duplicate Results
S-R4-413B

ANALYTE	MS Spike Conc. (pg/g dry)	48190-15-04 Background Conc. (pg/g dry)	48190-15-05 MS Conc. Found (pg/g dry)	Recovery (%)	MS Dup Spike Conc. (pg/g dry)	48190-15-04 Background Conc. (pg/g dry)	48190-15-06 MS Dup. Conc. Found (pg/g dry)	Recovery (%)	Recovery RPD (%)
2378-TCDD #	1403.51	5.14	897.93	64	1402.52	5.14	922.18	65	3
12378-PeCDD	7017.54	0.00	4217.89	60	7012.62	0.00	4265.76	61	1
123478-HxCDD	7017.54	6.24	3472.68	49	7012.62	8.24	3758.66	53	8
123678-HxCDD	7017.54	30.72	4218.99	60	7012.62	30.72	4045.16	57	4
123789-HxCDD	7017.54	39.95	4217.72	60	7012.62	39.95	4003.54	57	5
1234678-HpCDD	7017.54	383.54	4460.87	58	7012.62	383.54	4453.91	58	0
OCDD	14035.09	3689.09	10665.43	50	14025.25	3689.09	10804.68	51	2
2378-TCDF #	1403.51	35.06	827.73	56	1402.52	35.06	862.24	59	4
12378-PeCDF	7017.54	12.75	4323.96	61	7012.62	12.75	4321.08	61	0
23478-PeCDF	7017.54	13.43	4105.18	58	7012.62	13.43	4138.87	59	1
123478-HxCDF	7017.54	29.63	4207.44	60	7012.62	29.63	4256.62	60	1
123678-HxCDF	7017.54	10.01	4162.81	59	7012.62	10.01	4211.97	60	1
123789-HxCDF	7017.54	0.00	4024.49	57	7012.62	0.00	4073.52	58	1
234678-HxCDF	7017.54	13.31	4423.70	63	7012.62	13.31	4407.37	63	0
1234678-HpCDF	7017.54	222.09	4431.84	60	7012.62	222.09	4441.29	60	0
1234789-HpCDF	7017.54	0.00	4231.29	60	7012.62	0.00	4306.82	61	2
OCDF	14035.09	441.20	7537.17	51	14025.25	441.20	7588.20	51	1

Recovery is calculated as((conc. found-background conc.)/spike conc.)*100
= values from second column confirmation.

APPENDIX G

PAH Analytical Lab Raw Data Results

G-1
PAH Results Summary

Table G-1T Run 2 PAH Results - Stack Gas Concentrations (ng/sample, as measured)

PAH Congener	Concentration (ng/sample, as measured)[a]		
	FH	BH	Total
Acenaphthene	<20	160	160
Acenaphthylene	<20	1700 D,J	1700 D,J
Anthracene	<20	210 J	210 J
Benzo(a)anthracene	53	83	136
Benzo(b)fluoranthene	350	860	1210
Benzo(k)fluoranthene	270	840	1110
Benzo(g,h,i)perylene	210	130	340
Benzo(a)pyrene	110	(20)	110
Benzo(e)pyrene	2000 E	530 J	9200 E
Chrysene	200	3300 E	3500 E
Dibenzo(a,h)anthracene	85	20	105
Fluoranthene	53	3900 E	3950 E
Fluorene	<20	1500 E	1500 E
Indeno(1,2,3-c,d)pyrene	260	97	357
2-Methylnaphthalene	40	32000 D,E,B	32000 D,E,B
Naphthalene	1700 E, B	45000 D,E,B	452000 D,E,B
Perylene	<20	370 J	370 J
Pyrene	43	2600 E	2640 E
Phenanthrene	130	33000 D,E,B	33100 D,E,B

[a] ng/sample; nanogram per sample.
Standard conditions: temperature - 20 C; pressure - 1 atm (760 mm Hg).

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.

E = value above calibration range

B = congener found in blank at greater than 20% of the concentration found in the samples.

D = based on dilution.

J = The analyte was positively identified but the quantification is an estimate.

Table G-2T Run 3 PAH Results - Stack Gas Concentrations (ng/sample, as measured)

PAH Congener	Concentration (ng/sample, as measured)[a]		
	FH	BH	Total
Acenaphthene	<20	130	130
Acenaphthylene	<20	2000 E,J	2000 E,J
Anthracene	<20	82 J	82 J
Benzo(a)anthracene	<20	390	390
Benzo(b)fluoranthene	120	910	1030
Benzo(k)fluoranthene	92	470	562
Benzo(g,h,i)perylene	120	89	209
Benzo(a)pyrene	53	NQ	53
Benzo(e)pyrene	640	540 J	1180 J
Chrysene	77	2000 E	2080 E
Dibenzo(a,h)anthracene	51	25	76
Fluoranthene	33	3600 E	3630 E
Fluorene	<20	1700 E	1700 E
Indeno(1,2,3-c,d)pyrene	170	88	258
2-Methylnaphthalene	37	30000 D,E,B	30000 D,E,B
Naphthalene	530 B	380000 D,E,B	381000 D,E,B
Perylene	<20	NQ	NQ
Pyrene	27	2400 E	2430 E
Phenanthrene	<64	33000 D,E,B	33000 D,E,B

[a] ng/sample; nanogram per sample.
Standard conditions: temperature - 20 C; pressure - 1 atm (760 mm Hg).

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.
E = value above calibration range
B = congener found in blank at greater than 20% of the concentration found in the samples
D = based on dilution
NQ= d_{12}-benzo(a)pyrene recovery in Sample Run 4 was too low to quantify the compound. Maximum concentration of the compound is estimated by quantitation of benzo(e)pyrene at 270 ng.

Table G-3T Run 4 PAH Results - Stack Gas Concentrations (ng/sample, as measured)

PAH Congener	Concentration (ng/sample, as measured)[a]		
	FH	BH	Total
Acenaphthene	<20	26	26
Acenaphthylene	<20	260 J	260 J
Anthracene	<20	93	93
Benzo(a)anthracene	<20	82	82
Benzo(b)fluoranthene	96	170	266
Benzo(k)fluoranthene	37	120	157
Benzo(g,h,i)perylene	<20	85	85
Benzo(a)pyrene	<20	NQ	NQ
Benzo(e)pyrene	270	120 J	390 J
Chrysene	43	440	483
Dibenzo(a,h)anthracene	21	<20	21
Fluoranthene	23	910	933
Fluorene	<20	130	130
Indeno(1,2,3-c,d)pyrene	29	45	74
2-Methylnaphthalene	27	1300 D,B	1327
Naphthalene	440 B	210000 D,E,B	210000 D,E,B
Perylene	<20	57 J	57 J
Pyrene	<20	490	490
Phenanthrene	<20	8000 E,B	8000 E,B

[a] ng/sample; nanogram per sample.
Standard conditions: temperature - 20 C; pressure - 1 atm (760 mm Hg).

Note: (Below Detection Limit) values listed in parentheses and {EMPC} values listed in brackets.

E = value above calibration range

B = congener found in blank at greater than 20% of the concentration found in the samples

D = based on dilution

NQ = d_{12}-benzo(a)pyrene recovery in Sample Run 4 was too low to quantify the compound. Maximum concentration of the compound is estimated by quantitation of benzo(e)pyrene at 270 ng.

G-1-1
Air Sample Fractions

PAH Laboratory Air Results Summary Table G-1
PAH Front Half Fractions in ng/sample

Battelle ID	Run 2 48190-11-02			Run 3 48190-11-03			Run 4 48190-11-04		
Analysis date	8-16-99			8-16-99			8-16-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	< 20	U	20	< 20	U	20	< 20	U	20
Acenaphthylene	< 20	U	20	< 20	U	20	< 20	U	20
Anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(a)anthracene	53		20	< 20	U	20	< 20	U	20
Benzo(b)fluoranthene	350		20	120		20	96		20
Benzo(k)fluoranthene	270		20	92		20	37		20
Benzo(g,h,i)perylene	210		20	120		20	< 20	U	20
Benzo(a)pyrene	110		20	53		20	< 20	U	20
Benzo(e)pyrene	(2000)	E	20	640		20	270		20
Chrysene	200		20	77		20	43		20
Dibenzo(a,h)anthracene	85		20	51		20	21		20
Fluoranthene	53		20	33		20	23		20
Fluorene	< 20	U	20	< 20	U	20	< 20	U	20
Indeno(1,2,3-c,d)pyrene	260		20	170		20	29		20
2-Methylnaphthalene	40		20	37		20	27		20
Naphthalene	(1700)	E	100	530		100	440		100
Perylene	< 20	U	20	< 20	U	20	< 20	U	20
Pyrene	43		20	27		20	< 20	U	20
Phenanthrene	130	B	64	< 64	U	64	< 20	U	64

PAH Laboratory Air Results Summary Table G-1
PAH Front Half Fractions in ng/sample

Battelle ID	Run 2 48190-11-02			Run 3 48190-11-03			Run 4 48190-11-04		
Analysis date	8-16-99			8-16-99			8-16-99		
Internal Standard	% Recovery	Q	Reporting Limit	% Recovery	Q	Reporting Limit	% Recovery	Q	Reporting Limit
Acenaphthene-d10	74		50-150	79		50-150	75		50-150
Acenaphthylene-d8	56		50-150	50		50-150	64		50-150
Benzo(a)anthracene-d12	71		50-150	74		50-150	62		50-150
Benzo(a)pyrene-d12	17	&	50-150	22	&	50-150	21	&	50-150
Benzo(b)fluoranthene-d12	102		50-150	107		50-150	89		50-150
Benzo(g,h,i)perylene-d12	74		50-150	83		50-150	81		50-150
Benzo(k)fluoranthene-d12	86		50-150	97		50-150	103		50-150
Chrysene-d12	97		50-150	102		50-150	109		50-150
Dibenzo(a,h)anthracene-d14	85		50-150	96		50-150	78		50-150
Fluoranthene-d10	94		50-150	102		50-150	133		50-150
Fluorene-d10	87		50-150	97		50-150	79		50-150
Indeno(1,2,3-c,d)pyrene	84		50-150	93		50-150	87		50-150
Naphthalene-d8	87		50-150	86		50-150	88		50-150
Perylene-d12	32	&	50-150	18	&	50-150	29	&	50-150
Phenanthrene-d10	82		50-150	92		50-150	69		50-150
Pyrene-d10	90		50-150	96		50-150	124		50-150

ND, U = Not Detected, or below reporting limit.
= value from confirmation column.
& = outside QC limits.
NA = not applicable.
J = estimated value, below detection limit.
() = EMPC value.
E= exceeds calibration range.
B= method blank contained the target analyte at a reportable level

PAH Laboratory Air Results Summary Table G-2
PAH Back Half Fractions in ng/sample

Battelle ID	Run 2 48190-09-02			Run 3 48190-09-03			Run 4 48190-09-04		
Analysis date	8-16-99			8-16-99			8-16-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	160		20	130		20	26		20
Acenaphthylene	1700	D J A	20	2000	E J A	20	260	J A	20
Anthracene	210		20	82	J A	20	93		20
Benzo(a)anthracene	83		20	390		20	82		20
Benzo(b)fluoranthene	860		20	910		20	170		20
Benzo(k)fluoranthene	840		20	470		20	120		20
Benzo(g,h,i)perylene	130		20	89		20	85		20
Benzo(a)pyrene	< 20		20	NQ		20	NQ		20
Benzo(e)pyrene	7200	E J A	20	9700	E J A	20	NQ		20
Chrysene	3300	E	20	2000	E	20	440		20
Dibenzo(a,h)anthracene	20		20	25		20	< 20		20
Fluoranthene	3900	E	20	3600	E	20	910		20
Fluorene	1500	E	20	1700	E	20	130		20
Indeno(1,2,3-c,d)pyrene	97		20	88		20	45		20
2-Methylnaphthalene	32000	D E B	20	30000	D E B	20	1300	D B	20
Naphthalene	450000	D E B	20	380000	D B E	20	210000	D E B	20
Perylene	370	J A	20	NQ		20	57	J A	20
Pyrene	2600	E	20	2400	E	20	490		20
Phenanthrene	[illegible]	D E B	[illegible]	33000	D E	20	[illegible]	E	20

PAH Laboratory Air Results Summary Table G-2
PAH Back Half Fractions in ng/sample

Battelle ID	Run 2 48190-09-02			Run 3 48190-09-03			Run 4 48190-09-04		
Analysis date	8-16-99			8-16-99			8-16-99		
Internal Standard	%Recovery	Q	Reporting Limit	%Recovery	Q	Reporting Limit	%Recovery	Q	Reporting Limit
Acenaphthene-d10	76		50-150	87		50-150	73		50-150
Acenaphthylene-d8	1.5	&	50-150	0.70	&	50-150	1.2	&	50-150
Benzo(a)anthracene-d12	42		50-150	36		50-150	38	&	50-150
Benzo(a)pyrene-d12	6.1	&	50-150	4.9	&	50-150	NA		50-150
Benzo(b)fluoranthene-d12	102		50-150	88		50-150	86		50-150
Benzo(g,h,i)perylene-d12	47	&	50-150	47	&	50-150	67		50-150
Benzo(k)fluoranthene-d12	68		50-150	86		50-150	74		50-150
Chrysene-d12	66		50-150	88		50-150	73		50-150
Dibenzo(a,h)anthracene-d14	58		50-150	63		50-150	63		50-150
Fluoranthene-d10	73		50-150	82		50-150	82		50-150
Fluorene-d10	93		50-150	90		50-150	108		50-150
Indeno(1,2,3-c,d)pyrene	60		50-150	68		50-150	68		50-150
Naphthalene-d8	91		50-150	89		50-150	77		50-150
Perylene-d12	1.9	&	50-150	NA		50-150	1.8	&	50-150
Phenanthrene-d10	124		50-150	128		50-150	125		50-150
Pyrene-d10	64		50-150	70		50-150	74		50-150
13C6-Fluorene	24	&	50-150	31	&	50-150	13	&	50-150

ND, U = Not Detected.
= value from confirmation column.
& = outside QC limits.
NA = not applicable.
NQ = Not quantifiable due to low standard recovery of target analyte.
D = Result reported is the analysis of a dilution.
E = Estimated result, reported concentration exceeds the calibration range.
B = Method Blank contamination of target analyte at concentration above the reporting level.
JA = estimated value, below detection limit.
{} = EMPC value.

