EMISSIONS TESTING REPORT #10659
Text and Appendices A through D

PERFORMED FOR:

COVANTA PROJECTS, INC.
Fairfield, New Jersey

at the

HILLSBOROUGH COUNTY
SOLID WASTE ENERGY RECOVERY FACILITY
TAMPA, FLORIDA
Unit 4 SDA Inlet and FF Outlet
September 2009

by

TESTAR, Inc.
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Raleigh, North Carolina 27617
919-957-9500

REPORT CERTIFICATION - #10659

I hereby certify that I have personally examined and am familiar with the information submitted herein. Based upon my own knowledge and my inquiry of those individuals responsible for obtaining the information presented, the foregoing information is true, accurate and complete. I am aware that this information is being requested for the purpose of determining compliance with local, state, and federal laws and may be submitted to appropriate governmental regulatory agencies for those purposes. I am aware that there are significant penalties for submitting false information to such agencies, including the possibility of fine and imprisonment.

Signature _______________ Date: 9-15-09

Herbert T. Dixon, Jr., P.E.
Project Director

Professional Engineer, State of North Carolina

Seal Number 023011

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1.0 INTRODUCTION

1.1 General

Covanta Projects, Inc. (Covanta) operates the Hillsborough County Solid Waste Energy Recovery Facility in Tampa, Florida. Covanta contracted TESTAR, Inc. to conduct an air emissions testing program to quantify specific emissions from Unit 4 for compliance purposes. The testing program was conducted between August 31and September 03, 2009 by TESTAR under the supervision of Mr. G. J. Aldina of Covanta Projects, Inc.

1.2 Test Personnel

Table 1-1 presents the personnel that were involved in the testing program.

Table 1-1
Test Personnel

Affiliation	Personnel Responsibility
Covanta Projects	G. J. Aldina Test Coordinator
Florida Department of Environmental Protection	James Burkholder Test Observer
Camp, Dresser, & McKee, Inc.	Tony St. Clair, PE Test Observer
TESTAR, Inc.	Gary L. Williams, PE Project Director
	Blake Cone Field Laboratory Manager
	Chris Wrenn Field Laboratory Manager
	Jeff Aims Test Engineer
	Sean Daley Test Engineer
	Charles Nahrebecki Test Engineer
	Richie Perry Test Engineer
	Barrett Harris Test Engineer

1.3 Test Parameters and Run Numbers

Table 1-2 presents the test dates, sampling locations, flue gas parameters, sampling methods, and run numbers for reference for Unit 4.

Table 1-2
Unit 4 Test Sequence

Test Location	Sampling Method	Flue Gas Parameter	Run Date	Run Time	Run Number
Unit 4 SDA Inlet	EPA MM26	Hydrogen Chloride	08/31/09	0900-1006	4-I-MM26-1
			08/31/09	1037-1146	4-I-MM26-2
			08/31/09	1210-1317	4-I-MM26-3
	EPA 29	Mercury	08/31/09	0859-1123	4-I-M29-1
			08/31/09	1153-1417	4-I-M29-2
			08/31/09	1435-1656	4-I-M29-3
Unit 4 FF Outlet	EPA 23	Dioxins/Furans	09/02/09	1220-1638	4-O-M23-1
			09/0309	0755-1230	4-O-M23-2
			09/0309	1256-1715	4-O-M23-3
	EPA MM26	Hydrogen Chloride	08/31/09	0900-1006	4-O-MM26-1
			08/31/09	1037-1146	4-O-MM26-2
			08/31/09	1210-1317	4-O-MM26-3
	EPA 5/29	Particulate and Metals	08/31/09	0859-1123	4-O-M5/29-1
			08/31/09	1153-1416	4-O-M5/29-2
			08/31/09	1435-1656	4-O-M5/29-3
	EPA 9	Opacity	08/31/09	0915-1015	4-S-M9-1
	CTM 027	Ammonia	09/02/09	0756-0906	4-O-CTM027-1
			09/02/09	0923-1031	4-O-CTM027-2
			09/02/09	1048-1156	4-O-CTM027-3

Table 1-3
Utilization of EPA Method 2 and 3 Data

Runs Requiring Additional Information	Runs Providing Air Flow Rate Data	Runs Providing Flue Gas Composition Data
4-I-MM26-1	4-I-M29-1	4-I-M29-1
4-I-MM26-2	4-I-M29-1	4-I-M29-1
4-I-MM26-3	4-I-M29-2	4-I-M29-2
4-O-MM26-1	4-O-M5/29-1	4-O-M5/29-1
4-O-MM26-2	4-O-M5/29-1	4-O-M5/29-1
4-O-MM26-3	4-O-M5/29-2	4-O-M5/29-2

2.0 SUMMARY OF RESULTS

2.1 Report Organization

The results of the testing project are summarized in Section 2. The process tested is discussed in Section 3. The sampling and analytical methods utilized are discussed in Section 4 while the Quality Assurance/Quality Control results are presented in Section 5. Appendix A contains detailed results of the testing program. Appendix B contains the field data that was collected and Appendix C contains the analytical results. Appendix D contains all pertinent testing equipment calibration data. Refer to the Table of Contents and the List of Tables and Figures for a complete reference with appropriate page numbers.

2.2 Presentation of Results

Table 2-1 presents the results of the emissions testing project for Unit 4. A more detailed summary of the sampling gas parameters is presented in Appendix A.

2.3 Opacity Results

Opacity measurements were taken during one EPA Method 5/29 test run on Unit 4. No opacity results are presented in Appendix A because all values were zero. The field data sheets are located in Appendix B.

2.4 Dioxins/Furans Results

In accordance with EPA Method 23, Section 9.9, all dioxins/furans results that were below the minimum detection limit (ND) or were an estimated maximum possible concentration (EMPC) were treated as zero when averaging or totaling the results.

2.5 Non-detected Values

All non-detected results were used as a zero when calculating total catch weights and when averaging across test runs.

2.6 Duplicate Analyses

Run 4-S-M5/29-2 was analyzed in duplicate for metals. All samples for mercury were analyzed in duplicate. All samples for hydrogen chloride were analyzed in duplicate. The average of the duplicate analyses was used for reporting purposes.

Table 2-1
Summary of Emissions
Unit 4

Parameter	Rep. 1	Rep. 2	Rep. 3	Average	Permit Limit
Unit 4 Process Information [1]					
Heat Input, MMBtu/hr	248	243	248	246	NA
Waste Charging Rate, lbs/hr	49,607	48,568	49,694	49,290	NA
Unit 4 SDA Inlet					
Hydrogen Chloride, ppm @ 7% O_2	652	664	566	627	NA
Mercury, mg/DSCM @ 7% O_2	0.0603	0.0709	0.0835	0.0716	NA
Unit 4 FF Outlet Concentrations					
Ammonia, ppm @ 7% O_2	5.69	1.81	2.45	3.32	10/15 [2]
Dioxins/Furans, ng/DSCM @ 7% O_2	0.315	0.295	0.180	0.263	13
Hydrogen Chloride, ppm @ 7% O_2	13.0	11.2	10.3	11.5	25
Mercury, ug/DSCM @ 7% O_2	1.50	1.53	1.57	1.53	28
Metals					
Cadmium, mg/DSCM @ 7% O_2	0.00025	0.00020	0.00017	0.00021	0.010
Lead, mg/DSCM @ 7% O_2	0.00217	0.00177	0.00155	0.00183	0.140
Opacity, %	0	---	---	0	10
Particulate, Gr/DSCF @ 7% O_2	0.000244	0.000366	0.000664	0.000425	NA
Particulate, mg/DSCM @ 7% O_2	0.56	0.84	1.52	0.97	12
Unit 4 FF Outlet Concentrations, lb/MMBtu: For Informational Purposes Only					
Ammonia, lb/MMBtu	0.0036	0.0011	0.0016	0.0021	NA
Dioxins/Furans, lb/MMBtu	2.83E-10	2.65E-10	1.62E-10	2.37E-10	NA
Hydrogen Chloride, lb/MMBtu	0.0177	0.0152	0.0140	0.0156	NA
Mercury, lb/MMBtu	1.35E-06	1.37E-06	1.41E-06	1.38E-06	NA
Metals					
Cadmium, lb/MMBtu	2.28E-07	1.80E-07	1.53E-07	1.87E-07	NA
Lead, lb/MMBtu	1.95E-06	1.59E-06	1.39E-06	1.64E-04	NA
Particulate, lb/MMBtu	0.000502	0.000753	0.00136	0.000873	NA
Unit 4 FF Outlet Emission Rates, lb/hr					
Ammonia, lb/hr	0.915	0.270	0.384	0.523	NA
Dioxins/Furans, lb/hr	6.94E-08	6.59E-08	3.79E-08	5.77E-08	3.61E-06
Hydrogen Chloride, lb/hr	4.38	3.77	3.40	3.85	25.4
Mercury, lb/hr	3.34E-04	3.33E-04	3.51E-04	3.39E-04	0.022
Metals					
Cadmium, lb/hr	5.65E-05	4.38E-05	3.81E-05	4.61E-05	NA
Lead, lb/hr	4.84E-04	3.85E-04	3.46E-04	4.05E-04	NA
Particulate, lb/hr	0.125	0.183	0.339	0.215	3.3
Unit 4 Removal Efficiency, %					
HCl RE%, ppm @ 7% O_2	98.0	98.3	98.2	98.2	$\geq$95
Mercury RE%, mg/DSCM @ 7% O_2	97.5	97.8	98.1	97.8	$\geq$85

[1] Process information based upon EPA Method 5/29 test data and a reference heat content of 5000 BTU/lb.

[2] Ammonia slip emission limit:
@ 195 MMBtu/hr = 10 ppmvd
@ 260 MMBtu/hr = 15 ppmvd

3.0 PROCESS DESCRIPTION AND OPERATION

The Hillsborough County Solid Waste Energy Recovery Facility processes a nominal 1800 tons of solid waste each day, generating approximately 45 megawatts of electricity. The facility is operated by Covanta Hillsborough, Inc. There are three (3) Martin GmbH waterwall furnaces processing up to 400 tons of waste per day and one (1) Martin GmbH waterwall furnace processing up to 600 tons of waste per day. Waste is combusted at furnace temperatures exceeding 1,800 degrees Fahrenheit and reduced to an inert ash residue. Before leaving the facility, combustion air is directed through technologically advanced air pollution control equipment consisting of a spray dryer absorbers (SDA), aqueous ammonia injection, powdered carbon injection, and fabric filter baghouses.

4.0 SAMPLING AND ANALYTICAL METHODS

This section briefly describes the sampling and analytical procedures that were used and any deviations from the methods. Figure 4-1 depicts the cross-section of the SDA Inlet test location and Figure 4-2 depicts the cross-section of the Fabric Filter Outlet test location.

4.1 EPA Methods 1-4

EPA Methods 1 through 4 were utilized in conjunction with each isokinetic test method. EPA Method 1 was used to determine the location of the sampling points. EPA Method 2 was used to measure the flue gas flow rate. EPA Method 3 was used to determine the flue gas molecular weight. EPA Method 4 was used to determine the flue gas moisture content. The information provided by these methods was used in determining isokinetics, parameter concentrations, and parameter emission rates.

4.2 EPA Method 9 - Opacity

Opacity (visible emissions) readings were taken every 15 seconds by a certified visual emissions reader for the specified length of time during one EPA Method 5/29 test run.

4.3 EPA Method 23

The concentrations and emissions rates of polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans (PCDD/PCDF or dioxins/furans) were determined utilizing EPA 23. The EPA Method 23 sampling train consisted of a glass nozzle, a heated glass probe, a heated glassmat filter, a condenser, an XAD resin trap, an empty impinger, two chilled impingers each with 100mL of DI water, an empty impinger, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 23 with no exceptions except that the methylene chloride rinse was not performed with EPA approval.

At the end of each test run, the nozzle, probe, and filter fronthalf were rinsed with acetone into a sample jar. The filter was recovered dry into a glass petri dish. The filter backhalf, and condenser were rinsed with acetone into a sample jar. All of the components listed above up to the XAD resin trap were rinsed again with toluene into a sample jar. The XAD resin trap was sealed and placed into a chilled ice chest. The contents of the first three impingers were poured back into the original reagent jar. The silica gel was poured back into its original container. The moisture catch was then determined gravimetrically.

The samples were analyzed in accordance with EPA Method 23 for dioxins/furans.

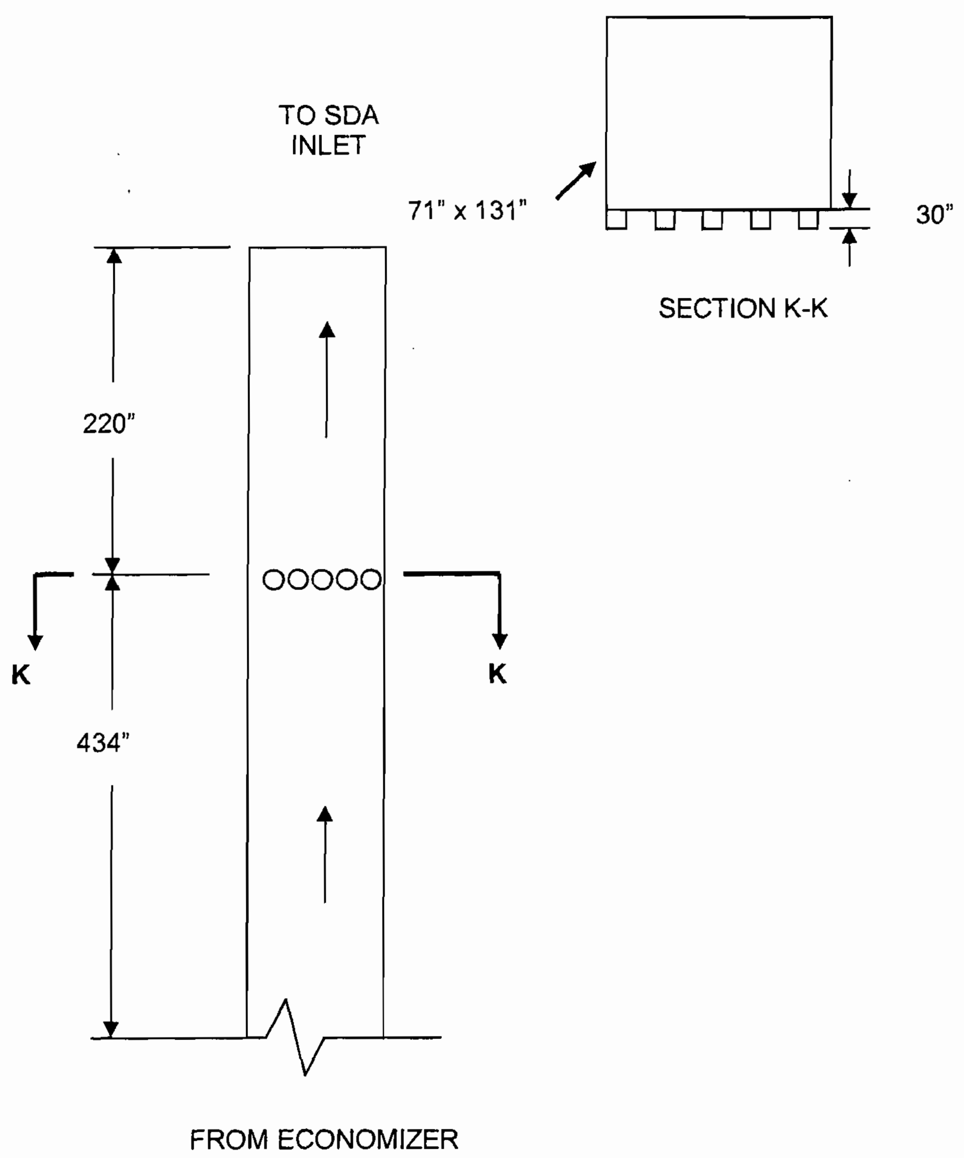

Figure 4-1. SDA Inlet Sampling Location
(Unit 4)

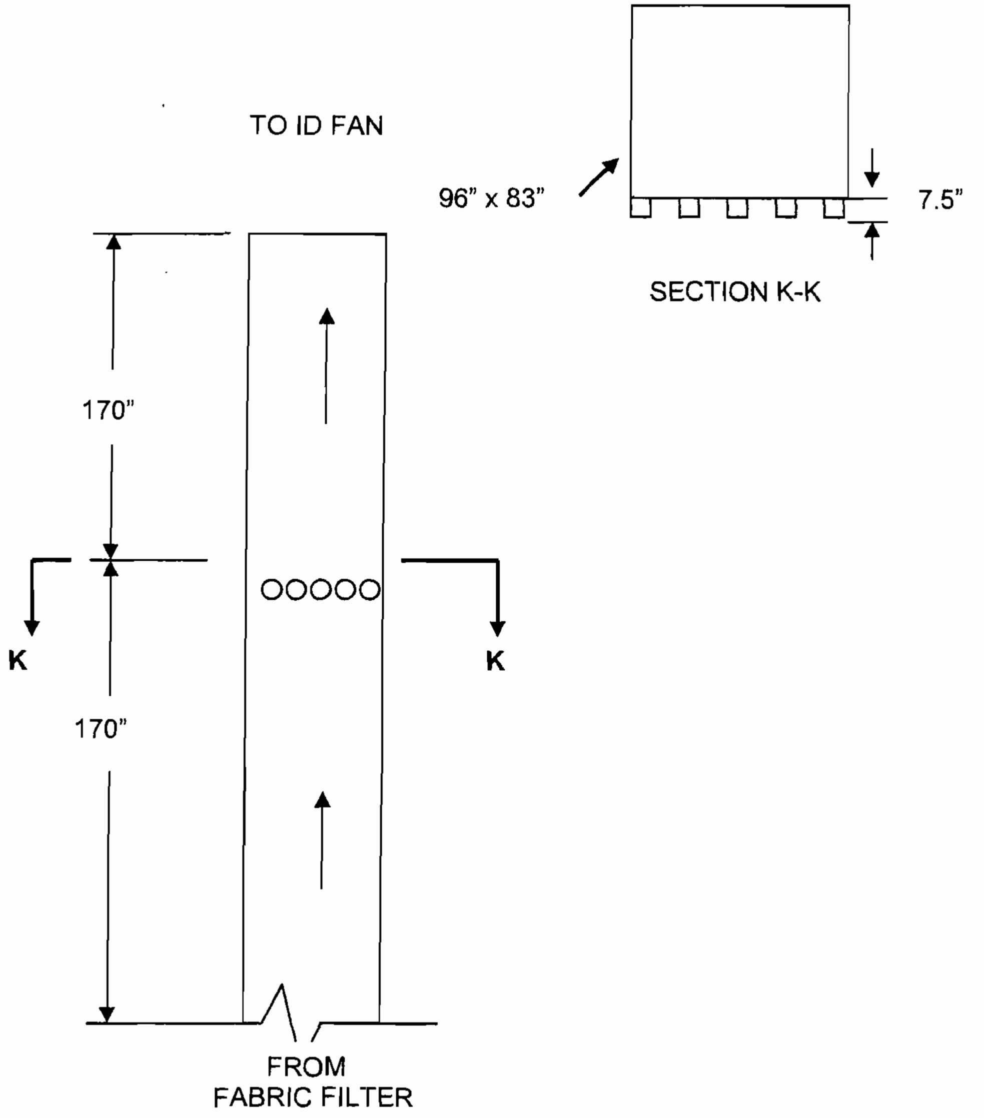

Figure 4-2. FF Outlet Sampling Location (Unit 4)

4.4 EPA Modified Method 26

Hydrogen chloride concentrations and emission rates were determined utilizing EPA Method 26 modified to use large impingers. The EPA Method 26 sampling train consisted of a heated glass probe, a heated quartz filter, two chilled impingers each with 100mL of 0.1N H_2SO_4, two chilled impingers each with 100mL of DI, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 26 except that large impingers were used for sample collection.

At the end of each test run, the contents of the H_2SO_4 impingers were poured back into the original H_2SO_4 reagent jar. The contents of the DI impingers were poured back into the original reagent jar. The silica gel was returned to its original container. The moisture catch in the components was determined gravimetrically. The filter backhalf and H_2SO_4 impingers were rinsed with DI water into the H_2SO_4 reagent jar.

The H_2SO_4 portion of the samples were analyzed in accordance with EPA Method 26 for hydrogen chloride.

4.5 EPA Method 5/29

Particulate and metals concentrations and emission rates were determined utilizing EPA Methods 5 and 29. The EPA Method 5/29 sampling train consisted of a glass nozzle, a heated glass probe, a heated, tared quartz filter, two chilled impingers each with 100mL of 5%HNO_3/10%H_2O_2, an empty impinger, two chilled impingers each with 100mL of 4%$KMnO_4$/10%H_2SO_4, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated in accordance with EPA Method 29 with no exceptions.

At the end of each test run, the nozzle, probe, and filter fronthalf were rinsed with 100 mL of acetone into a glass sample jar. Then, the nozzle, probe, and filter fronthalf were rinsed with 100 mL of 0.1N nitric acid into a sample jar. The filter was recovered dry into another sample jar. The contents of the 5%HNO_3/10%H_2O_2 impingers were poured back into the original reagent jar. Any condensate in the empty impinger was poured into a sample jar. The 4%$KMnO_4$/10%H_2SO_4 impingers were recovered into another sample jar.

The moisture catch was then determined gravimetrically. The filter backhalf and 5%HNO_3/10%H_2O_2 impingers were rinsed with 100 mL of 0.1N nitric acid into the reagent jar. The empty impinger was rinsed with 100 mL of 0.1N nitric acid into a sample jar. The 4%$KMnO_4$/10%H_2SO_4 impingers were rinsed with 100 mL of 4%$KMnO_4$/10%H_2SO_4 and 100 mL of DI water into the jar containing the 4%$KMnO_4$/10%H_2SO_4 reagent. The 4%$KMnO_4$/10%H_2SO_4 impingers and connecting glassware were rinsed with 25mL of 8N HCl if any brown residue remained. This HCl rinse was added to a jar containing 200mL of DI water.

The filter and acetone rinses were desiccated and analyzed gravimetrically for particulate following EPA Method 5 techniques. Then, the samples were analyzed in accordance with EPA Method 29 for metals.

4.6 Conditional Test Method 027 - Ammonia

Ammonia concentrations were determined utilizing Conditional Test Method 027 (CTM 027). The sampling train consisted of a glass nozzle, a heated glass probe, a heated glassmat filter, two chilled G-S impingers each with 100mL of 0.1N H_2SO_4, an empty impinger, an impinger with 200 grams of silica gel, and a dry gas metering console. The equipment was operated isokinetically in accordance with CTM 027.

At the end of each test run, the contents of the impingers were poured back into the original reagent jar. The silica gel was returned to its original container. The moisture catch in the components was determined gravimetrically. The probe, filter glassware, impingers, and connecting glassware were rinsed with DI water into the reagent jar. The filter was placed into a separate jar.

The samples, excluding the filters, were analyzed using ion chromatography techniques in accordance with CTM 027 for ammonia.

5.0 QA/QC RESULTS

5.1 QA/QC Policy Procedures

TESTAR, Inc. is committed to adhering to Quality Assurance/Quality Control (QA/QC) procedures and objectives that meet or exceed the relevant EPA guidance. Our procedures include calibration of equipment as appropriate, proper glassware pre-cleaning to prevent contamination of samples, proper sample recovery, documented sample custody, blank samples, duplicate analyses, matrix spike recovery, and validated computer generated results. We also adhere to other method specific criteria such as maintaining isokinetic conditions during particulate type testing and posttest leak checks.

TESTAR, Inc. uses oil manometers to determine velocity differential pressures thus eliminating potential errors from magnehelic gauges. The manometers are leveled and zeroed prior to taking any measurements. All equipment used onsite undergoes a pretest audit and operational check for accuracy. Dry gas meters are checked by using an orifice to determine the meter gamma. The audit gamma must be within 3% of the full test gamma for the meter to be acceptable. Likewise, all thermocouples are checked at ambient temperature versus an ASTM reference thermometer or a thermometer that has been checked against an ASTM reference thermometer. The reading must agree within 2°F. Additionally, the barometer is checked against a reference barometer prior to each project and must agree within 0.1" Hg.

After each testing project, the dry gas meter undergoes a posttest audit following the guidelines of Alternate Method 009. Alternate Method 009 utilizes a mathematical calculation to check the dry gas meter calibration factor (gamma) versus the full test calibration factor. The gamma must agree within ±5% of the full test gamma.

5.2 Sample Custody and Preservation

Proper sample custody and preservation techniques ensure that the samples collected and analyzed are the same, that the sample did not change in concentration prior to analysis, and that the sample was not tampered with prior to analysis. To ensure accurate results, TESTAR collects and transports samples in clean containers that are inert to the matrix enclosed, that will not contaminate the sample, and that prevent photochemical reactions when appropriate. All samples contain unique identifiers that include the client name, facility name, TESTAR project number, collection date, unique run number, sample fraction, and matrix. Liquid levels are marked in order to determine if any leakage occurred during transport. Samples are accompanied by sample custody forms identifying the client, facility, project number, sample, fractions, collection date, etc. When custody is relinquished to the laboratory, the receiving sample custodian signs the form.

5.3 Sample Blanks, Duplicates, and Matrix Spikes

Several types of blanks are utilized depending upon the project QA objectives. Typical blanks include field blanks, reagent blanks, and trip blanks. Blanks help to identify the source of contamination if contamination is suspected based upon the result validation procedure. Trip blanks are typically not analyzed unless the field blank shows significant contamination. Field blanks and reagent blanks are analyzed during most testing programs involving metals unless requested not to do so by the client. Field blanks are analyzed during most programs involving organics such as dioxins/furans.

Duplicates and matrix spikes are analyzed for projects involving metals testing. At least 10% of the samples are analyzed in duplicate for metals and at least one matrix spike is performed. All mercury analyses are performed in duplicate.

Breakthrough analyses are performed for projects involving organics utilizing adsorbent tubes. Adsorbent tubes are desorbed and analyzed separately to determine if any breakthrough occurred. Breakthrough is said to have occurred if the organic catch weight on the last fraction (generally the backhalf of the last adsorbent tube) is more than 10% of the total train organic catch.

5.4 Data Validation and Presentation

The field test engineer is responsible for reviewing and validating data as it is obtained. Additionally the onsite project manager reviews data for consistency, completeness, and accuracy prior to leaving the site. This validation procedure is based upon their knowledge of the process being tested and/or similar sources as well as checks built into the software being utilized. This allows for error correction or for the testing to be repeated immediately rather than at a later undetermined date. The data undergoes another review by a Project Director upon return to headquarters. Analytical data is reviewed by the QA Director upon submittal by the analytical laboratory to resolve any conflicts or concerns as soon as possible rather than after the results have been calculated.

Data is collected using computerized spreadsheets in the field and the results are calculated using validated computer programs to prevent erroneous calculations.

5.5 QA/QC Results

This section presents QA/QC results from measures taken during the testing program. The results are summarized in the following tables for easy reference.

Table 5-1
Summary of QA/QC Procedures

Test Method	QA/QC Procedure	QA/QC Objective	QA/QC Results	Status of QA/QC
EPA M23	Internal Standard Recoveries (4-6)	40 – 130 %	77.5 – 98 %	Acceptable
	Internal Standard Recoveries (7-8)	25 – 130 %	71.4 – 91.7 %	Acceptable
	Surrogate Standard Recoveries	70 – 130 %	90.3 – 110 %	Acceptable
EPA MM26	HCl Reagent Blank	ND	< 0.094 mg	Acceptable
	HCl Audit	< ±10 %	- 1.77 %	Acceptable
	HCl Spike	90 – 110 %	102.8 %	Acceptable
EPA M5/29	Acetone Blank	< 1.0E-5 mg/mg	0.00E-06 mg/mg	Acceptable
EPA M29	Duplicate RPD	≤ 20 %	3.0 %	Acceptable
Cadmium	Reagent Blank	< 1.0 ug	< 0.2 ug	Acceptable
Lead	Reagent Blank	< 1.0 ug	< 0.2 ug	Acceptable
	Spike Recoveries	75 – 125 %	96 – 103 %	Acceptable
EPA M29 - Hg	Duplicate RPD	≤ 10 %	6.1 %	Acceptable
	Reagent Blank	< 0.6 ug	< 0.5 ug	Acceptable
	Spike Recoveries	75 – 125 %	83 – 118 %	Acceptable
CTM 027	Reagent Blank	ND	< 0.039 mg	Acceptable
	NH3 Audit	< +10 %	2.68 %	Acceptable
	NH3 Spike	90 – 110 %	104.8 %	Acceptable

APPENDIX A
Test Results

APPENDIX A.1
Test Results

Unit 4 SDA Inlet
Hydrogen Chloride

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ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: MM26

Client Name	Covanta Projects, Inc.	**Operator**	RBP
Plant Name	Hillsborough County SWERF	**Project #**	10659
Sampling Location	Unit #4 SDA Inlet	**Standard Temperature, °F**	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**	**1**	**1**		**SET AVERAGE**
Run Number		4-I-MM26-1	4-I-MM26-2	4-I-MM26-3		
Run Date		08/31/09	08/31/09	08/31/09		
Run Start Time	hh:mm	900	1037	1210		
Run Stop Time	hh:mm	1006	1146	1317		
Sampling Parameters						
Meter Calibration Factor	Y	0.9874	0.9874	0.9874		
Y_{QA} Calculated by Test Run	Y_{QA}	1.0318	1.0289	1.0351		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-1.00	-1.55	-1.50		-1.35
Barometric Pressure	in Hg	29.9	29.9	29.9		29.9
Carbon Dioxide Percentage	% CO_2	9.8	9.8	9.9		9.8
Oxygen Percentage	% O_2	9.5	9.5	9.6		9.5
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.7	80.7	80.5		80.6
Total Water Volume Collected	mL	154.9	146.5	151.3		150.9
Sample Volume	ft^3	37.442	37.671	37.547		37.553
Average Meter Temperature	°F	93	97	100		97
Average Delta H	in H_2O	1.20	1.20	1.20		1.20
Total Sampling Time	min	60	60	60		60
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	7.291	6.896	7.122		7.103
Volume Metered @ STP	DSCF	35.339	35.323	34.992		35.218
Absolute Stack/Duct Pressure	in Hg	29.8	29.8	29.8		29.8
Absolute Meter Pressure	in Hg	30.0	30.0	30.0		30.0
Calculated Stack Moisture	% H_2O	17.1	16.3	16.9		16.8
Air Flow Rate Results						
Dry Standard Stack Flow/Minute	DSCFM	75,484	75,484	73,973		74,980

Air flow rates taken from concurrent EPA Method 29 test runs.