G-2
PAH Blank Lab Summaries

PAH Field Air Blank Laboratory Results Summary Table G-3
PAH Field and Proof Blank Fractions ng/sample

Battelle ID	Field Proof Blank Initial BH-PB1-PAH 48190-09-05			Field Proof Blank Final FH-PB2-PAH 48190-11-06			Field Proof Blank Final BH-PB2-PAH 48190-09-06		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	< 20	U	20	< 20	U	20	< 20	U	20
Acenaphthylene	< 20	U	20	< 20	U	20	< 20	U	20
Anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(a)anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(b)fluoranthene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(k)fluoranthene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(g,h,i)perylene	29	U	20	< 20	U	20	69		20
Benzo(a)pyrene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(e)pyrene	< 20	U	20	< 20	U	20	< 20	U	20
Chrysene	< 20	U	20	< 20	U	20	< 20	U	20
Dibenzo(a,h)anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Fluoranthene	21		20	< 20	U	20	37		20
Fluorene	< 20	U	20	< 20	U	20	< 20	U	20
Indeno(1,2,3-c,d)pyrene	< 20	U	20	< 20	U	20	< 20	U	20
2-Methylnaphthalene	< 470	J	120	58		20	< 120	J	120
Naphthalene	210	B J	470	350	B	100	< 470	J	470
Perylene	< 20	U	20	< 20	U	20	< 20	U	20
Pyrene	26		20	< 20	U	20	58		20
Phenanthrene	< 120	J	120	< 64	J	64	< 120	J	120

PAH Field Air Blank Laboratory Results Summary Table G-3
PAH Field and Proof Blank Fractions ng/sample

Battelle ID	Field Proof Blank Initial BH-PB1-PAH 48190-09-05			Field Proof Blank Final FH-PB2-PAH 48190-11-06			Field Proof Blank Final BH-PB2-PAH 48190-09-06		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	% Recovery	Q	Reporting Limit	% Recovery	Q	Reporting Limit	% Recovery	Q	Reporting Limit
Acenaphthene-d10	111		50-150	80		50-150	94		50-150
Acenaphthylene-d8	96		50-150	68		50-150	89		50-150
Benzo(a)anthracene-d12	97		50-150	72		50-150	95		50-150
Benzo(a)pyrene-d12	97		50-150	76		50-150	98		50-150
Benzo(b)fluoranthene-d12	102		50-150	97		50-150	105		50-150
Benzo(g,h,i)perylene-d12	92		50-150	82		50-150	85		50-150
Benzo(k)fluoranthene-d12	109		50-150	97		50-150	102		50-150
Chrysene-d12	121		50-150	102		50-150	116		50-150
Dibenzo(a,h)anthracene-d14	90		50-150	84		50-150	85		50-150
Fluoranthene-d10	103		50-150	86		50-150	86		50-150
Fluorene-d10	84		50-150	73		50-150	83		50-150
Indeno(1,2,3-c,d)pyrene-d12	94		50-150	83		50-150	89		50-150
Naphthalene-d8	91		50-150	74		50-150	77		50-150
Perylene-d12	100		50-150	80		50-150	95		50-150
Phenanthrene-d10	78		50-150	68		50-150	70		50-150
Pyrene-d10	103		50-150	84		50-150	86		50-150
13C6-Fluorene	61		50-150	NA			69		50-150

U = Not Detected, or below reporting limit.
# = value from confirmation column.
& = outside QC limits.
Q = Qualifier.
D = Result reported is analysis of a dilution.
E = Estimated result, reported concentration exceeds the calibration range.
B = method Blank contamination of target analyte at concentration above reporting level.
J = Estimated value, below detection limit.
NA = Not applicable.
E = value over calibration range

PAH Field Air Blank Laboratory Results Summary Table G-3
PAH Field and Proof Blank Fractions ng/sample

Battelle ID	Field Train Blank FH-FB1 48190-11-07			Field Train Blank BH-FB1 48190-09-07			Field Proof Blank Initial FH-PB1 48190-11-05		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	< 20	U	20	< 20	U	20	< 20	U	20
Acenaphthylene	< 20	U	20	< 20	U	20	< 20	U	20
Anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(a)anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(b)fluoranthene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(k)fluoranthene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(g,h,i)perylene	< 20	U	20	67		20	< 20	U	20
Benzo(a)pyrene	< 20	U	20	< 20	U	20	< 20	U	20
Benzo(e)pyrene	< 20	U	20	25		20	< 20	U	20
Chrysene	< 20	U	20	< 20	U	20	< 20	U	20
Dibenzo(a,h)anthracene	< 20	U	20	< 20	U	20	< 20	U	20
Fluoranthene	36		20	50		20	< 20	U	20
Fluorene	< 20	U	20	< 20	U	20	< 20	U	20
Indeno(1,2,3-c,d)pyrene	< 20	U	20	< 20	U	20	< 20	U	20
2-Methylnaphthalene	< 20	U	20	< 120	J	120	53		20
Naphthalene	< 100	J	100	< 470	J	470	440	B	100
Perylene	< 20	U	20	< 20	U	20	< 20	U	20
Pyrene	21		20	55		20	< 20	U	20
Phenanthrene	68	B	64	< 120	J	120	< 64	J	64

PAH Field Air Blank Laboratory Results Summary Table G-3
PAH Field and Proof Blank Fractions ng/sample

Battelle ID	Field Train Blank FH-FB1 48190-11-07			Field Train Blank BH-FB1 48190-09-07			Field Proof Blank Initial FH-PB1 48190-11-05		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit
Acenaphthene-d10	96		50-150	95		50-150	83		50-150
Acenaphthylene-d8	81		50-150	86		50-150	73		50-150
Benzo(a)anthracene-d12	78		50-150	83		50-150	81		50-150
Benzo(a)pyrene-d12	71		50-150	88		50-150	88		50-150
Benzo(b)fluoranthene-d12	110		50-150	104		50-150	100		50-150
Benzo(g,h,i)perylene-d12	92		50-150	110		50-150	97		50-150
Benzo(k)fluoranthene-d12	103		50-150	104		50-150	106		50-150
Chrysene-d12	103		50-150	111		50-150	110		50-150
Dibenzo(a,h)anthracene-d14	87		50-150	119		50-150	97		50-150
Fluoranthene-d10	94		50-150	99		50-150	94		50-150
Fluorene-d10	75		50-150	77		50-150	77		50-150
Indeno(1,2,3-c,d)pyrene-d12	95		50-150	114		50-150	99		50-150
Naphthalene-d8	87		50-150	78		50-150	76		50-150
Perylene-d12	50		50-150	91		50-150	89		50-150
Phenanthrene-d10	76		50-150	71		50-150	79		50-150
Pyrene-d10	92		50-150	95		50-150	87		50-150
13C6-Fluorene	NA			62		50-150	NA		

U = Not Detected, or below reporting limit.
# = value from confirmation column.
& = outside QC limits.
Q = Qualifier.
E = Estimated result, reported concentration exceeds the calibration range.
B = method Blank contamination of target analyte at concentration above reporting level.
J = Estimated value, below detection limit.

PAH Laboratory Air Blank Results Summary Table G-4
PAH Laboratory and Spike Blank Fractions ng/sample

Battelle ID	Lab Train Blank FH-LB-PAH 48190-11-10			Lab Train Blank BH-LB-PAH 48190-09-11			Lab Control Spike Blank FH-LCS-PAH 48190-11-08		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	< 20	U	20	< 20	U	20	150		20
Acenaphthylene	< 20	U	20	< 20	U	20	180		20
Anthracene	< 20	U	20	< 20	U	20	260		20
Benzo(a)anthracene	< 20	U	20	< 20	U	20	200		20
Benzo(b)fluoranthene	< 20	U	20	< 20	U	20	200		20
Benzo(k)fluoranthene	< 20	U	20	< 20	U	20	190		20
Benzo(g,h,i)perylene	< 20	U	20	< 20	U	20	200		20
Benzo(a)pyrene	< 20	U	20	< 20	U	20	190		20
Benzo(e)pyrene	< 20	U	20	< 20	U	20	220		20
Chrysene	< 20	U	20	< 20	U	20	200		20
Dibenzo(a,h)anthracene	< 20	U	20	< 20	U	20	200		20
Fluoranthene	< 20	U	20	< 20	U	20	220		20
Fluorene	< 20	U	20	< 20	U	20	210		20
Indeno(1,2,3-c,d)pyrene	< 20	U	20	< 20	U	20	170		20
2-Methylnaphthalene	< 20	U	20	25		20	180		20
Naphthalene	21		20	94		20	250	B	100
Perylene	< 20	U	20	< 20	U	20	200		20
Pyrene	< 20	U	20	< 20	U	20	210		20
Phenanthrene	< 20	U	20	25		20	210	B	64

PAH Laboratory Air Blank Results Summary Table G-4
PAH Laboratory and Spike Blank Fractions ng/sample

Battelle ID	Lab Train Blank FH-LB-PAH 48190-11-10			Lab Train Blank BH-LB-PAH 48190-09-11			Lab Control Spike Blank FH-LCS-PAH 48190-11-08		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit
Acenaphthene-d10	94		50-150	97		50-150	108		50-150
Acenaphthylene-d8	91		50-150	97		50-150	99		50-150
Benzo(a)anthracene-d12	79		50-150	65		50-150	81		50-150
Benzo(a)pyrene-d12	76		50-150	79		50-150	89		50-150
Benzo(b)fluoranthene-d12	91		50-150	81		50-150	97		50-150
Benzo(g,h,i)perylene-d12	83		50-150	86		50-150	110		50-150
Benzo(k)fluoranthene-d12	93		50-150	109		50-150	107		50-150
Chrysene-d12	109		50-150	135		50-150	113		50-150
Dibenzo(a,h)anthracene-d14	74		50-150	67		50-150	102		50-150
Fluoranthene-d10	94		50-150	130		50-150	100		50-150
Fluorene-d10	76		50-150	78		50-150	66		50-150
Indeno(1,2,3-c,d)pyrene-d12	80		50-150	79		50-150	112		50-150
Naphthalene-d8	92		50-150	100		50-150	99		50-150
Perylene-d12	78		50-150	86		50-150	89		50-150
Phenanthrene-d10	62		50-150	66		50-150	65		50-150
Pyrene-d10	96		50-150	123		50-150	102		50-150

U = Not Detected, or below reporting limit.
# = value from confirmation column.
& = outside QC limits.
Q = Qualifier.
NA = Not applicable.
B = Method Blank contamination of target analyte at concentration above the reporting level.
E = value over calibration range.

PAH Laboratory Air Blank Results Summary Table G-4
PAH Laboratory and Spike Blank Fractions ng/sample

Battelle ID	Lab Control Spike Blank BH-LCS-PAH 48190-09-09			Lab Control Spike Blank Duplicate FH-LCSDUP-PAH 48190-11-09			Lab Control Spike Blank Duplicate BH-LCSDUP-PAH 48190-09-10		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit	Concentration	Q	Reporting Limit
Acenaphthene	170		20	170		20	150		20
Acenaphthylene	180		20	180		20	170		20
Anthracene	250		20	250		20	200		20
Benzo(a)anthracene	200		20	190		20	190		20
Benzo(b)fluoranthene	200		20	210		20	170		20
Benzo(k)fluoranthene	200		20	200		20	200		20
Benzo(g,h,i)perylene	190		20	210		20	190		20
Benzo(a)pyrene	200		20	200		20	190		20
Benzo(e)pyrene	210		20	220		20	230		20
Chrysene	190		20	210		20	180		20
Dibenzo(a,h)anthracene	210		20	200		20	190		20
Fluoranthene	220		20	210		20	200		20
Fluorene	230		20	250		20	230		20
Indeno(1,2,3-c,d)pyrene	190		20	200		20	170		20
2-Methylnaphthalene	210	B	120	190		20	200	B	120
Naphthalene	< 470	J	470	240	B	100	< 470	J	470
Perylene	200		20	200		20	190		20
Pyrene	210		20	210		20	190		20
Phenanthrene	210	B	120	210	B	64	210	B	120

PAH Laboratory Air Blank Results Summary Table G-4
PAH Laboratory and Spike Blank Fractions ng/sample

Battelle ID	Lab Control Spike Blank BH-LCS-PAH 48190-09-09			Lab Control Spike Blank Duplicate FH-LCSDUP-PAH 48190-11-09			Lab Control Spike Blank Duplicate BH-LCSDUP-PAH 48190-09-10		
Analysis Date	8-21-99			8-23-99			8-21-99		
Congener	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit	% Recovery	Q	QC Reporting Limit
Acenaphthene-d10	109		50-150	97		50-150	100		50-150
Acenaphthylene-d8	98		50-150	95		50-150	89		50-150
Benzo(a)anthracene-d12	91		50-150	89		50-150	86		50-150
Benzo(a)pyrene-d12	93		50-150	86		50-150	81		50-150
Benzo(b)fluoranthene-d12	99		50-150	97		50-150	100		50-150
Benzo(g,h,i)perylene-d12	98		50-150	84		50-150	87		50-150
Benzo(k)fluoranthene-d12	106		50-150	98		50-150	98		50-150
Chrysene-d12	114		50-150	102		50-150	111		50-150
Dibenzo(a,h)anthracene-d14	99		50-150	79		50-150	86		50-150
Fluoranthene-d10	106		50-150	98		50-150	102		50-150
Fluorene-d10	88		50-150	70		50-150	93		50-150
Indeno(1,2,3-c,d)pyrene-d12	99		50-150	85		50-150	89		50-150
Naphthalene-d8	92		50-150	86		50-150	89		50-150
Perylene-d12	91		50-150	87		50-150	76		50-150
Phenanthrene-d10	76		50-150	67		50-150	83		50-150
Pyrene-d10	102		50-150	95		50-150	98		50-150

U = Not Detected, or below reporting limit.
# = value from confirmation column.
& = outside QC limits.
Q = Qualifier.
B = Method Blank contamination of target analyte at concentration above the reporting level.
NA = Not applicable.
E = value over calibration range

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

September 7, 1999

QUANTERRA INCORPORATED PROJECT NUMBER: G9G200205
PO/CONTRACT:

Tony Wisbith
Battelle
505 King Avenue
Room 6325
Columbus, OH 43201-2693

Dear Mr. Wisbith,

This report contains the analytical results for the samples received under chain of custody by Quanterra Incorporated on 7/16/99 and 8/11/99. These samples are associated with your G469005-06 project.

The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916)374-4333.

Sincerely,

For

Robert Weidenfeld
Project Manager

TABLE OF CONTENTS

QUANTERRA INCORPORATED PROJECT NUMBER G9G200205

Case Narrative

Quanterra's Quality Assurance Program

Sample Description Information

Chain of Custody Documentation

AIR, CARB 429 MOD, Hydrocarbons, Polycyclic
Performed at Quanterra - West Sacramento
Samples: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
- Sample Data Sheets
- Method Blank Reports
- Laboratory QC Reports
- Raw Data

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER G9G200205

CARB 429 MOD, Hydrocarbons, Polycyclic

The samples were received at Quanterra as extracts in two deliveries. These samples were spiked and extracted by Battelle using field surrogate (FS), internal standards (IS), and native standards (NS) supplied by Quanterra. A spiking table was sent by Quanterra that noted the recommended spiking levels for each standard based on the 6/22/99 fax information that Quanterra would receive 25% of each sample extract. A notation of spike amount was written on the COC for the first delivery group and indicated 200ng of IS per sample. No further notation of spiking amount, sample split, or other extraction information was included. All recovery calculations were based on this information. The first delivery group containing two samples was spiked with a different FS and IS mix that the other eighteen samples. A method Blank and Laboratory control sample were generated by Quanterra and processed with the samples through all cleanup and analysis steps performed at Quanterra.

The field surrogate was analyzed for in all samples but only samples 3 through 8 had the surrogate detected.

The first shipment was received at –20 degrees C with dry ice and the second batch was received at 20 degrees C with a blue ice pack.

The client requested that a reporting limit convention be used that incorporates the use of a combination of the lower calibration limit (LCL) and the level found in the Lab Blanks supplied by Battelle. The reporting limit for any analyte found in the Lab Blank at a level greater than one-half the LCL was rasied to 5X the blank level. All other analytes used the LCL as the reporting limit. . Positive results in samples below this reporting limit are to be given the 'J' qualifier to indicate that they are estimated. Samples 3-10 were reported using sample 11 as the blank and samples 12-19 were reported using sample 20 as the blank

Samples 1 and 2 were spiked with a different internal standard and recovery standard mix from an older calibraion curve. The relative response factor from a single-point CS-3 standard from the older curve were used to quantitate the two samples in questions. Samples 1 and 2 used the method Blank generated by Quanterra for the extract and final cleanup steps as a basis of its reporting limit. No levels were found in the Method blanks so all the reporting limits are at 20ng/sample.

Several samples had internal standard recoveries below 50 percent. The samples affected by these recoveries are as follows:

CASE NARRATIVE

QUANTERRA INCORPORATED PROJECT NUMBER G9G200205

-3: d8-Acenaphthylene, d12-Benzo(a)anthracene, d12-Perylene, d12-Benzo(ghi)perylene and d12-benzo(a)pyrene.

-4: d8-Acenaphthylene, d12-Benzo(a)anthracene, d12-Perylene (no recovery--native cannot be quantitated), d12-benzo(a)pyrene, and d12-Benzo(ghi)perylene.

-5: d8-Acenaphthylene, d12-Benzo(a)anthracene, d12-Perylene. d12-Benzo(a)pyrene (no recovery-natives cannot be quantitated for Benzo(a) or Benzo(e)pyrene).

-12: d12-Benzo(a)pyrene and d12-Perylene.

-13: d12-Benzo(a)pyrene and d12-Perylene.

-14: d12-Benzo(a)pyreen and d12-Perylene.

The very low recovery of the d12-benzo(a)pyrene in sample –4 did not allow the quantitation of Benzo(a)pyrene and the quantitation of Benzo(e)pyrene should be considered a maximum possible concentration. The low recovery of this same internal standard would not allow for the quantitation of Benzo(a)pyrene or Benzo(e)pyrene in sample 5. In most other cases, sensitivity and signal-to-noise ratio were adequate to detect the native compounds associated with the affected internal standards at their reporting limits. The exception is Perylene in sample -4, as noted above. Re-extraction of these air train samples was not possible because the entire extract was consumed in the initial processing.

Samples 3, 4, and 5 each have one or more saturated analyte in the data from the initial analysis. All three samples were diluted and reanalyzed for the affected compounds, which are flagged with a "D" footnote and the reporting limit raised accordingly. Sample 3 and 4 were diluted 20X and sample 5 was diluted 10X.

Low level concentrations of Benzo(g,h,i)perylene were detected in samples 6-8.

There were no other anomalies associated with this project.

Quanterra - Western Region

Quality Control Definitions

QC Parameter	Definition
QC Batch	A set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.
Duplicate Control Sample (DCS)	Consist of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects. This QC is performed only if required by client or when insufficient sample is available to perform MS/MSD.
Duplicate Sample (DU)	A second aliquot of an environmental sample, taken from the same sample container when possible, that is processed independently with the first sample aliquot. The results are used to assess the effect of the sample matrix on the precision of the analytical process. The precision estimated using this sample is not necessarily representative of the precision for other samples in the batch.
Laboratory Control Sample (LCS)	A volume of reagent water for aqueous samples or a contaminant-free solid matrix (Ottawa sand) for soil and sediment samples which is spiked with known amounts of representative target analytes and required surrogates. An LCS is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects.
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	A field sample fortified with known quantities of target analytes that are also added to the LCS. Matrix spike duplicate is a second matrix spike sample. MSs/MSDs are carried through the entire analytical process and are used to determine sample matrix effect on accuracy of the measurement system. The accuracy and precision estimated using MS/MSD is only representative of the precision of the sample that was spiked.
Method Blank (MB)	A sample composed of all the reagents (in the same quantities) in reagent water carried through the entire analytical process. The method blank is used to monitor the level of contamination introduced during sample preparation steps.
Surrogate Spike	Organic constituents not expected to be detected in environmental media and are added to every sample and QC at a known concentration. Surrogates are used to determine the efficiency of the sample preparation and the analytical process.

Source: Quanterra® Quality Control Program, Policy QA-003, Rev. 0, 8/19/96.

Sample Summary
G9G200205

WO#	Sample #	Client Sample ID		Sampling Date	Received Date
D09KN	1	48200-51-02	XAD Blank	7/14/99 11:00 AM	7/16/99 10:00 AM
D09KQ	2	48200-51-03	Method Blank	7/14/99 11:00 AM	7/16/99 10:00 AM
D19W6	3	48190-09-02	BH R2		8/11/99 08:40 AM
D19W8	4	48190-09-03	BH R3		8/11/99 08:40 AM
D19W9	5	48190-09-04	BH R4		8/11/99 08:40 AM
D19WA	6	48190-09-05	BH PB1		8/11/99 08:40 AM
D19WC	7	48190-09-06	BH PB2		8/11/99 08:40 AM
D19WD	8	48190-09-07	BH FB1		8/11/99 08:40 AM
D19WE	9	48190-09-09	BH LCS		8/11/99 08:40 AM
D19WF	10	48190-09-10	BH LCS Dup		8/11/99 08:40 AM
D19WG	11	48190-09-11	BH Lab Blank		8/11/99 08:40 AM
D19WH	12	48190-11-02	FH R2		8/11/99 08:40 AM
D19WJ	13	48190-11-03	FH R3		8/11/99 08:40 AM
D19WK	14	48190-11-04	FH R4		8/11/99 08:40 AM
D19WL	15	48190-11-05	FH PB1		8/11/99 08:40 AM
D19WM	16	48190-11-06	FH PB2		8/11/99 08:40 AM
D19WN	17	48190-11-07	FH FB1		8/11/99 08:40 AM
D19WP	18	48190-11-08	FH LCS		8/11/99 08:40 AM
D19WQ	19	48190-11-09	FH LCS Dup		8/11/99 08:40 AM
D19WR	20	48190-11-10	FH Lab Blank		8/11/99 08:40 AM

Notes(s):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must no be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity, pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weigh

2

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000290

Client: WA-165

Project Description: 649005-06

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
48190-11-02			FH Run# 2	1	~30m OCM
-03			FH Run# 3	1	
-04			FH Run# 4	1	
-05			Proof blank #1 FH	1	
-06			Proof blank #2 FH	1	
-07			Field Blank #1 FH	1	
-08			LCS FH	1	
-09			LCS Dup FH	1	
-10			LAB Blank FH	1	

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	8-10-91	1630						
(Printed) MARK F. MISITA			(Printed)			(Printed)		
Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date		Analyses Requested:		
[signature]	8/11/91	17:30						
(Printed) PHU NGUYEN			Method of Disposal:					

RECEIVED IN GOOD CONDITION UNDER COC
AUG 11 1991
INI: _____

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB CHAIN OF CUSTODY RECORD

№ 000288

Client: WA-105

Project Description: G469005-06

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
48190-09-02			BH Run #2	1	~30 mL OCM
03			BH Run #3	1	
04			BH Run #4	1	
05			Proof Blank #1 BH	1	
06			Proof Blank #2 BH	1	
07			Field Blank #1 BH	1	
09			LCS BH	1	
10			LCS Dup BH	1	
11			LAB Blank BH	1	

RECEIVED IN GOOD CONDITION UNDER COC
AUG 11 1999
IN: [illegible]

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	8-10	8-10-99						
(Printed) MARK F. MISITA			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	8/11/99	1:20 pm		8-11-99	
(Printed) PHILNOWYER			Method of Disposal:		

White-With Samples, Yellow-Laboratory, Pink-Field

Battelle
Columbus Division
505 King Avenue
Columbus, Ohio 43201-2693
(614) 424-4247

PCDD/PCDF/PCB
CHAIN OF CUSTODY RECORD

№ 000282

Client:

Project Description: G469005-06 WA-105 Train

Client ID Number	Date Sampled	Time Sampled	Location	No. Containers	Remarks/Condition Upon Receipt
48200-51-02	7/14/99	11:00	PAH Fraction in Dichloromethane 30mL	1	XAD/FILTER. ORG
48200-51-03	7/14/99	11:00	PAH Fraction in Dichloromethane 30mL	1	Method Blank
			As per July 7, 99 FAX:		
			both Above Samples spiked		
			w/F 200ul [200ng/Sample]		
			PAH IS		
					Recd in good cond.
					on 7-16-99

Relinquished by (Signature)	Date	Time	Received by (Signature)	Date	Time	Relinquished by (Signature)	Date	Time
[signature]	7-15-99	1710						
(Printed) MARK F. MIJITA			(Printed)			(Printed)		

Received for Laboratory by (Signature)	Date	Time	Samples Disposed of by:	Date	Analyses Requested:
[signature]	7/16/99	1530			
(Printed) [illegible]			Method of Disposal:		

CARB 429 MOD, Hydrocarbons, Polycyclic

BATTELLE

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS) Quanterra

Client Sample ID: 48200-51-02

Lot-Sample #...:	G9G200205-001	Work Order #...:	D09KN101	Matrix.....:	AIR
Date Sampled...:	7/14/99	Date Received..:	7/16/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/25/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

XAD Blank

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	20	ng
Acenaphthylene	ND	20	ng
Anthracene	ND	20	ng
Benzo(a)anthracene	ND	20	ng
Benzo(b)fluoranthene	ND	20	ng
Benzo(k)fluoranthene	ND	20	ng
Benzo(ghi)perylene	ND	20	ng
Benzo(a)pyrene	ND	20	ng
Benzo(e)pyrene	ND	20	ng
Chrysene	ND	20	ng
Dibenz(a,h)anthracene	ND	20	ng
Fluoranthene	ND	20	ng
Fluorene	ND	20	ng
Indeno(1,2,3-cd)pyrene	ND	20	ng
2-Methylnaphthalene	ND	20	ng
Naphthalene	150	20	ng
Perylene	ND	20	ng
Pyrene	ND	20	ng
Phenanthrene	20	20	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	114	50 - 150
Acenaphthylene-d8	96	50 - 150
Benzo(a)anthracene-d12	85	50 - 150
Benzo(a)pyrene-d12	101	50 - 150
Benzo(b)fluoranthene-d12	100	50 - 150
Benzo(ghi)perylene-d12	98	50 - 150
Benzo(k)fluoranthene-d12	111	50 - 150
Chrysene-d12	117	50 - 150
Dibenz(ah)anthracene-d14	87	50 - 150
Fluoranthene-d10	111	50 - 150
Fluorene d-10	88	50 - 150
Indeno(1,2,3-cd)pyrene-d12	95	50 - 150
Naphthalene-d8	109	50 - 150
Perylene-d12	86	50 - 150
Phenanthrene-d10	82	50 - 150
Pyrene-d10	107	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