Concentration and Emission Rate Data Summary						
Hydrogen Chloride	mg	811	826	691		
Molecular Weight	MW	36.46	36.46	36.46		
Concentration, ppm	ppm	535	545	460		513
Concentration @ 12% CO_2	ppm@12%	655	667	558		626
Concentration @ 7% O_2	ppm@7%	652	664	566		627
Emission Rate, lb/hr	lb/hr	229	233	193		219

APPENDIX A.2
Test Results

Unit 4 SDA Inlet
Mercury

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD M29

Client Name	Covanta Projects, Inc.	**Operator**	RBP
Plant Name	Hillsborough County SWERF	**Project #**	10659
Sampling Location	Unit #4 SDA Inlet	**Standard Temperature, °F**	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**	**1**	**1**		**SET AVERAGE**
Run Number		4-I-M29-1	4-I-M29-2	4-I-M29-3		
Run Date		08/31/09	08/31/09	08/31/09		
Run Start Time	hh:mm	859	1153	1435		
Run Stop Time	hh:mm	1123	1417	1656		
Sampling Parameters						
Meter Calibration Factor	Y	1.0027	1.0027	1.0027		
Y_{QA} Calculated by Test Run	Y_{QA}	0.9771	0.9801	0.9753		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-1.00	-1.50	-1.50		-1.33
Stack Cross-Sectional Area	ft^2	64.590	64.590	64.590		64.590
Barometric Pressure	in Hg	29.9	29.9	29.9		29.9
Actual Nozzle Diameter	in	0.300	0.308	0.300		
Carbon Dioxide Percentage	% CO_2	9.8	9.9	9.7		9.8
Oxygen Percentage	% O_2	9.5	9.6	9.6		9.6
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.7	80.5	80.7		80.6
Total Water Volume Collected	mL	329.5	287.6	288.2		301.8
Sample Volume	ft^3	75.199	76.544	74.581		75.441
Average Meter Temperature	°F	95	100	104		100
Average Stack Temperature	°F	386	392	395		391
Average Delta H	in H_2O	1.00	1.04	0.97		1.00
Total Sampling Time	min	125	125	125		125
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	15.510	13.537	13.566		14.204
Volume Metered @ STP	DSCF	71.855	72.491	70.106		71.484
Absolute Stack/Duct Pressure	in Hg	29.8	29.8	29.8		29.8
Absolute Meter Pressure	in Hg	30.0	30.0	30.0		30.0
Calculated Stack Moisture	% H_20	17.8	15.7	16.2		16.6
Dry Mole Fraction	decimal	0.822	0.843	0.838		0.834
Avg Differential Pressure (Delta P)	in H_2O	0.276	0.257	0.266		0.266
Dry Gas Molecular Weight	lb/lb-mole	29.95	29.97	29.94		29.95
Wet Stack Gas Molecular Weight	lb/lb-mole	27.83	28.08	28.00		27.97
Average Stack Gas Velocity	ft/sec	38.05	36.70	37.47		37.41
Percent of Isokinetic Rate	% ISO	100.2	97.9	98.7		98.9
F-Factor	DSCF/MM	9570	9570	9570		9570
Air Flow Rate Results						
Actual Stack Flow/Minute	ACFM	147,444	142,242	145,213		144,966
Dry Standard Stack Flow/Minute	DSCFM	75,484	73,973	74,813		74,757

Concentration and Emission Rate Data Summary						
Mercury (Hg)	ug	100.635	118.355	134.779		117.923
Concentration ug/DSCM	ug/DSCM	49.5	57.7	67.9		58.3
Concentration ug @ 12% CO2	ug@12%	60.6	69.9	84.0		71.5
Concentration ug @ 7% O_2	ug@7%	60.3	70.9	83.5		71.6
Emission Rate, lb/hr	lb/hr	1.40E-02	1.60E-02	1.90E-02		1.63E-02
Emission Rate, lb/MMBtu	lb/MMBtu	5.42E-05	6.37E-05	7.50E-05		6.43E-05

APPENDIX A.3
Test Results

Unit 4 Fabric Filter Outlet
Ammonia

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: **CTM027**

Client Name	Covanta Projects, Inc.	**Operator**	RBP
Plant Name	Hillsborough County SWERF	**Project #**	10659
Sampling Location	Unit #4 FF Outlet	**Standard Temperature, °F**	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1	1	1		**SET AVERAGE**
Run Number		4-O-CTM027-1	4-O-CTM027-2	4-O-CTM027-3		
Run Date		09/02/09	09/02/09	09/02/09		
Run Start Time	hh:mm	756	923	1048		
Run Stop Time	hh:mm	906	1031	1156		
Sampling Parameters						
Meter Calibration Factor	Y	0.9921	0.9921	0.9921		
Y_{QA} Calculated by Test Run	Y_{QA}	1.0001	0.9931	1.0047		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-9.50	-9.50	-9.50		-9.50
Stack Cross-Sectional Area	ft^2	55.330	55.330	55.330		55.330
Barometric Pressure	in Hg	29.8	29.8	29.8		29.8
Actual Nozzle Diameter	in	0.280	0.278	0.280		
Carbon Dioxide Percentage	% CO_2	10.0	9.3	9.7		9.7
Oxygen Percentage	% O_2	9.4	10.2	9.7		9.8
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.6	80.5	80.6		80.6
Total Water Volume Collected	mL	155.4	152.8	166.4		158.2
Sample Volume	ft^3	36.246	36.154	36.684		36.361
Average Meter Temperature	°F	86	89	90		88
Average Stack Temperature	°F	301	308	310		306
Average Delta H	in H_2O	1.10	1.08	1.12		1.10
Total Sampling Time	min	62.5	62.5	62.5		63
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	7.315	7.192	7.832		7.446
Volume Metered @ STP	DSCF	34.693	34.419	34.902		34.672
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1		29.1
Absolute Meter Pressure	in Hg	29.9	29.9	29.9		29.9
Calculated Stack Moisture	% H_20	17.4	17.3	18.3		17.7
Dry Mole Fraction	decimal	0.826	0.827	0.817		0.823
Avg Differential Pressure (Delta P)	in H_2O	0.326	0.326	0.335		0.329
Dry Gas Molecular Weight	lb/lb-mole	29.98	29.90	29.94		29.94
Wet Stack Gas Molecular Weight	lb/lb-mole	27.89	27.84	27.75		27.83
Average Stack Gas Velocity	ft/sec	39.68	39.94	40.58		40.06
Percent of Isokinetic Rate	% ISO	97.9	98.6	98.5		98.3
F-Factor	DSCF/MM	9570	9570	9570		9570
Air Flow Rate Results						
Actual Stack Flow/Minute	ACFM	131,715	132,579	134,718		133,004
Dry Standard Stack Flow/Minute	DSCFM	73,429	73,377	73,364		73,390

Concentration and Emission Rate Data Summary						
Ammonia	mg	3.27	0.958	1.38		
Molecular Weight	MW	17.01	17.01	17.01		
Concentration, ppm	ppm	4.71	1.39	1.97		2.69
Concentration @ 12% CO_2	ppm@12%	5.65	1.79	2.44		3.29
Concentration @ 7% O_2	ppm@7%	5.69	1.81	2.45		3.32
Emission Rate, lb/hr	lb/hr	0.915	0.270	0.384		0.523
Emission Rate, lb/MMBtu	lb/MMBtu	0.0036	0.0011	0.0016		0.0021

APPENDIX A.4
Test Results

Unit 4 Fabric Filter Outlet
Dioxins/Furans

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD 23

Client Name	Covanta Projects, Inc.	Operator	RBP
Plant Name	Hillsborough County RRF	Project #	10659
Sampling Location	Unit #4 FF Outlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1	1	1		SET AVERAGE
Run Number		4-O-M23-1	4-O-M23-2	4-O-M23-3		
Run Date		09/02/09	09/03/09	09/03/09		
Run Start Time	hh:mm	1220	755	1256		
Run Stop Time	hh:mm	1638	1230	1715		
Sampling Parameters						
Meter Calibration Factor	Y	0.9921	0.9921	0.9921		
Y_{QA} Calculated by Test Run	Y_{QA}	0.9928	0.9915	0.9922		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-9.50	-9.50	-9.50		-9.50
Stack Cross-Sectional Area	ft^2	55.33	55.33	55.33		55.33
Barometric Pressure	in Hg	29.8	29.8	29.8		29.8
Actual Nozzle Diameter	in	0.261	0.261	0.261		
Carbon Dioxide Percentage	% CO_2	9.7	9.8	9.3		9.6
Oxygen Percentage	% O_2	9.7	9.7	10.1		9.8
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.6	80.5	80.6		80.6
Total Water Volume Collected	mL	575.7	597.2	584.0		585.6
Sample Volume	ft^3	128.902	129.784	127.161		128.616
Average Meter Temperature	°F	95	89	92		92
Average Stack Temperature	°F	310	303	305		306
Average Delta H	in H_2O	0.84	0.87	0.82		0.84
Total Sampling Time	min	250	250	250		250
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	27.098	28.110	27.489		27.566
Volume Metered @ STP	DSCF	121.378	123.596	120.492		121.822
Absolute Stack/Duct Pressure	in Hg	29.1	29.1	29.1		29.1
Absolute Meter Pressure	in Hg	29.9	29.9	29.9		29.9
Calculated Stack Moisture	% H_20	18.3	18.5	18.6		18.5
Saturated Stack Moisture	% H_20	100.0	100.0	100.0		100.0
Reported Stack Moisture Content	% H_20	18.3	18.5	18.6		18.5
Dry Mole Fraction	decimal	0.817	0.815	0.814		0.815
Avg Differential Press. (Delta P)	in H_2O	0.331	0.339	0.323		0.331
Dry Gas Molecular Weight	lb/lb-mole	29.94	29.96	29.89		29.93
Wet Stack Gas Molecular Weight	lb/lb-mole	27.76	27.74	27.68		27.73
Average Stack Gas Velocity	ft/sec	40.34	40.62	39.78		40.25
Percent of Isokinetic Rate	% ISO	99.0	99.6	99.5		99.4
F-Factor	DSCF/MM	9570	9570	9570		9570
Heat Input Rate	MMBtu/hr	245	248	234		243
Air Flow Rate Results						
Actual Stack Flow/Minute	ACFM	133,923	134,849	132,046		133,606
Dry Standard Stack Flow/Minute	DSCFM	73,034	73,961	72,189		73,061

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Concentration and Emission Rate Data Summary

2,3,7,8-TCDD	pg	0.0	0.0	0.0		0.0
Concentration, ng/DSCM	ng/DSCM	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Emission Rate, lb/hr	lb/hr	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	0.00E+00	0.00E+00		0.00E+00

Other TCDD	pg	46.8	54.2	38.1		46.4
Concentration, ng/DSCM	ng/DSCM	1.36E-02	1.55E-02	1.12E-02		1.34E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.68E-02	1.90E-02	1.44E-02		1.67E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.69E-02	1.92E-02	1.44E-02		1.68E-02
Emission Rate, lb/hr	lb/hr	3.72E-09	4.29E-09	3.02E-09		3.68E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.52E-11	1.73E-11	1.29E-11		1.51E-11

1,2,3,7,8-PeCDD	pg	0.0	0.0	0.0		0.0
Concentration, ng/DSCM	ng/DSCM	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Emission Rate, lb/hr	lb/hr	0.00E+00	0.00E+00	0.00E+00		0.00E+00
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	0.00E+00	0.00E+00		0.00E+00

Other PeCDD	pg	43.3	55.5	33.9		44.2
Concentration, ng/DSCM	ng/DSCM	1.26E-02	1.59E-02	9.93E-03		1.28E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.56E-02	1.94E-02	1.28E-02		1.59E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.56E-02	1.97E-02	1.28E-02		1.60E-02
Emission Rate, lb/hr	lb/hr	3.45E-09	4.39E-09	2.69E-09		3.51E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.40E-11	1.77E-11	1.15E-11		1.44E-11

1,2,3,4,7,8-HxCDD	pg	5.0	0.0	0.0		1.7
Concentration, ng/DSCM	ng/DSCM	1.46E-03	0.00E+00	0.00E+00		4.88E-04
Concen., ng/DSCM @ 12% CO2	ng@12%	1.81E-03	0.00E+00	0.00E+00		6.03E-04
Concen., ng/DSCM @ 7% O2	ng@7%	1.82E-03	0.00E+00	0.00E+00		6.05E-04
Emission Rate, lb/hr	lb/hr	4.00E-10	0.00E+00	0.00E+00		1.33E-10
Emission Rate, lb/MMBtu	lb/MMBtu	1.63E-12	0.00E+00	0.00E+00		5.44E-13

1,2,3,6,7,8-HxCDD	pg	8.3	10.2	3.9		7.5
Concentration, ng/DSCM	ng/DSCM	2.41E-03	2.91E-03	1.14E-03		2.15E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	2.98E-03	3.57E-03	1.47E-03		2.67E-03
Concen., ng/DSCM @ 7% O2	ng@7%	2.99E-03	3.62E-03	1.46E-03		2.69E-03
Emission Rate, lb/hr	lb/hr	6.58E-10	8.07E-10	3.07E-10		5.91E-10
Emission Rate, lb/MMBtu	lb/MMBtu	2.68E-12	3.25E-12	1.31E-12		2.42E-12

1,2,3,7,8,9-HxCDD	pg	0.0	9.0	3.3		4.1
Concentration, ng/DSCM	ng/DSCM	0.00E+00	2.57E-03	9.76E-04		1.18E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	3.15E-03	1.26E-03		1.47E-03
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	3.19E-03	1.26E-03		1.48E-03
Emission Rate, lb/hr	lb/hr	0.00E+00	7.12E-10	2.64E-10		3.25E-10
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	2.87E-12	1.13E-12		1.33E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Other HxCDD	pg	110.7	0.0	69.4		60.0
Concentration, ng/DSCM	ng/DSCM	3.22E-02	0.00E+00	2.03E-02		1.75E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	3.98E-02	0.00E+00	2.62E-02		2.20E-02
Concen., ng/DSCM @ 7% O2	ng@7%	4.00E-02	0.00E+00	2.62E-02		2.20E-02
Emission Rate, lb/hr	lb/hr	8.81E-09	0.00E+00	5.50E-09		4.77E-09
Emission Rate, lb/MMBtu	lb/MMBtu	3.59E-11	0.00E+00	2.35E-11		1.98E-11

1,2,3,4,6,7,8-HpCDD	pg	58.9	70.4	30.6		53.3
Concentration, ng/DSCM	ng/DSCM	1.71E-02	2.01E-02	8.97E-03		1.54E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	2.12E-02	2.46E-02	1.16E-02		1.91E-02
Concen., ng/DSCM @ 7% O2	ng@7%	2.13E-02	2.50E-02	1.15E-02		1.93E-02
Emission Rate, lb/hr	lb/hr	4.69E-09	5.57E-09	2.43E-09		4.23E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.91E-11	2.24E-11	1.04E-11		1.73E-11

Other HpCDD	pg	52.1	73.6	30.0		51.9
Concentration, ng/DSCM	ng/DSCM	1.52E-02	2.10E-02	8.79E-03		1.50E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.88E-02	2.57E-02	1.13E-02		1.86E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.88E-02	2.61E-02	1.13E-02		1.87E-02
Emission Rate, lb/hr	lb/hr	4.15E-09	5.83E-09	2.38E-09		4.12E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.69E-11	2.34E-11	1.02E-11		1.68E-11

OCDD	pg	115.0	154.0	78.6		115.9
Concentration, ng/DSCM	ng/DSCM	3.35E-02	4.40E-02	2.30E-02		3.35E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	4.14E-02	5.39E-02	2.97E-02		4.17E-02
Concen., ng/DSCM @ 7% O2	ng@7%	4.15E-02	5.46E-02	2.96E-02		4.19E-02
Emission Rate, lb/hr	lb/hr	9.15E-09	1.22E-08	6.23E-09		9.19E-09
Emission Rate, lb/MMBtu	lb/MMBtu	3.73E-11	4.91E-11	2.66E-11		3.77E-11

2,3,7,8-TCDF	pg	0.0	0.0	3.6		1.2
Concentration, ng/DSCM	ng/DSCM	0.00E+00	0.00E+00	1.06E-03		3.53E-04
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	0.00E+00	1.37E-03		4.55E-04
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	0.00E+00	1.36E-03		4.54E-04
Emission Rate, lb/hr	lb/hr	0.00E+00	0.00E+00	2.86E-10		9.54E-11
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	0.00E+00	1.22E-12		4.08E-13

Other TCDF	pg	180.0	107.0	64.6		117.2
Concentration, ng/DSCM	ng/DSCM	5.24E-02	3.06E-02	1.89E-02		3.40E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	6.48E-02	3.74E-02	2.44E-02		4.22E-02
Concen., ng/DSCM @ 7% O2	ng@7%	6.50E-02	3.79E-02	2.44E-02		4.24E-02
Emission Rate, lb/hr	lb/hr	1.43E-08	8.47E-09	5.12E-09		9.31E-09
Emission Rate, lb/MMBtu	lb/MMBtu	5.84E-11	3.41E-11	2.19E-11		3.81E-11

1,2,3,7,8-PeCDF	pg	15.3	10.4	5.7		10.5
Concentration, ng/DSCM	ng/DSCM	4.45E-03	2.97E-03	1.68E-03		3.03E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	5.51E-03	3.64E-03	2.17E-03		3.77E-03
Concen., ng/DSCM @ 7% O2	ng@7%	5.52E-03	3.69E-03	2.16E-03		3.79E-03
Emission Rate, lb/hr	lb/hr	1.22E-09	8.23E-10	4.54E-10		8.32E-10
Emission Rate, lb/MMBtu	lb/MMBtu	4.96E-12	3.31E-12	1.94E-12		3.41E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

2,3,4,7,8-PeCDF	pg	12.6	13.2	6.4		10.7
Concentration, ng/DSCM	ng/DSCM	3.67E-03	3.77E-03	1.88E-03		3.10E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	4.53E-03	4.62E-03	2.42E-03		3.86E-03
Concen., ng/DSCM @ 7% O2	ng@7%	4.55E-03	4.68E-03	2.42E-03		3.88E-03
Emission Rate, lb/hr	lb/hr	1.00E-09	1.04E-09	5.08E-10		8.52E-10
Emission Rate, lb/MMBtu	lb/MMBtu	4.09E-12	4.20E-12	2.17E-12		3.49E-12

Other PeCDF	pg	106.1	74.2	38.6		73.0
Concentration, ng/DSCM	ng/DSCM	3.09E-02	2.12E-02	1.13E-02		2.11E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	3.82E-02	2.60E-02	1.46E-02		2.62E-02
Concen., ng/DSCM @ 7% O2	ng@7%	3.83E-02	2.63E-02	1.45E-02		2.64E-02
Emission Rate, lb/hr	lb/hr	8.44E-09	5.87E-09	3.06E-09		5.79E-09
Emission Rate, lb/MMBtu	lb/MMBtu	3.44E-11	2.36E-11	1.31E-11		2.37E-11

1,2,3,4,7,8-HxCDF	pg	14.0	14.1	6.7		11.6
Concentration, ng/DSCM	ng/DSCM	4.07E-03	4.03E-03	1.95E-03		3.35E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	5.04E-03	4.93E-03	2.52E-03		4.16E-03
Concen., ng/DSCM @ 7% O2	ng@7%	5.05E-03	5.00E-03	2.52E-03		4.19E-03
Emission Rate, lb/hr	lb/hr	1.11E-09	1.12E-09	5.29E-10		9.20E-10
Emission Rate, lb/MMBtu	lb/MMBtu	4.54E-12	4.49E-12	2.26E-12		3.76E-12

1,2,3,6,7,8-HxCDF	pg	12.8	0.0	6.4		6.4
Concentration, ng/DSCM	ng/DSCM	3.72E-03	0.00E+00	1.87E-03		1.86E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	4.61E-03	0.00E+00	2.41E-03		2.34E-03
Concen., ng/DSCM @ 7% O2	ng@7%	4.62E-03	0.00E+00	2.41E-03		2.34E-03
Emission Rate, lb/hr	lb/hr	1.02E-09	0.00E+00	5.06E-10		5.08E-10
Emission Rate, lb/MMBtu	lb/MMBtu	4.15E-12	0.00E+00	2.16E-12		2.10E-12

2,3,4,6,7,8-HxCDF	pg	12.3	0.0	7.6		6.6
Concentration, ng/DSCM	ng/DSCM	3.58E-03	0.00E+00	2.22E-03		1.93E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	4.43E-03	0.00E+00	2.86E-03		2.43E-03
Concen., ng/DSCM @ 7% O2	ng@7%	4.44E-03	0.00E+00	2.85E-03		2.43E-03
Emission Rate, lb/hr	lb/hr	9.79E-10	0.00E+00	5.99E-10		5.26E-10
Emission Rate, lb/MMBtu	lb/MMBtu	3.99E-12	0.00E+00	2.56E-12		2.18E-12

1,2,3,7,8,9-HxCDF	pg	0.0	5.9	0.0		2.0
Concentration, ng/DSCM	ng/DSCM	0.00E+00	1.70E-03	0.00E+00		5.66E-04
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	2.08E-03	0.00E+00		6.93E-04
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	2.11E-03	0.00E+00		7.02E-04
Emission Rate, lb/hr	lb/hr	0.00E+00	4.70E-10	0.00E+00		1.57E-10
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	1.89E-12	0.00E+00		6.31E-13

Other HxCDF	pg	33.6	55.6	20.4		36.5
Concentration, ng/DSCM	ng/DSCM	9.77E-03	1.59E-02	5.98E-03		1.05E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.21E-02	1.94E-02	7.71E-03		1.31E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.21E-02	1.97E-02	7.69E-03		1.32E-02
Emission Rate, lb/hr	lb/hr	2.67E-09	4.40E-09	1.62E-09		2.90E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.09E-11	1.77E-11	6.91E-12		1.18E-11

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

1,2,3,4,6,7,8-HpCDF	pg	37.7	51.0	23.6		37.4
Concentration, ng/DSCM	ng/DSCM	1.10E-02	1.46E-02	6.92E-03		1.08E-02
Concen., ng/DSCM @ 12% CO2	ng@12%	1.36E-02	1.78E-02	8.92E-03		1.34E-02
Concen., ng/DSCM @ 7% O2	ng@7%	1.36E-02	1.81E-02	8.90E-03		1.35E-02
Emission Rate, lb/hr	lb/hr	3.00E-09	4.04E-09	1.87E-09		2.97E-09
Emission Rate, lb/MMBtu	lb/MMBtu	1.22E-11	1.62E-11	8.00E-12		1.22E-11

1,2,3,4,7,8,9-HpCDF	pg	7.4	0.0	0.0		2.5
Concentration, ng/DSCM	ng/DSCM	2.14E-03	0.00E+00	0.00E+00		7.14E-04
Concen., ng/DSCM @ 12% CO2	ng@12%	2.65E-03	0.00E+00	0.00E+00		8.83E-04
Concen., ng/DSCM @ 7% O2	ng@7%	2.66E-03	0.00E+00	0.00E+00		8.86E-04
Emission Rate, lb/hr	lb/hr	5.86E-10	0.00E+00	0.00E+00		1.95E-10
Emission Rate, lb/MMBtu	lb/MMBtu	2.39E-12	0.00E+00	0.00E+00		7.96E-13

Other HpCDF	pg	-0.1	32.4	6.5		12.9
Concentration, ng/DSCM	ng/DSCM	-1.75E-05	9.26E-03	1.90E-03		3.71E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	-2.16E-05	1.13E-02	2.46E-03		4.59E-03
Concen., ng/DSCM @ 7% O2	ng@7%	-2.17E-05	1.15E-02	2.45E-03		4.64E-03
Emission Rate, lb/hr	lb/hr	-4.78E-12	2.56E-09	5.15E-10		1.02E-09
Emission Rate, lb/MMBtu	lb/MMBtu	-1.95E-14	1.03E-11	2.20E-12		4.17E-12

OCDF	pg	0.0	41.4	0.0		13.8
Concentration, ng/DSCM	ng/DSCM	0.00E+00	1.18E-02	0.00E+00		3.94E-03
Concen., ng/DSCM @ 12% CO2	ng@12%	0.00E+00	1.45E-02	0.00E+00		4.83E-03
Concen., ng/DSCM @ 7% O2	ng@7%	0.00E+00	1.47E-02	0.00E+00		4.89E-03
Emission Rate, lb/hr	lb/hr	0.00E+00	3.28E-09	0.00E+00		1.09E-09
Emission Rate, lb/MMBtu	lb/MMBtu	0.00E+00	1.32E-11	0.00E+00		4.40E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-1

Congener	UNITY	Concentration ng/DSCM	Concentration ng@12%	Concentration ng@7%	Emission Rate lb/hr	Emission Rate lb/MMBtu
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	1	1.36E-02	1.68E-02	1.69E-02	3.72E-09	1.52E-11
1,2,3,7,8-PeCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	1	1.26E-02	1.56E-02	1.56E-02	3.45E-09	1.40E-11
1,2,3,4,7,8-HxCDD	1	1.46E-03	1.81E-03	1.82E-03	4.00E-10	1.63E-12
1,2,3,6,7,8-HxCDD	1	2.41E-03	2.98E-03	2.99E-03	6.58E-10	2.68E-12
1,2,3,7,8,9-HxCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDD	1	3.22E-02	3.98E-02	4.00E-02	8.81E-09	3.59E-11
1,2,3,4,6,7,8-HpCDD	1	1.71E-02	2.12E-02	2.13E-02	4.69E-09	1.91E-11
Other HpCDD	1	1.52E-02	1.88E-02	1.88E-02	4.15E-09	1.69E-11
OCDD	1	3.35E-02	4.14E-02	4.15E-02	9.15E-09	3.73E-11
TOTAL PCDD		1.28E-01	1.58E-01	1.59E-01	3.50E-08	1.43E-10
2,3,7,8-TCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDF	1	5.24E-02	6.48E-02	6.50E-02	1.43E-08	5.84E-11
1,2,3,7,8-PeCDF	1	4.45E-03	5.51E-03	5.52E-03	1.22E-09	4.96E-12
2,3,4,7,8-PeCDF	1	3.67E-03	4.53E-03	4.55E-03	1.00E-09	4.09E-12
Other PeCDF	1	3.09E-02	3.82E-02	3.83E-02	8.44E-09	3.44E-11
1,2,3,4,7,8-HxCDF	1	4.07E-03	5.04E-03	5.05E-03	1.11E-09	4.54E-12
1,2,3,6,7,8-HxCDF	1	3.72E-03	4.61E-03	4.62E-03	1.02E-09	4.15E-12
2,3,4,6,7,8-HxCDF	1	3.58E-03	4.43E-03	4.44E-03	9.79E-10	3.99E-12
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	9.77E-03	1.21E-02	1.21E-02	2.67E-09	1.09E-11
1,2,3,4,6,7,8-HpCDF	1	1.10E-02	1.36E-02	1.36E-02	3.00E-09	1.22E-11
1,2,3,4,7,8,9-HpCDF	1	2.14E-03	2.65E-03	2.66E-03	5.86E-10	2.39E-12
Other HpCDF	1	-1.75E-05	-2.16E-05	-2.17E-05	-4.78E-12	-1.95E-14
OCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		1.26E-01	1.55E-01	1.56E-01	3.44E-08	1.40E-10
TOTAL PCDD/PCDF		2.54E-01	3.14E-01	3.15E-01	6.94E-08	2.83E-10

.315
.295
.180

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-2

Congener	UNITY	Concentration ng/DSCM	Concentration ng@12%	Concentration ng@7%	Emission Rate lb/hr	Emission Rate lb/MMBtu
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	1	1.55E-02	1.90E-02	1.92E-02	4.29E-09	1.73E-11
1,2,3,7,8-PeCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	1	1.59E-02	1.94E-02	1.97E-02	4.39E-09	1.77E-11
1,2,3,4,7,8-HxCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDD	1	2.91E-03	3.57E-03	3.62E-03	8.07E-10	3.25E-12
1,2,3,7,8,9-HxCDD	1	2.57E-03	3.15E-03	3.19E-03	7.12E-10	2.87E-12
Other HxCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	1	2.01E-02	2.46E-02	2.50E-02	5.57E-09	2.24E-11
Other HpCDD	1	2.10E-02	2.57E-02	2.61E-02	5.83E-09	2.34E-11
OCDD	1	4.40E-02	5.39E-02	5.46E-02	1.22E-08	4.91E-11
TOTAL PCDD		1.22E-01	1.49E-01	1.51E-01	3.38E-08	1.36E-10
2,3,7,8-TCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDF	1	3.06E-02	3.74E-02	3.79E-02	8.47E-09	3.41E-11
1,2,3,7,8-PeCDF	1	2.97E-03	3.64E-03	3.69E-03	8.23E-10	3.31E-12
2,3,4,7,8-PeCDF	1	3.77E-03	4.62E-03	4.68E-03	1.04E-09	4.20E-12
Other PeCDF	1	2.12E-02	2.60E-02	2.63E-02	5.87E-09	2.36E-11
1,2,3,4,7,8-HxCDF	1	4.03E-03	4.93E-03	5.00E-03	1.12E-09	4.49E-12
1,2,3,6,7,8-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3,4,6,7,8-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDF	1	1.70E-03	2.08E-03	2.11E-03	4.70E-10	1.89E-12
Other HxCDF	1	1.59E-02	1.94E-02	1.97E-02	4.40E-09	1.77E-11
1,2,3,4,6,7,8-HpCDF	1	1.46E-02	1.78E-02	1.81E-02	4.04E-09	1.62E-11
1,2,3,4,7,8,9-HpCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HpCDF	1	9.26E-03	1.13E-02	1.15E-02	2.56E-09	1.032E-11
OCDF	1	1.18E-02	1.45E-02	1.47E-02	3.28E-09	1.32E-11
TOTAL PCDF		1.16E-01	1.42E-01	1.44E-01	3.21E-08	1.29E-10
TOTAL PCDD/PCDF		2.38E-01	2.91E-01	2.95E-01	6.59E-08	2.65E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-3

		Concentration			Emission Rate	
Congener	**UNITY**	**ng/DSCM**	**ng@12%**	**ng@7%**	**lb/hr**	**lb/MMBtu**
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	1	1.12E-02	1.44E-02	1.44E-02	3.02E-09	1.29E-11
1,2,3,7,8-PeCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	1	9.93E-03	1.28E-02	1.28E-02	2.69E-09	1.15E-11
1,2,3,4,7,8-HxCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDD	1	1.14E-03	1.47E-03	1.46E-03	3.07E-10	1.31E-12
1,2,3,7,8,9-HxCDD	1	9.76E-04	1.26E-03	1.26E-03	2.64E-10	1.13E-12
Other HxCDD	1	2.03E-02	2.62E-02	2.62E-02	5.50E-09	2.35E-11
1,2,3,4,6,7,8-HpCDD	1	8.97E-03	1.16E-02	1.15E-02	2.43E-09	1.04E-11
Other HpCDD	1	8.79E-03	1.13E-02	1.13E-02	2.38E-09	1.02E-11
OCDD	1	2.30E-02	2.97E-02	2.96E-02	6.23E-09	2.66E-11
TOTAL PCDD		8.43E-02	1.09E-01	1.09E-01	2.28E-08	9.75E-11
2,3,7,8-TCDF	1	1.06E-03	1.37E-03	1.36E-03	2.86E-10	1.22E-12
Other TCDF	1	1.89E-02	2.44E-02	2.44E-02	5.12E-09	2.19E-11
1,2,3,7,8-PeCDF	1	1.68E-03	2.17E-03	2.16E-03	4.54E-10	1.94E-12
2,3,4,7,8-PeCDF	1	1.88E-03	2.42E-03	2.42E-03	5.08E-10	2.17E-12
Other PeCDF	1	1.13E-02	1.46E-02	1.45E-02	3.06E-09	1.31E-11
1,2,3,4,7,8-HxCDF	1	1.95E-03	2.52E-03	2.52E-03	5.29E-10	2.26E-12
1,2,3,6,7,8-HxCDF	1	1.87E-03	2.41E-03	2.41E-03	5.06E-10	2.16E-12
2,3,4,6,7,8-HxCDF	1	2.22E-03	2.86E-03	2.85E-03	5.99E-10	2.56E-12
1,2,3,7,8,9-HxCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	1	5.98E-03	7.71E-03	7.69E-03	1.62E-09	6.91E-12
1,2,3,4,6,7,8-HpCDF	1	6.92E-03	8.92E-03	8.90E-03	1.87E-09	8.00E-12
1,2,3,4,7,8,9-HpCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HpCDF	1	1.90E-03	2.46E-03	2.45E-03	5.15E-10	2.203E-12
OCDF	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		5.57E-02	7.18E-02	7.17E-02	1.51E-08	6.44E-11
TOTAL PCDD/PCDF		1.40E-01	1.81E-01	1.80E-01	3.79E-08	1.62E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Average Concentration and Emission Rate Summary

Congener	UNITY	Concentration ng/DSCM	Concentration ng@12%	Concentration ng@7%	Emission Rate lb/hr	Emission Rate lb/MMBtu
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	1	1.34E-02	1.67E-02	1.68E-02	3.68E-09	1.51E-11
1,2,3,7,8-PeCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	1	1.28E-02	1.59E-02	1.60E-02	3.51E-09	1.44E-11
1,2,3,4,7,8-HxCDD	1	4.88E-04	6.03E-04	6.05E-04	1.33E-10	5.44E-13
1,2,3,6,7,8-HxCDD	1	2.15E-03	2.67E-03	2.69E-03	5.91E-10	2.42E-12
1,2,3,7,8,9-HxCDD	1	1.18E-03	1.47E-03	1.48E-03	3.25E-10	1.33E-12
Other HxCDD	1	1.75E-02	2.20E-02	2.20E-02	4.77E-09	1.98E-11
1,2,3,4,6,7,8-HpCDD	1	1.54E-02	1.91E-02	1.93E-02	4.23E-09	1.73E-11
Other HpCDD	1	1.50E-02	1.86E-02	1.87E-02	4.12E-09	1.68E-11
OCDD	1	3.35E-02	4.17E-02	4.19E-02	9.19E-09	3.77E-11
TOTAL PCDD		1.11E-01	1.39E-01	1.40E-01	3.05E-08	1.25E-10
2,3,7,8-TCDF	1	3.53E-04	4.55E-04	4.54E-04	9.54E-11	4.08E-13
Other TCDF	1	3.40E-02	4.22E-02	4.24E-02	9.31E-09	3.81E-11
1,2,3,7,8-PeCDF	1	3.03E-03	3.77E-03	3.79E-03	8.32E-10	3.41E-12
2,3,4,7,8-PeCDF	1	3.10E-03	3.86E-03	3.88E-03	8.52E-10	3.49E-12
Other PeCDF	1	2.11E-02	2.62E-02	2.64E-02	5.79E-09	2.37E-11
1,2,3,4,7,8-HxCDF	1	3.35E-03	4.16E-03	4.19E-03	9.20E-10	3.76E-12
1,2,3,6,7,8-HxCDF	1	1.86E-03	2.34E-03	2.34E-03	5.08E-10	2.10E-12
2,3,4,6,7,8-HxCDF	1	1.93E-03	2.43E-03	2.43E-03	5.26E-10	2.18E-12
1,2,3,7,8,9-HxCDF	1	5.66E-04	6.93E-04	7.02E-04	1.57E-10	6.31E-13
Other HxCDF	1	1.05E-02	1.31E-02	1.32E-02	2.90E-09	1.18E-11
1,2,3,4,6,7,8-HpCDF	1	1.08E-02	1.34E-02	1.35E-02	2.97E-09	1.22E-11
1,2,3,4,7,8,9-HpCDF	1	7.14E-04	8.83E-04	8.86E-04	1.95E-10	7.96E-13
Other HpCDF	1	3.71E-03	4.59E-03	4.64E-03	1.02E-09	4.168E-12
OCDF	1	3.94E-03	4.83E-03	4.89E-03	1.09E-09	4.40E-12
TOTAL PCDF		9.90E-02	1.23E-01	1.24E-01	2.72E-08	1.11E-10
TOTAL PCDD/PCDF		2.10E-01	2.62E-01	2.63E-01	5.77E-08	2.37E-10