BATTELLE

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS) Quanterra

Client Sample ID: 48200-51-03

Lot-Sample #...:	G9G200205-002	Work Order #...:	D09KQ101	Matrix.....:	AIR
Date Sampled...:	7/14/99	Date Received..:	7/16/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		Method Blank
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	ND		20	ng
Benzo(k)fluoranthene	ND		20	ng
Benzo(ghi)perylene	ND		20	ng
Benzo(a)pyrene	ND		20	ng
Benzo(e)pyrene	ND		20	ng
Chrysene	ND		20	ng
Dibenz(a,h)anthracene	ND		20	ng
Fluoranthene	ND		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	ND		20	ng
2-Methylnaphthalene	ND		20	ng
Naphthalene	59	J B	20	ng
Perylene	ND		20	ng
Pyrene	ND		20	ng
Phenanthrene	ND		20	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	116	50 - 150
Acenaphthylene-d8	93	50 - 150
Benzo(a)anthracene-d12	72	50 - 150
Benzo(a)pyrene-d12	86	50 - 150
Benzo(b)fluoranthene-d12	91	50 - 150
Benzo(ghi)perylene-d12	86	50 - 150
Benzo(k)fluoranthene-d12	102	50 - 150
Chrysene-d12	119	50 - 150
Dibenz(ah)anthracene-d14	73	50 - 150
Fluoranthene-d10	104	50 - 150
Fluorene d-10	77	50 - 150
Indeno(1,2,3-cd)pyrene-d12	78	50 - 150
Naphthalene-d8	104	50 - 150
Perylene-d12	73	50 - 150
Phenanthrene-d10	66	50 - 150
Pyrene-d10	107	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-02

Lot-Sample #...:	G9G200205-012	Work Order #...:	D19WH101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Run 2

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	53		20	ng
Benzo(b)fluoranthene	350		20	ng
Benzo(k)fluoranthene	270		20	ng
Benzo(ghi)perylene	210		20	ng
Benzo(a)pyrene	110		20	ng
Benzo(e)pyrene	2000	E	20	ng
Chrysene	200		20	ng
Dibenz(a,h)anthracene	85		20	ng
Fluoranthene	53		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	260		20	ng
2-Methylnaphthalene	40		20	ng
Naphthalene	1700	E B	100	ng
Perylene	ND		20	ng
Pyrene	43		20	ng
Phenanthrene	130	B	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
Acenaphthene-d10	74		50 - 150
Acenaphthylene-d8	56		50 - 150
Benzo(a)anthracene-d12	71		50 - 150
Benzo(a)pyrene-d12	17	*	50 - 150
Benzo(b)fluoranthene-d12	102		50 - 150
Benzo(ghi)perylene-d12	74		50 - 150
Benzo(k)fluoranthene-d12	86		50 - 150
Chrysene-d12	97		50 - 150
Dibenz(ah)anthracene-d14	85		50 - 150
Fluoranthene-d10	94		50 - 150
Fluorene d-10	87		50 - 150
Indeno(1,2,3-cd)pyrene-d12	84		50 - 150
Naphthalene-d8	87		50 - 150
Perylene-d12	32	*	50 - 150
Phenanthrene-d10	82		50 - 150
Pyrene-d10	90		50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

*	Surrogate recovery is outside stated control limits.
B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
E	Estimated result. Result concentration exceeds the calibration range.

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-03

Lot-Sample #...:	G9G200205-013	Work Order #...:	D19WJ101	Matrix	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Run 3

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	120		20	ng
Benzo(k)fluoranthene	92		20	ng
Benzo(ghi)perylene	120		20	ng
Benzo(a)pyrene	53		20	ng
Benzo(e)pyrene	640		20	ng
Chrysene	77		20	ng
Dibenz(a,h)anthracene	51		20	ng
Fluoranthene	33		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	170		20	ng
2-Methylnaphthalene	37		20	ng
Naphthalene	530	B	100	ng
Perylene	ND		20	ng
Pyrene	27		20	ng
Phenanthrene	ND	J	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
Acenaphthene-d10	79		50 - 150
Acenaphthylene-d8	50		50 - 150
Benzo(a)anthracene-d12	74		50 - 150
Benzo(a)pyrene-d12	22	*	50 - 150
Benzo(b)fluoranthene-d12	107		50 - 150
Benzo(ghi)perylene-d12	83		50 - 150
Benzo(k)fluoranthene-d12	97		50 - 150
Chrysene-d12	102		50 - 150
Dibenz(ah)anthracene-d14	96		50 - 150
Fluoranthene-d10	102		50 - 150
Fluorene d-10	97		50 - 150
Indeno(1,2,3-cd)pyrene-d12	93		50 - 150
Naphthalene-d8	86		50 - 150
Perylene-d12	18	*	50 - 150
Phenanthrene-d10	92		50 - 150
Pyrene-d10	96		50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

* Surrogate recovery is outside stated control limits.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Estimated result. Result is less than the reporting limit.

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-04

Lot-Sample #...:	G9G200205-014	Work Order #...:	D19WK101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/30/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Run 4

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	96		20	ng
Benzo(k)fluoranthene	37		20	ng
Benzo(ghi)perylene	ND		20	ng
Benzo(a)pyrene	ND		20	ng
Benzo(e)pyrene	270		20	ng
Chrysene	43		20	ng
Dibenz(a,h)anthracene	21		20	ng
Fluoranthene	23		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	29		20	ng
2-Methylnaphthalene	27		20	ng
Naphthalene	440	B	100	ng
Perylene	ND		20	ng
Pyrene	ND		20	ng
Phenanthrene	ND	J	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY		RECOVERY LIMITS
Acenaphthene-d10	75		50 - 150
Acenaphthylene-d8	64		50 - 150
Benzo(a)anthracene-d12	62		50 - 150
Benzo(a)pyrene-d12	21	*	50 - 150
Benzo(b)fluoranthene-d12	89		50 - 150
Benzo(ghi)perylene-d12	81		50 - 150
Benzo(k)fluoranthene-d12	103		50 - 150
Chrysene-d12	109		50 - 150
Dibenz(ah)anthracene-d14	78		50 - 150
Fluoranthene-d10	133		50 - 150
Fluorene d-10	79		50 - 150
Indeno(1,2,3-cd)pyrene-d12	87		50 - 150
Naphthalene-d8	88		50 - 150
Perylene-d12	29	*	50 - 150
Phenanthrene-d10	69		50 - 150
Pyrene-d10	124		50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

* Surrogate recovery is outside stated control limits.

Method blank contamination. The associated method blank contains the target analyte at a reportable level.

Estimated result. Result is less than the reporting limit.

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-05

Lot-Sample #...:	G9G200205-015	Work Order #...:	D19WL101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Proof Blank

1

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	ND		20	ng
Benzo(k)fluoranthene	ND		20	ng
Benzo(ghi)perylene	ND		20	ng
Benzo(a)pyrene	ND		20	ng
Benzo(e)pyrene	ND		20	ng
Chrysene	ND		20	ng
Dibenz(a,h)anthracene	ND		20	ng
Fluoranthene	ND		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	ND		20	ng
2-Methylnaphthalene	53		20	ng
Naphthalene	440	B	100	ng
Perylene	ND		20	ng
Pyrene	ND		20	ng
Phenanthrene	ND	J	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	83	50 - 150
Acenaphthylene-d8	73	50 - 150
Benzo(a)anthracene-d12	81	50 - 150
Benzo(a)pyrene-d12	88	50 - 150
Benzo(b)fluoranthene-d12	100	50 - 150
Benzo(ghi)perylene-d12	97	50 - 150
Benzo(k)fluoranthene-d12	106	50 - 150
Chrysene-d12	110	50 - 150
Dibenz(ah)anthracene-d14	97	50 - 150
Fluoranthene-d10	94	50 - 150
Fluorene d-10	77	50 - 150
Indeno(1,2,3-cd)pyrene-d12	99	50 - 150
Naphthalene-d8	76	50 - 150
Perylene-d12	89	50 - 150
Phenanthrene-d10	79	50 - 150
Pyrene-d10	87	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

Method blank contamination. The associated method blank contains the target analyte at or above reportable level.

Estimated result. Result is less than the reporting limit.

BATTELLE

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Quanterra

Client Sample ID: 48190-11-06

Lot-Sample #...:	G9G200205-016	Work Order #...:	D19WM101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Proof Blank 2

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	ND		20	ng
Benzo(k)fluoranthene	ND		20	ng
Benzo(ghi)perylene	ND		20	ng
Benzo(a)pyrene	ND		20	ng
Benzo(e)pyrene	ND		20	ng
Chrysene	ND		20	ng
Dibenz(a,h)anthracene	ND		20	ng
Fluoranthene	ND		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	ND		20	ng
2-Methylnaphthalene	58		20	ng
Naphthalene	350	B	100	ng
Perylene	ND		20	ng
Pyrene	ND		20	ng
Phenanthrene	ND	J	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	80	50 - 150
Acenaphthylene-d8	68	50 - 150
Benzo(a)anthracene-d12	72	50 - 150
Benzo(a)pyrene-d12	76	50 - 150
Benzo(b)fluoranthene-d12	97	50 - 150
Benzo(ghi)perylene-d12	82	50 - 150
Benzo(k)fluoranthene-d12	97	50 - 150
Chrysene-d12	102	50 - 150
Dibenz(ah)anthracene-d14	84	50 - 150
Fluoranthene-d10	86	50 - 150
Pyrene d-10	73	50 - 150
Indeno(1,2,3-cd)pyrene-d12	83	50 - 150
Naphthalene-d8	74	50 - 150
Perylene-d12	80	50 - 150
Phenanthrene-d10	68	50 - 150
Fluorene-d10	84	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-07

Lot-Sample #...:	G9G200205-017	Work Order #...:	D19WN101	Matrix ...:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Field Blank

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	ND		20	ng
Acenaphthylene	ND		20	ng
Anthracene	ND		20	ng
Benzo(a)anthracene	ND		20	ng
Benzo(b)fluoranthene	ND		20	ng
Benzo(k)fluoranthene	ND		20	ng
Benzo(ghi)perylene	ND		20	ng
Benzo(a)pyrene	ND		20	ng
Benzo(e)pyrene	ND		20	ng
Chrysene	ND		20	ng
Dibenz(a,h)anthracene	ND		20	ng
Fluoranthene	36		20	ng
Fluorene	ND		20	ng
Indeno(1,2,3-cd)pyrene	ND		20	ng
2-Methylnaphthalene	ND		20	ng
Naphthalene	ND	J	100	ng
Perylene	ND		20	ng
Pyrene	21		20	ng
Phenanthrene	68	B	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	96	50 - 150
Acenaphthylene-d8	81	50 - 150
Benzo(a)anthracene-d12	78	50 - 150
Benzo(a)pyrene-d12	71	50 - 150
Benzo(b)fluoranthene-d12	110	50 - 150
Benzo(ghi)perylene-d12	92	50 - 150
Benzo(k)fluoranthene-d12	103	50 - 150
Chrysene-d12	103	50 - 150
Dibenz(ah)anthracene-d14	87	50 - 150
Fluoranthene-d10	94	50 - 150
Fluorene d-10	75	50 - 150
Indeno(1,2,3-cd)pyrene-d12	95	50 - 150
Naphthalene-d8	87	50 - 150
Perylene-d12	50	50 - 150
Phenanthrene-d10	76	50 - 150
Pyrene-d10	92	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-08

Lot-Sample #...:	G9G200205-018	Work Order #...:	D19WP101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH LCS

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	150		20	ng
Acenaphthylene	180		20	ng
Anthracene	260		20	ng
Benzo(a)anthracene	200		20	ng
Benzo(b)fluoranthene	200		20	ng
Benzo(k)fluoranthene	190		20	ng
Benzo(ghi)perylene	200		20	ng
Benzo(a)pyrene	190		20	ng
Benzo(e)pyrene	220		20	ng
Chrysene	200		20	ng
Dibenz(a,h)anthracene	200		20	ng
Fluoranthene	220		20	ng
Fluorene	210		20	ng
Indeno(1,2,3-cd)pyrene	170		20	ng
2-Methylnaphthalene	180		20	ng
Naphthalene	250	B	100	ng
Perylene	200		20	ng
Pyrene	210		20	ng
Phenanthrene	210	B	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	108	50 - 150
Acenaphthylene-d8	99	50 - 150
Benzo(a)anthracene-d12	81	50 - 150
Benzo(a)pyrene-d12	89	50 - 150
Benzo(b)fluoranthene-d12	97	50 - 150
Benzo(ghi)perylene-d12	110	50 - 150
Benzo(k)fluoranthene-d12	107	50 - 150
Chrysene-d12	113	50 - 150
Dibenz(ah)anthracene-d14	102	50 - 150
Fluoranthene-d10	100	50 - 150
Fluorene d-10	66	50 - 150
Indeno(1,2,3-cd)pyrene-d12	112	50 - 150
Naphthalene-d8	99	50 - 150
Perylene-d12	89	50 - 150
Phenanthrene-d10	65	50 - 150
Pyrene-d10	102	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-09