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-1

Congener	1989 ITEF	Concentration ng/DSCM	ng@12%	ng@7%	Emission Rate lb/hr	lb/MMBtu
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	1.46E-04	1.81E-04	1.82E-04	4.00E-11	1.63E-13
1,2,3,6,7,8-HxCDD	0.1	2.41E-04	2.98E-04	2.99E-04	6.58E-11	2.68E-13
1,2,3,7,8,9-HxCDD	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	1.71E-04	2.12E-04	2.13E-04	4.69E-11	1.91E-13
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	3.35E-05	4.14E-05	4.15E-05	9.15E-12	3.73E-14
TOTAL PCDD		5.92E-04	7.32E-04	7.34E-04	1.62E-10	6.60E-13
2,3,7,8-TCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	2.23E-04	2.75E-04	2.76E-04	6.09E-11	2.48E-13
2,3,4,7,8-PeCDF	0.5	1.83E-03	2.27E-03	2.27E-03	5.01E-10	2.04E-12
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	4.07E-04	5.04E-04	5.05E-04	1.11E-10	4.54E-13
1,2,3,6,7,8-HxCDF	0.1	3.72E-04	4.61E-04	4.62E-04	1.02E-10	4.15E-13
2,3,4,6,7,8-HxCDF	0.1	3.58E-04	4.43E-04	4.44E-04	9.79E-11	3.99E-13
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	1.10E-04	1.36E-04	1.36E-04	3.00E-11	1.22E-13
1,2,3,4,7,8,9-HpCDF	0.01	2.14E-05	2.65E-05	2.66E-05	5.86E-12	2.39E-14
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDF	0.001	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		3.32E-03	4.11E-03	4.13E-03	9.09E-10	3.71E-12
TOTAL PCDD/PCDF		3.92E-03	4.84E-03	4.86E-03	1.07E-09	4.37E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-2

		- - - - - - - - - Concentration - - - - - - - - -			- - - Emission Rate - - -	
Congener	**1989 ITEF**	**ng/DSCM**	**ng@12%**	**ng@7%**	**lb/hr**	**lb/MMBtu**
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDD	0.1	2.91E-04	3.57E-04	3.62E-04	8.07E-11	3.25E-13
1,2,3,7,8,9-HxCDD	0.1	2.57E-04	3.15E-04	3.19E-04	7.12E-11	2.87E-13
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	2.01E-04	2.46E-04	2.50E-04	5.57E-11	2.24E-13
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	4.40E-05	5.39E-05	5.46E-05	1.22E-11	4.91E-14
TOTAL PCDD		7.94E-04	9.72E-04	9.85E-04	2.20E-10	8.85E-13
2,3,7,8-TCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	1.49E-04	1.82E-04	1.84E-04	4.12E-11	1.66E-13
2,3,4,7,8-PeCDF	0.5	1.89E-03	2.31E-03	2.34E-03	5.22E-10	2.10E-12
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	4.03E-04	4.93E-04	5.00E-04	1.12E-10	4.49E-13
1,2,3,6,7,8-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3,4,6,7,8-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8,9-HxCDF	0.1	1.70E-04	2.08E-04	2.11E-04	4.70E-11	1.89E-13
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	1.46E-04	1.78E-04	1.81E-04	4.04E-11	1.62E-13
1,2,3,4,7,8,9-HpCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
OCDF	0.001	1.18E-05	1.45E-05	1.47E-05	3.28E-12	1.32E-14
TOTAL PCDF		2.76E-03	3.38E-03	3.43E-03	7.66E-10	3.08E-12
TOTAL PCDD/PCDF		3.56E-03	4.36E-03	4.42E-03	9.86E-10	3.97E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Concentration and Emission Rate Summary
Run Number: 4-O-M23-3

		Concentration			Emission Rate	
Congener	**1989 ITEF**	**ng/DSCM**	**ng@12%**	**ng@7%**	**lb/hr**	**lb/MMBtu**
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,6,7,8-HxCDD	0.1	1.14E-04	1.47E-04	1.46E-04	3.07E-11	1.31E-13
1,2,3,7,8,9-HxCDD	0.1	9.76E-05	1.26E-04	1.26E-04	2.64E-11	1.13E-13
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	8.97E-05	1.16E-04	1.15E-04	2.43E-11	1.04E-13
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	2.30E-05	2.97E-05	2.96E-05	6.23E-12	2.66E-14
TOTAL PCDD		3.24E-04	4.18E-04	4.17E-04	8.76E-11	3.75E-13
2,3,7,8-TCDF	0.1	1.06E-04	1.37E-04	1.36E-04	2.86E-11	1.22E-13
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	8.40E-05	1.08E-04	1.08E-04	2.27E-11	9.71E-14
2,3,4,7,8-PeCDF	0.5	9.39E-04	1.21E-03	1.21E-03	2.54E-10	1.09E-12
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	1.95E-04	2.52E-04	2.52E-04	5.29E-11	2.26E-13
1,2,3,6,7,8-HxCDF	0.1	1.87E-04	2.41E-04	2.41E-04	5.06E-11	2.16E-13
2,3,4,6,7,8-HxCDF	0.1	2.22E-04	2.86E-04	2.85E-04	5.99E-11	2.56E-13
1,2,3,7,8,9-HxCDF	0.1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	6.92E-05	8.92E-05	8.90E-05	1.87E-11	8.00E-14
1,2,3,4,7,8,9-HpCDF	0.01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
OCDF	0.001	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL PCDF		1.80E-03	2.33E-03	2.32E-03	4.87E-10	2.08E-12
TOTAL PCDD/PCDF		2.13E-03	2.74E-03	2.74E-03	5.75E-10	2.46E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

Unit #4 FF Outlet
Average Concentration and Emission Rate Summary

Congener	1989 ITEF	Concentration ng/DSCM	Concentration ng@12%	Concentration ng@7%	Emission Rate lb/hr	Emission Rate lb/MMBtu
2,3,7,8-TCDD	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other TCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDD	0.5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Other PeCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDD	0.1	4.88E-05	6.03E-05	6.05E-05	1.33E-11	5.44E-14
1,2,3,6,7,8-HxCDD	0.1	2.15E-04	2.67E-04	2.69E-04	5.91E-11	2.42E-13
1,2,3,7,8,9-HxCDD	0.1	1.18E-04	1.47E-04	1.48E-04	3.25E-11	1.33E-13
Other HxCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDD	0.01	1.54E-04	1.91E-04	1.93E-04	4.23E-11	1.73E-13
Other HpCDD	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
OCDD	0.001	3.35E-05	4.17E-05	4.19E-05	9.19E-12	3.77E-14
TOTAL PCDD		5.70E-04	7.07E-04	7.12E-04	1.56E-10	6.40E-13
2,3,7,8-TCDF	0.1	3.53E-05	4.55E-05	4.54E-05	9.54E-12	4.08E-14
Other TCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,7,8-PeCDF	0.05	1.52E-04	1.89E-04	1.90E-04	4.16E-11	1.70E-13
2,3,4,7,8-PeCDF	0.5	1.55E-03	1.93E-03	1.94E-03	4.26E-10	1.74E-12
Other PeCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,7,8-HxCDF	0.1	3.35E-04	4.16E-04	4.19E-04	9.20E-11	3.76E-13
1,2,3,6,7,8-HxCDF	0.1	1.86E-04	2.34E-04	2.34E-04	5.08E-11	2.10E-13
2,3,4,6,7,8-HxCDF	0.1	1.93E-04	2.43E-04	2.43E-04	5.26E-11	2.18E-13
1,2,3,7,8,9-HxCDF	0.1	5.66E-05	6.93E-05	7.02E-05	1.57E-11	6.31E-14
Other HxCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2,3,4,6,7,8-HpCDF	0.01	1.08E-04	1.34E-04	1.35E-04	2.97E-11	1.22E-13
1,2,3,4,7,8,9-HpCDF	0.01	7.14E-06	8.83E-06	8.86E-06	1.95E-12	7.96E-15
Other HpCDF	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0
OCDF	0.001	3.94E-06	4.83E-06	4.89E-06	1.09E-12	4.40E-15
TOTAL PCDF		2.63E-03	3.27E-03	3.29E-03	7.21E-10	2.96E-12
TOTAL PCDD/PCDF		3.20E-03	3.98E-03	4.00E-03	8.77E-10	3.60E-12

* In accordance with EPA Method 23, Section 9.9, results below the minimum detection limit were treated as zero when averaging or totaling the results. 68oF and 29.92 inches Hg

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APPENDIX A.5
Test Results

Unit 4 Fabric Filter Outlet
Hydrogen Chloride

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ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: MM26

Client Name	Covanta Projects, Inc.	**Operator**	SGD
Plant Name	Hillsborough County SWERF	**Project #**	10659
Sampling Location	Unit #4 FF Outlet	**Standard Temperature, °F**	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		**1**	**1**	**1**		**SET AVERAGE**
Run Number		4-O-MM26-1	4-O-MM26-2	4-O-MM26-3		
Run Date		08/31/09	08/31/09	08/31/09		
Run Start Time	hh:mm	900	1037	1210		
Run Stop Time	hh:mm	1006	1146	1317		
Sampling Parameters						
Meter Calibration Factor	Y	0.9921	0.9921	0.9921		
Y_{QA} Calculated by Test Run	Y_{QA}	1.0145	0.9989	0.9909		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-10.00	-9.50	-9.00		-9.50
Barometric Pressure	in Hg	29.9	29.9	29.9		29.9
Carbon Dioxide Percentage	% CO_2	9.2	9.2	9.4		9.3
Oxygen Percentage	% O_2	10.1	10.1	10.1		10.1
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.7	80.7	80.5		80.6
Total Water Volume Collected	mL	179.8	167.9	175.3		174.3
Sample Volume	ft^3	37.792	38.512	38.892		38.399
Average Meter Temperature	°F	90	94	96		93
Average Delta H	in H_2O	1.30	1.30	1.30		1.30
Total Sampling Time	min	60	60	60		60
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	8.463	7.903	8.251		8.206
Volume Metered @ STP	DSCF	36.065	36.500	36.692		36.419
Absolute Stack/Duct Pressure	in Hg	29.2	29.2	29.2		29.2
Absolute Meter Pressure	in Hg	30.0	30.0	30.0		30.0
Calculated Stack Moisture	% H_20	19.0	17.8	18.4		18.4
F-Factor	DSCF/MM	9570	9570	9570		9570
Air Flow Rate Results						
Dry Standard Stack Flow/Minute	DSCFM	76,559	76,559	74,955		76,024

Air flow rates taken from concurrent EPA Method 5/29 test runs.

Concentration and Emission Rate Data Summary						
Hydrogen Chloride	mg	15.6	13.6	12.6		
Molecular Weight	MW	36.46	36.46	36.46		
Concentration, ppm	ppm	10.08	8.68	8.00		8.92
Concentration @ 12% CO_2	ppm@12%	13.1	11.3	10.2		11.6
Concentration @ 7% O_2	ppm@7%	13.0	11.2	10.3		11.5
Emission Rate, lb/hr	lb/hr	4.38	3.77	3.40		3.85
Emission Rate, lb/MMBtu	lb/MMBtu	0.0177	0.0152	0.0140		0.0156

Removal Efficiency Summary For: HCl

		ppm @ 7% O2		Removal Efficiency, %
Unit #	Repitition Number	Inlet Result	Stack Result	
4	1	652	13.0	98.0%
	2	664	11.2	98.3%
	3	566	10.3	98.2%
			AVERAGE =>	98.2%

APPENDIX A.6
Test Results

Unit 4 Fabric Filter Outlet
Particulate and Metals

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD M5/29

Client Name	Covanta Projects, Inc.	Operator	SGD
Plant Name	Hillsborough County SWERF	Project #	10659
Sampling Location	Unit #4 FF Outlet	Standard Temperature, °F	68

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1	1	1		SET AVERAGE
Run Number		4-O-M5/29-1	4-O-M5/29-2	4-O-M5/29-3		
Run Date		8/31/09	8/31/09	8/31/09		
Run Start Time	hh:mm	859	1153	1435		
Run Stop Time	hh:mm	1123	1416	1656		
Sampling Parameters						
Meter Calibration Factor	Y	0.9771	0.9771	0.9771		
Y_{QA} Calculated by Test Run	Y_{QA}	0.9778	0.9756	0.9696		
Y_{QA} PASS/FAIL by Test Run	Check	PASS	PASS	PASS		PASS
Pitot Tube Coefficient	C_p	0.84	0.84	0.84		
Stack/Duct Static Pressure	in H_2O	-10.00	-9.00	-9.00		-9.33
Stack Cross-Sectional Area	ft^2	55.33	55.33	55.33		55.33
Barometric Pressure	in Hg	29.9	29.9	29.9		29.9
Actual Nozzle Diameter	in	0.279	0.278	0.279		
Carbon Dioxide Percentage	% CO_2	9.2	9.4	9.5		9.4
Oxygen Percentage	% O_2	10.1	10.1	10.0		10.1
Carbon Monoxide Percentage	% CO	0.0	0.0	0.0		0.0
Nitrogen Percentage	% N_2	80.7	80.5	80.5		80.6
Total Water Volume Collected	mL	356.5	329.8	302.8		329.7
Sample Volume	ft^3	77.081	74.981	76.271		76.111
Average Meter Temperature	°F	84	90	94		89
Average Stack Temperature	°F	297	296	297		296
Average Delta H	in H_2O	1.18	1.11	1.12		1.14
Total Sampling Time	min	125	125	125		125
Air Flow Parameters						
Volume of Water vapor @ STP	SCF	16.780	15.524	14.253		15.519
Volume Metered @ STP	DSCF	73.178	70.479	71.165		71.607
Absolute Stack/Duct Pressure	in Hg	29.2	29.2	29.2		29.2
Absolute Meter Pressure	in Hg	30.0	30.0	30.0		30.0
Calculated Stack Moisture	% H_2O	18.7	18.1	16.7		17.8
Dry Mole Fraction	decimal	0.813	0.819	0.833		0.822
Avg Differential Pressure (Delta P)	in H_2O	0.359	0.339	0.340		0.346
Dry Gas Molecular Weight	lb/lb-mole	29.88	29.91	29.92		29.90
Wet Stack Gas Molecular Weight	lb/lb-mole	27.66	27.76	27.93		27.78
Average Stack Gas Velocity	ft/sec	41.67	40.37	40.29		40.78
Percent of Isokinetic Rate	% ISO	99.7	98.8	97.7		98.7
F-Factor	DSCF/MM	9570	9570	9570		9570
Heat Input Rate	MMBtu/hr	248	243	248		246
Heat Content of Waste	Btu/lb	5000	5000	5000		5000
Waste Charging Rate	lb/hr	49,607	48,568	49,694		49,290
Air Flow Rate Results						
Actual Stack Flow/Minute	ACFM	138,340	134,008	133,753		135,367
Dry Standard Stack Flow/Minute	DSCFM	76,559	74,955	75,990		75,835

Concentration and Emission Rate Data Summary

Filterable Particulate	mg	0.9	1.3	2.4		1.5
Concentration, Gr/DSCF	gr/DSCF	1.90E-04	2.85E-04	5.20E-04		3.32E-04
Concentration @ 12% CO_2	Gr@12%	2.48E-04	3.63E-04	6.57E-04		4.23E-04
Concentration @ 7% O_2	Gr@7%	2.44E-04	3.66E-04	6.64E-04		4.25E-04
Concentration mg/DSCM	mg/DSCM	0.43	0.65	1.19		0.76
Concentration mg @ 7% O_2	mg@7%	0.56	0.84	1.52		0.97
Emission Rate, lb/hr	lb/hr	0.125	0.183	0.339		0.215
Emission Rate, lb/MMBtu	lb/MMBtu	5.02E-04	7.53E-04	1.36E-03		8.73E-04

Cadmium (Cd)	ug	0.408	0.312	0.270		0.330
Concentration ug/DSCM	ug/DSCM	0.20	0.16	0.13		0.16
Concentration ug @ 12% CO2	ug@12%	0.26	0.20	0.17		0.21
Concentration ug @ 7% O_2	ug@7%	0.25	0.20	0.17		0.21
Concentration mg @ 7% O_2	mg@7%	0.00025	0.00020	0.00017		0.00021
Emission Rate, lb/hr	lb/hr	5.65E-05	4.38E-05	3.81E-05		4.61E-05
Emission Rate, lb/MMBtu	lb/MMBtu	2.28E-07	1.80E-07	1.53E-07		1.87E-07

Lead (Pb)	ug	3.500	2.740	2.450		2.897
Concentration ug/DSCM	ug/DSCM	1.69	1.37	1.22		1.43
Concentration ug @ 12% CO2	ug@12%	2.20	1.75	1.54		1.83
Concentration ug @ 7% O_2	ug@7%	2.17	1.77	1.55		1.83
Concentration mg @ 7% O_2	mg@7%	0.00217	0.00177	0.00155		0.00183
Emission Rate, lb/hr	lb/hr	4.84E-04	3.85E-04	3.46E-04		4.05E-04
Emission Rate, lb/MMBtu	lb/MMBtu	1.95E-06	1.59E-06	1.39E-06		1.64E-06

Mercury (Hg)	ug	2.415	2.365	2.484		2.421
Concentration ug/DSCM	ug/DSCM	1.17	1.18	1.23		1.19
Concentration ug @ 12% CO2	ug@12%	1.52	1.51	1.56		1.53
Concentration ug @ 7% O_2	ug@7%	1.50	1.53	1.57		1.53
Emission Rate, lb/hr	lb/hr	3.34E-04	3.33E-04	3.51E-04		3.39E-04
Emission Rate, lb/MMBtu	lb/MMBtu	1.35E-06	1.37E-06	1.41E-06		1.38E-06

Removal Efficiency Summary For: Mercury

		ug/DSCM @ 7% O2		Removal Efficiency, %
Unit #	Repitition Number	Inlet Result	Stack Result	
4	1	60.3	1.50	97.5%
	2	70.9	1.53	97.8%
	3	83.5	1.57	98.1%
			AVERAGE =>	97.8%

APPENDIX A.7
Example Calculations

CONSTANTS, DEFINITIONS, & NOMENCLATURE

0.04707	Standard cubic feet per gram or milliliter of water @ standard conditions
0.18	Molecular weight of water divided by 100
0.28	Molecular weight of nitrogen divided by 100
0.32	Molecular weight of oxygen divided by 100
0.44	Molecular weight of carbon dioxide divided by 100
0.264	Ratio of O2 to N2 in air, v/v
0.5	Diatomic factor
13.6	Specific gravity of mercury
17.64	Conversion factor, standard temperature, standard pressure, (degrees R, inches Hg)
20.9	Percent O2 by volume (dry basis) in ambient air
24	Hours per day
24.056	Molar volume liters per mole, STP
85.49	Pitot tube constant, ft./sec.
385.3	Molar volume, ft3/mole @ 68 deg. F, 29.92 inches Hg.
60	Minutes per hours, seconds per minute
100	Conversion to percent
460	0 degrees F in degrees R
7,000	Grains per pound
453,592	Milligrams per pound
A	Cross-sectional area of stack, square feet
avg	Average
CTavg	Calibration time, average
%CO2	Percent carbon dioxide, volume, dry basis
%CO + N2	Percent carbon monoxide and nitrogen, volume, dry basis
Cp	Pitot tube coefficient
Delta H	Average pressure differential of meterbox orifice, inches water
Delta pavg	Average pressure drop
DRE	Destruction and Removal Efficiency
%EA	Percent Excess Air
F	F-factor, dry standard cubic feet per million Btu
Gr/DSCF	Grains per dry standard cubic foot
7% O2	Concentration corrected to 7% oxygen
12% CO2	Concentration corrected to 12% carbon dioxide
gms/day	Grams per day
%H2O	Percent moisture
Hg	Mercury
%I	Percent isokinetic sampling rate
Lb/hr	Emission rate, pounds per hour
Lb/MMBtu	Emission rate, pounds per million Btu heat input
Mfd	Mole fraction, dry
Md	Molecular weight of flue gas, dry
Ms	Molecular weight of flue gas, wet
mg	Milligrams
mg/DSCM	Milligrams per dry standard cubic meter
Nozzle area	Area of sampling nozzle, square feet
%O2	Percent oxygen
Pbar	Barometric pressure, inches Hg
Pg	Flue gas static pressure, inches H2O
ppmd	Concentration, parts per million, dry, volume
Ps	Flue gas absolute pressure, inches Hg
Pstd	Standard absolute pressure at 29.92 inches Hg
Qsd	Volumetric flowrate, dry standard cubic feet per minute
Qaw	Volumetric flowrate, wet actual cubic feet per minute

CONSTANTS, DEFINITIONS, & NOMENCLATURE

(continued)

ta	Ambient temperature
Theta	Run time, minutes
tm	Dry gas meter temperature, degrees F, average of inlet and outlet meter temperatures
ts	Flue gas temperature, degrees F
Tstd	Standard absolute temperature, 528 Rankin
Vlc	Volume of liquid collected, mL
Vm	Volume of metered gas sample, dry, cubic feet
Vm(std)	Volume of metered gas sample, at standard conditions, dry cubic feet
vs	Average flue gas velocity, feet per second
Vsc	Milliliters sampled, dry, STP
Va	Milliliters sampled, actual, dry
Vw(std)	Volume of water vapor, stand cubic feet
Y	Gamma, dry gas meter calibration factor

CALCULATIONS

Volume Metered, Dry, (STP)

Vm(std) = 17.64 * Y * Vm * (Pbar + Delta H / 13.6) / (460 + tm) ft3

Vsc = (17.64 * Va * Pbar) / (ta + 460) Milliliters

Va = (Theta * 60 * Vc * Y) / (CTavg * 1000) Milliliters

Volume of Water Collected, Dry Standard Cubic Feet (STP)

Vw(std) = 0.04707 * Vlc

Percent Moisture Content

%H2O = 100 * Vw(std) / (Vw(std) + Vm(std))

Mole Fraction of Flue Gas (Dry)

Mfd = 1 - (%H2O / 100)

Molecular Weight of Flue Gas (Dry)

Md = (%CO2 * 0.44) + (%O2 * 0.32) + ((%CO + %N2) * 0.28)

Molecular Weight of Flue Gas (Wet)

Ms = (Md * Mfd) + (0.18 * %H2O)

Flue Gas Absolute Pressure (" Hg)

Ps = Pbar + (Pg / 13.6)

Flue Gas Velocity, Feet per Second, (Delta p avg is square of average square root)

vs = 85.49 * Cp * SQRT ((Delta p avg * (460 + ts)) / (Ps * Ms))

Volumetric Flowrate, Cubic Feet per Minute (STP), DSCFM

Qsd = 60 * Mfd * vs * A * (Tstd / (ts + 460)) * (Ps / Pstd)

Volumetric Flowrate, Cubic Feet per Minute, (Actual), ACFM

Qaw = 60 * vs * A

Percent Isokinetic

%I = (Pstd / Tstd) * (100 / 60) * ((ts + 460) * vm(std)) / (Ps * vs * Mfd * Theta * Nozzle area)

Heat Input Rate, Million BTU per Hour

MMBtu / hr = 60 * (Qsd / F) * ((20.9-%O2) / 20.9)

Percent Excess Air

%EA = 100 * (%O2 – (0.5 * %CO)) / ((0.264 - %N2) – (%O2 – (0.5 * %CO)))

Grains per Cubic Foot, Dry Standard

Gr / DSCF = (7,000 / 453,592) * (mg / Vm(std))

Gr/DSCF = (7,000 * ppmd * Mol. wt.) / (385.3 E+06)

Pounds per Hour

Lb/hr = 60 * (mg / 453,592) * (Qsd / Vm(std))

Lb/hr = (60 * ppmd * Mol. wt. * Qsd) / (385.3 E+06)

Pounds per Million BTU

Lb/MMBtu = (mg / 453,592) * (F / Vm(std)) * (20.9 / (20.9-%O2))

Lb/MMBtu = ((ppmd * Mol. wt.) / (385.3 E+06)) * F * (20.9 / (20.9-%O2))

Parts per Million, Dry Volume

ppmd = (385.3 E+06 * mg) / (453,592 * Mol. wt. * Vm(std)) ft3

ppmd = 1,000,000 * (24.056 * mg/1000)/(Vsc * Mol. Wt.) milliliters

ppmd = 1,000,000 * (24.056 * ug/1,000,000)/(Vsc * Mol. Wt.) milliliters

Milligrams per Cubic Meter, Dry Standard

mg/DSCM = ppmd * (Mol. wt. / 24.056)

Grams per Day

gms/day = 24 * 60 * (ug/10E+06) * Qsd / Vm(std)

Corrections

7% O_2 multiply by (20.9-7) / (20.9 – O_2)
12% CO_2 multiply by (12 / %CO_2)

APPENDIX B
Field Data

APPENDIX B.1
Field Data

Unit 4 SDA Inlet
Hydrogen Chloride

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	**Project #**	10659
Plant Name	Hillsborough County SWERF	**Balance Type**	Electronic
Plant City, State	Tampa, FL	**Balance ID**	EB1
Sampling Location	Unit #4 SDA Inlet	**Operator Name**	Blake Cone

Run Number	4-I-MM26-1	4-I-MM26-2	4-I-MM26-3	
Test Date	08/31/09	08/31/09	08/31/09	
Reagent Box ID				

Impinger Reagent	H2SO4	mL	mL	mL	mL
Final Catch Weight	grams	583.6	583.4	584.5	
Initial Tare Weight	grams	441.0	445.5	441.5	
Net Moisture Caught	grams	142.6	137.9	143.0	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
Initial Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
KMNo4 Weight	grams				
KMnO4 g/mL	1.1				
Initial Jar Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	256.9	255.5	256.3	
Initial Tare Weight	grams	244.6	246.9	248.0	
Net Moisture Caught	grams	12.3	8.6	8.3	0.0

Total Catch	grams	154.9	146.5	151.3	0.0

Signature:	[signature]	**Checked By:**	[signature]

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-I-MM26-1		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	900
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1006
Test Location	Unit #4 SDA Inlet	Tester Signature	R.B. Perry		
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.650	Pbar	29.9	Meter Console #		T2			CO_2
Meter Calibration Factor	0.9874	Pstatic	-1.00	Ideal Nozzle Diameter		0.299			9.8
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		9.5
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.500	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		HB2	1.0318		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		CB17	-4.50%		80.7
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-2	PASS		H_2O
K Factor (delta H/delta P)	######	N_2	80.5	TC ID #s		HCl			154.9

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		87	89	DGM initial		763.325					763.325
Thermocouples		Y	Y	Vacuum	15	15	16				16
Pitots		Y	Y	Leak Rate	0.000	0.001	0.002				OK
Tedlar Bag	NA	Y	Y	DGM final		765.975					765.975

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
B - 3	900	0.0	745.458	NA		1.20	4	89	88	NA	269	67	NA
-		5.0	748.452	NA		1.20	4	91	88	NA	257	64	NA
-		10.0	751.352	NA		1.20	5	93	89	NA	256	61	NA
-		15.0	754.350	NA		1.20	8	95	89	NA	255	63	NA
-		20.0	757.358	NA		1.20	10	97	90	NA	256	64	NA
-		25.0	760.325	NA		1.20	13	97	90	NA	260	62	NA
-		30.0	763.325	NA		1.20	15	97	91	NA	256	63	NA
-	932	35.0	767.735	NA		1.20	4	96	92	NA	251	66	NA
-	938	40.0	771.523	NA		1.20	6	99	93	NA	255	64	NA
-		45.0	775.247	NA		1.20	8	99	93	NA	253	64	NA
-		50.0	778.750	NA		1.20	10	99	93	NA	254	62	NA
-		55.0	782.310	NA		1.20	14	101	93	NA	255	63	NA
-	1006	60.0	785.550										
						MAX =>	15						
Average Values	60.0	37.442				1.20		93					

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-I-MM26-2			
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1037	
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1146	
Test Location	Unit #4 SDA Inlet	Tester Signature	A.B. Berry			
Date of Test	08/31/09	Checked By				

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.650	Pbar	29.9	Meter Console #		T2			CO_2
Meter Calibration Factor	0.9874	Pstatic	-1.55	Ideal Nozzle Diameter		0.299			9.8
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		9.5
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.500	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		HB2	1.0289		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		CB17	-4.20%		80.7
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-2	PASS		H_2O
K Factor (delta H/delta P)	######	N_2	80.5	TC ID #s		HCl			146.5

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		90	91	DGM initial		808.149					808.149
Thermocouples		Y	Y	Vacuum	15	16	24				24
Pitots		Y	Y	Leak Rate	0.001	0.001	0.001				OK
Tedlar Bag	NA	Y	Y	DGM final		808.418					808.418

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 3	1037	0.0	786.231	NA		1.20	4	95	94	NA	250	67	NA
-		5.0	789.442	NA		1.20	5	96	94	NA	254	60	NA
-		10.0	792.695	NA		1.20	7	99	94	NA	256	56	NA
-		15.0	795.632	NA		1.20	8	99	94	NA	256	56	NA
-		20.0	798.752	NA		1.20	11	100	95	NA	255	56	NA
-		25.0	801.910	NA		1.20	12	101	95	NA	256	56	NA
-		30.0	805.020	NA		1.20	19	101	95	NA	257	57	NA
-	1121	35.0	808.149	NA		1.20	4	97	95	NA	251	64	NA
-		40.0	811.668	NA		1.20	6	98	95	NA	254	54	NA
-		45.0	814.802	NA		1.20	8	101	95	NA	256	54	NA
-		50.0	817.938	NA		1.20	11	102	96	NA	256	54	NA
-		55.0	821.040	NA		1.20	13	102	96	NA	256	55	NA
-	1146	60.0	824.171										
						MAX =>	19						
Average Values		60.0	37.671			1.20		97					

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-I-MM26-3		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1210
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1317
Test Location	Unit #4 SDA Inlet	Tester Signature	R B Perry		
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.650	Pbar	29.9	Meter Console #		T2			CO_2
Meter Calibration Factor	0.9874	Pstatic	-1.50	Ideal Nozzle Diameter		0.299			9.9
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		9.6
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.500	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		CB2	1.0351		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		HB17	-4.83%		80.5
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-2	PASS		H_20
K Factor (delta H/delta P)	######	N_2	80.5	TC ID #s		HCl			151.3

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		93	99	DGM initial		840.238					840.238
Thermocouples		Y	Y	Vacuum	15	15	25				25
Pitots		Y	Y	Leak Rate	0.001	0.001	0.003				OK
Tedlar Bag	NA	Y	Y	DGM final		840.482					840.482

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 3	1210	0.0	824.599	NA		1.20	6	98	96	NA	250	67	NA
-		5.0	827.733	NA		1.20	7	98	96	NA	255	60	NA
-		10.0	830.871	NA		1.20	12	102	96	NA	256	57	NA
-		15.0	834.022	NA		1.20	13	102	96	NA	257	57	NA
-		20.0	837.158	NA		1.20	15	103	97	NA	257	57	NA
-	1235	25.0	840.238	NA		1.20	9	104	98	NA	255	58	NA
-	1242	30.0	843.638	NA		1.20	9	104	98	NA	255	59	NA
-		35.0	846.775	NA		1.20	10	105	98	NA	256	59	NA
-		40.0	849.912	NA		1.20	12	106	99	NA	257	60	NA
-		45.0	853.057	NA		1.20	13	106	99	NA	256	61	NA
-		50.0	856.163	NA		1.20	16	106	99	NA	258	62	NA
-		55.0	859.280	NA		1.20	19	106	99	NA	257	63	NA
-	1317	60.0	862.390										
-													
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-													
						MAX =>	19						
Average Values		60.0	37.547			1.20		100					

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APPENDIX B.2
Field Data

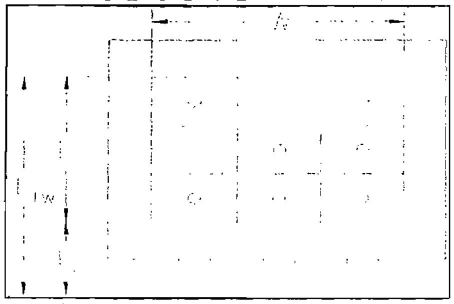
Unit 4 SDA Inlet
Mercury

Best Available Copy

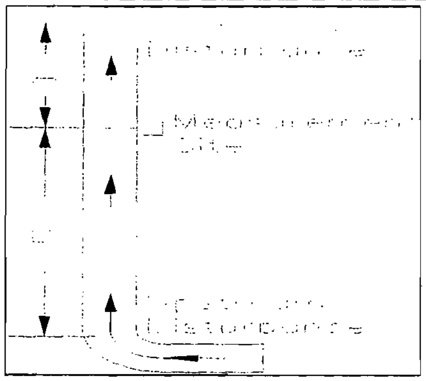
EPA Method 1 for Rectangular Ducts or Stacks

Client Name	Covanta Projects, Inc.	**Operator**	GLW
Plant Name	Hillsborough County Solid Waste ERF	**Date**	08/30/09
Plant City, State	Tampa, FL	**Project #**	10659
Sampling Location	Unit 4 SDA Inlet	**# of Ports Available**	5
Stack Type	Rectangular	**# of Ports Used**	5
Stack Size	Large	**Port Inside Diam.**	3 inches