Lot-Sample #...:	G9G200205-019	Work Order #...:	D19WQ101	Matrix.....	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH LCS Dupli

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	170		20	ng
Acenaphthylene	180		20	ng
Anthracene	250		20	ng
Benzo(a)anthracene	190		20	ng
Benzo(b)fluoranthene	210		20	ng
Benzo(k)fluoranthene	200		20	ng
Benzo(ghi)perylene	210		20	ng
Benzo(a)pyrene	200		20	ng
Benzo(e)pyrene	220		20	ng
Chrysene	210		20	ng
Dibenz(a,h)anthracene	200		20	ng
Fluoranthene	210		20	ng
Fluorene	250		20	ng
Indeno(1,2,3-cd)pyrene	200		20	ng
2-Methylnaphthalene	190		20	ng
Naphthalene	240	B	100	ng
Perylene	200		20	ng
Pyrene	210		20	ng
Phenanthrene	210	B	64	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	97	50 - 150
Acenaphthylene-d8	95	50 - 150
Benzo(a)anthracene-d12	89	50 - 150
Benzo(a)pyrene-d12	86	50 - 150
Benzo(b)fluoranthene-d12	97	50 - 150
Benzo(ghi)perylene-d12	84	50 - 150
Benzo(k)fluoranthene-d12	98	50 - 150
Chrysene-d12	102	50 - 150
Dibenz(ah)anthracene-d14	79	50 - 150
Fluoranthene-d10	98	50 - 150
Fluorene d-10	70	50 - 150
Indeno(1,2,3-cd)pyrene-d12	85	50 - 150
Naphthalene-d8	86	50 - 150
Perylene-d12	87	50 - 150
Phenanthrene-d10	67	50 - 150
Pyrene-d10	95	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-11-10

Lot-Sample #...:	G9G200205-020	Work Order #...:	D19WR101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

FH Lab Blank

ARAMETER	RESULT	REPORTING LIMIT	UNITS
cenaphthene	ND	20	ng
cenaphthylene	ND	20	ng
nthracene	ND	20	ng
enzo(a)anthracene	ND	20	ng
enzo(b)fluoranthene	ND	20	ng
enzo(k)fluoranthene	ND	20	ng
enzo(ghi)perylene	ND	20	ng
enzo(a)pyrene	ND	20	ng
enzo(e)pyrene	ND	20	ng
hrysene	ND	20	ng
ibenz(a,h)anthracene	ND	20	ng
luoranthene	ND	20	ng
luorene	ND	20	ng
ndeno(1,2,3-cd)pyrene	ND	20	ng
-Methylnaphthalene	ND	20	ng
aphthalene	21	20	ng
erylene	ND	20	ng
yrene	ND	20	ng
henanthrene	ND	20	ng

NTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
cenaphthene-d10	94	50 - 150
cenaphthylene-d8	91	50 - 150
enzo(a)anthracene-d12	79	50 - 150
enzo(a)pyrene-d12	76	50 - 150
enzo(b)fluoranthene-d12	91	50 - 150
enzo(ghi)perylene-d12	83	50 - 150
enzo(k)fluoranthene-d12	93	50 - 150
hrysene-d12	109	50 - 150
ibenz(ah)anthracene-d14	74	50 - 150
luoranthene-d10	94	50 - 150
luorene d-10	76	50 - 150
ndeno(1,2,3-cd)pyrene-d12	80	50 - 150
aphthalene-d8	92	50 - 150
erylene-d12	78	50 - 150
henanthrene-d10	62	50 - 150
yrene-d10	96	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

METHOD BLANK REPORT

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Lot #...:	G9G200205	Work Order #...:	D1DLC101	Matrix	AIR
MB Lot-Sample #:	G9H160000155B				
Prep Date.....:	8/16/99	Analysis Date..:	8/25/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	20	ng
Acenaphthylene	ND	20	ng
Anthracene	ND	20	ng
Benzo(a)anthracene	ND	20	ng
Benzo(b)fluoranthene	ND	20	ng
Benzo(k)fluoranthene	ND	20	ng
Benzo(ghi)perylene	ND	20	ng
Benzo(a)pyrene	ND	20	ng
Benzo(e)pyrene	ND	20	ng
Chrysene	ND	20	ng
Dibenz(a,h)anthracene	ND	20	ng
Fluoranthene	ND	20	ng
Fluorene	ND	20	ng
Indeno(1,2,3-cd)pyrene	ND	20	ng
2-Methylnaphthalene	ND	20	ng
Naphthalene	ND	20	ng
Perylene	ND	20	ng
Pyrene	ND	20	ng
Phenanthrene	ND	20	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	102	50 - 150
Acenaphthylene-d8	95	50 - 150
Benzo(a)anthracene-d12	73	50 - 150
Benzo(a)pyrene-d12	86	50 - 150
Benzo(b)fluoranthene-d12	84	50 - 150
Benzo(ghi)perylene-d12	91	50 - 150
Benzo(k)fluoranthene-d12	101	50 - 150
Chrysene-d12	104	50 - 150
Dibenz(ah)anthracene-d14	81	50 - 150
Fluoranthene-d10	98	50 - 150
Fluorene d-10	92	50 - 150
Indeno(1,2,3-cd)pyrene-d12	86	50 - 150
Naphthalene-d8	88	50 - 150
Perylene-d12	91	50 - 150
Phenanthrene-d10	72	50 - 150
Pyrene-d10	98	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Lot #...:	G9G200205	Work Order #...:	D1DLC102	Matrix.....:	AIR
LCS Lot-Sample #:	G9H160000155C				
Prep Date.....:	8/16/99	Analysis Date..:	8/25/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

PARAMETER	RESULT	SPIKE AMOUNT	UNITS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene	**150**	**200**	**ng**	**75**	**50 - 150**
Acenaphthylene	**188**	**200**	**ng**	**94**	**50 - 150**
Anthracene	**218**	**200**	**ng**	**109**	**50 - 150**
Benzo(a)anthracene	**194**	**200**	**ng**	**97**	**50 - 150**
Benzo(b)fluoranthene	**175**	**200**	**ng**	**88**	**50 - 150**
Benzo(k)fluoranthene	**207**	**200**	**ng**	**104**	**50 - 150**
Benzo(ghi)perylene	**194**	**200**	**ng**	**97**	**50 - 150**
Benzo(a)pyrene	**197**	**200**	**ng**	**98**	**50 - 150**
Benzo(e)pyrene	**204**	**200**	**ng**	**102**	**50 - 150**
Chrysene	**200**	**200**	**ng**	**100**	**50 - 150**
Dibenz(a,h)anthracene	**215**	**200**	**ng**	**107**	**50 - 150**
Fluoranthene	**192**	**200**	**ng**	**96**	**50 - 150**
Fluorene	**225**	**200**	**ng**	**112**	**50 - 150**
Indeno(1,2,3-cd)pyrene	**181**	**200**	**ng**	**91**	**50 - 150**
2-Methylnaphthalene	**193**	**200**	**ng**	**96**	**50 - 150**
Naphthalene	**213**	**200**	**ng**	**107**	**50 - 150**
Perylene	**200**	**200**	**ng**	**100**	**50 - 150**
Phenanthrene	**190**	**200**	**ng**	**95**	**50 - 150**
Pyrene	**204**	**200**	**ng**	**102**	**50 - 150**

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	122	50 - 150
Acenaphthylene-d8	102	50 - 150
Benzo(a)anthracene-d12	96	50 - 150
Benzo(b)fluoranthene-d12	108	50 - 150
Benzo(k)fluoranthene-d12	102	50 - 150
Benzo(ghi)perylene-d12	100	50 - 150
Benzo(a)pyrene-d12	98	50 - 150
Chrysene-d12	109	50 - 150
Dibenz(ah)anthracene-d14	96	50 - 150
Fluorene d-10	101	50 - 150
Fluoranthene-d10	111	50 - 150
Indeno(1,2,3-cd)pyrene-d12	99	50 - 150
Naphthalene-d8	98	50 - 150
Perylene-d12	98	50 - 150
Phenanthrene-d10	89	50 - 150
Pyrene-d10	108	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off error in calculated results

Bold print denotes control parameters

AMENDED
MAY 8
GBL
BH Run 2

BATTELLE

Client Sample ID: 48190-09-02

Trace Level Organic Compounds

Lot-Sample #...: G9G200205-003 Work Order #...: D19W6101 Matrix.....: AIR
Date Sampled...: 08/09/99 Date Received..: 08/11/99
Prep Date.....: 08/16/99 Analysis Date..: 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	160	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	1700 D,JA	400	ng	CA-2 CARB 429 MOD
Anthracene	210 JA	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	83	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	860	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	840	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	130	20	ng	CA-2 CARB 429 MOD
Benzo(a)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	530 JA	20	ng	CA-2 CARB 429 MOD
Chrysene	3300 E	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	20	20	ng	CA-2 CARB 429 MOD
Fluoranthene	3900 E	20	ng	CA-2 CARB 429 MOD
Fluorene	1500 E	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	97	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	32000 D,E,B	400	ng	CA-2 CARB 429 MOD
Naphthalene	450000 D,E,B	400	ng	CA-2 CARB 429 MOD
Perylene	370 JA	20	ng	CA-2 CARB 429 MOD
Pyrene	2600 E	20	ng	CA-2 CARB 429 MOD
Phenanthrene	33000 D,E,B	20	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	76	(50 - 150)
Acenaphthylene-d8	1.5 *	(50 - 150)
Benzo(a)anthracene-d12	42 *	(50 - 150)
Benzo(a)pyrene-d12	6.1 *	(50 - 150)
Benzo(b)fluoranthene-d12	102	(50 - 150)
Benzo(ghi)perylene-d12	47 *	(50 - 150)
Benzo(k)fluoranthene-d12	68	(50 - 150)
Chrysene-d12	66	(50 - 150)
Dibenz(ah)anthracene-d14	58	(50 - 150)
Fluoranthene-d10	73	(50 - 150)
Fluorene d-10	93	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	60	(50 - 150)
Naphthalene-d8	91	(50 - 150)
Perylene-d12	1.9 *	(50 - 150)
Phenanthrene-d10	124	(50 - 150)
Pyrene-d10	64	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	24 *	(0.0- 0.0)

(Continued on next page)

AMENDED
MAY 1 0 2000

BATTELLE

Client Sample ID: 48190-09-02

Trace Level Organic Compounds

BH Run 2

Lot-Sample #...: G9G200205-003 Work Order #...: D19W6101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

D Result was obtained from the analysis of a dilution.

JA The analyte was positively identified, but the quantitation is an estimate.

E Estimated result. Result concentration exceeds the calibration range.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

AMENDED

MAY

BH - Run 3

BATTELLE

Client Sample ID: 48190-09-03

Trace Level Organic Compounds

Lot-Sample #...: G9G200205-004 **Work Order #...:** D19W8101 **Matrix.....** AIR
Date Sampled...: 08/09/99 **Date Received..:** 08/11/99
Prep Date.....: 08/16/99 **Analysis Date..:** 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	130	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	2000 E,JA	20	ng	CA-2 CARB 429 MOD
Anthracene	82 JA	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	390	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	910	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	470	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	89	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	540 JA	20	ng	CA-2 CARB 429 MOD
Chrysene	2000 E	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	25	20	ng	CA-2 CARB 429 MOD
Fluoranthene	3600 E	20	ng	CA-2 CARB 429 MOD
Fluorene	1700 E	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	88	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	30000 D,E,B	400	ng	CA-2 CARB 429 MOD
Naphthalene	380000 D,B,E	400	ng	CA-2 CARB 429 MOD
Pyrene	2400 E	20	ng	CA-2 CARB 429 MOD
Phenanthrene	33000 D,E	20	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	87	(50 - 150)
Acenaphthylene-d8	0.70 *	(50 - 150)
Benzo(a)anthracene-d12	36 *	(50 - 150)
Benzo(a)pyrene-d12	4.9 *	(50 - 150)
Benzo(b)fluoranthene-d12	88	(50 - 150)
Benzo(ghi)perylene-d12	47 *	(50 - 150)
Benzo(k)fluoranthene-d12	86	(50 - 150)
Chrysene-d12	88	(50 - 150)
Dibenz(ah)anthracene-d14	63	(50 - 150)
Fluoranthene-d10	82	(50 - 150)
Fluorene d-10	90	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	68	(50 - 150)
Naphthalene-d8	89	(50 - 150)
Phenanthrene-d10	128	(50 - 150)
Pyrene-d10	70	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	31 *	(0.0- 0.0)

(Continued on next page)

AMENDED
MAY 1 0 1995

BATTELLE

Client Sample ID: 48190-09-03

Trace Level Organic Compounds

BH - Run 3

Lot-Sample #...: G9G200205-004 Work Order #...: D19W8101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

E Estimated result. Result concentration exceeds the calibration range.