Rectangular Stacks or Ducts			
Distance to Far Wall of Stack	(L_{fw})	101	in
Distance to Near Wall of Stack	(L_{nw})	30	in
Depth of Stack (=L_{fw} - L_{nw})	(L)	71	in
Width of Stack	(W)	131	in
Equivalent Stack Diam(=2LW/(L+W	(D_e)	92 1/8	in
Area of Stack (=LW/C_{units})	(A_s)	64.59	ft^2



Distance from Port to Disturbances				
Distance Upstream	FEET =>	36	2	<= IN
Diameters Upstream (=DU/D_e)	(B_D)		4.71	diameters
Distance Downstream	FEET =>	18	4	<= IN
Diameters Downstream (=DD/D_e)	(A_D)		2.39	diameters



Number of Traverse Points Required			
Diameters to Flow Disturbance		Minimum Number of[1] Traverse Points	
Up Stream	Down Stream	Particulate Points	Velocity Points
2.00-4.99	0.50-1.24	25	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
>= 8.00	>=2.00	9 or 12[2]	9 or 12[2]
Upstream Spec		25	
Downstream Spec		12	
Traverse Pts Required		25	0

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

[2] 9 for Rectangular Stacks 12 to 24 inches
12 for All Stacks over 24 inches

Number of Traverse Points Used			
25	Input Traverse Points Required		
5	Ports by	5	Points In
25	Total Points to be Measured		

Location of Traverse Points in Rectangular Stacks
(Fraction of Stack Dimension from Inside Wall to Traverse Point)

Traverse Point Number	Number of Traverse Points Across the Stack: 2	3	4	5	6	7	8	9	10	11	12
1	.250	.167	.125	.100	.083	.071	.063	.056	.050	.045	.042
2	.750	.500	.375	.300	.250	.214	.188	.167	.150	.136	.125
3		.833	.625	.500	.417	.357	.313	.278	.250	.227	.208
4			.875	.700	.583	.500	.438	.389	.350	.318	.292
5				.900	.750	.643	.563	.500	.450	.409	.375
6					.917	.786	.688	.611	.550	.500	.458
7						.929	.813	.722	.650	.591	.542
8							.938	.833	.750	.682	.625
9								.944	.850	.773	.708
10									.950	.864	.792
11										.955	.875
12											.958

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Dimension	Distance from Inside Wall	Distance Including Nipple Length
		in	in
1	0.100	7 1/8	37 1/8
2	0.300	21 2/8	51 2/8
3	0.500	35 4/8	65 4/8
4	0.700	49 6/8	79 6/8
5	0.900	63 7/8	93 7/8
6			
7			
8			
9			
10			
11			
12			

Signature: [signature]   Checked: [signature]

EPA Method 2 for Air Flow Rate Determination

Client Name	Covanta Projects, Inc.				Operator	CAN
Plant Name	Hillsborough County SWERRF				Date	08/30/09
Plant City, State	Tampa, FL				Project #	10659
Sampling Location	Unit #4 SDA Inlet				# of Ports Used	5
Thermocouple Check	PreTest	Y	PostTest	Y	Pitot Identification	146
Pitot Leak Check	PreTest	Y	PostTest	Y	Pitot Coefficient (C_p)	(OR 0.99)
Manometer ID #	T2	Umbilical ID #		U50-2	Thermocouple ID #	146

Stack or Duct Dimensions			
Diameter or Depth of Duct/Stack	(D)	71.00	in
Width of Duct/Stack	(W)	131.00	in
Area of Duct/Stack	(A_s)	64.59	ft^2

Pressures			
Barometric Pressure	(P_b)	29.90	in Hg
Static Pressure	(P_{static})	-1.55	in H_2O
Absolute Stack Pressure	(P_s)	29.79	in Hg

Stack Gas Composition				
Composition Data:	Actuals		Estimates	
Carbon Dioxide Concentration		($\%CO_2$)		%
Oxygen Concentration		($\%O_2$)		%
Carbon Monoxide Concentration		($\%CO$)		%
Nitrogen Concentration		($\%N_2$)	100.0	%
Stack Moisture Content		(B_{ws})		%
Stack Dry Molecular Weight		(M_d)	28.00	lb/lb-mole
Stack Wet Molecular Weight		(M_s)	28.00	lb/lb-mole

Results			
Standard Temp. °F => 68	Standard Press. =>		29.92
Flue Gas Density			lb/ft^3
Avg Stack Gas Velocity	(v_s)		ft/sec
Pounds Per Hour Flow Rate	(Q_{lb})		Lb/Hr
Actual Wet Flow Rate	(Q_{aw})		ACFM
Stack Dry Std Flow Rate	(Q_{sd})		DSCFM
Stack Wet Std Flow Rate	(Q_{sw})		WSCFM
Stack Dry Std Flow Rate	(Q_{sdh})	#VALUE!	DSCFH
Stack Wet Std Flow Rate	(Q_{swh})		WSCFH
Stack Dry Std Flow Rate, Metric	(Q_{dsmm})		DSCMM
Stack Cross Section Schematic			

Velocity Traverse Data			
Run #:	4-I-Cyclonic Flow		
Run Time	1530	<= Until =>	1600
Traverse Point	Cyclonic Angle, degrees	Velocity Head, (Δp) in H_2O	Stack Temp, (t_s) °F
A - 5	2.0		
A - 4	1.0		
A - 3	3.0		
A - 2	0.0		
A - 1	4.0		
B - 5	1.0		
B - 4	3.0		
B - 3	5.0		
B - 2	-5.0		
B - 1	6.0		
C - 5	2.0		
C - 4	1.0		
C - 3	-2.0		
C - 2	2.0		
C - 1	7.0		
D - 5	4.0		
D - 4	7.0		
D - 3	8.0		
D - 2	5.0		
D - 1	6.0		
E - 5	8.0		
E - 4	4.0		
E - 3	-1.0		
E - 2	4.0		
E - 1	14.0		
-			
Average	4.2	#DIV/0!	ERRR

Please report the square of the average square roots of Δp or $(\Delta p)_{avg} = (^1/_n\Sigma(\Delta p^{1/2}))^2$

Formulas Used	
A_s = DW for Rectangular Stacks	$A_s = (\pi(D/2)^2)/144$ for Circular Stacks
$P_s = P_{bar} + P_{static}/13.6$	$(\Delta p)^{1/2}_{avg} = {}^1/_n\Sigma(\Delta p^{1/2})$
$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$	$T_{s(avg)} = {}^1/_n\Sigma t_s + 460oR$
$M_d = .44(\%CO_2) + .32(\%O_2) + .28(\%N_2 + \%CO)$	$v_s = 85.49C_p(\Delta p)^{1/2}_{avg}(T_{s(avg)}/(P_sM_s))^{1/2}$
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	$Q_{sd} = 60*60(1 - B_{ws})v_sA_s(528oF/T_{s(avg)})(P_s/29.92)$
Signature: on file	Approved By: [signature]

EPA Method 3 for Molecular Weight Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Fuel Type	MSW
Plant City, State	Tampa, FL	Fo Min	
Test Location	Unit #4 SDA Inlet	Fo Max	

Date	08/31/09	Run Number	4-I-M29-1		ORSAT ID	2	Leak Ck?
Shared With	4-I-MM26-1,2		Start Time	0859	Stop Time	1123	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB10
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1214	9.8	19.2	9.4	80.8	0.1	0.1	
1220	9.9	19.4	9.5	80.6	0.1	0.1	Fo
1226	9.8	19.4	9.6	80.6	0.0	0.2	
Averages	9.8		9.5	80.7	OK	OK	

Date	08/31/09	Run Number	4-I-M29-2		ORSAT ID	2	Leak Ck?
Shared With	4-I-MM26-3		Start Time	1153	Stop Time	1417	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB3
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1425	9.9	19.5	9.6	80.5	0.1	0.0	
1431	9.8	19.4	9.6	80.6	0.1	0.1	Fo
1438	9.9	19.4	9.5	80.6	0.0	0.1	
Averages	9.9		9.6	80.5	OK	OK	

Date	08/31/09	Run Number	4-I-M29-3		ORSAT ID	2	Leak Ck?
Shared With			Start Time	1435	Stop Time	1656	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB4
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1726	9.7	19.3	9.6	80.7	0.0	0.1	
1732	9.7	19.4	9.7	80.6	0.1	0.2	Fo
1738	9.8	19.3	9.5	80.7	0.1	0.1	
Averages	9.7		9.6	80.7	OK	OK	

Date	08/31/09	Run Number			ORSAT ID	2	Leak Ck?
Shared With			Start Time		Stop Time		Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
			0.0	100.0			
			0.0	100.0			Fo
			0.0	100.0			
Averages	#DIV/0!		0.0	#DIV/0!			

Signature:	[signature]	Checked by:	[signature]

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Balance Type	Electronic
Plant City, State	Tampa, FL	Balance ID	EB1
Sampling Location	Unit #4 SDA Inlet	Operator Name	Blake Cone

Run Number	4-I-M29-1	4-I-M29-2	4-I-M29-3	
Test Date	08/31/09	08/31/09	08/31/09	
Reagent Box ID				

Impinger Reagent	HNO3/H2O2	mL	mL	mL	mL
Final Catch Weight	grams	555.0	540.8	542.9	
Initial Tare Weight	grams	247.6	274.2	274.3	
Net Moisture Caught	grams	307.4	266.6	268.6	0.0

Impinger Reagent	IMPIN 3	mL	mL	mL	mL
Final Catch Weight	grams	37.2	33.5	33.2	
Initial Tare Weight	grams	31.4	31.6	31.2	
Net Moisture Caught	grams	5.8	1.9	2.0	0.0

Impinger Reagent	KMnO4/H2SO4	mL	mL	mL	mL
Final Catch Weight	grams	461.0	463.5	461.2	
KMNo4 Weight	grams	220.0	220.0	220.0	
KMnO4 g/mL	1.1	200.0	200.0	200.0	
Initial Jar Tare Weight	grams	240.0	240.5	240.0	
Net Moisture Caught	grams	1.0	3.0	1.2	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	265.3	266.6	270.4	
Initial Tare Weight	grams	250.0	250.5	254.0	
Net Moisture Caught	grams	15.3	16.1	16.4	0.0

Total Catch	grams	329.5	287.6	288.2	0.0

Signature:		Checked By:	

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M29

Client Name	Covanta Projects, Inc.	Run #	4-I-M29-1		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	859
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1123
Test Location	Unit #4 SDA Inlet	Tester Signature	R B Perry		
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.659	Pbar	29.9	Meter Console #		T7			CO_2
Meter Calibration Factor	1.0027	Pstatic	-1.00	Ideal Nozzle Diameter		0.299			**9.8**
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN985			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		0.300	XAD ID & Tares		**9.5**
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	8'	144			CO
Estimated Delta P or M2 Avg.	0.50	Estimates		Liner Material		BG	Y_{qa}		**0.0**
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		HB3	0.9771		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		CB14	2.55%		**80.7**
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-1	**PASS**		H_2O
K Factor (delta H/delta P)	3.64	N_2	**80.5**	TC ID #s		144			**329.5**

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		87	93	DGM initial		1,027.061					1027.061
Thermocouples		Y	Y	Vacuum	15	15	8				15
Pitots		Y	Y	Leak Rate	0.001	0.006	0.016				OK
Tedlar Bag	OB-10	Y	Y	DGM final		1027.400					1027.400

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 1	859	0.0	966.600	0.30	1.09	1.09	2	89	88	360	255	67	NA
A - 2		5.0	969.870	0.28	1.02	1.02	2	92	89	385	256	66	NA
A - 3		10.0	972.750	0.28	1.02	1.02	3	93	89	386	256	64	NA
A - 4		15.0	975.552	0.27	0.98	0.98	5	94	89	388	255	64	NA
A - 5		20.0	978.628	0.26	0.95	0.95	6	95	90	386	256	63	NA
B - 1	924	25.0	981.615	0.25	0.91	0.91	8	94	91	375	261	64	NA
B - 2	926	30.0	984.452	0.25	0.91	0.91	10	96	91	388	261	58	NA
B - 3		35.0	987.378	0.30	1.09	1.09	12	97	92	388	261	58	NA
B - 4		40.0	990.348	0.28	1.02	1.02	13	97	92	388	260	58	NA
B - 5		45.0	993.475	0.30	1.09	1.09	14	98	92	387	260	58	NA
C - 1	951	50.0	996.471	0.24	0.87	0.87	12	96	93	386	260	60	NA
C - 2	954	55.0	999.492	0.25	0.91	0.91	11	97	93	389	258	60	NA
C - 3		60.0	1002.403	0.27	0.98	0.98	11	98	93	389	260	57	NA
C - 4		65.0	1005.200	0.32	1.17	1.17	13	98	94	389	260	58	NA
C - 5		70.0	1008.490	0.33	1.20	1.20	16	99	94	387	261	58	NA
D - 1	1019	75.0	1011.731	0.26	0.95	0.95	16	98	94	389	260	61	NA
D - 2	1021	80.0	1014.852	0.27	0.98	0.98	14	98	94	389	261	60	NA
D - 3		85.0	1017.848	0.30	1.09	1.09	15	98	95	389	260	60	NA
D - 4		90.0	1020.885	0.30	1.09	1.09	17	99	95	389	260	60	NA
D - 5		95.0	1023.928	0.29	1.06	1.06	18	99	95	389	259	60	NA
E - 1	1046	100.0	1027.061	0.24	0.87	0.87	3	96	96	382	257	66	NA
E - 2	1058	105.0	1030.315	0.26	0.95	0.95	4	98	95	385	258	59	NA
E - 3		110.0	1033.229	0.27	0.98	0.98	6	100	95	386	258	61	NA
E - 4	1112	115.0	1036.230	0.26	0.95	0.95	7	101	96	385	258	65	NA
E - 5		120.0	1039.275	0.27	0.98	0.98	8	101	96	386	258	63	NA
-	1123	125.0	1042.138										
-													
-													
-													
-													
						MAX =>	18						
Average Values		125.0	75.199	0.276	1.00	1.00		95		386			

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M29

Client Name	Covanta Projects, Inc.	Run #	4-I-M29-2			
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1153
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1417
Test Location	Unit #4 SDA Inlet	Tester Signature	R B Perry		
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.659	Pbar	29.9	Meter Console #		T7			CO_2
Meter Calibration Factor	1.0027	Pstatic	-1.50	Ideal Nozzle Diameter		0.299			9.9
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN341			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		0.308	XAD ID & Tares		9.6
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	8'	601			CO
Estimated Delta P or M2 Avg.	0.50	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		HB4	0.9801		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		CB16	2.26%		80.5
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-1	PASS		H_20
K Factor (delta H/delta P)	4.04	N_2	80.5	TC ID #s		601			287.6

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		93	98	DGM initial		88.858					88.858
Thermocouples		Y	Y	Vacuum	15	27	15				27
Pitots		Y	Y	Leak Rate	0.001	0.001	0.006				OK
Tedlar Bag	OB3	Y	Y	DGM final		89.306					89.306

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
E - 1	1153	0.0	42.600	0.25	1.01	1.01	3	96	96	389	256	65	NA
E - 2		5.0	45.682	0.26	1.05	1.05	4	98	96	387	257	63	NA
E - 3		10.0	48.727	0.20	0.81	0.81	5	99	96	389	258	63	NA
E - 4		15.0	51.510	0.25	1.01	1.01	6	100	97	388	258	62	NA
E - 5		20.0	54.508	0.28	1.13	1.13	6	100	96	388	258	62	NA
D - 1	1218	25.0	57.636	0.22	0.89	0.89	7	99	97	386	258	66	NA
D - 2	1221	30.0	60.471	0.26	1.05	1.05	9	101	97	391	258	63	NA
D - 3		35.0	63.478	0.28	1.13	1.13	12	102	97	392	257	63	NA
D - 4		40.0	66.638	0.30	1.21	1.21	13	103	98	392	260	64	NA
D - 5		45.0	69.850	0.28	1.13	1.13	14	103	98	390	258	63	NA
C - 1	1246	50.0	73.051	0.23	0.93	0.93	13	101	98	390	258	64	NA
C - 2	1249	55.0	76.003	0.24	0.97	0.97	13	102	99	393	259	67	NA
C - 3		60.0	79.032	0.28	1.13	1.13	17	102	99	394	259	63	NA
C - 4		65.0	82.200	0.32	1.29	1.29	18	102	99	392	259	62	NA
C - 5		70.0	85.450	0.32	1.29	1.29	21	102	99	393	259	62	NA
B - 1	1314	75.0	88.858	0.23	0.93	0.93	3	99	98	389	256	66	NA
B - 2	1323	80.0	92.347	0.24	0.97	0.97	4	101	99	395	256	65	NA
B - 3		85.0	95.352	0.25	1.01	1.01	5	103	99	396	256	58	NA
B - 4		90.0	98.378	0.29	1.17	1.17	6	103	99	396	256	59	NA
B - 5		95.0	101.482	0.28	1.13	1.13	7	104	99	394	257	59	NA
A - 1	1348	100.0	104.645	0.22	0.89	0.89	8	102	99	392	258	63	NA
A - 2	1352	105.0	107.565	0.24	0.97	0.97	9	104	100	396	259	60	NA
A - 3		110.0	110.580	0.20	0.81	0.81	9	104	100	396	258	59	NA
A - 4		115.0	113.358	0.24	0.97	0.97	9	104	100	395	258	58	NA
A - 5		120.0	116.280	0.28	1.13	1.13	12	104	100	392	258	59	NA
-	1417	125.0	119.592										
-													
-													
-													
-													
						MAX =>	21						
Average Values		125.0	76.544	0.257	1.04	1.04		100		392			

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M29

Client Name	Covanta Projects, Inc.	Run #	4-I-M29-3		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1435
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1656
Test Location	Unit #4 SDA Inlet	Tester Signature	R. B. Perry		
Date of Test	08/31/09	Checked By	[illegible]		

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.659	Pbar	29.9	Meter Console #		T7			CO_2
Meter Calibration Factor	1.0027	Pstatic	-1.50	Ideal Nozzle Diameter		0.299			9.7
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN985			O_2
Estimated DGM Temp	95	Pstd	29.92	Actual Nozzle Diameter		0.300	XAD ID & Tares		9.6
Estimated Stack Temp or M2 Avg.	460	Diluent		Probe Lgth/ID #	8'	144			CO
Estimated Delta P or M2 Avg.	0.50	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	16.0	CO_2	9.5	Filter Box #		HB3	0.9753		N_2
Estimated Dry Molecular Weight	29.92	O_2	10.0	Cold Box ID #		CB14	2.73%		80.7
Estimated Velocity, ft/sec	53.3	CO	0.0	Umbilical ID #		U50-1	PASS		H_2O
K Factor (delta H/delta P)	3.64	N_2	80.5	TC ID #s		144			288.2

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		98	97	DGM initial		164.325					164.325
Thermocouples		Y	Y	Vacuum	15	23	15				23
Pitots		Y	Y	Leak Rate	0.002	0.002	0.001				OK
Tedlar Bag	OB-4	Y	Y	DGM final		164.623					164.623

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 1	1435	0.0	119.995	0.23	0.84	0.84	4	100	100	382	257	66	NA
A - 2		5.0	122.765	0.24	0.87	0.87	4	103	100	395	256	65	NA
A - 3		10.0	125.585	0.24	0.87	0.87	5	104	101	395	257	65	NA
A - 4		15.0	128.425	0.26	0.95	0.95	6	105	101	394	257	64	NA
A - 5		20.0	131.410	0.27	0.98	0.98	8	106	101	397	258	65	NA
B - 1	1500	25.0	134.409	0.24	0.87	0.87	8	104	101	397	258	63	NA
B - 2	1504	30.0	137.278	0.23	0.84	0.84	8	105	101	394	258	60	NA
B - 3		35.0	140.190	0.27	0.98	0.98	9	106	102	397	258	60	NA
B - 4		40.0	143.200	0.28	1.02	1.02	11	106	102	397	258	61	NA
B - 5		45.0	146.085	0.28	1.02	1.02	12	106	102	395	258	61	NA
C - 1	1529	50.0	149.111	0.22	0.80	0.80	11	105	102	395	259	62	NA
C - 2	1531	55.0	151.890	0.25	0.91	0.91	13	106	102	395	258	60	NA
C - 3		60.0	154.810	0.29	1.05	1.05	14	107	102	396	259	62	NA
C - 4		65.0	157.859	0.32	1.16	1.16	15	107	102	396	258	62	NA
C - 5		70.0	161.092	0.32	1.16	1.16	17	107	102	395	258	62	NA
D - 1	1556	75.0	164.325	0.23	0.84	0.84	4	104	102	396	254	65	NA
D - 2	1605	80.0	167.652	0.26	0.95	0.95	4	105	103	398	257	64	NA
D - 3		85.0	170.617	0.27	0.98	0.98	6	106	103	397	257	59	NA
D - 4		90.0	173.587	0.31	1.13	1.13	7	108	103	395	258	58	NA
D - 5		95.0	176.743	0.30	1.09	1.09	8	108	103	394	258	58	NA
E - 1	1630	100.0	179.857	0.23	0.84	0.84	8	108	103	394	259	60	NA
E - 2		105.0	182.695	0.27	0.98	0.98	9	108	103	396	258	59	NA
E - 3		110.0	185.700	0.28	1.02	1.02	9	108	103	395	258	59	NA
E - 4		115.0	188.732	0.29	1.05	1.05	11	108	103	395	258	60	NA
E - 5		120.0	191.819	0.28	1.02	1.02	13	108	103	394	259	61	NA
-	1656	125.0	194.874										
-													
-													
-													
-													
						MAX =>	17						
Average Values		125.0	74.581	0.266	0.97	0.97		104		395			

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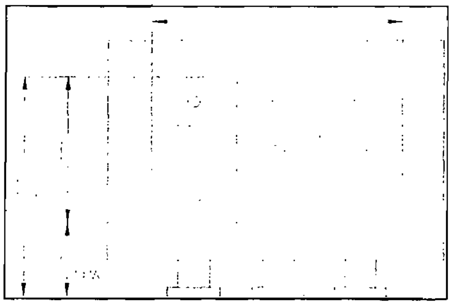
APPENDIX B.3
Field Data

Unit 4 Fabric Filter Outlet
Ammonia

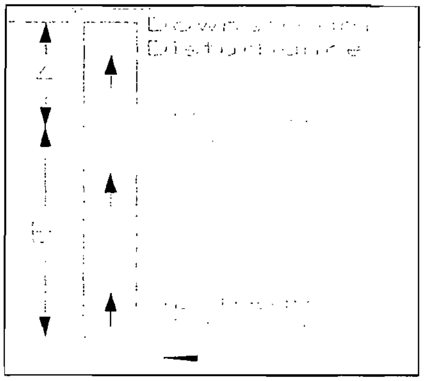
EPA Method 1 for Rectangular Ducts or Stacks

Client Name	Covanta Projects, Inc.	**Operator**	GLW
Plant Name	Hillsborough County Solid Waste ERF	**Date**	08/30/09
Plant City, State	Tampa, FL	**Project #**	10659
Sampling Location	Unit 4 FF Outlet	**# of Ports Available**	5
Stack Type	Rectangular	**# of Ports Used**	5
Stack Size	Large	**Port Inside Diam.**	3 inches

Rectangular Stacks or Ducts			
Distance to Far Wall of Stack	(L_{fw})	103 4/8	in
Distance to Near Wall of Stack	(L_{nw})	7 4/8	in
Depth of Stack (=L_{fw} - L_{nw})	(L)	96	in
Width of Stack	(W)	83	in
Equivalent Stack Diam(=2LW/(L+W	(D_e)	89	in
Area of Stack (=LW/C_{units})	(A_s)	55.33	ft^2



Distance from Port to Disturbances				
Distance Upstream	FEET =>		170	<= IN
Diameters Upstream (=DU/D_e)		(B_D)	1.91	diameters
Distance Downstream	FEET =>		170	<= IN
Diameters Downstream (=DD/D_e)		(A_D)	1.91	diameters



Number of Traverse Points Required			
Diameters to Flow Disturbance		Minimum Number of[1] Traverse Points	
Up Stream	Down Stream	Particulate Points	Velocity Points
2.00-4.99	0.50-1.24	25	16
5.00-5.99	1.25-1.49	20	16
6.00-6.99	1.50-1.74	16	12
7.00-7.99	1.75-1.99	12	12
>= 8.00	>=2.00	9 or 12[2]	9 or 12[2]
Upstream Spec		25	
Downstream Spec		12	
Traverse Pts Required		25	0

[1] Check Minimum Number of Points for the Upstream and Downstream conditions, then use the largest.

[2] 9 for Rectangular Stacks 12 to 24 inches

12 for All Stacks over 24 inches

Number of Traverse Points Used			
25	Input Traverse Points Required		
5	Ports by	5	Points In
25	Total Points to be Measured		

Traverse Point Locations			
Traverse Point Number	Fraction of Stack Dimension	Distance from Inside Wall	Distance Including Nipple Length
		in	in
1	0.100	9 5/8	17 1/8
2	0.300	28 6/8	36 2/8
3	0.500	48	55 4/8
4	0.700	67 2/8	74 6/8
5	0.900	86 3/8	93 7/8
6			
7			
8			
9			
10			
11			
12			

Location of Traverse Points in Rectangular Stacks

(Fraction of Stack Dimension from Inside Wall to Traverse Point)

Traverse Point Number	Number of Traverse Points Across the Stack										
	2	3	4	5	6	7	8	9	10	11	12
1	.250	.167	.125	.100	.083	.071	.063	.056	.050	.045	.042
2	.750	.500	.375	.300	.250	.214	.188	.167	.150	.136	.125
3		.833	.625	.500	.417	.357	.313	.278	.250	.227	.208
4			.875	.700	.583	.500	.438	.389	.350	.318	.292
5				.900	.750	.643	.563	.500	.450	.409	.375
6					.917	.786	.688	.611	.550	.500	.458
7						.929	.813	.722	.650	.591	.542
8							.938	.833	.750	.682	.625
9								.944	.850	.773	.708
10									.950	.864	.792
11										.955	.875
12											.958

Signature: [signature]

Checked: [signature]

EPA Method 2 for Air Flow Rate Determination

Client Name	Covanta Projects, Inc.			
Plant Name	Hillsborough County SWERRF			
Plant City, State	Tampa, FL			
Sampling Location	Unit #4 FF Outlet			
Thermocouple Check	PreTest	Y	PostTest	Y
Pitot Leak Check	PreTest	Y	PostTest	Y
Manometer ID #	T3	Umbilical ID #	U50-4	

Operator	JMA
Date	08/30/09
Project #	10659
# of Ports Used	5
Pitot Identification	600
Pitot Coefficient (C_p)	(OR 0.99)
Thermocouple ID #	600

Stack or Duct Dimensions			
Diameter or Depth of Duct/Stack	(D)	96.00	in
Width of Duct/Stack	(W)	83.00	in
Area of Duct/Stack	(A_s)	55.33	ft^2

Pressures			
Barometric Pressure	(P_b)	29.70	in Hg
Static Pressure	(P_{static})		in H_2O
Absolute Stack Pressure	(P_s)	29.70	in Hg

Stack Gas Composition				
Composition Data:	Actuals		Estimates	
Carbon Dioxide Concentration		($\%CO_2$)		%
Oxygen Concentration		($\%O_2$)		%
Carbon Monoxide Concentration		($\%CO$)		%
Nitrogen Concentration		($\%N_2$)	100.0	%
Stack Moisture Content		(B_{ws})		%
Stack Dry Molecular Weight		(M_d)	28.00	lb/lb-mole
Stack Wet Molecular Weight		(M_s)	28.00	lb/lb-mole

Results			
Standard Temp. °F => 68	Standard Press. =>		29.92
Flue Gas Density			lb/ft^3
Avg Stack Gas Velocity	(v_s)		ft/sec
Pounds Per Hour Flow Rate	(Q_{lb})		Lb/Hr
Actual Wet Flow Rate	(Q_{aw})		ACFM
Stack Dry Std Flow Rate	(Q_{sd})		DSCFM
Stack Wet Std Flow Rate	(Q_{sw})		WSCFM
Stack Dry Std Flow Rate	(Q_{sdh})	#VALUE!	DSCFH
Stack Wet Std Flow Rate	(Q_{swh})		WSCFH
Stack Dry Std Flow Rate, Metric	(Q_{dsmm})		DSCMM

Stack Cross Section Schematic

Velocity Traverse Data			
Run #:	4-O-Cyclonic Flow		
Run Time	1600	<= Until =>	1630
Traverse Point	Cyclonic Angle, degrees	Velocity Head, (Δp) in H_2O	Stack Temp, (t_s) °F
A - 5	5.0		
A - 4	5.0		
A - 3	5.0		
A - 2	0.0		
A - 1	5.0		
B - 5	5.0		
B - 4	5.0		
B - 3	5.0		
B - 2	0.0		
B - 1	5.0		
C - 5	5.0		
C - 4	8.0		
C - 3	8.0		
C - 2	5.0		
C - 1	10.0		
D - 5	10.0		
D - 4	5.0		
D - 3	0.0		
D - 2	5.0		
D - 1	10.0		
E - 5	10.0		
E - 4	10.0		
E - 3	10.0		
E - 2	5.0		
E - 1	5.0		
- 2			
Average[1]	5.8	#DIV/0!	ERRR

[1] Please report the square of the average square roots of Δp, or $(\Delta p)_{avg} = ({}^1/_n\Sigma(\Delta p^{1/2}))^2$

Formulas Used	
$A_s = DW$ for Rectangular Stacks	$A_s = (\pi(D/2)^2)/144$ for Circular Stacks
$P_s = P_{bar} + P_{static}/13.6$	$(\Delta p)^{1/2}{}_{avg} = {}^1/_n\Sigma(\Delta p^{1/2})$
$\%N_2 = 100 - \%CO_2 - \%O_2 - \%CO$	$T_{s(avg)} = {}^1/_n\Sigma t_s + 460oR$
$M_d = .44(\%CO_2) + .32(\%O_2) + .28(\%N_2 + \%CO)$	$v_s = 85.49C_p(\Delta p)^{1/2}{}_{avg}(T_{s(avg)}/(P_sM_s))^{1/2}$
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	$Q_{sd} = 60{*}60(1 - B_{ws})v_sA_s(528oF/T_{s(avg)})(P_s/29.92)$

Signature:	[signature]	Approved By:	[signature]

EPA Method 3 for Molecular Weight Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Fuel Type	MSW
Plant City, State	Tampa, FL	Fo Min	
Test Location	Unit #4 FF Outlet	Fo Max	

Date	09/02/09	Run Number	4-O-CTM027-1		ORSAT ID	2	Leak Ck?
Shared With			Start Time	0756	Stop Time	0906	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator GLW
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	Bag # OB10
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1025	10.0	19.3	9.3	80.7	0.0	0.1	
1031	10.0	19.4	9.4	80.6	0.1	0.0	Fo
1037	9.9	19.3	9.4	80.7	0.1	0.1	
Averages	10.0		9.4	80.6	OK	OK	

Date	09/02/09	Run Number	4-O-CTM027-2		ORSAT ID	2	Leak Ck?
Shared With			Start Time	0923	Stop Time	1031	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator GLW
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	Bag # OB4
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1112	9.3	19.5	10.2	80.5	0.0	0.0	
1118	9.3	19.5	10.2	80.5	0.1	0.1	Fo
1125	9.4	19.5	10.1	80.5	0.1	0.1	
Averages	9.3		10.2	80.5	OK	OK	

Date	09/02/09	Run Number	4-O-CTM027-3		ORSAT ID	2	Leak Ck?
Shared With			Start Time	1048	Stop Time	1156	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator GLW
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	Bag # OB3
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1224	9.8	19.4	9.6	80.6	0.1	0.2	
1230	9.7	19.5	9.8	80.5	0.0	0.0	Fo
1237	9.7	19.5	9.8	80.5	0.1	0.2	
Averages	9.7		9.7	80.6	OK	OK	

Date	09/02/09	Run Number			ORSAT ID	2	Leak Ck?
Shared With			Start Time		Stop Time		Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator GLW
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	Bag #
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
			0.0	100.0			
			0.0	100.0			Fo
			0.0	100.0			
Averages	#DIV/0!		0.0	#DIV/0!			