JA The analyte was positively identified, but the quantitation is an estimate.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

BATTELLE

Client Sample ID: 48190-09-04

Trace Level Organic Compounds

BH Run 4

Lot-Sample #...: G9G200205-005 Work Order #...: D19W9101 Matrix.....: AIR
Date Sampled...: 08/09/99 Date Received..: 08/11/99
Prep Date.....: 08/16/99 Analysis Date..: 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	26	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	260 JA	20	ng	CA-2 CARB 429 MOD
Anthracene	93	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	82	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	170	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	120	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	85	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	120 JA	20	ng	CA-2 CARB 429 MOD
Chrysene	440	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Fluoranthene	910	20	ng	CA-2 CARB 429 MOD
Fluorene	130	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	45	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	1300 D,B	200	ng	CA-2 CARB 429 MOD
Naphthalene	210000 D,E,B	200	ng	CA-2 CARB 429 MOD
Perylene	57 JA	20	ng	CA-2 CARB 429 MOD
Pyrene	490	20	ng	CA-2 CARB 429 MOD
Phenanthrene	8000 E	20	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	73	(50 - 150)
Acenaphthylene-d8	1.2 *	(50 - 150)
Benzo(a)anthracene-d12	38 *	(50 - 150)
Benzo(b)fluoranthene-d12	86	(50 - 150)
Benzo(ghi)perylene-d12	67	(50 - 150)
Benzo(k)fluoranthene-d12	74	(50 - 150)
Chrysene-d12	73	(50 - 150)
Dibenz(ah)anthracene-d14	63	(50 - 150)
Fluoranthene-d10	82	(50 - 150)
Fluorene d-10	108	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	68	(50 - 150)
Naphthalene-d8	77	(50 - 150)
Perylene-d12	1.8 *	(50 - 150)
Phenanthrene-d10	125	(50 - 150)
Pyrene-d10	74	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	13 *	(0.0- 0.0)

(Continued on next page)

BATTELLE

AMENDED

MAY 10 1... 6

Client Sample ID: 48190-09-04

Trace Level Organic Compounds

BH - Run 4

Lot-Sample #...: G9G200205-005 Work Order #...: D19W9101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

JA The analyte was positively identified, but the quantitation is an estimate.

D Result was obtained from the analysis of a dilution.

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

E Estimated result. Result concentration exceeds the calibration range.

BATTELLE

Client Sample ID: 48190-09-05

Trace Level Organic Compounds

BH - PB 1

Lot-Sample #...: G9G200205-006 **Work Order #...:** D19WA101 **Matrix.....:** AIR
Date Sampled...: 08/09/99 **Date Received..:** 08/11/99
Prep Date.....: 08/16/99 **Analysis Date..:** 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	ND	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	ND	20	ng	CA-2 CARB 429 MOD
Anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	**29**	**20**	**ng**	**CA-2 CARB 429 MOD**
Benzo(a)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Chrysene	ND	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Fluoranthene	**21**	**20**	**ng**	**CA-2 CARB 429 MOD**
Fluorene	ND	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	ND	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	ND	120	ng	CA-2 CARB 429 MOD
Naphthalene	ND	470	ng	CA-2 CARB 429 MOD
Perylene	ND	20	ng	CA-2 CARB 429 MOD
Pyrene	**28**	**20**	**ng**	**CA-2 CARB 429 MOD**
Phenanthrene	ND J	120	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	111	(50 - 150)
Acenaphthylene-d8	96	(50 - 150)
Benzo(a)anthracene-d12	97	(50 - 150)
Benzo(a)pyrene-d12	97	(50 - 150)
Benzo(b)fluoranthene-d12	102	(50 - 150)
Benzo(ghi)perylene-d12	92	(50 - 150)
Benzo(k)fluoranthene-d12	109	(50 - 150)
Chrysene-d12	121	(50 - 150)
Dibenz(ah)anthracene-d14	90	(50 - 150)
Fluoranthene-d10	103	(50 - 150)
Fluorene d-10	84	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	94	(50 - 150)
Naphthalene-d8	91	(50 - 150)
Perylene-d12	100	(50 - 150)
Phenanthrene-d10	78	(50 - 150)
Pyrene-d10	103	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	61 *	(0.0- 0.0)

(Continued on next page)

BATTELLE

AMENDED

MAY 1 0 2000

Client Sample ID: 48190-09-05

Trace Level Organic Compounds

BH-PB1

Lot-Sample #...: G9G200205-006 Work Order #...: D19WA101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

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

BATTELLE

Client Sample ID: 48190-09-06

Trace Level Organic Compounds

BH PB2

Lot-Sample #...: G9G200205-007 **Work Order #...:** D19WC101 **Matrix.....:** AIR
Date Sampled...: 08/09/99 **Date Received..:** 08/11/99
Prep Date.....: 08/16/99 **Analysis Date..:** 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	ND	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	ND	20	ng	CA-2 CARB 429 MOD
Anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	**69**	**20**	**ng**	**CA-2 CARB 429 MOD**
Benzo(a)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Chrysene	ND	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Fluoranthene	**37**	**20**	**ng**	**CA-2 CARB 429 MOD**
Fluorene	ND	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	ND	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	ND J	120	ng	CA-2 CARB 429 MOD
Naphthalene	ND J	470	ng	CA-2 CARB 429 MOD
Perylene	ND	20	ng	CA-2 CARB 429 MOD
Pyrene	**58**	**20**	**ng**	**CA-2 CARB 429 MOD**
Phenanthrene	ND J	120	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	94	(50 - 150)
Acenaphthylene-d8	89	(50 - 150)
Benzo(a)anthracene-d12	95	(50 - 150)
Benzo(a)pyrene-d12	98	(50 - 150)
Benzo(b)fluoranthene-d12	105	(50 - 150)
Benzo(ghi)perylene-d12	85	(50 - 150)
Benzo(k)fluoranthene-d12	102	(50 - 150)
Chrysene-d12	116	(50 - 150)
Dibenz(ah)anthracene-d14	85	(50 - 150)
Fluoranthene-d10	86	(50 - 150)
Fluorene d-10	83	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	89	(50 - 150)
Naphthalene-d8	77	(50 - 150)
Perylene-d12	95	(50 - 150)
Phenanthrene-d10	70	(50 - 150)
Pyrene-d10	86	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	69 *	(0.0- 0.0)

(Continued on next page)

BATTELLE

Client Sample ID: 48190-09-06

Trace Level Organic Compounds

BH - PB 2

Lot-Sample #...: G9G200205-007 Work Order #...: D19WC101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

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

BH FB 1

BATTELLE

Client Sample ID: 48190-09-07

Trace Level Organic Compounds

Lot-Sample #...: G9G200205-008 **Work Order #...:** D19WD101 **Matrix.....** AIR
Date Sampled...: 08/09/99 **Date Received..:** 08/11/99
Prep Date.....: 08/16/99 **Analysis Date..:** 08/26/99
Prep Batch #...: 9228155
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
Acenaphthene	ND	20	ng	CA-2 CARB 429 MOD
Acenaphthylene	ND	20	ng	CA-2 CARB 429 MOD
Anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(a)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(b)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(k)fluoranthene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(ghi)perylene	**67**	**20**	**ng**	**CA-2 CARB 429 MOD**
Benzo(a)pyrene	ND	20	ng	CA-2 CARB 429 MOD
Benzo(e)pyrene	**25**	**20**	**ng**	**CA-2 CARB 429 MOD**
Chrysene	ND	20	ng	CA-2 CARB 429 MOD
Dibenz(a,h)anthracene	ND	20	ng	CA-2 CARB 429 MOD
Fluoranthene	**50**	**20**	**ng**	**CA-2 CARB 429 MOD**
Fluorene	ND	20	ng	CA-2 CARB 429 MOD
Indeno(1,2,3-cd)pyrene	ND	20	ng	CA-2 CARB 429 MOD
2-Methylnaphthalene	ND J	120	ng	CA-2 CARB 429 MOD
Naphthalene	ND J	470	ng	CA-2 CARB 429 MOD
Perylene	ND	20	ng	CA-2 CARB 429 MOD
Pyrene	**55**	**20**	**ng**	**CA-2 CARB 429 MOD**
Phenanthrene	ND J	120	ng	CA-2 CARB 429 MOD

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	95	(50 - 150)
Acenaphthylene-d8	86	(50 - 150)
Benzo(a)anthracene-d12	83	(50 - 150)
Benzo(a)pyrene-d12	88	(50 - 150)
Benzo(b)fluoranthene-d12	104	(50 - 150)
Benzo(ghi)perylene-d12	110	(50 - 150)
Benzo(k)fluoranthene-d12	104	(50 - 150)
Chrysene-d12	111	(50 - 150)
Dibenz(ah)anthracene-d14	119	(50 - 150)
Fluoranthene-d10	99	(50 - 150)
Fluorene d-10	77	(50 - 150)
Indeno(1,2,3-cd)pyrene-d12	114	(50 - 150)
Naphthalene-d8	78	(50 - 150)
Perylene-d12	91	(50 - 150)
Phenanthrene-d10	71	(50 - 150)
Pyrene-d10	95	(50 - 150)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
13C6-Fluorene	62 *	(0.0- 0.0)

(Continued on next page)

BATTELLE

Client Sample ID: 48190-09-07

Trace Level Organic Compounds

BH - FB 1

Lot-Sample #...: G9G200205-008 Work Order #...: D19WD101 Matrix.....: AIR

NOTE(S):

* Surrogate recovery is outside stated control limits.

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

BATTELLE

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS) Quanterra

Client Sample ID: 48190-09-09

Lot-Sample #...:	G9G200205-009	Work Order #...:	D19WE101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5	BH	LCS
Dilution Factor:	1				

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	170		20	ng
Acenaphthylene	180		20	ng
Anthracene	250		20	ng
Benzo(a)anthracene	200		20	ng
Benzo(b)fluoranthene	200		20	ng
Benzo(k)fluoranthene	200		20	ng
Benzo(ghi)perylene	190		20	ng
Benzo(a)pyrene	200		20	ng
Benzo(e)pyrene	210		20	ng
Chrysene	190		20	ng
Dibenz(a,h)anthracene	210		20	ng
Fluoranthene	220		20	ng
Fluorene	230		20	ng
Indeno(1,2,3-cd)pyrene	190		20	ng
2-Methylnaphthalene	210	B	120	ng
Naphthalene	ND	J	470	ng
Perylene	200		20	ng
Pyrene	210		20	ng
Phenanthrene	210	B	120	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	109	50 - 150
Acenaphthylene-d8	98	50 - 150
Benzo(a)anthracene-d12	91	50 - 150
Benzo(a)pyrene-d12	93	50 - 150
Benzo(b)fluoranthene-d12	99	50 - 150
Benzo(ghi)perylene-d12	98	50 - 150
Benzo(k)fluoranthene-d12	106	50 - 150
Chrysene-d12	114	50 - 150
Dibenz(ah)anthracene-d14	99	50 - 150
Fluoranthene-d10	106	50 - 150
Fluorene d-10	88	50 - 150
Indeno(1,2,3-cd)pyrene-d12	99	50 - 150
Naphthalene-d8	92	50 - 150
Perylene-d12	91	50 - 150
Phenanthrene-d10	76	50 - 150
Pyrene-d10	102	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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

BATTELLE

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS) Quanterra

Client Sample ID: 48190-09-10

Lot-Sample #...:	G9G200205-010	Work Order #...:	D19WF101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/26/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

BH LCS Duplicat

PARAMETER	RESULT		REPORTING LIMIT	UNITS
Acenaphthene	150		20	ng
Acenaphthylene	170		20	ng
Anthracene	200		20	ng
Benzo(a)anthracene	190		20	ng
Benzo(b)fluoranthene	170		20	ng
Benzo(k)fluoranthene	200		20	ng
Benzo(ghi)perylene	190		20	ng
Benzo(a)pyrene	190		20	ng
Benzo(e)pyrene	230		20	ng
Chrysene	180		20	ng
Dibenz(a,h)anthracene	190		20	ng
Fluoranthene	200		20	ng
Fluorene	230		20	ng
Indeno(1,2,3-cd)pyrene	170		20	ng
Methylnaphthalene	200	B	120	ng
Naphthalene	ND	J	470	ng
Perylene	190		20	ng
Pyrene	190		20	ng
Phenanthrene	210	B	120	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	100	50 - 150
Acenaphthylene-d8	89	50 - 150
Benzo(a)anthracene-d12	86	50 - 150
Benzo(a)pyrene-d12	81	50 - 150
Benzo(b)fluoranthene-d12	100	50 - 150
Benzo(ghi)perylene-d12	87	50 - 150
Benzo(k)fluoranthene-d12	98	50 - 150
Chrysene-d12	111	50 - 150
Dibenz(ah)anthracene-d14	86	50 - 150
Fluoranthene-d10	102	50 - 150
Fluorene d-10	93	50 - 150
Indeno(1,2,3-cd)pyrene-d12	89	50 - 150
Naphthalene-d8	89	50 - 150
Perylene-d12	76	50 - 150
Phenanthrene-d10	83	50 - 150
Pyrene-d10	98	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

B Method blank contamination. The associated method blank contains the target analyte at a reportable level.