Signature:	[signature]	Checked by:	[signature]

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	**Project #**	10659
Plant Name	Hillsborough County SWERF	**Balance Type**	Electronic
Plant City, State	Tampa, FL	**Balance ID**	EB1
Sampling Location	Unit #4 FF Outlet	**Operator Name**	Blake Cone

Run Number	4-O-CTM027-1	4-O-CTM027-2	4-O-CTM027-3	
Test Date	09/02/09	09/02/09	09/02/09	
Reagent Box ID				

Impinger Reagent	0.1N H2SO4	mL	mL	mL	mL
Final Catch Weight	grams	590.3	585.8	602.8	
Initial Tare Weight	grams	442.5	439.5	443.5	
Net Moisture Caught	grams	147.8	146.3	159.3	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
Initial Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
KMNo4 Weight	grams				
KMnO4 g/mL	1.1				
Initial Jar Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	258.6	248.0	265.7	
Initial Tare Weight	grams	251.0	241.5	258.6	
Net Moisture Caught	grams	7.6	6.5	7.1	0.0

Total Catch	grams	155.4	152.8	166.4	0.0

Signature:		**Checked By:**	

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Client Name	Covanta Projects, Inc.	Run #	4-O-CTM027-1		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	756
Plant City, State	Tampa, FL	Personnel	RBP	Run End	906
Test Location	Unit #4 FF Outlet	Tester Signature	R.B. Perry		
Date of Test	09/02/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #		T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter		0.279			10.0
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN838			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.280	XAD ID & Tares		9.4
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	145			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	1.0001		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB20	-0.81%		80.6
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-1	PASS		H_20
K Factor (delta H/delta P)	3.31	N_2	80.0	TC ID #s		145			155.4

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		80	84	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	6					15
Pitots		Y	Y	Leak Rate	0.001	0.001					OK
Tedlar Bag	OB10	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	756	0.0	793.129	0.18	0.60	0.60	4	82	81	298	302	65	NA
A - 4		2.5	794.295	0.19	0.63	0.63	4	83	80	300	318	62	NA
A - 3		5.0	795.449	0.19	0.63	0.63	4	84	81	301	318	59	NA
A - 2		7.5	796.375	0.22	0.73	0.73	4	85	80	300	319	57	NA
A - 1		10.0	797.857	0.22	0.73	0.73	4	88	82	299	320	56	NA
B - 5	809	12.5	799.102	0.24	0.79	0.79	4	87	82	298	321	61	NA
B - 4	811	15.0	800.373	0.26	0.86	0.86	4	88	82	300	320	59	NA
B - 3		17.5	801.710	0.29	0.96	0.96	4	89	82	300	320	57	NA
B - 2		20.0	803.112	0.26	0.86	0.86	4	89	83	300	320	57	NA
B - 1		22.5	804.452	0.30	0.99	0.99	4	90	83	300	321	58	NA
C - 5	823	25.0	805.882	0.31	1.02	1.02	5	89	83	295	321	60	NA
C - 4	825	27.5	807.320	0.32	1.06	1.06	5	89	83	300	320	59	NA
C - 3		30.0	808.760	0.29	0.96	0.96	5	90	83	301	320	59	NA
C - 2		32.5	810.175	0.32	1.06	1.06	5	92	84	301	320	60	NA
C - 1		35.0	811.613	0.34	1.12	1.12	5	91	83	301	321	61	NA
D - 5	837	37.5	813.092	0.42	1.39	1.39	6	91	83	299	320	61	NA
D - 4	839	40.0	814.695	0.41	1.36	1.36	6	92	84	301	320	60	NA
D - 3		42.5	816.285	0.38	1.26	1.26	6	92	84	302	320	60	NA
D - 2		45.0	817.817	0.38	1.26	1.26	6	93	84	303	319	61	NA
D - 1	849	47.5	819.339	0.46	1.52	1.52	6	93	84	303	319	61	NA
E - 5	851	50.0	820.941	0.45	1.49	1.49	6	92	84	302	319	62	NA
E - 4		52.5	822.575	0.48	1.59	1.59	6	93	85	304	318	61	NA
E - 3		55.0	824.283	0.49	1.62	1.62	6	93	84	304	318	61	NA
E - 2		57.5	826.010	0.45	1.49	1.49	6	94	85	304	319	61	NA
E - 1		60.0	827.672	0.48	1.59	1.59	6	94	85	304	319	62	NA
-	906	62.5	829.375										
-													
-													
-													
-													
						MAX =>	6						
Average Values		62.5	36.246	0.326	1.10	1.10		86		301			

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD CTM027

Client Name	Covanta Projects, Inc.	Run #	4-O-CTM027-2		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	923
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1031
Test Location	Unit #4 FF Outlet	Tester Signature	R B Perry		
Date of Test	09/02/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #		T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter		0.279			9.3
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN834			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.278	XAD ID & Tares		10.2
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	600			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	0.9931		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB20	-0.10%		80.5
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-1	PASS		H_2O
K Factor (delta H/delta P)	3.21	N_2	80.0	TC ID #s		600			152.8

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		84	86	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	8					15
Pitots		Y	Y	Leak Rate	0.001	0.001					OK
Tedlar Bag	OB4	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	923	0.0	829.655	0.19	0.61	0.61	4	88	85	305	310	66	NA
A - 4		2.5	830.852	0.17	0.55	0.55	4	90	86	307	312	63	NA
A - 3		5.0	831.950	0.19	0.61	0.61	4	90	85	307	313	61	NA
A - 2		7.5	833.072	0.19	0.61	0.61	4	90	85	307	318	58	NA
A - 1		10.0	834.209	0.18	0.58	0.58	4	91	85	307	316	57	NA
B - 5	935	12.5	835.311	0.31	1.00	1.00	4	91	85	305	318	60	NA
B - 4	937	15.0	836.732	0.25	0.80	0.80	4	91	85	307	318	58	NA
B - 3		17.5	838.052	0.31	1.00	1.00	4	92	85	308	319	58	NA
B - 2		20.0	839.482	0.25	0.80	0.80	4	93	85	308	320	58	NA
B - 1		22.5	840.792	0.28	0.90	0.90	4	93	85	308	320	58	NA
C - 5	949	25.0	842.164	0.28	0.90	0.90	4	92	85	305	320	60	NA
C - 4	951	27.5	843.515	0.30	0.96	0.96	4	93	86	307	320	60	NA
C - 3		30.0	844.943	0.31	1.00	1.00	5	94	86	307	320	59	NA
C - 2		32.5	846.378	0.28	0.90	0.90	5	94	86	308	320	59	NA
C - 1		35.0	847.738	0.36	1.16	1.16	5	94	87	308	320	60	NA
D - 5	1003	37.5	849.273	0.39	1.25	1.25	6	93	87	305	318	60	NA
D - 4	1005	40.0	850.800	0.38	1.22	1.22	6	93	87	308	320	59	NA
D - 3		42.5	852.320	0.38	1.22	1.22	6	93	87	308	320	58	NA
D - 2		45.0	853.880	0.46	1.48	1.48	6	94	87	309	319	58	NA
D - 1		47.5	855.475	0.48	1.54	1.54	6	95	87	309	318	58	NA
E - 5	1017	50.0	857.154	0.47	1.51	1.51	6	93	87	305	319	61	NA
E - 4	1019	52.5	858.863	0.46	1.48	1.48	6	94	87	309	320	60	NA
E - 3		55.0	860.560	0.49	1.57	1.57	6	94	87	310	320	60	NA
E - 2		57.5	862.245	0.53	1.70	1.70	7	94	87	310	320	61	NA
E - 1		60.0	864.025	0.51	1.64	1.64	7	93	87	311	320	61	NA
-	1031	62.5	865.809										
-													
-													
-													
-													
						MAX =>	7						
Average Values		62.5	36.154	0.326	1.08	1.08		89		308			

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD CTM027

Client Name	Covanta Projects, Inc.	Run #	4-O-CTM027-3		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1048
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1156
Test Location	Unit #4 FF Outlet	Tester Signature	R B Perry		
Date of Test	09/02/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #		T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter		0.279			9.7
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN838			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.280	XAD ID & Tares		9.7
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	145			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	1.0047		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB20	-1.27%		80.6
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-1	PASS		H_2O
K Factor (delta H/delta P)	3.31	N_2	80.0	TC ID #s		145			166.4

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		86	88	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	10					15
Pitots		Y	Y	Leak Rate	0.001	0.000					OK
Tedlar Bag	OB3	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	1048	0.0	866.092	0.19	0.63	0.63	4	87	85	307	315	66	NA
A - 4		2.5	867.210	0.21	0.69	0.69	4	88	85	310	315	64	NA
A - 3		5.0	868.440	0.21	0.69	0.69	4	88	85	310	316	61	NA
A - 2		7.5	869.632	0.21	0.69	0.69	4	89	86	311	317	60	NA
A - 1		10.0	870.822	0.33	1.09	1.09	4	90	85	310	318	58	NA
B - 5	1100	12.5	872.272	0.31	1.02	1.02	4	90	85	301	319	59	NA
B - 4	1102	15.0	873.675	0.32	1.06	1.06	5	91	86	310	318	57	NA
B - 3		17.5	875.115	0.29	0.96	0.96	5	92	86	310	319	57	NA
B - 2		20.0	876.530	0.21	0.69	0.69	4	93	86	311	320	58	NA
B - 1		22.5	877.762	0.31	1.02	1.02	4	93	86	310	321	58	NA
C - 5	1114	25.0	879.185	0.32	1.06	1.06	4	92	86	305	321	60	NA
C - 4	1116	27.5	880.628	0.35	1.16	1.16	5	94	86	311	320	59	NA
C - 3		30.0	882.121	0.36	1.19	1.19	5	94	86	311	321	58	NA
C - 2		32.5	883.651	0.32	1.06	1.06	5	95	86	311	322	59	NA
C - 1		35.0	885.095	0.31	1.02	1.02	5	95	86	311	322	59	NA
D - 5	1128	37.5	886.563	0.41	1.36	1.36	5	93	86	307	320	60	NA
D - 4	1130	40.0	888.139	0.43	1.42	1.42	5	94	87	312	319	59	NA
D - 3		42.5	889.750	0.41	1.36	1.36	5	95	87	313	319	59	NA
D - 2		45.0	891.382	0.41	1.36	1.36	5	96	87	312	319	59	NA
D - 1		47.5	892.980	0.40	1.32	1.32	5	96	87	312	320	60	NA
E - 5	1142	50.0	894.572	0.43	1.42	1.42	5	94	88	309	318	61	NA
E - 4	1144	52.5	896.190	0.45	1.49	1.49	5	96	88	313	319	56	NA
E - 3		55.0	897.844	0.43	1.42	1.42	5	96	88	313	318	56	NA
E - 2		57.5	899.485	0.43	1.42	1.42	5	96	88	313	318	56	NA
E - 1		60.0	901.090	0.46	1.52	1.52	5	97	88	312	319	56	NA
-	1156	62.5	902.776										
-													
-													
-													
-													
						MAX =>	5						
Average Values		62.5	36.684	0.335	1.13	1.12		90		310			

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APPENDIX B.4
Field Data

Unit 4 Fabric Filter Outlet
Dioxins/Furans

EPA Method 3 for Molecular Weight Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Fuel Type	MSW
Plant City, State	Tampa, FL	Fo Min	
Test Location	Unit #4 FF Outlet	Fo Max	

Date	09/02/09	Run Number	4-O-M23-1		ORSAT ID	2	Leak Ck?
Shared With			Start Time	1220	Stop Time	1638	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB8
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1643	9.7	19.3	9.6	80.7	0.1	0.2	
1650	9.6	19.4	9.8	80.6	0.1	0.1	Fo
1658	9.7	19.4	9.7	80.6	0.0	0.1	
Averages	9.7		9.7	80.6	OK	OK	

Date	09/03/09	Run Number	4-O-M23-2		ORSAT ID	2	Leak Ck?
Shared With			Start Time	0755	Stop Time	1230	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB1
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1237	9.7	19.5	9.8	80.5	0.1	0.1	
1243	9.8	19.5	9.7	80.5	0.0	0.1	Fo
1250	9.8	19.4	9.6	80.6	0.1	0.2	
Averages	9.8		9.7	80.5	OK	OK	

Date	09/03/09	Run Number	4-O-M23-3		ORSAT ID	2	Leak Ck?
Shared With			Start Time	1256	Stop Time	1715	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB3
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
1723	9.4	19.5	10.1	80.5	0.1	0.0	
1730	9.3	19.4	10.1	80.6	0.0	0.1	Fo
1738	9.3	19.5	10.2	80.5	0.1	0.1	
Averages	9.3		10.1	80.6	OK	OK	

Date	09/03/09	Run Number			ORSAT ID	2	Leak Ck?
Shared With			Start Time		Stop Time		Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	Operator
							GLW
							Bag #
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	Fyrite #s
			0.0	100.0			
			0.0	100.0			Fo
			0.0	100.0			
Averages	#DIV/0!		0.0	#DIV/0!			

Signature:		Checked by:	

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Balance Type	Electronic
Plant City, State	Tampa, FL	Balance ID	EB1
Sampling Location	Unit #4 FF Outlet	Operator Name	Blake Cone

Run Number	4-O-M23-1	4-O-M23-2	4-O-M23-3	
Test Date	09/02/09	09/03/09	09/03/09	
Reagent Box ID				

Impinger Reagent	DI	mL	mL	mL	mL
Final Catch Weight	grams	735.0	744.6	737.9	
Initial Tare Weight	grams	200.0	200.0	200.0	
Net Moisture Caught	grams	535.0	544.6	537.9	0.0

		X-16	X-ATE-08	X-15	
Impinger Reagent	XAD	mL	mL	mL	mL
Final Catch Weight	grams	314.1	368.9	369.1	
Initial Tare Weight	grams	297.5	342.2	343.9	
Net Moisture Caught	grams	16.6	26.7	25.2	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
KMNo4 Weight	grams				
KMnO4 g/mL	1.1				
Initial Jar Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	258.1	264.8	272.2	
Initial Tare Weight	grams	234.0	238.9	251.3	
Net Moisture Caught	grams	24.1	25.9	20.9	0.0

Total Catch	grams	575.7	597.2	584.0	0.0

Signature:	[signature]	Checked By:	[signature]

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD 23

Client Name	Covanta Projects, Inc.	Run #	4-O-M23-1		
Plant Name	Hillsborough County RRF	Project #	10659	Run Start	1220
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1638
Test Location	Unit #4 FF Outlet	Tester Signature	RB Perry		
Date of Test	09/02/09	Checked By	[illegible]		

Isokinetic Factor Setup		Pressures		Sampling Equipment		Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #	T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter	0.279			**9.7**
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #	GN894	XAD ID & Tares		O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter	0.261	X-16	297.5	**9.7**
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID # 8'	600			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material	BG	Y_{qa}		**0.0**
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #	HB6	0.9928		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #	CB7	-0.07%		**80.6**
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #	U50-4	**PASS**		H_2O
K Factor (delta H/delta P)	2.50	N_2	**80.0**	TC ID #s	600			**575.7**

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		88	90	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	10					15
Pitots		Y	Y	Leak Rate	0.001	0.001					**OK**
Tedlar Bag	OB8	Y	Y	DGM final							0.000

Point #	Clock Time (24 hr)	Test Time (min)	Dry Gas Meter Reading (ft^3)	Velocity Head (in H_2O)	Desired Orifice ΔH (in H_2O)	Actual Orifice ΔH (in H_2O)	Pump Vac. (in Hg)	DGM Inlet Temp (°F)	DGM Outlet Temp (°F)	Stack Temp (°F)	Filter Temp (°F)	Imp. Exit Temp (°F)	Cond. Exit Temp (°F)
A - 5	1220	0.0	903.084	0.24	0.60	0.60	6	91	88	312	245	65	57
A - 4		10.0	907.483	0.21	0.52	0.52	6	93	89	313	268	64	57
A - 3		20.0	911.735	0.19	0.47	0.47	6	95	89	314	267	64	60
A - 2		30.0	915.797	0.21	0.52	0.52	6	94	89	315	255	62	57
A - 1		40.0	920.064	0.32	0.80	0.80	7	96	90	315	255	61	56
B - 5	1310	50.0	925.250	0.21	0.52	0.52	7	96	91	315	255	64	59
B - 4	1312	60.0	929.532	0.32	0.80	0.80	7	97	92	315	255	60	59
B - 3		70.0	934.723	0.23	0.57	0.57	7	99	92	317	255	58	58
B - 2		80.0	939.182	0.26	0.65	0.65	7	99	93	316	255	61	59
B - 1		90.0	943.895	0.25	0.62	0.62	7	99	93	315	255	61	59
C - 5	1402	100.0	948.469	0.31	0.77	0.77	7	99	94	308	256	65	61
C - 4	1404	110.0	953.490	0.31	0.77	0.77	8	100	94	309	256	62	58
C - 3		120.0	958.527	0.32	0.80	0.80	8	101	94	308	251	61	59
C - 2		130.0	963.687	0.30	0.75	0.75	8	98	94	308	256	63	61
C - 1		140.0	968.686	0.35	0.87	0.87	8	96	93	307	255	61	60
D - 5	1454	150.0	973.969	0.41	1.02	1.02	8	96	92	305	255	65	63
D - 4	1456	160.0	979.649	0.38	0.95	0.95	8	99	92	306	256	62	60
D - 3		170.0	985.222	0.38	0.95	0.95	8	99	93	306	255	61	59
D - 2		180.0	990.812	0.43	1.07	1.07	8	100	93	306	255	61	60
D - 1		190.0	996.480	0.49	1.22	1.22	8	100	93	307	255	62	61
E - 5	1546	200.0	1002.331	0.53	1.32	1.32	8	99	93	306	253	65	61
E - 4	1548	210.0	1008.278	0.47	1.17	1.17	8	100	93	305	253	62	59
E - 3		220.0	1014.285	0.42	1.05	1.05	8	100	93	306	255	61	61
[illegible] - 2		230.0	1020.310	0.48	1.20	1.20	8	100	93	306	255	61	60
[illegible] - 1		240.0	1026.302	0.44	1.10	1.10	9	101	93	306	255	62	62

Continued on Page 2

Client Name	Covanta Projects, Inc.	Run #	4-O-M23-1		
Plant Name	Hillsborough County RRF	Project #	10659	Page	2 of 2

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
-	1638	250.0	1031.986										
-													
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						MAX =>	9						
Average Values		250.0	128.902	0.331	0.84	0.84		95		310			

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD 23

Client Name	Covanta Projects, Inc.	Run #	4-O-M23-2		
Plant Name	Hillsborough County RRF	Project #	10659	Run Start	755
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1230
Test Location	Unit #4 FF Outlet	Tester Signature	R.B. Perry		
Date of Test	09/03/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #		T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter		0.319			**9.8**
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN896	XAD ID & Tares		O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.261	X-ATE-8	342.2	**9.7**
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	145			CO
Estimated Delta P or M2 Avg.	0.350	Estimates		Liner Material		BG	Y_{qa}		**0.0**
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	0.9915		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB5	0.06%		**80.5**
Estimated Velocity, ft/sec	41.1	CO	0.0	Umbilical ID #		U50-1	**PASS**		H_2O
K Factor (delta H/delta P)	2.50	N_2	**80.0**	TC ID #s		145			**597.2**

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		79	90	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	9					15
Pitots		Y	Y	Leak Rate	0.002	0.001					**OK**
Tedlar Bag	OB1	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	755	0.0	33.938	0.21	0.52	0.52	5	80	77	300	253	66	65
A - 4		10.0	37.950	0.25	0.62	0.62	6	85	80	301	255	62	47
A - 3		20.0	42.552	0.22	0.55	0.55	7	88	82	302	255	60	48
A - 2		30.0	46.772	0.24	0.60	0.60	7	89	83	302	256	61	50
A - 1		40.0	51.252	0.15	0.37	0.37	7	90	83	300	256	61	51
B - 5	845	50.0	54.782	0.31	0.77	0.77	7	89	84	300	255	63	52
B - 4	847	60.0	59.749	0.26	0.65	0.65	7	91	84	302	256	55	48
B - 3		70.0	64.367	0.24	0.60	0.60	7	92	84	303	256	56	49
B - 2		80.0	68.772	0.24	0.60	0.60	7	92	84	302	256	57	50
B - 1		90.0	73.195	0.24	0.60	0.60	7	93	85	302	256	57	49
C - 5	937	100.0	77.670	0.35	0.87	0.87	8	92	86	301	255	59	51
C - 4	939	110.0	82.805	0.31	0.77	0.77	7	94	86	302	256	58	50
C - 3		120.0	87.895	0.34	0.85	0.85	8	94	86	302	255	59	52
C - 2	1004	130.0	93.173	0.31	0.77	0.77	8	90	86	303	254	65	52
C - 1	1021	140.0	98.153	0.45	1.12	1.12	8	92	87	304	253	57	49
D - 5	1035	150.0	103.849	0.44	1.10	1.10	8	94	86	305	255	57	49
D - 4	1038	160.0	109.615	0.42	1.05	1.05	8	95	87	304	256	57	50
D - 3		170.0	115.412	0.39	0.97	0.97	8	95	87	305	255	58	51
D - 2		180.0	121.078	0.42	1.05	1.05	8	96	87	304	255	60	52
D - 1	1128	190.0	126.868	0.44	1.10	1.10	8	96	88	304	255	61	54
E - 5	1130	200.0	133.010	0.50	1.25	1.25	8	94	89	304	253	62	52
E - 4		210.0	139.020	0.49	1.22	1.22	8	95	89	305	253	59	50
E - 3		220.0	145.142	0.48	1.20	1.20	9	95	89	305	253	60	51
E - 2		230.0	151.292	0.49	1.22	1.22	9	95	89	305	253	62	52
E - 1		240.0	157.485	0.49	1.22	1.22	9	97	89	304	255	62	53

Continued on Page 2

Client Name	Covanta Projects, Inc.	**Run #**	4-O-M23-2	
Plant Name	Hillsborough County RRF	**Project #**	10659	**Page** 2 of 2

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
-	1230	250.0	163.722										
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						MAX =>	9						
Average Values		250.0	129.784	0.339	0.87	0.87		89		303			

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD 23

Client Name	Covanta Projects, Inc.	Run #	4-O-M23-3		
Plant Name	Hillsborough County RRF	Project #	10659	Run Start	1256
Plant City, State	Tampa, FL	Personnel	RBP	Run End	1715
Test Location	Unit #4 FF Outlet	Tester Signature	RB Perry		
Date of Test	09/03/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment		Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.8	Meter Console #	T3			CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter	0.319			9.3
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #	GN566	XAD ID & Tares		O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter	0.261	X-15	343.9	10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID # 8'	600			CO
Estimated Delta P or M2 Avg.	0.350	Estimates		Liner Material	BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #	HB6	0.9922		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #	CB7	-0.01%		80.6
Estimated Velocity, ft/sec	41.1	CO	0.0	Umbilical ID #	U50-1	PASS		H_2O
K Factor (delta H/delta P)	2.50	N_2	80.0	TC ID #s	600			584.0

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		90	89	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	8					15
Pitots		Y	Y	Leak Rate	0.001	0.001					OK
Tedlar Bag	OB3	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
E - 5	1256	0.0	164.020	0.48	1.20	1.20	7	90	89	305	251	65	50
E - 4		10.0	169.960	0.42	1.05	1.05	8	93	89	305	253	55	46
E - 3		20.0	175.832	0.42	1.05	1.05	8	93	89	305	254	53	48
E - 2		30.0	181.640	0.42	1.05	1.05	8	92	88	305	256	53	48
E - 1		40.0	187.420	0.47	1.17	1.17	7	92	89	306	256	54	47
D - 5	1346	50.0	193.410	0.42	1.05	1.05	8	90	87	302	255	58	49
D - 4		60.0	199.222	0.36	0.90	0.90	7	92	87	304	240	57	56
D - 3		70.0	204.686	0.38	0.95	0.95	7	92	88	305	251	59	59
D - 2		80.0	210.100	0.38	0.95	0.95	7	92	88	305	251	60	58
D - 1		90.0	215.700	0.44	1.10	1.10	7	93	87	305	252	60	58
C - 5	1439	100.0	221.649	0.31	0.77	0.77	7	92	88	304	251	62	60
C - 4	1441	110.0	226.758	0.33	0.82	0.82	6	93	88	305	252	61	60
C - 3		120.0	232.010	0.39	0.97	0.97	7	94	88	305	252	62	60
C - 2		130.0	237.635	0.30	0.75	0.75	7	94	89	305	251	60	57
C - 1		140.0	242.675	0.36	0.90	0.90	7	95	89	305	251	62	58
B - 5	1530	150.0	248.104	0.26	0.65	0.65	6	95	89	305	251	63	58
B - 4	1533	160.0	252.738	0.27	0.67	0.67	6	96	89	305	251	63	59
B - 3		170.0	257.352	0.29	0.72	0.72	6	97	90	305	252	61	59
B - 2		180.0	262.178	0.24	0.60	0.60	6	97	90	306	251	61	59
B - 1	1613	190.0	266.693	0.27	0.67	0.67	6	98	91	306	252	62	59
A - 5	1615	200.0	270.288	0.16	0.40	0.40	5	95	91	302	251	65	61
A - 4		210.0	274.548	0.22	0.55	0.55	6	95	91	305	251	62	60
A - 3		220.0	278.448	0.19	0.47	0.47	6	96	91	305	251	62	55
A - 2		230.0	282.433	0.21	0.52	0.52	6	96	91	306	252	62	59
1		240.0	286.610	0.25	0.62	0.62	6	96	91	306	251	64	61

Continued on Page 2

Client Name	Covanta Projects, Inc.	Run #	4-O-M23-3		
Plant Name	Hillsborough County RRF	Project #	10659	Page	2 of 2

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
-	1715	250.0	291.181										
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						MAX =>	8						
Average Values		250.0	127.161	0.323	0.82	0.82		92		305			

APPENDIX B.5
Field Data

Unit 4 Fabric Filter Outlet
Hydrogen Chloride

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	**Project #**	10659
Plant Name	Hillsborough County SWERF	**Balance Type**	Electronic
Plant City, State	Tampa, FL	**Balance ID**	EB1
Sampling Location	Unit #4 FF Outlet	**Operator Name**	Blake Cone

Run Number	4-O-MM26-1	4-O-MM26-2	4-O-MM26-3	
Test Date	08/31/09	08/31/09	08/31/09	
Reagent Box ID				

Impinger Reagent	H2SO4	mL	mL	mL	mL
Final Catch Weight	grams	614.5	600.9	608.7	
Initial Tare Weight	grams	442.0	441.7	440.5	
Net Moisture Caught	grams	172.5	159.2	168.2	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
Initial Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Impinger Reagent		mL	mL	mL	mL
Final Catch Weight	grams				
KMNo4 Weight	grams				
KMnO4 g/mL	1.1				
Initial Jar Tare Weight	grams				
Net Moisture Caught	grams	0.0	0.0	0.0	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	268.8	261.2	259.8	
Initial Tare Weight	grams	261.5	252.5	252.7	
Net Moisture Caught	grams	7.3	8.7	7.1	0.0

Total Catch	grams	179.8	167.9	175.3	0.0

Signature:	[signature]	**Checked By:**	[signature]

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-O-MM26-1		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	900
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1006
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.9	Meter Console #		T3	QUARTZ	NA	CO_2
Meter Calibration Factor	0.9921	Pstatic	-10.00	Ideal Nozzle Diameter		0.279			9.2
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		F4	1.0145		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB16	-2.26%		80.7
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-4	PASS		H_2O
K Factor (delta H/delta P)	######	N_2	80.0	TC ID #s		HCl			179.8

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		75	80	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	6					15
Pitots		Y	Y	Leak Rate	0.001	0.000					OK
Tedlar Bag	NA	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
E · 3	900	0.0	423.800	NA		1.30	4	84	84	NA	252	65	NA
.		5.0	426.960	NA		1.30	4	87	85	NA	260	60	NA
.		10.0	430.060	NA		1.30	4	88	86	NA	260	59	NA
.		15.0	433.150	NA		1.30	4	90	85	NA	263	59	NA
.		20.0	436.250	NA		1.30	4	92	86	NA	262	57	NA
.	1N/FC	25.0	439.410	NA		1.30	4	94	87	NA	262	57	NA
.	932-	30.0	442.560	NA		1.30	4	95	87	NA	262	58	NA
.	938	35.0	445.720	NA		1.30	4	94	88	NA	262	62	NA
.		40.0	448.930	NA		1.30	4	96	89	NA	262	57	NA
.		45.0	452.060	NA		1.30	4	98	89	NA	262	58	NA
.		50.0	455.190	NA		1.30	4	99	90	NA	261	58	NA
.		55.0	458.380	NA		1.30	4	99	90	NA	260	59	NA
.	1006	60.0	461.592										
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						MAX =>	4						
Average Values		60.0	37.792			1.30		90					

68

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-O-MM26-2		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1037
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1146
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.9	Meter Console #		T3	QUARTZ	NA	CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.50	Ideal Nozzle Diameter		0.279			9.2
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		F4	0.9989		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB16	-0.69%		80.7
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-4	PASS		H_2O
K Factor (delta H/delta P)	######	N_2	80.0	TC ID #s		HCl			167.9

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		80	84	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	7					15
Pitots		Y	Y	Leak Rate	0.000	0.000					OK
Tedlar Bag	NA	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A · 3	1037	0.0	461.800	NA		1.30	5	90	89	NA	262	65	NA
-		5.0	464.970	NA		1.30	5	92	90	NA	263	54	NA
.		10.0	468.200	NA		1.30	5	94	90	NA	262	54	NA
.		15.0	471.390	NA		1.30	5	95	90	NA	263	55	NA
.		20.0	474.490	NA		1.30	5	97	91	NA	263	57	NA
.		25.0	477.800	NA		1.30	5	98	91	NA	263	58	NA
.	IN/FC	30.0	481.100	NA		1.30	5	98	91	NA	264	60	NA
.	1112-	35.0	484.218	NA		1.30	5	99	92	NA	263	62	NA
.	1121	40.0	487.440	NA		1.30	5	98	92	NA	264	57	NA
.		45.0	490.670	NA		1.30	5	100	91	NA	263	56	NA
.		50.0	493.900	NA		1.30	5	100	92	NA	262	57	NA
.		55.0	497.100	NA		1.30	5	100	93	NA	262	58	NA
.	1146	60.0	500.312										
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						MAX =>	5						
Average Values		60.0	38.512			1.30		94					

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD MM26

Client Name	Covanta Projects, Inc.	Run #	4-O-MM26-3		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1210
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1317
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.808	Pbar	29.9	Meter Console #		T3	QUARTZ	NA	CO_2
Meter Calibration Factor	0.9921	Pstatic	-9.00	Ideal Nozzle Diameter		0.278			9.4
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		NA			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		NA	XAD ID & Tares		10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	4'	HCl			CO
Estimated Delta P or M2 Avg.	0.600	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		F4	0.9909		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB16	0.12%		80.5
Estimated Velocity, ft/sec	53.7	CO	0.0	Umbilical ID #		U50-4	PASS		H_2O
K Factor (delta H/delta P)	######	N_2	80.0	TC ID #s		HCl			175.3

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		84	86	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	10					15
Pitots		Y	Y	Leak Rate	0.000	0.000					OK
Tedlar Bag	NA	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
E - 5	1210	0.0	500.500	NA		1.30	5	94	93	NA	263	65	NA
-		5.0	503.730	NA		1.30	5	95	92	NA	262	62	NA
-		10.0	507.030	NA		1.30	5	97	93	NA	262	56	NA
-		15.0	510.290	NA		1.30	5	98	93	NA	258	58	NA
-	IN/FC	20.0	513.530	NA		1.30	5	100	93	NA	257	59	NA
-	1235-	25.0	516.791	NA		1.30	5	98	94	NA	258	65	NA
-	1242	30.0	520.310	NA		1.30	5	100	94	NA	258	61	NA
-		35.0	523.230	NA		1.30	5	100	94	NA	257	62	NA
-		40.0	526.440	NA		1.30	5	101	95	NA	259	63	NA
-		45.0	529.640	NA		1.30	5	101	95	NA	256	64	NA
-		50.0	532.890	NA		1.30	5	102	95	NA	258	60	NA
-		55.0	536.150	NA		1.30	5	102	95	NA	257	62	NA
-	1317	60.0	539.392										
-													
-													
-													
-													
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-													
						MAX =>	5						
Average Values		60.0	38.892			1.30		96					

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APPENDIX B.6
Field Data

Unit 4 Fabric Filter Outlet
Particulate and Metals

EPA Method 3 for Molecular Weight Determination

Client Name	Covanta Projects, Inc.	Project #	10659
Plant Name	Hillsborough County SWERF	Fuel Type	MSW
Plant City, State	Tampa, FL	Fo Min	
Test Location	Unit #4 FF Outlet	Fo Max	

Date	08/31/09	Run Number	4-O-M29-1		ORSAT ID	2	Leak Ck?
Shared With	4-O-MM26-1,2		Start Time	0859	Stop Time	1123	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	**Operator** GLW **Bag #**
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB8
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	**Fyrite #s**
1152	9.2	19.3	10.1	80.7	0.1	0.0	
1159	9.3	19.4	10.1	80.6	0.1	0.1	**Fo**
1207	9.2	19.4	10.2	80.6	0.0	0.1	
Averages	9.2		10.1	80.7	OK	OK	

Date	08/31/09	Run Number	4-O-M29-2		ORSAT ID	2	Leak Ck?
Shared With	4-O-MM26-3		Start Time	1153	Stop Time	1416	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	**Operator** GLW **Bag #**
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB1
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	**Fyrite #s**
1403	9.4	19.4	10.0	80.6	0.1	0.2	
1410	9.3	19.5	10.2	80.5	0.1	0.1	**Fo**
1416	9.4	19.5	10.1	80.5	0.0	0.1	
Averages	9.4		10.1	80.5	OK	OK	

Date	08/31/09	Run Number	4-O-M29-3		ORSAT ID	2	Leak Ck?
Shared With			Start Time	1435	Stop Time	1656	Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	**Operator** GLW **Bag #**
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	OB8
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	**Fyrite #s**
1708	9.5	19.5	10.0	80.5	0.1	0.0	
1714	9.4	19.4	10.0	80.6	0.1	0.0	**Fo**
1720	9.5	19.5	10.0	80.5	0.0	0.0	
Averages	9.5		10.0	80.5	OK	OK	

Date	08/31/09	Run Number			ORSAT ID	2	Leak Ck?
Shared With			Start Time		Stop Time		Y
Sample Analysis Time	Carbon Dioxide Concentra.	Oxygen Concentra.	Oxygen Concentra. by difference	CO & Nitrogen Concentra.	Carbon Dioxide Difference	Oxygen Difference	**Operator** GLW **Bag #**
	($\%CO_2$)	reading	($\%O_2$)	($\%CO+N_2$)	(M_d)	(ΔM_d)	
hh:mm	reading	reading	reading	percent	lb/lb-mole	lb/lb-mole	**Fyrite #s**
			0.0	100.0			
			0.0	100.0			**Fo**
			0.0	100.0			
Averages	#DIV/0!		0.0	#DIV/0!			