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

BATTELLE

Quanterra

Hydrocarbons, Polycyclic Aromatic (HRGC/HRMS)

Client Sample ID: 48190-09-11

Lot-Sample #...:	G9G200205-011	Work Order #...:	D19WG101	Matrix.....:	AIR
Date Sampled...:	8/9/99	Date Received..:	8/11/99		
Prep Date.....:	8/16/99	Analysis Date..:	8/30/99		
Prep Batch #...:	9228155	Instrument.....:	8D5		
Dilution Factor:	1				

BH Lab Blank

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Acenaphthene	ND	20	ng
Acenaphthylene	ND	20	ng
Anthracene	ND	20	ng
Benzo(a)anthracene	ND	20	ng
Benzo(b)fluoranthene	ND	20	ng
Benzo(k)fluoranthene	ND	20	ng
Benzo(ghi)perylene	ND	20	ng
Benzo(a)pyrene	ND	20	ng
Benzo(e)pyrene	ND	20	ng
Chrysene	ND	20	ng
Dibenz(a,h)anthracene	ND	20	ng
Fluoranthene	ND	20	ng
Fluorene	ND	20	ng
Indeno(1,2,3-cd)pyrene	ND	20	ng
2-Methylnaphthalene	25	20	ng
Naphthalene	94	20	ng
Perylene	ND	20	ng
Pyrene	ND	20	ng
Phenanthrene	25	20	ng

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
Acenaphthene-d10	97	50 - 150
Acenaphthylene-d8	97	50 - 150
Benzo(a)anthracene-d12	65	50 - 150
Benzo(a)pyrene-d12	79	50 - 150
Benzo(b)fluoranthene-d12	81	50 - 150
Benzo(ghi)perylene-d12	86	50 - 150
Benzo(k)fluoranthene-d12	109	50 - 150
Chrysene-d12	135	50 - 150
Dibenz(ah)anthracene-d14	67	50 - 150
Fluoranthene-d10	130	50 - 150
Fluorene d-10	78	50 - 150
Indeno(1,2,3-cd)pyrene-d12	79	50 - 150
Naphthalene-d8	100	50 - 150
Perylene-d12	86	50 - 150
Phenanthrene-d10	66	50 - 150
Pyrene-d10	123	50 - 150

NOTES:

Calculations are performed before rounding to avoid round-off errors in calculated results

APPENDIX H

Chlorine Analytical Lab Raw Data Results

H-1
Chlorine Sewage Sludge Results

Chlorine Laboratory Sludge Results Summary Table H-1
Chlorine Sewage Sludge Results
(mg/kg)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-S-R1-113D	MSD-S-R3-313D/C	MSD-S-R4-411C/D
Analysis Date	7-21-99	7-22-99	7-23-99
Chlorine Sewage Sludge Results			
Free Chlorine (mg/kg)	18.49	4.84	17.14
Total Chlorine (mg/kg)	{0.00}	4.84	4.29

Footnotes

1. Calculated values from sludge extract volume and sludge weight; uncorrected for Blank Cl_2 content
2. Blank sample composed of extract fluid generated from 5.01 grams of sludge mixed with 96.5 milliliters (mL) DI water, 3.5 mL HCl heated to 50°C for 10 minutes, cooled to ambient temp. at EPA T&E Laboratory.

{value} = reported value is less than sample specific detection limit
(value) = not detected

H-2
Chlorine Scrubber Water Inlet Results

Chlorine Laboratory Scrubber Water In Results Summary Table H-2
Chlorine Scrubber Water In Results
(mg/L)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-WI-R2-211D	MSD-WI-R3-311C	MSD-WI-R4-413C/D
Analysis Date	7/21/99	7/22/99	7/23/99
Chlorine Scrubber Water In Results			
Free Chlorine (mg/L)	0.01	0.05	0.03
Total Chlorine (mg/L)	{-0.01}	0.08	0.05

Footnotes

1. Uncorrected for Blank Free or Total Cl_2 content
2. Total Cl_2 results are lower than corresponding free Cl_2 results due to possible color interference.
3. Blank sample composed of DI water prepared by EPA T&E Laboratory staff.

{value} = reported value is less than sample specific detection limit
(value) = not detected

H-3
Chlorine Scrubber Water Outlet Results

Chlorine Laboratory Scrubber Water Out Results Summary Table H-3
Chlorine Scrubber Water Out Results
(mg/L)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-WO-R2-211D	MSD-WO-R3-312D	MSD-WO-R4-412C/D
Analysis Date	7-21-99	7-22-99	7-23-99
Chlorine Scrubber Water Out Results			
Free Chlorine (mg/L)	0.03	0.05	0.01
Total Chlorine (mg/L)	0.05	0.03	0.02

Footnotes

1. Uncorrected for Blank Free or Total Cl_2 content
2. Total Cl_2 results are lower than corresponding free Cl_2 results due to possible color interference.
3. Blank sample composed of DI water prepared by EPA T&E Laboratory staff.

{value} = reported value is less than sample specific detection limit
(value) = not detected

H-4
Chlorine Lab Sludge Blank Results

Chlorine Laboratory "Sludge" Blank Results Summary Table H-4
Chlorine Laboratory Blank Fractions
(mg/L)

	Laboratory Blank	**Laboratory Spike**	
T & E Sample No.	**Blank Extract**	**Blank Extract**	N/A
Analysis Date	7/22/99	7/23/99	
Chlorine Analytes			
Free Chlorine (mg/L)	0.03	0.04	
Total Chlorine (mg/L)	0.01	0.03	

Footnotes

1. Blank extract sample composed of extract fluid generated from 5.01 grams of sludge mixed with 96.5 milliliters (mL) DI water, 3.5 mL HCl heated to 50°C for 10 minutes, cooled to ambient temp. at EPA T&E Laboratory.

{value} = reported value is less than sample specific detection limit
(value) = below detection limit

H-5
Chlorine Lab Water Blank Results

Chlorine Laboratory "Scrubber Water" Blank Results Summary Table H-5
Chlorine Laboratory Blank Fractions
(mg/L)

	Laboratory Blanks		
T & E Sample No.	**Blank DI**	**Blank DI**	**Blank DI**
Analysis Date	7/21/99	7/22/99	7/23/99
Chlorine Analytes			
Free Chlorine (mg/L)	0.03	0.04	0.03
Total Chlorine (mg/L)	0.02	0.01	0.02

Footnotes

1. Blank sample composed of DI water prepared by EPA T&E Laboratory staff.

{value} = reported value is less than sample specific detection limit
(value) = below detection limit

H-6
Chlorine Field Water Blank Results

Chlorine Field "Scrubber Water" Blank Results Summary Table H-6
Chlorine Field Blank Fractions
(mg/L)

	Field Blanks		
T & E Sample No.	Grab WI	Grab WO	Grab WO-DUP
Analysis Date	7/21/99	7/21/99	7/21/99
Chlorine Analytes			
Free Chlorine (mg/L)	0.05	0.04	0.04
Total Chlorine (mg/L)	0.09	(0.00)	(0.00)

Footnotes

1. Uncorrected for Blank Free or Total Cl_2 content
2. Total Cl_2 results are lower than corresponding free Cl_2 results due to possible color interference.
3. Field blank samples composed of DI water prepared by EPA T&E Laboratory staff.

{value} = reported value is less than sample specific detection limit
(value) = below detection limit

H-7
Chlorine Lab Raw Data Sheets

H-7

T&E Lab Sheets

Battelle Project

Soil Samples

Date	Sample ID	Sample weight (A)	% solids provided (B)	Volume extract used (A x B x 20)	Free Cl2 (mg/L)	Total Cl2 (mg/L)	
7/21/99	MSD-S-R1-113D	103.9996	25.39	528			
7/21/99	MSD-S-R1-113D	10.75	25.39	497	0.04	0.00	1 hr To F
7/22/99	MSD-S-R3-313D/C	10.3340	25.39	500	0.01	0.01	20 min To
7/23/99	MSD-S-R4-411C/D	10.033	25.39	430	0.01	0.01	40 min to I

Date	Sample ID	Free Cl2 (mg/L)	Total Cl2 (mg/L)
7/21/99	MSD-WI-R2-211D	0.01	-0.01
7/21/99	MSD-WO-R2-212D	0.03	0.05
7/21/99	GRAB WI	0.05	0.09
7/21/99	GRAB WO	0.04	0.00
7/21/99	GRAB WO-DUP	0.04	0.00
7/21/99	BLANK DI	0.03	0.02
7/22/99	MSD-WO-R3-312D	0.05	0.03
7/22/99	MSD-WI-R3-311C	0.05	0.08
7/22/99	BLANK DI	0.04	0.01
7/22/99	BLANK EX	0.03	0.01
7/23/99	MSD-WI-R4-413C/D	0.14 / REDO 0.03	0.05
7/23/99	MSD-WO-R4-412C/D	0.01	0.02
7/23/99	BLANK DI	0.03	0.02
7/23/99	BLANK EX	0.04	0.03

PRELIMINARY TEST

5.01 g SLUDGE
+ 96.5 mL DI WATER

MIX 5 MIN
pH = 8.31

ADDED 3.5 mL HCl
HEATED TO 50°C
HELD @ 50°C FOR 10 MIN.
COOL TO ROOM TEMPERATURE (27°C)
pH = 3.99

EXTRACTION FLUID #1 WILL BE US

Battelle Project

Soil Samples

Date	Sample ID	Sample Weight (g)	% Solid (percent)	Volume extract used (mL)	Free Cl (mg/L)	Total Cl (mg/L)	
	MSD-WI-R2-[illegible]		25.39				
7/21/99	MSD-S-R1-113D	10.3996		[illegible] mL	[illegible]		Dilute 1:[illegible] to fill
7/21/99	MSD-S-R1 113D	10.75	25.39	497 ml	0.04	0.00	
	DI Water Blank				0.03	0.02	
7/22/99	MSD-S-R3-313D/313C	10.3340	25.39	500 mL	0.01	0.01	Begin fill 1:40
	DI Water Blank				0.04	0.01	
	Extract Blank				0.03	0.02	
7/23		10.033	25.39	430 mL	0.04	0.01	Begin fill

Water Samples

Date	Sample ID	Free Cl (mg/L)	Total Cl (mg/L)
7/21/99	MSD-WI-R2-211D	0.01	-0.01
"	MSD-WO R1-212D	0.03	0.05
7/21/99	Grab WI	0.05	0.09
	Grab WO	0.04	0.00
	WO Dup.	0.04	0.00
	MSD-WO R3-312D	0.05	0.03
	MSD-WI R3-311C	0.05	0.09
7/23	Ex Blank	Beaker Broke Lost Sample	0.02
—	DI Blank	0.03	0.02
	MSD-WI-R4-413D/C	0.14 / Rech 0.03	0.05
	MSD-WO-R4-412C/D	0.01	0.02
	Ex Blank Rech	0.04	0.03

[illegible]
5.01 g sla[illegible]
+ 96.5 mL
mix 5 m[illegible]
pH = 8.31

Table 2: Battelle Project Sludge Sample Results

Date	Sample ID	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7/21/99	MSD-S-R1-113D	0.04	0.00	0.001075	0.497	23.51	18.49	0.00
7/22/99	MSD-S-R3-313D/C	0.01	0.01	0.001033	0.500	19.99	4.84	4.84
7/22/99	BLANK EXTRACT	0.03	0.01	-	-	-	-	-
7/23/99	MSD-S-R4-411C/D	0.04	0.01	0.001003	0.430	20.43	17.14	4.29
7/23/99	BLANK EXTRACT	0.04	0.03	-	-	-	-	-

(1) Not corrected for Blank Cl_2 readings

(2) Calculation used: (mg Cl_2/ L extract) X (L extract/ Kg Sludge) = mg Cl_2/ Kg Sludge

Table 3: Battelle Project Water Sample Results

Date	Sample ID	Free Cl_2 (mg/L)	Total Cl_2 (mg/L)	Average % Sample
7/21/99	MSD-WI-R2-211D	0.01	-0.01	0.15
7/21/99	MSD-WO-R2-212D	0.03	0.05	0.15
7/21/99	GRAB WI	0.05	0.09	-
7/21/99	GRAB WO	0.04	0.00	-
7/21/99	GRAB WO-DUP	0.04	0.00	-
7/21/99	BLANK DI	0.03	0.02	-
7/22/99	MSD-WO-R3-312D	0.05	0.03	0.14
7/22/99	MSD-WI-R3-311C	0.05	0.08	0.13
7/22/99	BLANK DI	0.04	0.01	-
7/23/99	MSD-WI-R4-413C/D	0.03	0.05	0.15
7/23/99	MSD-WO-R4-412C/D	0.01	0.02	0.16
7/23/99	BLANK DI	0.03	0.02	-

(1) Not corrected for Blank Free Cl_2 or Total Cl_2 readings

(2) Total Cl_2 results are lower in some cases than the corresponding free Cl_2 results possibly due to color interference.