Signature:	[signature]	Checked by:	[signature]

EPA Method 4 for Percent Moisture Determination

Client Name	Covanta Projects, Inc.	**Project #**	10659
Plant Name	Hillsborough County SWERF	**Balance Type**	Electronic
Plant City, State	Tampa, FL	**Balance ID**	EB1
Sampling Location	Unit #4 FF Outlet	**Operator Name**	Blake Cone

Run Number	4-O-M29-1	4-O-M29-2	4-O-M29-3	
Test Date	08/31/09	08/31/09	08/31/09	
Reagent Box ID				

Impinger Reagent	HNO3/H2O2	mL	mL	mL	mL
Final Catch Weight	grams	615.1	589.3	565.0	
Initial Tare Weight	grams	275.7	274.1	275.8	
Net Moisture Caught	grams	339.4	315.2	289.2	0.0

Impinger Reagent	IMPIN 3	mL	mL	mL	mL
Final Catch Weight	grams	33.2	32.7	32.1	
Initial Tare Weight	grams	31.0	31.5	31.6	
Net Moisture Caught	grams	2.2	1.2	0.5	0.0

Impinger Reagent	KMnO4/H2SO4	mL	mL	mL	mL
Final Catch Weight	grams	462.0	461.0	462.0	
KMNo4 Weight	grams	220.0	220.0	220.0	
KMnO4 g/mL	1.1	200.0	200.0	200.0	
Initial Jar Tare Weight	grams	241.6	240.5	240.0	
Net Moisture Caught	grams	0.4	0.5	2.0	0.0

Silica Gel	SG	grams	grams	grams	grams
Final Catch Weight	grams	266.0	265.4	246.1	
Initial Tare Weight	grams	251.5	252.5	235.0	
Net Moisture Caught	grams	14.5	12.9	11.1	0.0

Total Catch	grams	356.5	329.8	302.8	0.0

Signature:	[signature]	**Checked By:**	[signature]

ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M5/29

Client Name	Covanta Projects, Inc.	Run #	4-O-M5/29-1		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	859
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1123
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.791	Pbar	29.9	Meter Console #		T5	T106-07	0.3590	CO_2
Meter Calibration Factor	0.9771	Pstatic	-10.00	Ideal Nozzle Diameter		0.279			9.2
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN545			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.279	XAD ID & Tares		10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	600			CO
Estimated Delta P or M2 Avg.	0.60	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	0.9778		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB2	-0.07%		80.7
Estimated Velocity, ft/sec	53.8	CO	0.0	Umbilical ID #		U50-3	PASS		H_20
K Factor (delta H/delta P)	3.22	N_2	80.0	TC ID #s		600			356.5

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		75	82	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	6					15
Pitots		Y	Y	Leak Rate	0.003	0.001					OK
Tedlar Bag	OB8	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
E - 5	859	0.0	844.300	0.25	0.81	0.81	2	80	79	296	253	65	NA
E - 4		5.0	846.930	0.23	0.74	0.74	2	80	79	296	253	53	NA
E - 3		10.0	849.470	0.22	0.71	0.71	2	81	79	296	254	52	NA
E - 2		15.0	851.940	0.26	0.84	0.84	2	82	79	296	254	52	NA
E - 1		20.0	854.610	0.22	0.71	0.71	2	83	79	296	254	52	NA
D - 5	924/	25.0	857.100	0.27	0.87	0.87	2	83	80	296	254	56	NA
D - 4	926	30.0	859.800	0.28	0.90	0.90	2	85	81	297	254	53	NA
D - 3		35.0	862.560	0.30	0.97	0.97	2	86	81	297	254	53	NA
D - 2		40.0	865.410	0.28	0.90	0.90	2	86	81	297	254	54	NA
D - 1		45.0	868.200	0.34	1.10	1.10	2	87	82	297	254	54	NA
C - 5	951/	50.0	871.100	0.38	1.23	1.23	3	86	82	295	253	58	NA
C - 4	954	55.0	874.220	0.40	1.29	1.29	3	87	83	296	255	54	NA
C - 3		60.0	877.360	0.40	1.29	1.29	3	88	83	297	254	54	NA
C - 2		65.0	880.620	0.35	1.13	1.13	3	89	84	297	254	55	NA
C - 1		70.0	883.730	0.38	1.23	1.23	3	88	84	297	254	56	NA
B - 5	1019/	75.0	886.861	0.46	1.48	1.48	4	87	85	294	252	58	NA
B - 4	1021	80.0	890.340	0.40	1.29	1.29	4	88	84	297	254	56	NA
B - 3		85.0	893.600	0.42	1.35	1.35	4	89	84	297	254	56	NA
B - 2		90.0	896.940	0.42	1.35	1.35	4	90	85	297	254	58	NA
B - 1		95.0	900.250	0.44	1.42	1.42	4	90	85	297	254	56	NA
A - 5	1046/	100.0	903.665	0.46	1.48	1.48	4	85	85	297	254	65	NA
A - 4	1058	105.0	907.100	0.48	1.55	1.55	4	88	85	297	253	54	NA
A - 3		110.0	910.640	0.47	1.52	1.52	4	89	85	297	254	56	NA
A - 2		115.0	914.210	0.50	1.61	1.61	4	90	85	297	254	58	NA
A - 1		120.0	917.750	0.52	1.68	1.68	4	90	85	297	254	56	NA
-	1123	125.0	921.381										
						MAX =>	4						
Average Values		125.0	77.081	0.359	1.18	1.18		84		297			

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M5/29

Client Name	Covanta Projects, Inc.	Run #	4-O-M5/29-2		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1153
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1416
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.791	Pbar	29.9	Meter Console #		T5	T107-15	0.4742	CO_2
Meter Calibration Factor	0.9771	Pstatic	-9.00	Ideal Nozzle Diameter		0.278			9.4
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN692			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.278	XAD ID & Tares		10.1
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	145			CO
Estimated Delta P or M2 Avg.	0.60	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	0.9756		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB2	0.16%		80.5
Estimated Velocity, ft/sec	53.7	CO	0.0	Umbilical ID #		U50-3	PASS		H_2O
K Factor (delta H/delta P)	3.19	N_2	80.0	TC ID #s		145			329.8

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		82	85	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	6					15
Pitots		Y	Y	Leak Rate	0.002	0.000					OK
Tedlar Bag	OB1	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	1153	0.0	921.700	0.47	1.50	1.50	4	85	85	296	251	65	NA
- 4		5.0	925.170	0.48	1.53	1.53	4	87	85	297	252	54	NA
A - 3		10.0	928.720	0.52	1.66	1.66	4	88	86	296	252	53	NA
A - 2		15.0	932.300	0.53	1.69	1.69	4	89	86	296	253	55	NA
A - 1		20.0	935.960	0.54	1.72	1.72	4	91	86	296	254	56	NA
B - 5	1218/	25.0	939.691	0.42	1.34	1.34	4	90	87	296	253	58	NA
B - 4	1220	30.0	942.950	0.48	1.53	1.53	4	91	87	297	254	57	NA
B - 3		35.0	946.440	0.42	1.34	1.34	4	91	87	296	254	56	NA
B - 2		40.0	949.820	0.40	1.27	1.27	4	91	87	296	254	57	NA
B - 1		45.0	953.100	0.42	1.34	1.34	4	92	87	296	255	57	NA
C - 5	1245/	50.0	956.392	0.35	1.12	1.12	4	91	88	294	254	61	NA
C - 4	1247	55.0	959.500	0.38	1.21	1.21	4	93	88	297	255	58	NA
C - 3		60.0	962.720	0.37	1.18	1.18	4	93	89	297	256	56	NA
C - 2		65.0	965.930	0.36	1.15	1.15	4	94	89	297	256	56	NA
C - 1		70.0	969.090	0.36	1.15	1.15	4	93	89	296	255	55	NA
D - 5	1312/	75.0	972.228	0.23	0.73	0.73	3	91	89	296	255	65	NA
D - 4	1324	80.0	974.740	0.25	0.80	0.80	3	92	90	296	255	55	NA
D - 3		85.0	977.381	0.23	0.73	0.73	3	92	89	296	256	51	NA
D - 2		90.0	979.884	0.22	0.70	0.70	3	93	89	296	256	53	NA
D - 1		95.0	982.317	0.28	0.89	0.89	3	93	89	295	255	53	NA
E - 5	1349/	100.0	984.978	0.17	0.54	0.54	2	92	90	293	252	59	NA
E - 4	1351	105.0	987.059	0.20	0.64	0.64	2	93	90	296	253	57	NA
E - 3		110.0	989.280	0.20	0.64	0.64	2	93	90	296	255	58	NA
E - 2		115.0	991.720	0.22	0.70	0.70	2	94	90	296	258	59	NA
E - 1		120.0	994.200	0.23	0.73	0.73	2	94	91	296	259	60	NA
-	1416	125.0	996.681										
-													
-													
-													
-													
-													
						MAX =>	4						
Average Values		125.0	74.981	0.339	1.11	1.11		90		296			

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD M5/29

Client Name	Covanta Projects, Inc.	Run #	4-O-M5/29-3		
Plant Name	Hillsborough County SWERF	Project #	10659	Run Start	1435
Plant City, State	Tampa, FL	Personnel	SGD	Run End	1656
Test Location	Unit #4 FF Outlet	Tester Signature			
Date of Test	08/31/09	Checked By			

Isokinetic Factor Setup		Pressures		Sampling Equipment			Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM	1.791	Pbar	29.9	Meter Console #		T5	T107-16	0.4596	CO_2
Meter Calibration Factor	0.9771	Pstatic	-9.00	Ideal Nozzle Diameter		0.278			9.5
Pitot Tube Coefficient	0.84	Tstd, °F	68	Nozzle #		GN545			O_2
Estimated DGM Temp	90	Pstd	29.92	Actual Nozzle Diameter		0.279	XAD ID & Tares		10.0
Estimated Stack Temp or M2 Avg.	290	Diluent		Probe Lgth/ID #	8'	600			CO
Estimated Delta P or M2 Avg.	0.60	Estimates		Liner Material		BG	Y_{qa}		0.0
Estimated Moisture Content	20.0	CO_2	9.0	Filter Box #		HB6	0.9696		N_2
Estimated Dry Molecular Weight	29.88	O_2	11.0	Cold Box ID #		CB2	0.77%		80.5
Estimated Velocity, ft/sec	53.7	CO	0.0	Umbilical ID #		U50-3	PASS		H_20
K Factor (delta H/delta P)	3.23	N_2	80.0	TC ID #s		600			302.8

Equipment Checks		PRE	POST	Leak Checks	1	2	3	4	5	6	Status
Tambient		85	85	DGM initial							0.000
Thermocouples		Y	Y	Vacuum	15	6					15
Pitots		Y	Y	Leak Rate	0.005	0.002					OK
Tedlar Bag	OB8	Y	Y	DGM final							0.000

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	Cond. Exit Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
A - 5	1435	0.0	0.000	0.55	1.78	1.78	2	91	91	297	253	57	NA
- 4		5.0	3.861	0.40	1.29	1.29	2	95	91	297	255	57	NA
- 3		10.0	7.175	0.55	1.78	1.78	2	96	91	297	254	59	NA
A - 2		15.0	10.774	0.49	1.58	1.58	4	96	92	297	254	49	NA
A - 1		20.0	14.401	0.53	1.71	1.71	4	96	92	297	255	49	NA
B - 5	1500/	25.0	18.095	0.40	1.29	1.29	3	95	92	297	256	53	NA
B - 4	1502	30.0	21.466	0.37	1.20	1.20	3	96	92	297	256	50	NA
B - 3		35.0	24.664	0.40	1.29	1.29	3	96	92	297	256	50	NA
B - 2		40.0	27.952	0.38	1.23	1.23	3	97	92	297	254	51	NA
B - 1		45.0	31.187	0.40	1.29	1.29	3	97	92	297	254	51	NA
C - 5	1527/	50.0	34.414	0.36	1.16	1.16	3	96	92	296	254	55	NA
C - 4	1529	55.0	37.567	0.31	1.00	1.00	3	97	92	296	254	51	NA
C - 3		60.0	40.513	0.32	1.03	1.03	3	97	92	297	255	51	NA
C - 2		65.0	43.501	0.36	1.16	1.16	3	97	93	297	255	52	NA
C - 1		70.0	46.607	0.38	1.23	1.23	3	97	93	297	255	53	NA
D - 5	1554/	75.0	49.807	0.27	0.87	0.87	3	96	93	291	256	56	NA
D - 4	1555	80.0	52.588	0.24	0.78	0.78	3	96	93	297	256	55	NA
D - 3		85.0	55.198	0.25	0.81	0.81	3	96	93	297	256	55	NA
D - 2		90.0	57.880	0.30	0.97	0.97	3	96	93	297	256	55	NA
D - 1		95.0	60.789	0.31	1.00	1.00	3	96	93	297	256	57	NA
E - 5	1620	100.0	63.768	0.19	0.61	0.61	2	93	93	296	256	67	NA
E - 4	1631	105.0	66.111	0.22	0.71	0.71	2	93	92	297	257	59	NA
E - 3		110.0	68.625	0.21	0.68	0.68	3	94	92	297	257	58	NA
E - 2		115.0	71.059	0.24	0.78	0.78	3	94	92	297	257	59	NA
E - 1		120.0	73.610	0.25	0.81	0.81	3	95	92	297	257	59	NA
-	1656	125.0	76.271										
-													
-													
-													
-													
						MAX =>	4						
Average Values		125.0	76.271	0.340	1.12	1.12		94		297			

76

APPENDIX B.7
Field Data

Unit 4 Stack
Opacity

EPA METHOD 9 VISIBLE EMISSIONS OBSERVATIONS

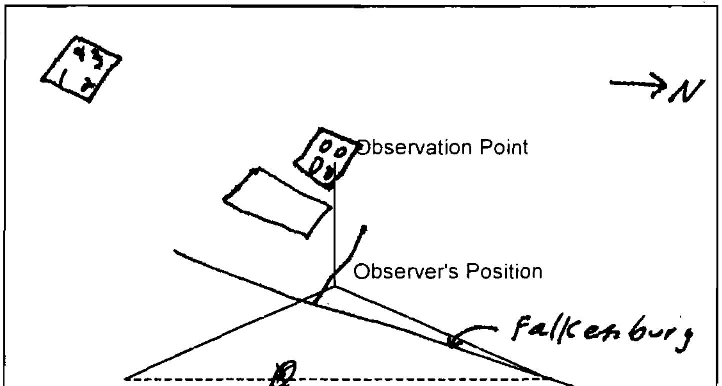
Client Name	Covata Projects, Inc.	Project Number	10659	Run #
Plant Name	Hillsborough County SWERF	Test Date	8/31/09	45-M9-1
Plant Address	950 North Falkenburg Road	Start Time	0915	Time Zone
Plant City, State	Tampa, FL	Stop Time		EDT
Certified By	ETA	Observer's Name	Gary Williams	
Certification Date	08/25/09	Observer's Signature	[signature]	

Process	Unit 4	Operating Mode	Full
Control Equipment	SDA/FF/CI	Operating Mode	Normal

Describe Emission Point	Stack with 4 flues					
Water Droplet Plume	Attached		Detached		None	XXX
	Begin	End			Begin	End
Describe Emisions	clear	clear	Emission Color		NA	NA
Height of Emission Point	224'	224'	Height Relative of Observer		224'	224'
Distance to Emission Point	1700'	1700'	Direction to Emission Point		260°	260°
Vertical Angle to Observ. Point	8°	8°	Direction to Observ. Point		260°	260°
Direction and Distance to Observation Point from Emission Point					10' up	10' up

Sky Conditions	mostly sunny	same
Background Color	blue	↓
Describe Plume Background	sky	
Wind Speed	0-2	
Wind Direction	var	
Wet Bulb Temperature, °F	80	
Ambient Temperature, °F	87	
Relative Percent Humidity, %	74	↓

Longitude	
Latitude	
Declination	



Indicate North, Wind Direction, Sun Location, and Plume Direction

min/sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

min/sec	0	15	30	45	Comments
31	0	0	0	0	
32	0	0	0	0	
33	0	0	0	0	
34	0	0	0	0	
35	0	0	0	0	
36	0	0	0	0	
37	0	0	0	0	
38	0	0	0	0	
39	0	0	0	0	
40	0	0	0	0	
41	0	0	0	0	
42	0	0	0	0	
43	0	0	0	0	
44	0	0	0	0	
45	0	0	0	0	
46	0	0	0	0	
47	0	0	0	0	
48	0	0	0	0	
49	0	0	0	0	
50	0	0	0	0	
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
54	0	0	0	0	
55	0	0	0	0	
56	0	0	0	0	
57	0	0	0	0	
58	0	0	0	0	
59	0	0	0	0	
60	0	0	0	0	

Max	0	Max 6 Minute Avg	0
Min	0	Min 6 Minute Avg	0

Number of readings above 10% were => 0

APPENDIX C
Analytical Data

APPENDIX C.1
Analytical Data

Ammonia

RESOLUTION ANALYTICS, INC.
Specialists in High Performance Liquid Chromatography

REPORT SUMMARY

RFA#: 10659

SAMPLE ID	*NH_3*
0.1 N H2SO4 BLANK	< 0.039 mg
4-O-CTM27-1	3.27 mg
4-O-CTM27-2	0.958 mg
4-O-CTM27-3	1.38 mg

Analytical Narrative

RFA # 10659

Client/Plant Name: Testar, Inc.

Date Rec'd in lab: 09/08/2009

Analyst: TCS

Date of Analysis: 09/09/2009

Analysis Method: CTM-027

Analyte(s): Ammonia

Sample Matrix & Components:

0.1 N H2SO4 & DI H_2O rinses

Summary of Sample Prep:

Samples were final volumed by TCS in the laboratory.
No further pretreatment of the samples was required.

Summary of Instrumentation:

Shimadzu CDD-6A PRP-X200 Column 250x4.1mm
Eluent: 4.28 mM Nitric Acid
Gain 0.2 µS/cm

20 µl Inj.
Flow Rate: 1.75 mls/min
Temp: 40°C

Limit(s) of Quantification: 0.195 ppm NH_3

Summary of QA Audit Sample Analysis:

See Analytical Data Sheets for results of internal QC audit results.
(All internal QC results were within ±10% limits.)

Summary of Sample Spike Analysis:

See Analytical Data Sheets for results of sample spike analyses.
(All spike results were within 90-110% recovery limits.)

Miscellaneous Comments Regarding Sample Analysis: (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

None.

Confirmation of Data Review:

To the best of my knowledge this analytical data has been checked thoroughly for completeness and the results presented are accurate, error-free, legible, and have been performed and validated in accordance with the approved method(s).

Lab QA Officer Signature J. Bruce Nest Date 9/10/09

Sample Record of Custody

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	09/02/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #*	Broken By	Reason Broken	Sealed By	Run Number	Fraction	Filter		XAD Resin	
							ID	Tare	ID	Tare
	PC				4-O-CTM27-1	0.1N H2SO4				
					4-O-CTM27-2	0.1N H2SO4				
					4-O-CTM27-3	0.1N H2SO4				
					Reagent Blank	0.1N H2SO4				

Signature	[signature]	Date	9/3/09
Checked By	[signature]	Date	9/3/09
Received By	[signature]	Date	9/8/09
Analytical Parameters	Ammonia per Conditional Test Method 027		
Sample Condition			

* PC = Personal Custody

Ammonia (CTM Method 027) Analytical Data Sheet

Client Name:	**TESTAR, Inc.**	Job Num.	**10659**
File Pathway:	C:\JOBS\TESTAR\10659\NH3.WB1	File:	NH3
Analyst:	TCS	Date:	09/09/2009

NH4 Standard Calibration Curve by Linear Regression

NH4 Conc. (ppm)	Standard Areas Inj. 1	Standard Areas Inj. 2	Average Area	% Diff.	Calculated Std Conc. (ppm)	% Deviation from Actual
1.00	41728	38940	40334	3.46%	1.02	1.97%
5.00	181722	181159	181441	0.16%	4.80	-3.91%
10.0	368799	371883	370341	0.42%	9.87	-1.28%
15.0	572140	572233	572187	0.01%	15.3	1.91%
20.0	757847	757256	757552	0.04%	20.3	1.29%
30.0	1110242	1113272	1111757	0.14%	29.8	-0.80%

R Squared: 1.000 Slope: 37280 Y-Int: 2318 LoQ (ppm): **0.206**

Field Samples in: 0.1 N H2SO4

Sample ID	Inj. 1 Area	Inj. 2 Area	Average Area	% Diff.	Dilution Factor	Sample Volume (mls)	**NH3 Catch (mgs)**
0.1 N H2SO4 BLK	< 10000	< 10000	< 10000	0.00%	1	200	**< 0.039**
4-O-CTM27-1	296054	295666	295860	0.07%	1	440	**3.27**
4-O-CTM27-2	87429	85284	86357	1.24%	1	450	**0.958**
4-O-CTM27-3	122888	122091	122490	0.33%	1	455	**1.38**

***** IN-HOUSE AUDIT REPORT *****

	Inj. 1	Inj. 2	Average Area	% Dev.	Expected ppm NH4	Calculated ppm NH4	Percent Diff.
IN-HOUSE AUDIT	462169	461152	461661	0.11%	12.0	12.3	2.68%

***** IN-HOUSE SPIKE REPORT *****

SPIKE ID	Inj. 1	Inj. 2	Average Area	% Dev.	Expected ppm NH4	Calculated ppm NH4	% Recovery
4-O-CTM27-3	650814	646548	648681	0.33%	15.0	15.7	104.8%

Note: 0.5 mls of the above sample was spiked with 0.5 mls of a 30 ppm NH4 spike.

Printing Date September 9, 2009 Printing Time 05:04 PM

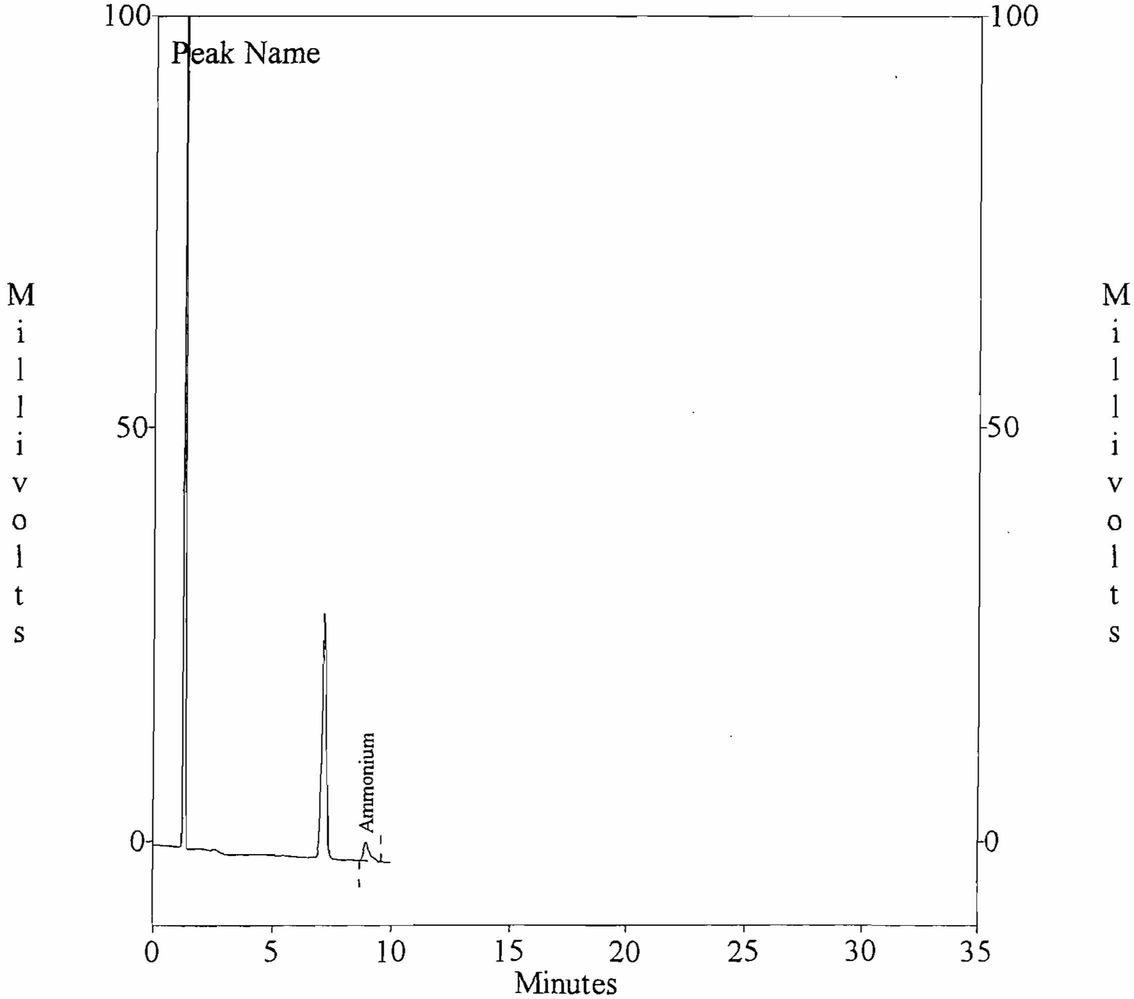
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.100
thod : c:\ezchrom\methods\ctm-027.met
mple ID : 1 PPM a
Acquired : Sep 09, 2009 11:05:48

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.97	41728

c:\ezchrom\chrom\10659.100 -- Channel A

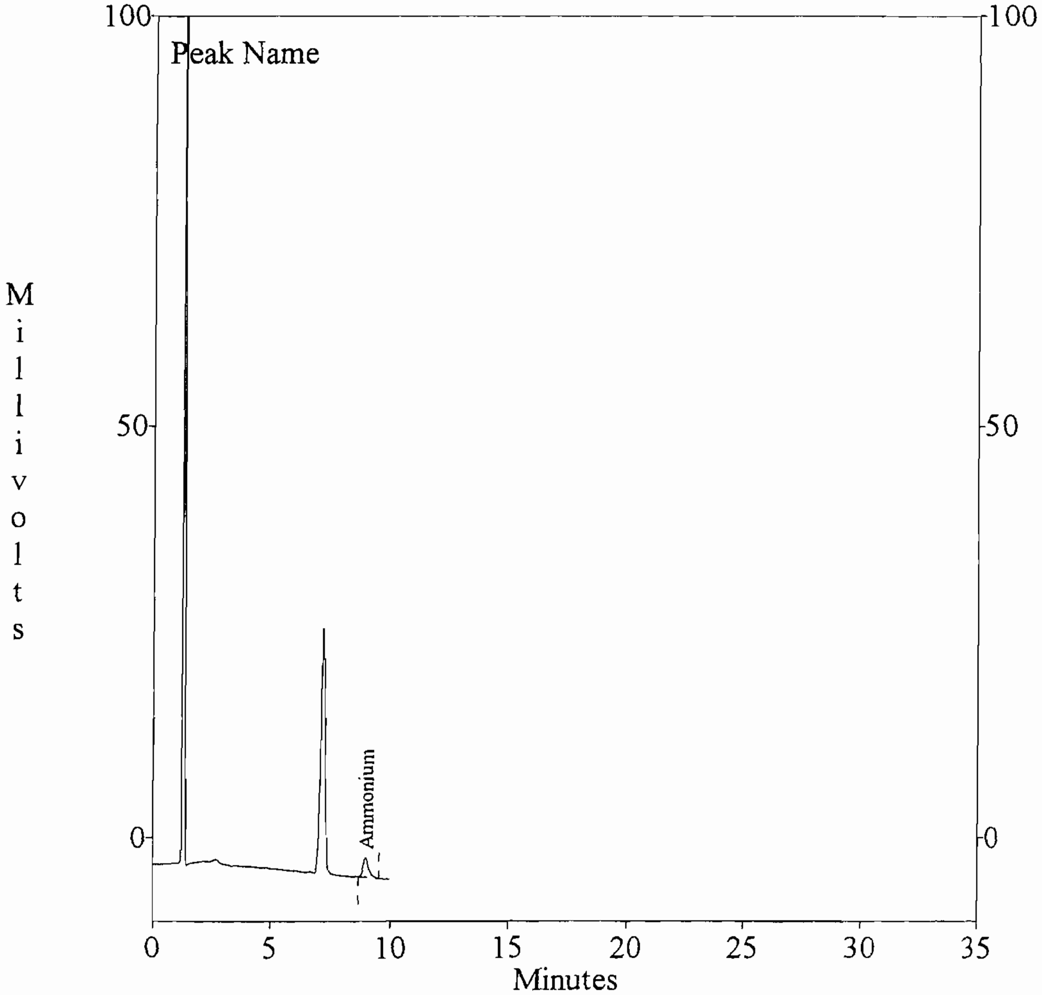


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.101
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 1 PPM b
Acquired : Sep 09, 2009 11:18:33

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.98	38940

c:\ezchrom\chrom\10659.101 -- Channel A



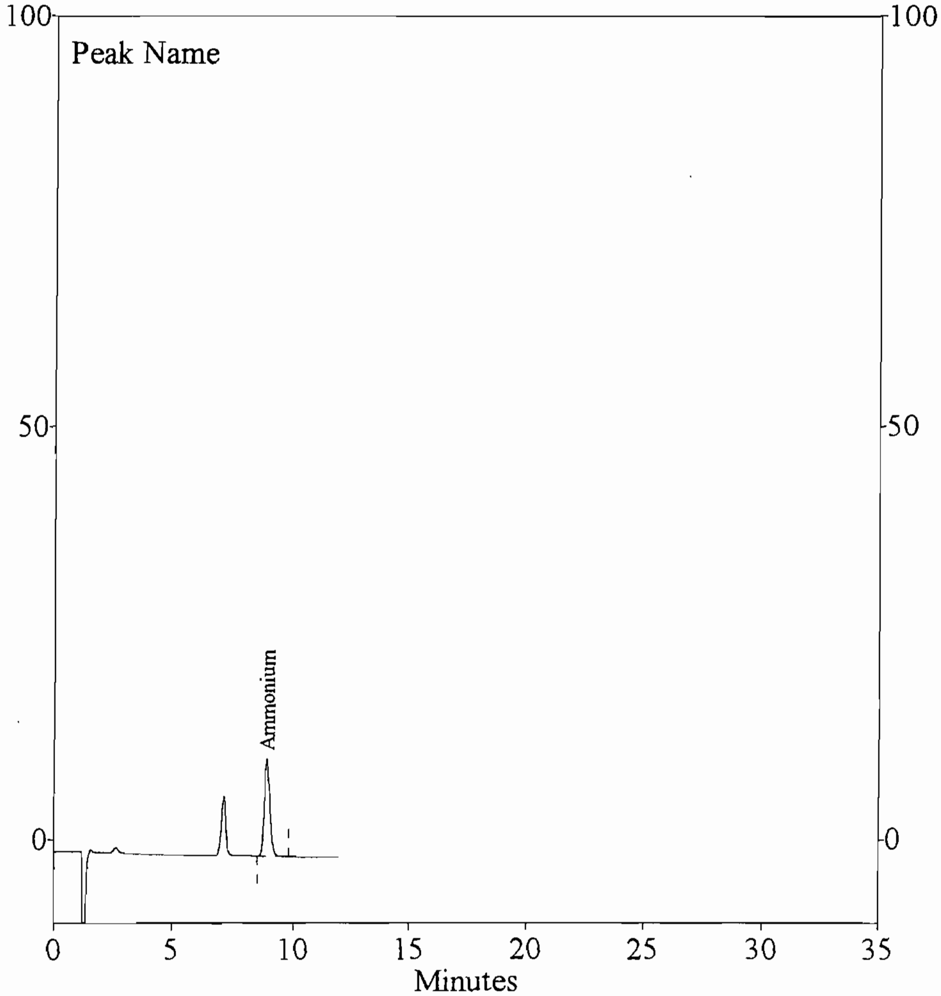
8C

Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.102
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 5 PPM a
Acquired : Sep 09, 2009 11:32:43

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.93	181722

c:\ezchrom\chrom\10659.102 -- Channel A

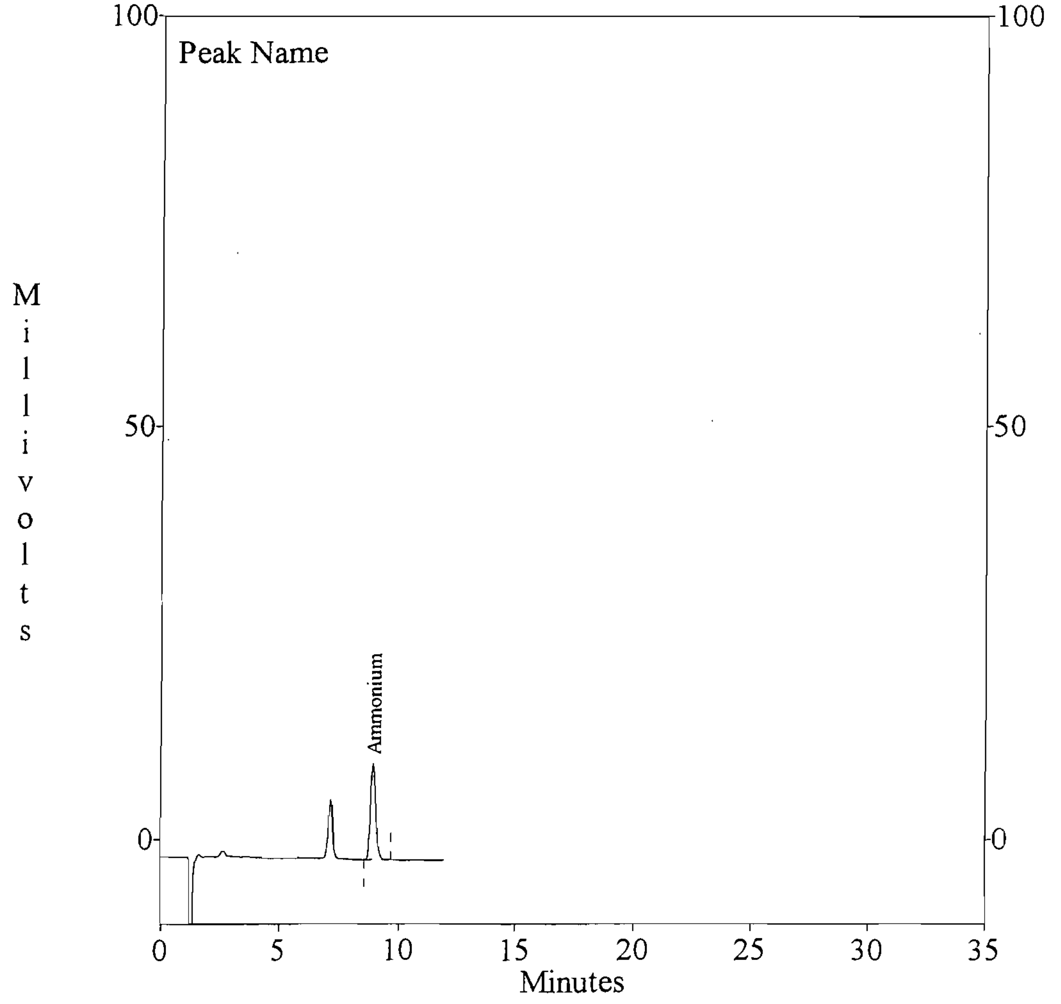


Instrument: Ion Chromatograph CDD-6A   Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3   Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm   20 µl Inj Vol   Temp 40
File : c:\ezchrom\chrom\10659.103
hod : c:\ezchrom\methods\ctm-027.met
Sample ID : 5 PPM b
Acquired : Sep 09, 2009 11:45:28

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.95	181159

c:\ezchrom\chrom\10659.103 -- Channel A

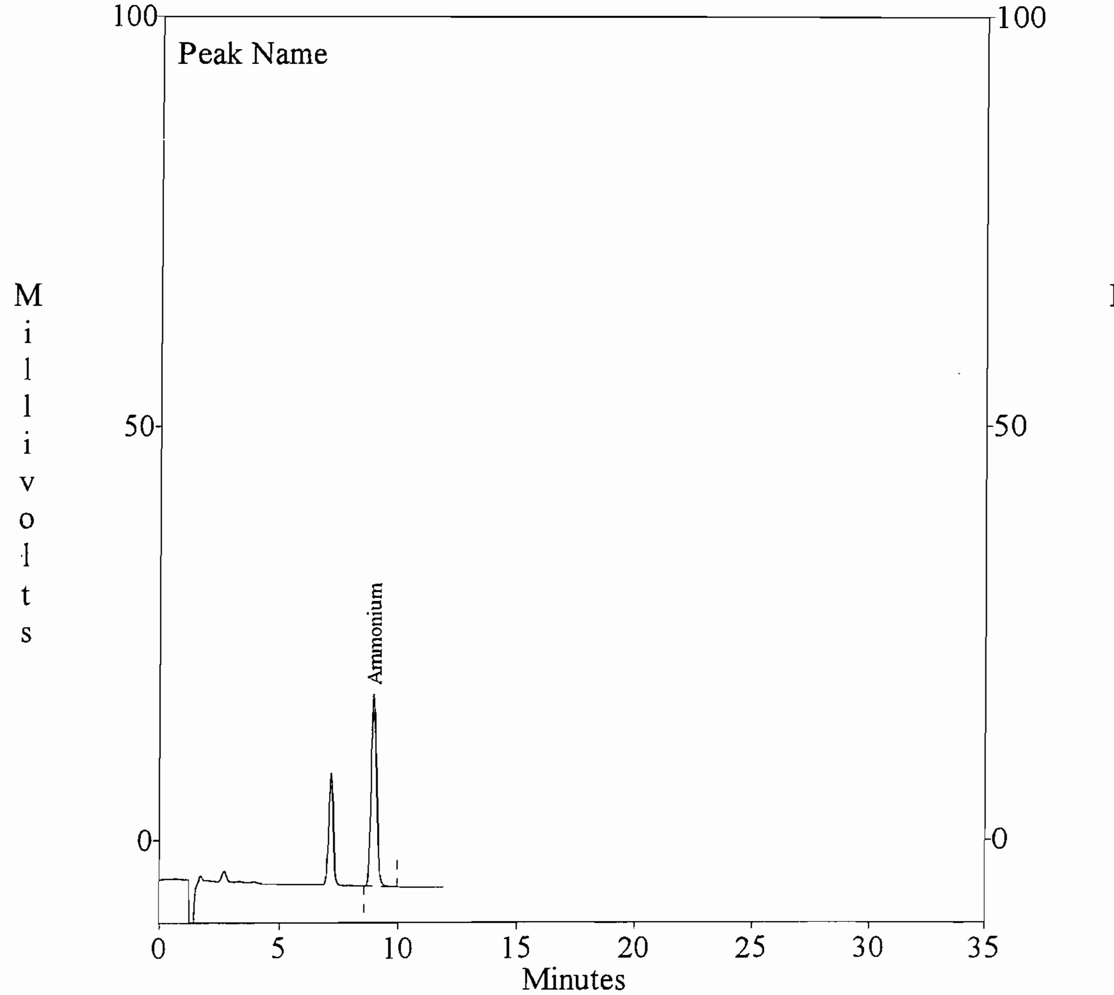


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO_3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.104
hod : c:\ezchrom\methods\ctm-027.met
ample ID : 10 PPM a
Acquired : Sep 09, 2009 12:00:02

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.95	368799

c:\ezchrom\chrom\10659.104 -- Channel A

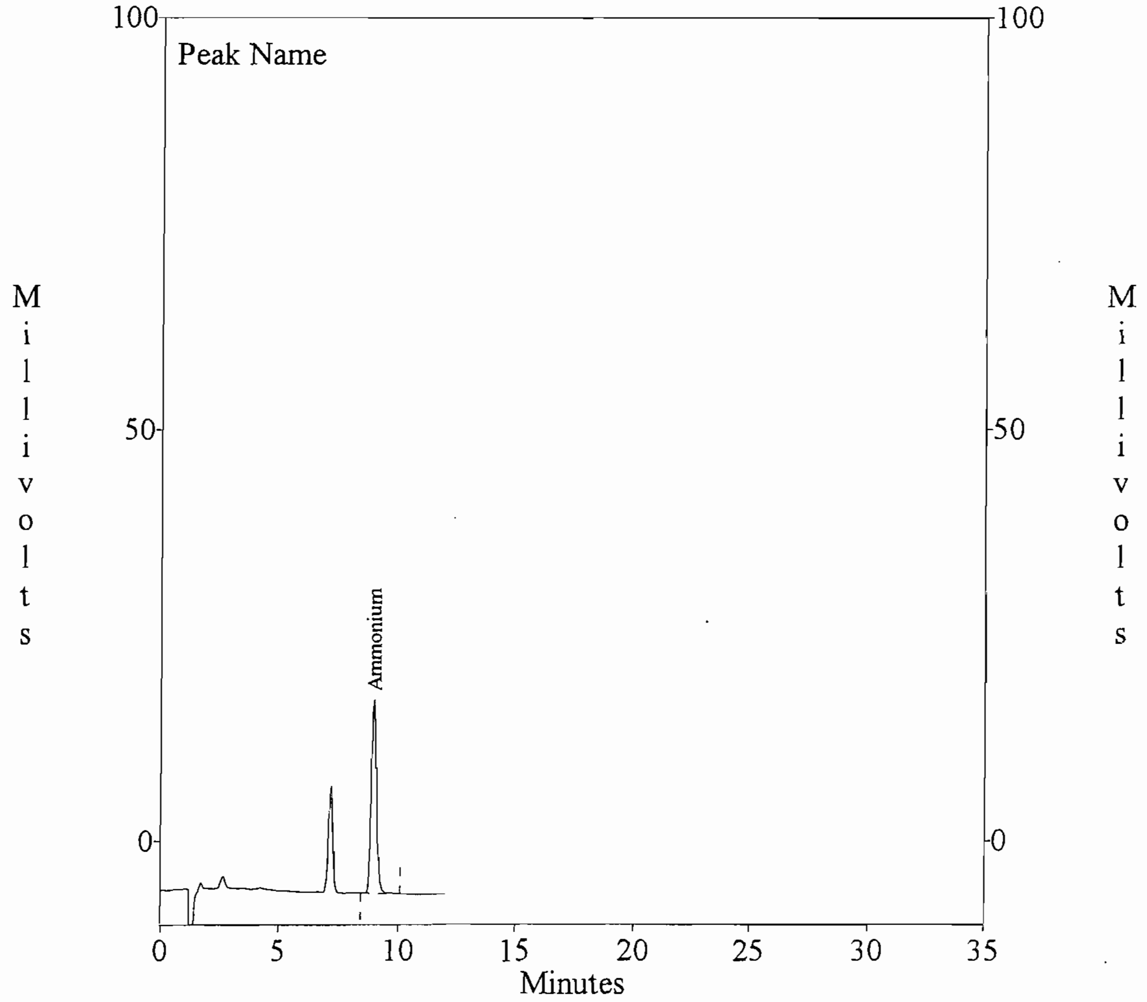


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO_3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.105
hod : c:\ezchrom\methods\ctm-027.met
ample ID : 10 PPM b
Acquired : Sep 09, 2009 12:12:47

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.97	371883

c:\ezchrom\chrom\10659.105 -- Channel A

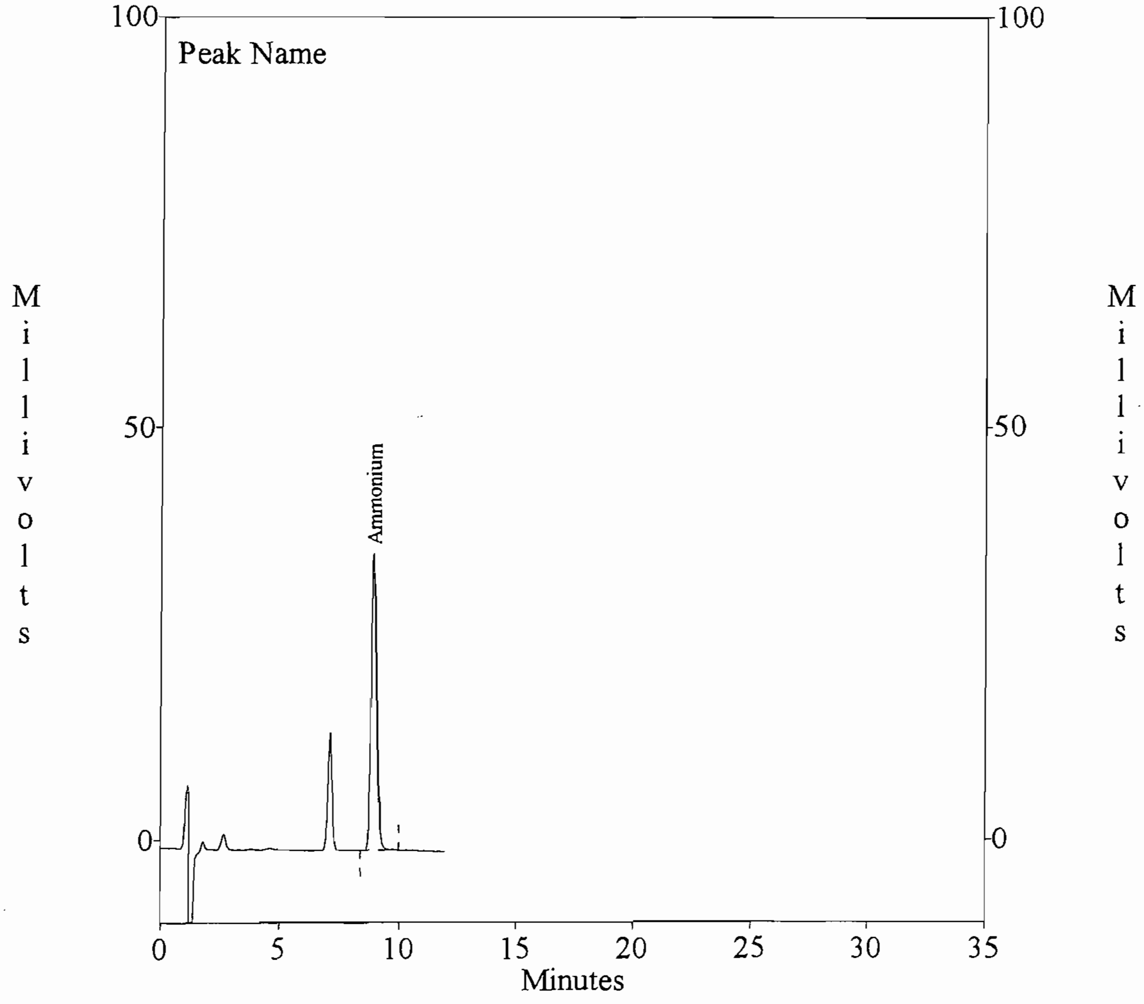


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.106
hod : c:\ezchrom\methods\ctm-027.met
ample ID : 15 PPM a
Acquired : Sep 09, 2009 12:36:15

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.95	572140

c:\ezchrom\chrom\10659.106 -- Channel A



BEST AVAILABLE COPY

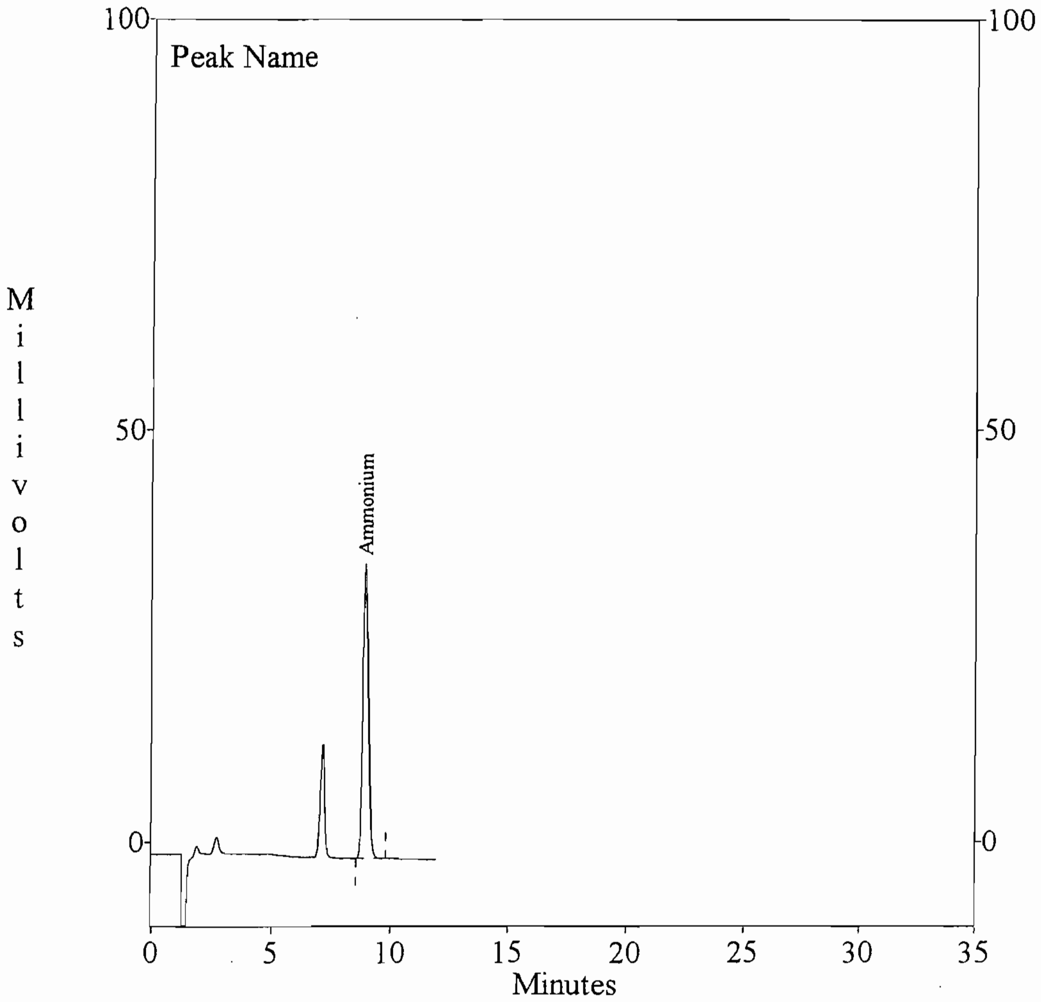
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm

Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.107
hod : c:\ezchrom\methods\ctm-027.met
ample ID : 15 PPM b
Acquired : Sep 09, 2009 12:49:01

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.95	572233

c:\ezchrom\chrom\10659.107 -- Channel A

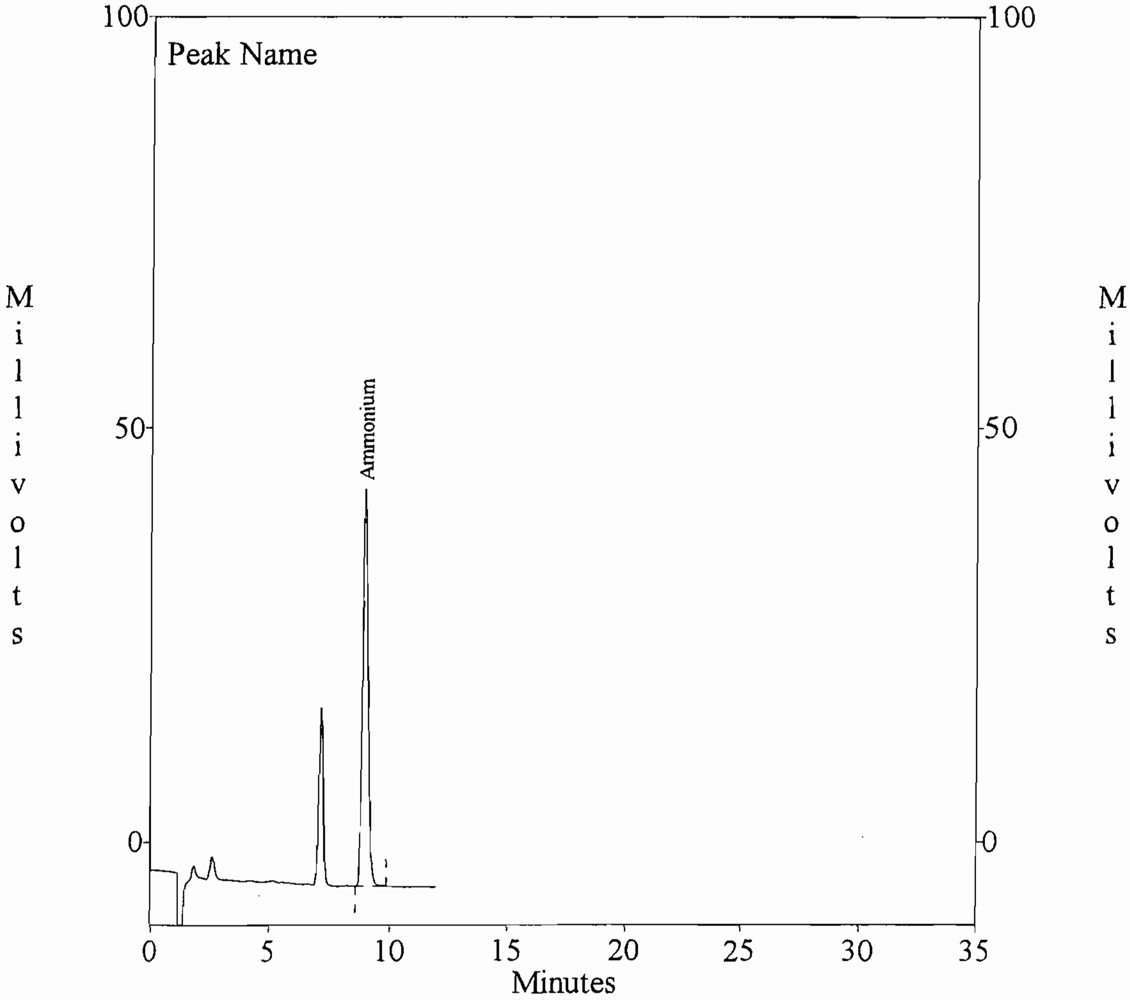


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.108
thod : c:\ezchrom\methods\ctm-027.met
.mple ID : 20 PPM a
Acquired : Sep 09, 2009 13:04:15

Channel A Results

Peak Name	Ret Time	Area
Ammonium	8.98	757847

c:\ezchrom\chrom\10659.108 -- Channel A



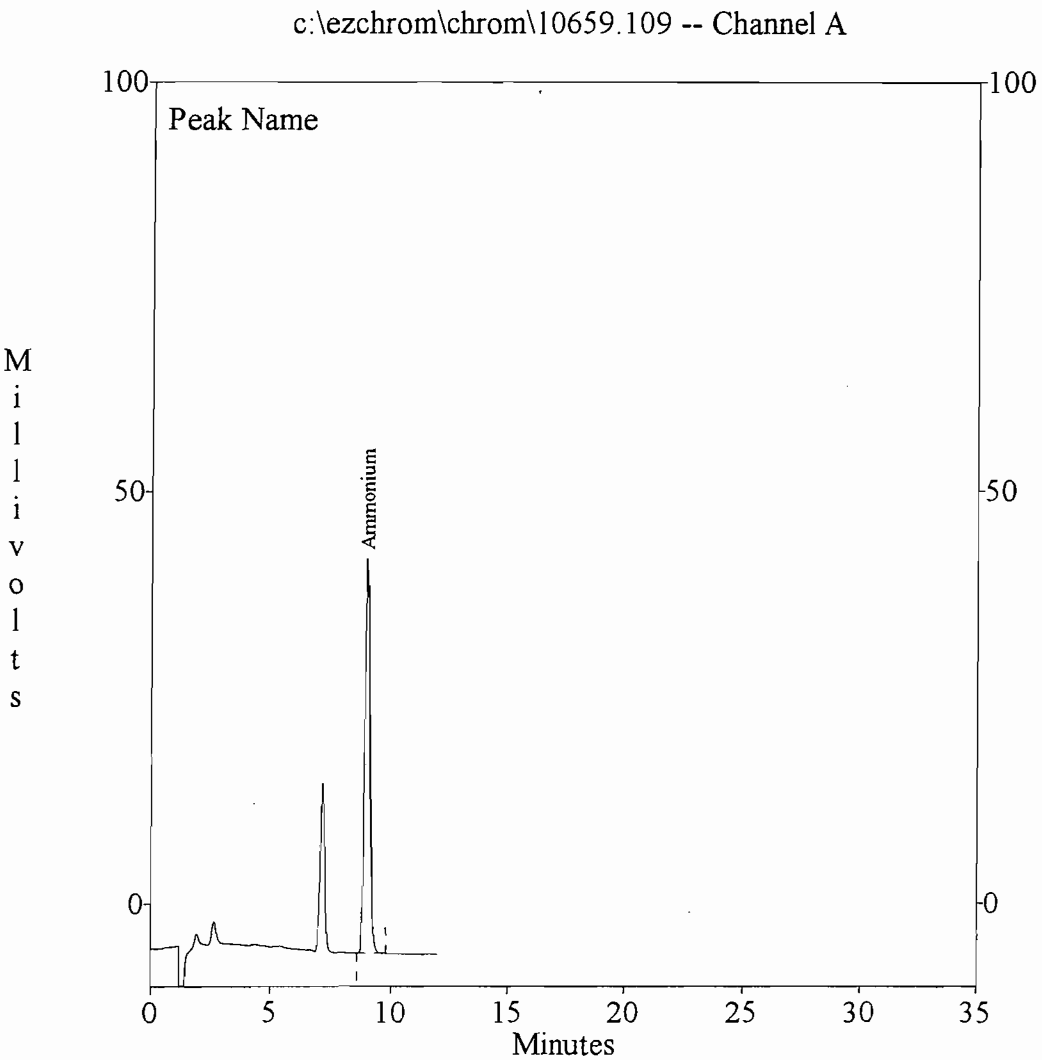
BEST AVAILABLE COPY

Instrument: Ion Chromatograph CDD-6A   Column: Hamilton PRP-X200 250x4.1mm

Eluent: 4.28 mM HNO3   Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm   20 µl Inj Vol   Temp 40
File : c:\ezchrom\chrom\10659.109
'thod : c:\ezchrom\methods\ctm-027.met
.iple ID : 20 PPM b
Acquired : Sep 09, 2009 13:17:00

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.00	757256

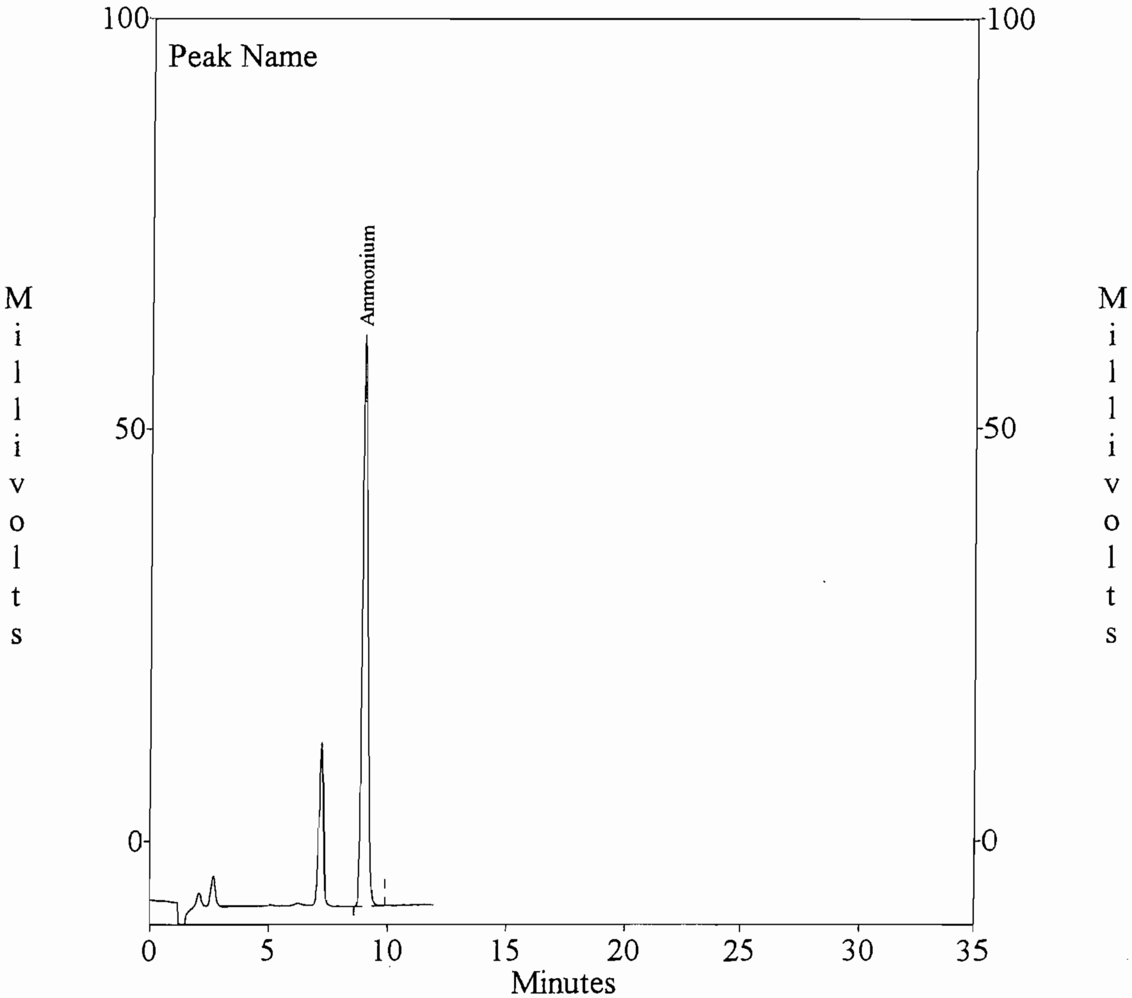


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO_3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.110
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 30 PPM a
Acquired : Sep 09, 2009 14:03:48

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.00	1110242

c:\ezchrom\chrom\10659.110 -- Channel A



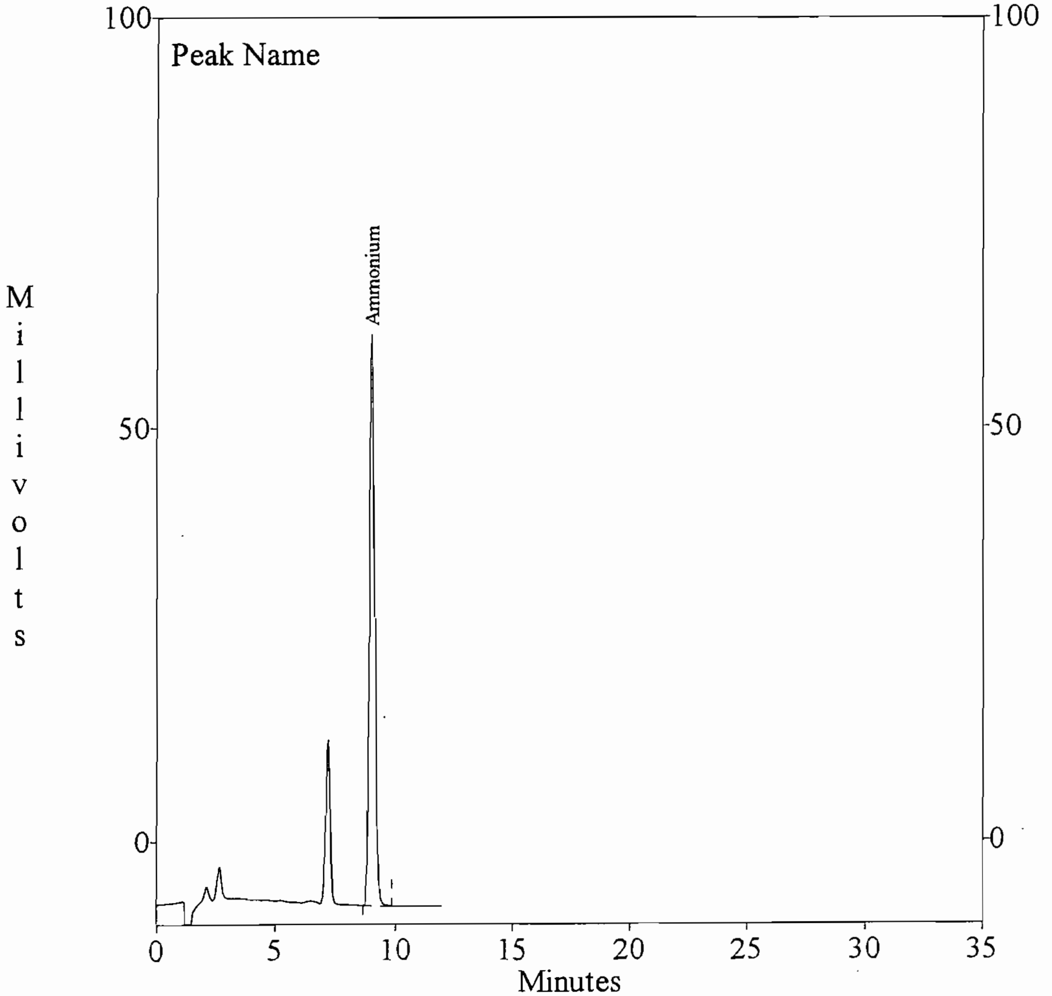
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.111
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 30 PPM b
Acquired : Sep 09, 2009 14:16:31