APPENDIX I

Percent Solids Analytical Lab Raw Data Results

I-1
Total Percent Solids Results Summary

Total % Solids Laboratory Sludge Results Summary Table I-1
Total % Solids Sewage Sludge Results
(% Solids)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-S-R1-113D	MSD-S-R3-313D/C	MSD-S-R4-411C/D
Analysis Date	7-21-99	7-22-99	7-23-99
Total % Solids Sewage Sludge Results			
Total % Solids			
Aliquot A	23.53	20.04	20.39
Aliquot B	23.47	20.02	20.33
Aliquot C	23.54	19.91	20.58
Average	23.51	19.99	20.43

Other Standards Percent Recovery

N/A

Footnotes

Total % Solids Laboratory Scrubber Water In Results Summary Table I-2
Total % Solids Scrubber Water In Results
(% Solids)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-WI-R2-211D	MSD-WI-R3-311C	MSD-WI-R4-413C/D
Analysis Date	7/21/99	7/22/99	7/23/99
Total % Solids Scrubber Water In Results			
Total % Solids			
Aliquot A	0.144	0.135	0.148
Aliquot B	0.148	0.117	0.146
Aliquot C	0.146	0.134	0.145
Average	0.146	0.129	0.146

Other Standards Percent Recovery

N/A

Footnotes

Total % Solids Laboratory Scrubber Water Out Results Summary Table I-3
Total % Solids Scrubber Water Out Results
(% Solids)

	Run 2	Run 3	Run 4
T & E Sample No.	MSD-WO-R2-212D	MSD-WO-R3-312D	MSD-WO-R4-412C/D
Analysis Date	7-21-99	7-22-99	7-23-99
Total % Solids Scrubber Water Out Results			
Total % Solids			
Aliquot A	0.154	0.142	0.159
Aliquot B	0.154	0.141	0.157
Aliquot C	0.154	0.142	0.158
Average	0.154	0.142	0.158

Other Standards Percent Recovery

N/A

Footnotes

I-2
Lab Raw Data Sheets

Battelle Total Solids

Date: Time:
Initial:

Sample ID	Crucible Tare Weight (g)	Crucible + Wet Sample (g)	Crucible + Dry Sample (g)	Percent Solids	Avg
				#DIV/0!	
				#DIV/0!	#DIV/0!
				#DIV/0!	
JAGUAR	56.~~67~~9607	66.3592	59.1722	#DIV/0!	
APE	49.6151	60.0990	52.0755	#DIV/0!	#DIV/0!
OCTAPUS	53.3762	67.0392	56.5918	#DIV/0!	
				#DIV/0!	
				#DIV/0!	#DIV/0!
				#DIV/0!	
21/99					
2C SPARROW	54.2767	93.4559	54.3369	#DIV/0!	
~~Penguin~~	51.5290	97.1887	51.5991	#DIV/0!	#DIV/0!
LION	50.0622	91.7559	50.1262	#DIV/0!	
				#DIV/0!	
				#DIV/0!	#DIV/0!
				#DIV/0!	
1-6					
UNLABELED	50.8373	95.2121	50.9014	#DIV/0!	
Θ	55.6551	97.0069	55.7161	#DIV/0!	#DIV/0!
Kitten	53.7711	98.0486	53.8356	#DIV/0!	
22/99					
13C BAT	48.2665	62.8176	51.1920	#DIV/0!	
EMU	49.3746	60.7136	51.6449	#DIV/0!	#DIV/0!
Plow	45.7975	65.5715	49.7354	#DIV/0!	
C Penguin	49.8530	91.7174	49.9097	#DIV/0!	
8	48.8554	97.0765	48.9199	#DIV/0!	#DIV/0!
CAT	55.7526	104.8808	55.8183	#DIV/0!	
24C FOXHOUND	46.9767	95.7014	47.0460	#DIV/0!	
AARDVARK	44.5017	91.7426	44.5685	#DIV/0!	#DIV/0!
CHICKEN	53.1790	99.6085	53.2449	#DIV/0!	
123/99					
APE	49.6146	60.3000	51.7933	#DIV/0!	
JAGUAR	56.9623	70.2733	59.6681	#DIV/0!	#DIV/0!
Octapus	53.3759	71.2580	57.0555	#DIV/0!	
Θ	55.6560	106.1937	55.7366	#DIV/0!	
SPARROW	54.2770	93.0871	54.3379	#DIV/0!	#DIV/0!
UNLABELED	50.9391	98.2218	50.9140	#DIV/0!	
C KITTEN	53.7733	102.6944	53.8456	#DIV/0!	
LION	50.0622	96.1916	50.1296	#DIV/0!	#DIV/0!
OSTRICH	51.5304	99.0937	51.3992	#DIV/0!	

Battelle Total Solids

Date: 7/21/99
Initial: RR

Sample ID	Container	Crucible Tare Weight (g)	Crucible + Wet Sample (g)	Crucible + Dry Sample (g)	Percent Solids	Avg
[illegible]	JAGUAR	56.9607	66.3592	59.1722	23.53	23.51
[illegible]	APE	49.6151	60.0990	52.0755	23.47	
[illegible]	OCTAPUS	53.3762	67.0392	56.5918	23.54	
[illegible]	SPARROW	54.2767	93.4559	54.3369	0.154	0.154
[illegible]	OSTRICH	51.5290	97.1887	51.5991	0.154	
[illegible]	LION	50.0622	91.7559	50.1262	0.154	
[illegible]	UNLABELED	50.8373	95.2121	50.9014	0.144	0.146
[illegible]	(circle with line)	55.6551	97.0069	55.7161	0.148	
[illegible]	KITTEN	53.7711	98.0486	53.8356	0.146	

Battelle Total Solids

Date: 7/22/99
Initial: RR

Sample ID	Sample ID	Empty Dish Tare Weight (g)	Dish Tare + Wet Sample (g)	Dish Tare + Dry Sample (g)	Percent Solids	Avg
	BAT	48.2665	62.8176	51.1820	20.04	19.99
	EMU	49.3746	60.7136	51.6449	20.02	
	PLOW	45.7975	65.5715	49.7354	19.91	
	PENGUIN	49.8530	91.7174	49.9097	0.135	0.129
	8	48.8554	97.0765	48.9119	0.117	
	CAT	55.7526	104.8808	55.8183	0.134	
	FOXHOUND	46.9767	95.7014	47.0460	0.142	0.142
	AARDVARK	44.5017	91.7426	44.5685	0.141	
	CHICKEN	53.1790	99.6085	53.2449	0.142	

Battelle Total Solids

Date: 7/23/99
Initial: RR

Sample ID	Crucible ID	Crucible Tare Weight, g	Crucible + Wet Sample, g	Crucible + Dry Sample, g	Percent Solids	Avg
[illegible]	APE	49.6146	60.3000	51.7933	20.39	20.43
[illegible]	JAGUAR	56.9623	70.2733	59.6681	20.33	
[illegible]	OCTAPUS	53.3759	71.2580	57.0555	20.58	
[illegible]	(circle with line)	55.6560	106.1937	55.7366	0.159	0.158
[illegible]	SPARROW	54.2770	93.0871	54.3379	0.157	
[illegible]	unlabeled	50.8391	98.2818	50.9140	0.158	
[illegible]	KITTEN	53.7733	102.6944	53.8456	0.148	0.146
[illegible]	LION	50.0622	96.1916	50.1296	0.146	
[illegible]	OSTRICH	51.5304	99.0937	51.5992	0.145	

APPENDIX J

Ultimate / Proximate Analytical Results

J-1
Analytical Summary

Table 2-23. Ultimate Analysis Results for Sewage Sludge

Ultimate Measurement	Dry Basis, %		
	Run 2	Run 3	Run 4
Hydrogen	4.95	4.93	5.16
Nitrogen	4.76	4.51	4.91
Oxygen	12.46	15.13	13.55
Carbon	38.24	37.03	39.35
Sulphur	1.33	1.33	1.35
Ash	38.26	37.07	35.68

Table 2-24. Proximate Analysis Results for Sewage Sludge

Proximate Measurement	Run 2		Run 3		Run 4	
	As Received	Dry Basis	As Received	Dry Basis	As Received	Dry Basis
Moisture, %	76.22	--	79.13	-	78.28	--
Volatile Matter, %	13.88	58.35	12.24	58.67	13.04	60.03
Fixed Carbon, %	0.80	3.39	0.89	4.26	0.93	4.29
Sulphur, %	0.32	1.33	0.28	1.33	0.29	1.35
BTU Content (BTU/lb)	1629	6852	1481	7097	1586	7302

J-2
Lab Raw Data Sheets

COMMERCIAL TESTING & ENGINEERING CO.
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ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD.
SOUTH HOLLAND, IL 60473
TEL: (708) 331-2900
FAX: (708) 333-3060

August 24, 1999

BATTELLE MEMORIAL INSTITUTE
Columbus Laboratories
505 King Avenue
Columbus, OH 43201
Attn: David Davis

Sample identification by
Battelle Memorial Institute

Kind of sample reported to us: Raw Sewage

Sample taken at: Battelle

Sample taken by: ------

Date sampled: August 5, 1999

Date received: August 6, 1999

Sample ID: 47904-72-11

MSD-S-RZ-213F

P.O. No. 151530

Analysis Report No. 71-98923

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	76.22	xxxxx
% Ash	9.10	38.26
% Volatile	13.88	58.35
% Fixed Carbon	0.80	3.39
	100.00	100.00
Btu/lb	1629	6852
% Sulfur	0.32	1.33
MAF Btu		11098

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	76.22	xxxxx
% Carbon	9.09	38.24
% Hydrogen	1.18	4.95
% Nitrogen	1.13	4.76
% Sulfur	0.32	1.33
% Ash	9.10	38.26
% Oxygen (diff)	2.96	12.46
	100.00	100.00

METHODS
Moisture: ASTM E 949; Ash: ASTM E 830; Volatile: ASTM E 897; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM E 711; Sulfur: ASTM D 4239(Method C); Carbon, Hydrogen & Nitrogen: ASTM D 5373; Oxygen: Calculated Value (Difference)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.
Joseph B. Hruska
South Holland Laboratory

MEMBER ACI

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILIT
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ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD.
SOUTH HOLLAND, IL 60473
TEL: (708) 331-2900
FAX: (708) 333-3080

August 24, 1999

BATTELLE MEMORIAL INSTITUTE
Columbus Laboratories
505 King Avenue
Columbus, OH 43201
Attn: David Davis

Sample identification by
Battelle Memorial Institute

Kind of sample reported to us: Raw Sewage

Sample taken at: Battelle

Sample taken by: ------

Date sampled: August 5, 1999

Date received: August 6, 1999

Sample ID: 47904-74-5

MSD-S-R3-313F

P.O. No. 151530

Analysis Report No. 71-98924

PROXIMATE ANALYSIS	As Received	Dry Basis
% Moisture	79.13	xxxxx
% Ash	7.74	37.07
% Volatile	12.24	58.67
% Fixed Carbon	0.89	4.26
	100.00	100.00
Btu/lb	1481	7097
% Sulfur	0.28	1.33
MAF Btu		11278

ULTIMATE ANALYSIS	As Received	Dry Basis
% Moisture	79.13	xxxxx
% Carbon	7.73	37.03
% Hydrogen	1.03	4.93
% Nitrogen	0.94	4.51
% Sulfur	0.28	1.33
% Ash	7.74	37.07
% Oxygen(diff)	3.15	15.13
	100.00	100.00

METHODS
Moisture: ASTM E 949; Ash: ASTM E 830; Volatile: ASTM E 897; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM E 711; Sulfur: ASTM D 4239(Method C); Carbon, Hydrogen & Nitrogen: ASTM D 5373; Oxygen: Calculated Value (Difference)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Joseph B. Hrusovsky

South Holland Laboratory

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TEL: (708) 331-2900
FAX: (708) 333-3060

August 24, 1999

BATTELLE MEMORIAL INSTITUTE
Columbus Laboratories
505 King Avenue
Columbus, OH 43201
Attn: David Davis

Sample identification by
Battelle Memorial Institute

Kind of sample reported to us: Raw Sewage

Sample taken at: Battelle

Sample taken by: ------

Date sampled: August 5, 1999

Date received: August 6, 1999

Sample ID: 47904-75-11

MSD-S-R4-413F

P.O. No. 151530

Analysis Report No. 71-98925

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	78.28	xxxxx
% Ash	7.75	35.68
% Volatile	13.04	60.03
% Fixed Carbon	0.93	4.29
	100.00	100.00
Btu/lb	1586	7302
% Sulfur	0.29	1.35
MAF Btu		11353

ULTIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	78.28	xxxxx
% Carbon	8.55	39.35
% Hydrogen	1.12	5.16
% Nitrogen	1.07	4.91
% Sulfur	0.29	1.35
% Ash	7.75	35.68
% Oxygen (diff)	2.94	13.55
	100.00	100.00

METHODS
Moisture: ASTM E 949; Ash: ASTM E 830; Volatile: ASTM E 897; Fixed Carbon: Calculated Value; ASTM D 3172
Btu/lb: ASTM E 711; Sulfur: ASTM D 4239(Method C); Carbon, Hydrogen & Nitrogen: ASTM D 5373; Oxygen: Calculated Value (Difference)

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO
Joseph B. Hrusch
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TECHNICAL REPORT DATA

(Please read Instructions on reverse before completing)

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7. AUTHOR(S) Clyde E. Riley, USEPA — Anthony S. Wisbith, Battelle Jeffery A. Ferg, Battelle — Dennis A. Falgout, PES		8. PERFORMING ORGANIZATION REPORT NO.
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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Clean Air Act Amendments of 1990 require the U.S. Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards (OAQPS) to establish standards of performance for sewage sludge incineration. These standards are necessary to protect public health and the environment from any adverse effects of pollutant emissions from sewage sludge incineration. The regulations will contain general regulatory requirements, pollutant characterization, and emission limits. To assess control technologies as well as associated strategies for cost-effective standards, EPA requires data on PCB, D/F, and PAH emissions from sewage sludge incinerators . While some emission data exist for sewage sludge incinerators, data on coplanar polychlorinated biphenyls (PCBs) from sewage sludge incinerators are very limited.

The test report summarizes testing of a multiple hearth incinerator at the Metropolitan Sewer District (MSD) Mill Creek Wastewater Treatment Plant in Cincinnati, Ohio in July, 1999. The emission data collected in this test program will be used by EPA/OAQPS and EPA's Office of Water (OW) to support a decision about further data gathering efforts in support of MACT standards for sewage sludge incinerators. During the testing, a second EPA contractor monitored and recorded the process and emission control system operating parameters, and prepared Section 4.0, Process Description And Operation of the report. The report consist of five documents: Executive Summary Report; Volume I-Main Report; Volume II-Appendices A-J; Volume III-Appendices K-P; and a Data Quality Assessment Report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
PCBs PAHs Dioxins/furans	Air Pollution control	

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