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.02	1113272

c:\ezchrom\chrom\10659.111 -- Channel A



BEST AVAILABLE COPY

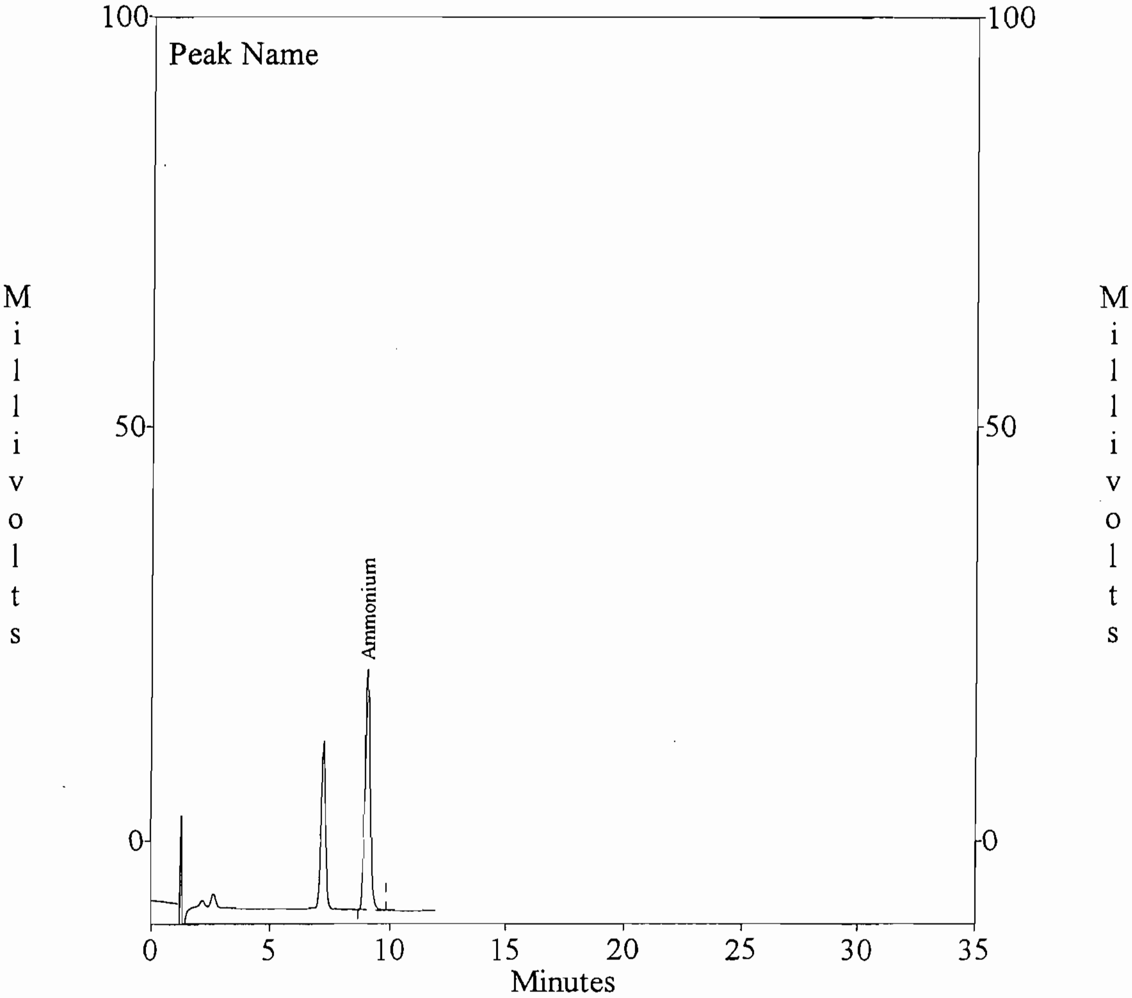
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.112
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 12 PPM AUDIT a
Acquired : Sep 09, 2009 14:33:14

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.05	462169

c:\ezchrom\chrom\10659.112 -- Channel A



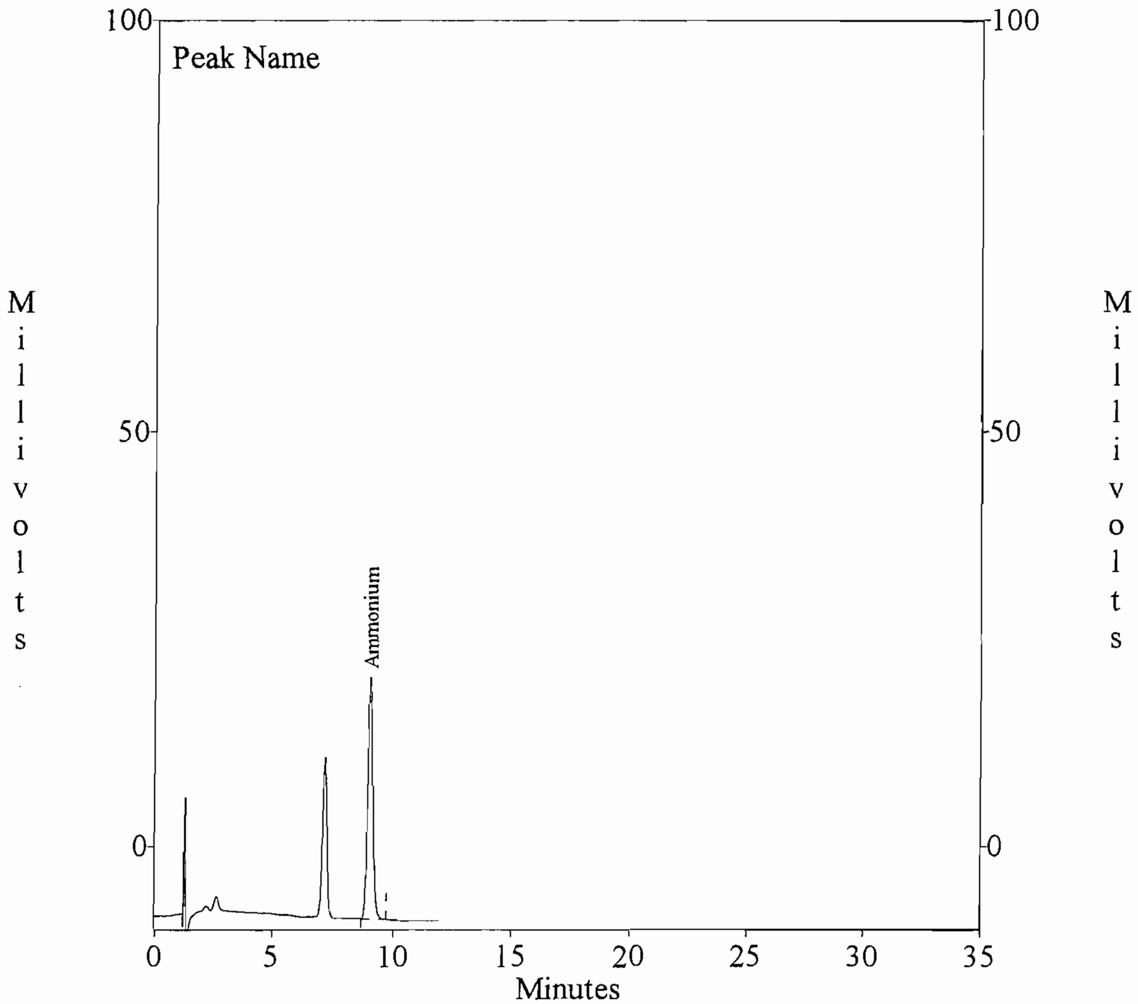
BEST AVAILABLE COPY

Instrument: Ion Chromatograph CDD-6A   Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3   Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm   20 µl Inj Vol   Temp 40
File : c:\ezchrom\chrom\10659.113
hod : c:\ezchrom\methods\ctm-027.met
.iple ID : 12 PPM AUDIT b
Acquired : Sep 09, 2009 14:46:00

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.07	461152

c:\ezchrom\chrom\10659.113 -- Channel A



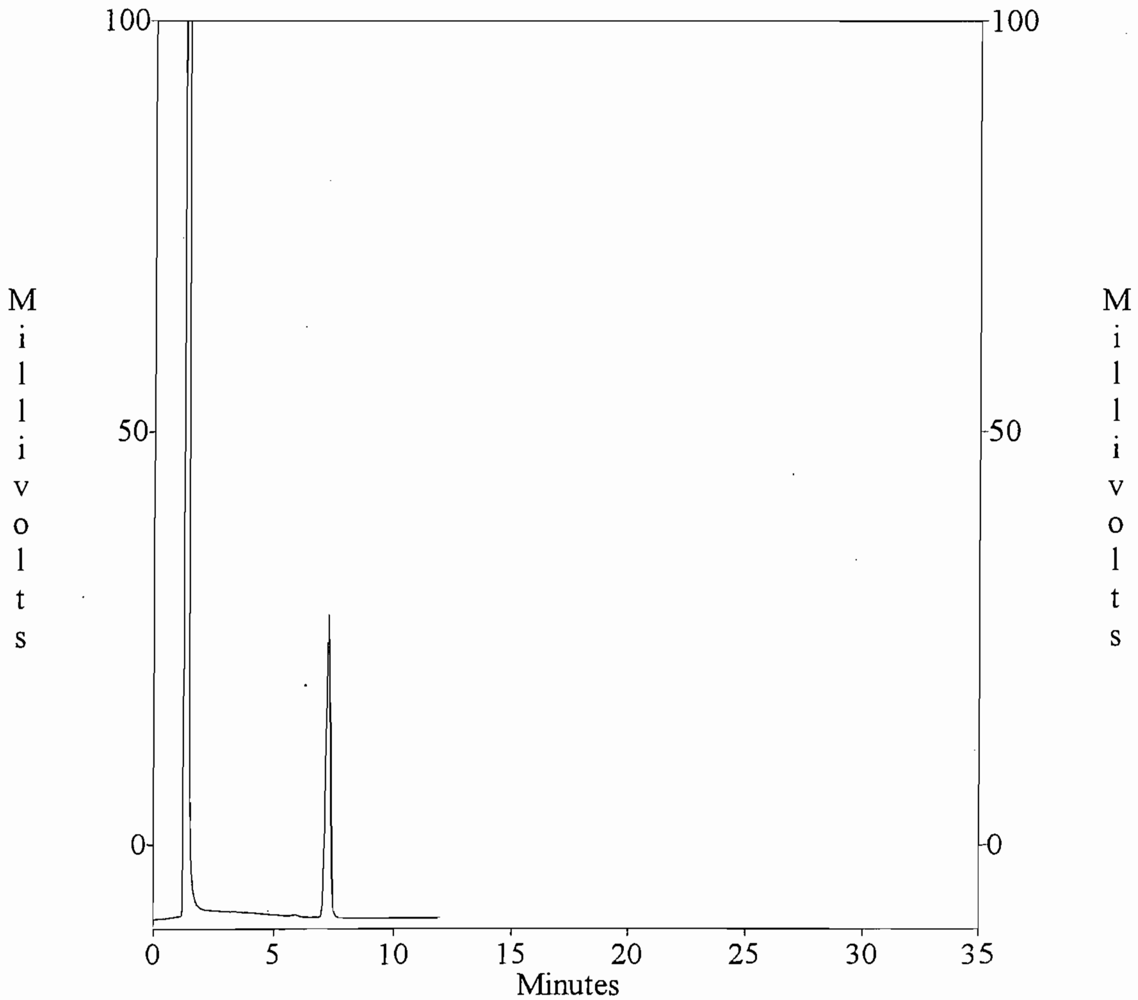
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm

Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.114
od : c:\ezchrom\methods\ctm-027.met
Sample ID : 0.1 N H2SO4 a
Acquired : Sep 09, 2009 14:58:45

Channel A Results

Peak Name	Ret Time	Area

c:\ezchrom\chrom\10659.114 -- Channel A



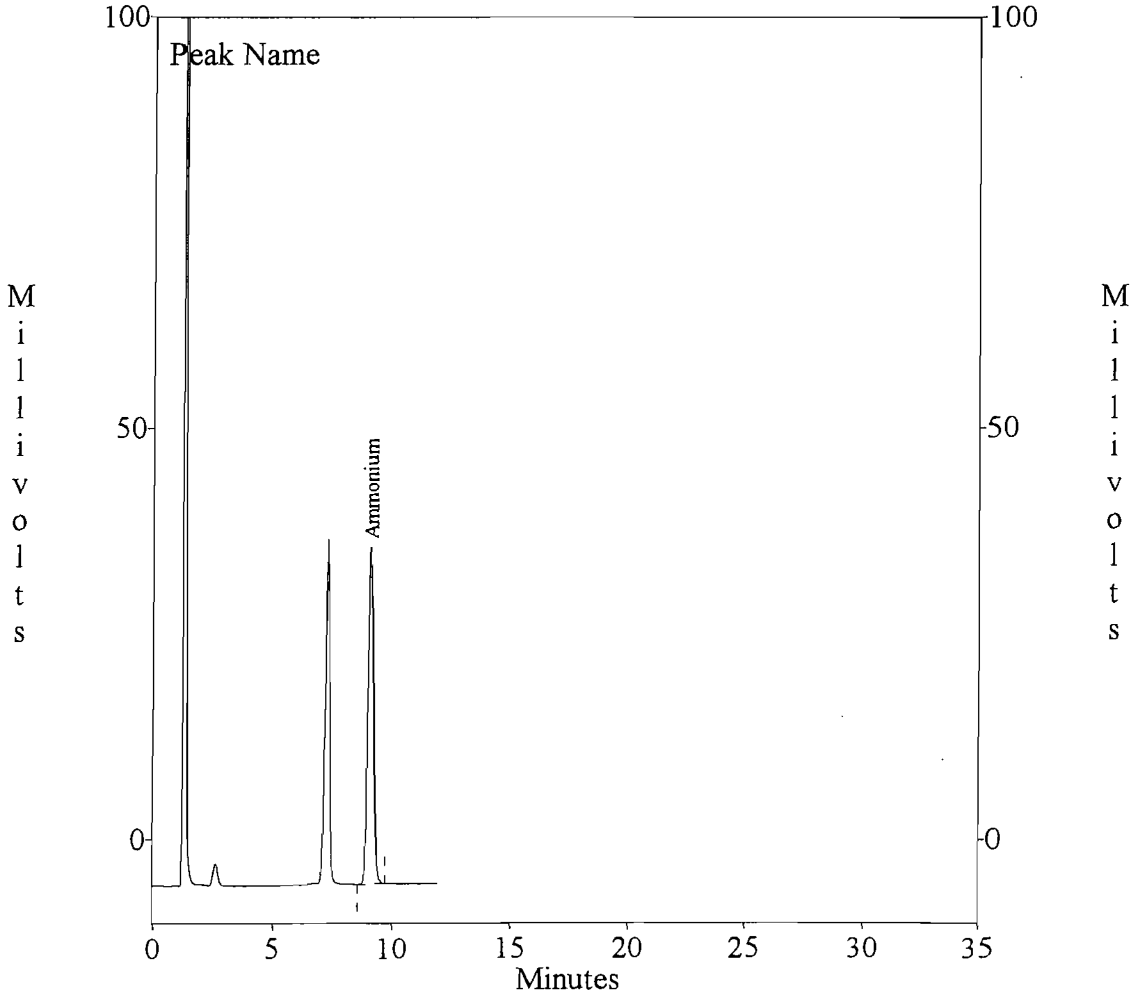
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.122
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : MATRIX SPIKE a
Acquired : Sep 09, 2009 16:40:51

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.12	650814

c:\ezchrom\chrom\10659.122 -- Channel A



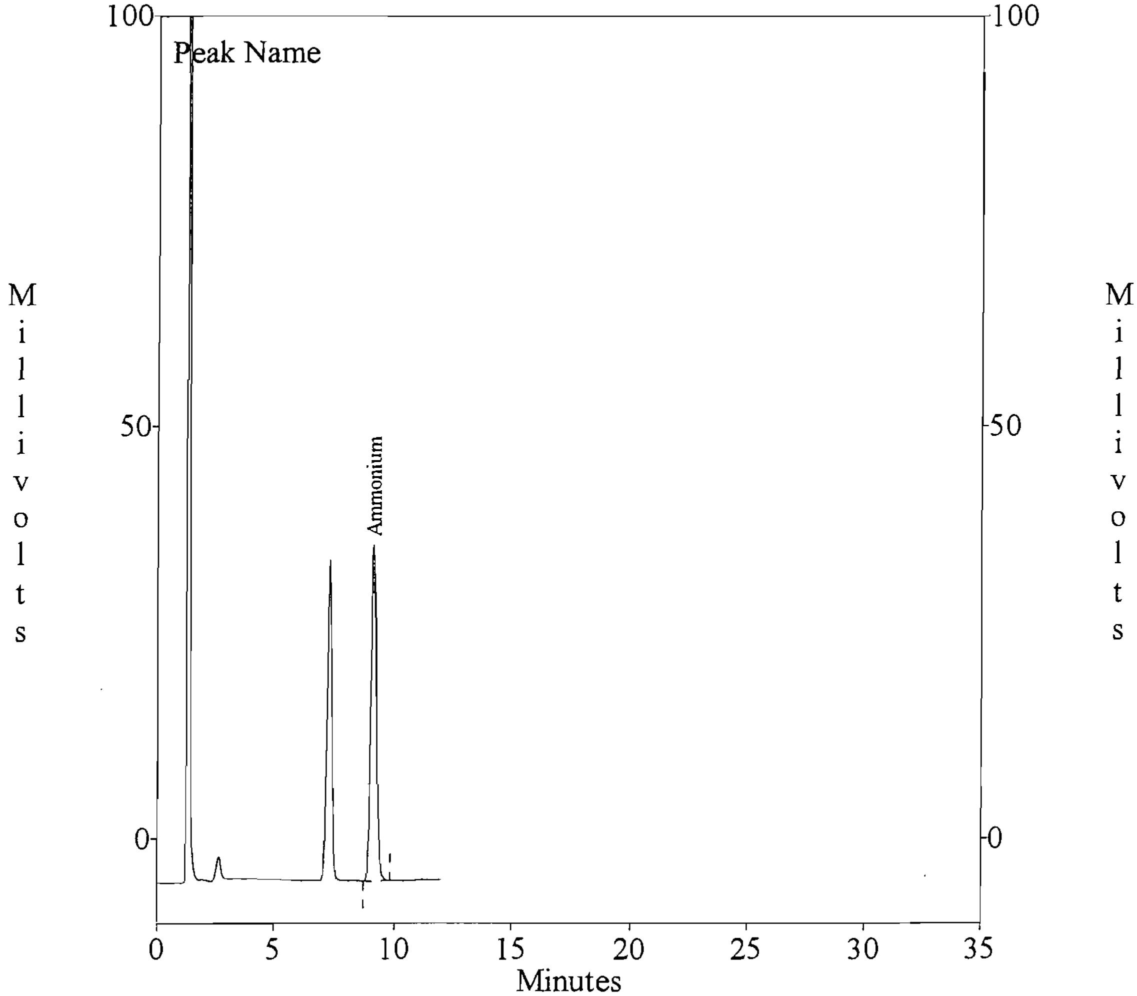
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO_3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.123
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : MATRIX SPIKE b
Acquired : Sep 09, 2009 16:53:37

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.12	646548

c:\ezchrom\chrom\10659.123 -- Channel A

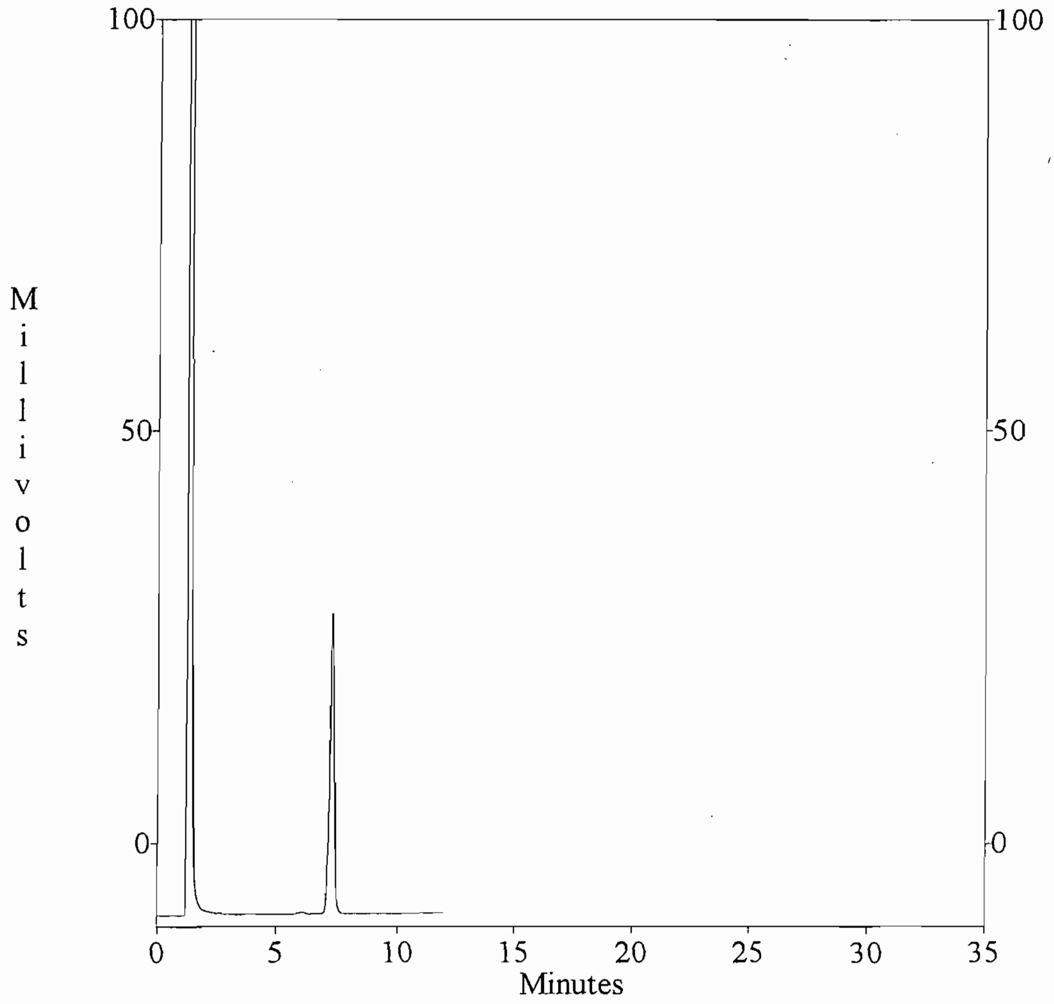


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.115
hod : c:\ezchrom\methods\ctm-027.met
Sample ID : 0.1 N H2SO4 b
Acquired : Sep 09, 2009 15:11:31

Channel A Results

Peak Name	Ret Time	Area

c:\ezchrom\chrom\10659.115 -- Channel A

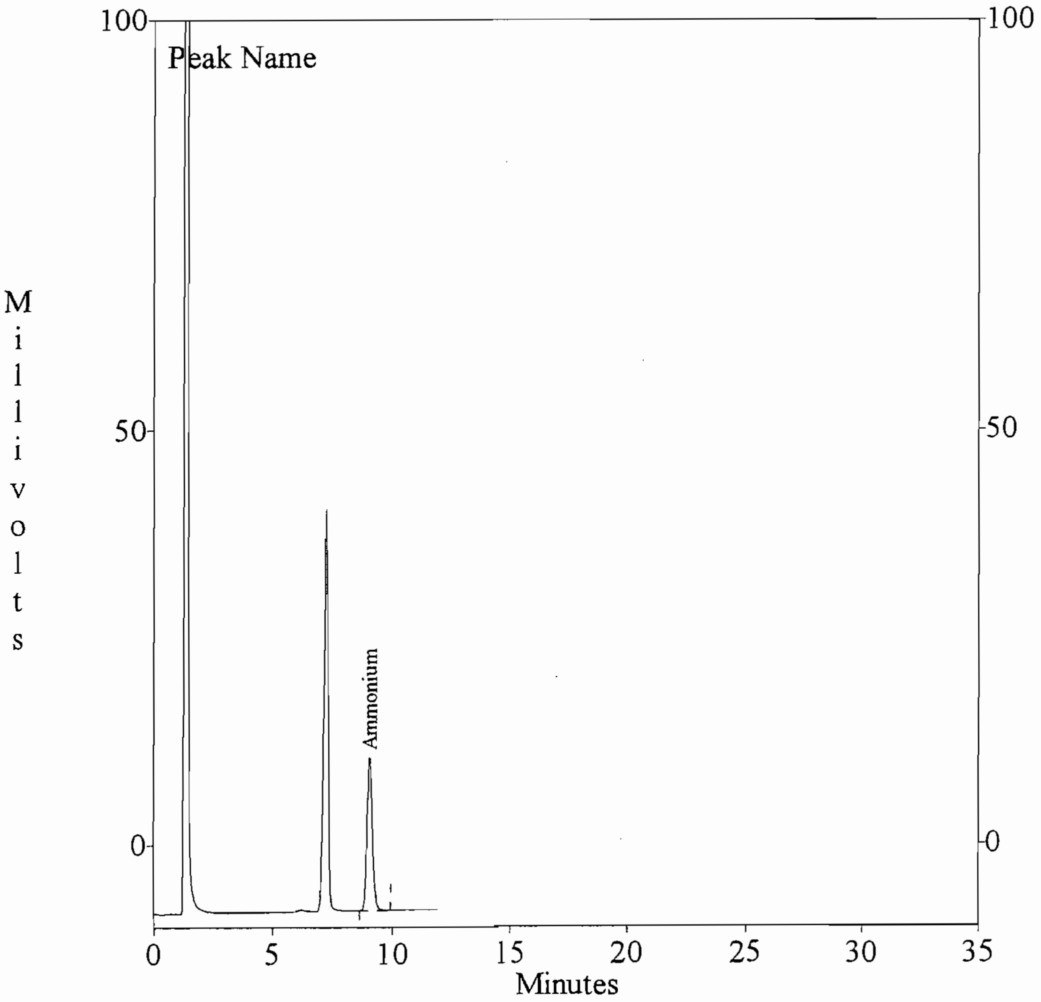


Instrument: Ion Chromatograph CDD-6A   Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3   Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm   20 µl Inj Vol   Temp 40
File : c:\ezchrom\chrom\10659.116
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-1 a
Acquired : Sep 09, 2009 15:24:17

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.10	296054

c:\ezchrom\chrom\10659.116 -- Channel A

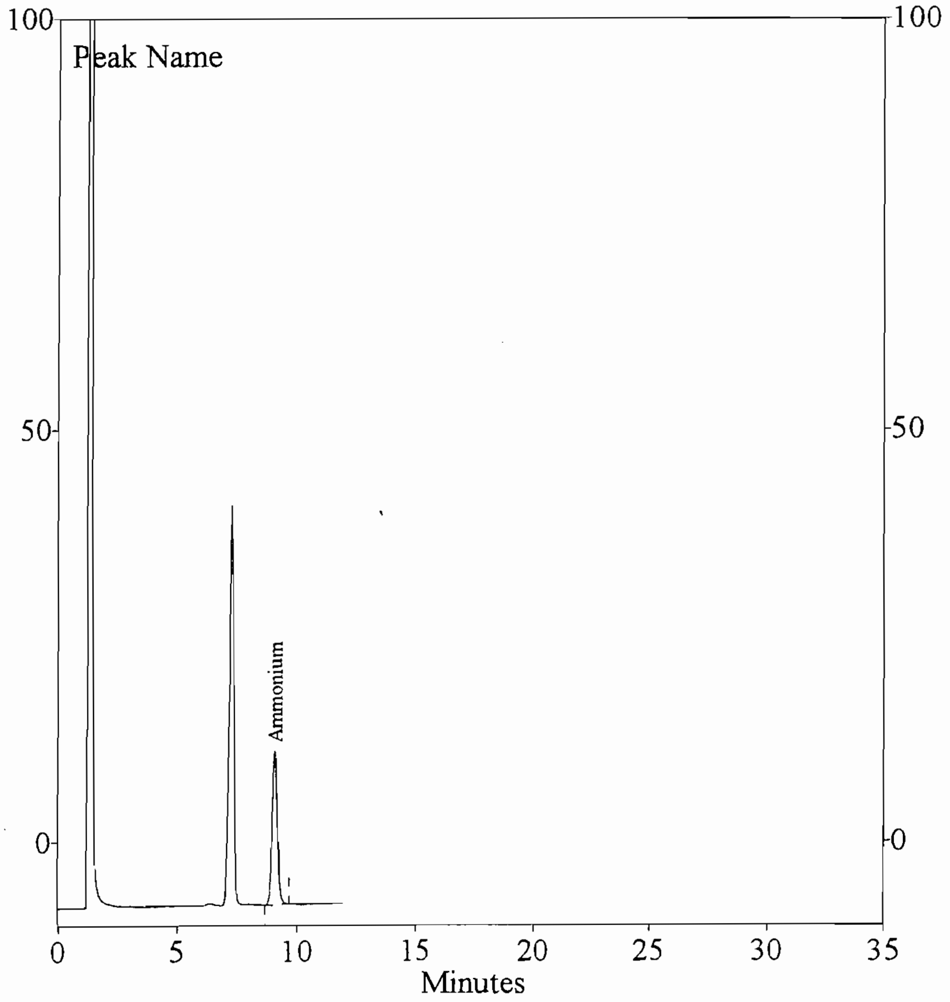


Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40
File : c:\ezchrom\chrom\10659.117
hod : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-1 b
Acquired : Sep 09, 2009 15:37:03

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.12	295666

c:\ezchrom\chrom\10659.117 -- Channel A



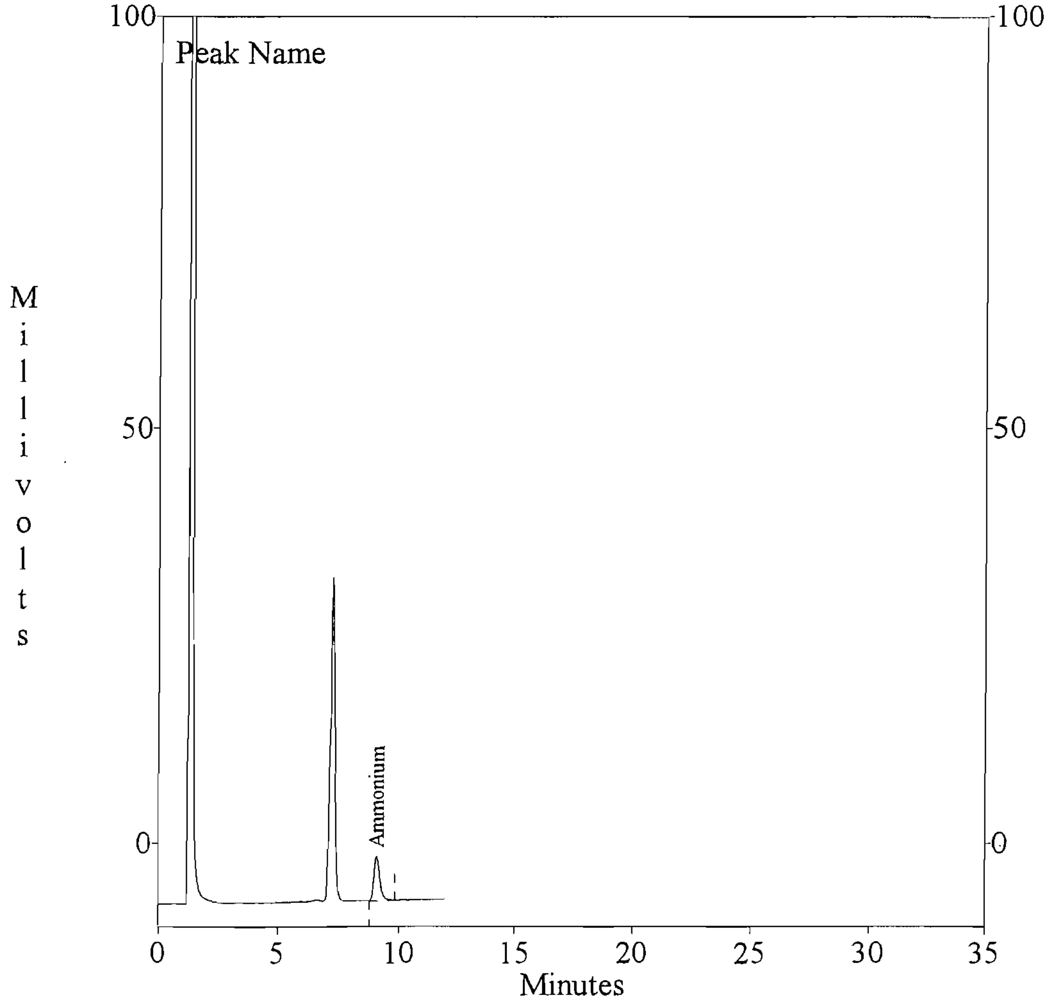
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.118
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-2 a
Acquired : Sep 09, 2009 15:49:49

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.13	87429

c:\ezchrom\chrom\10659.118 -- Channel A



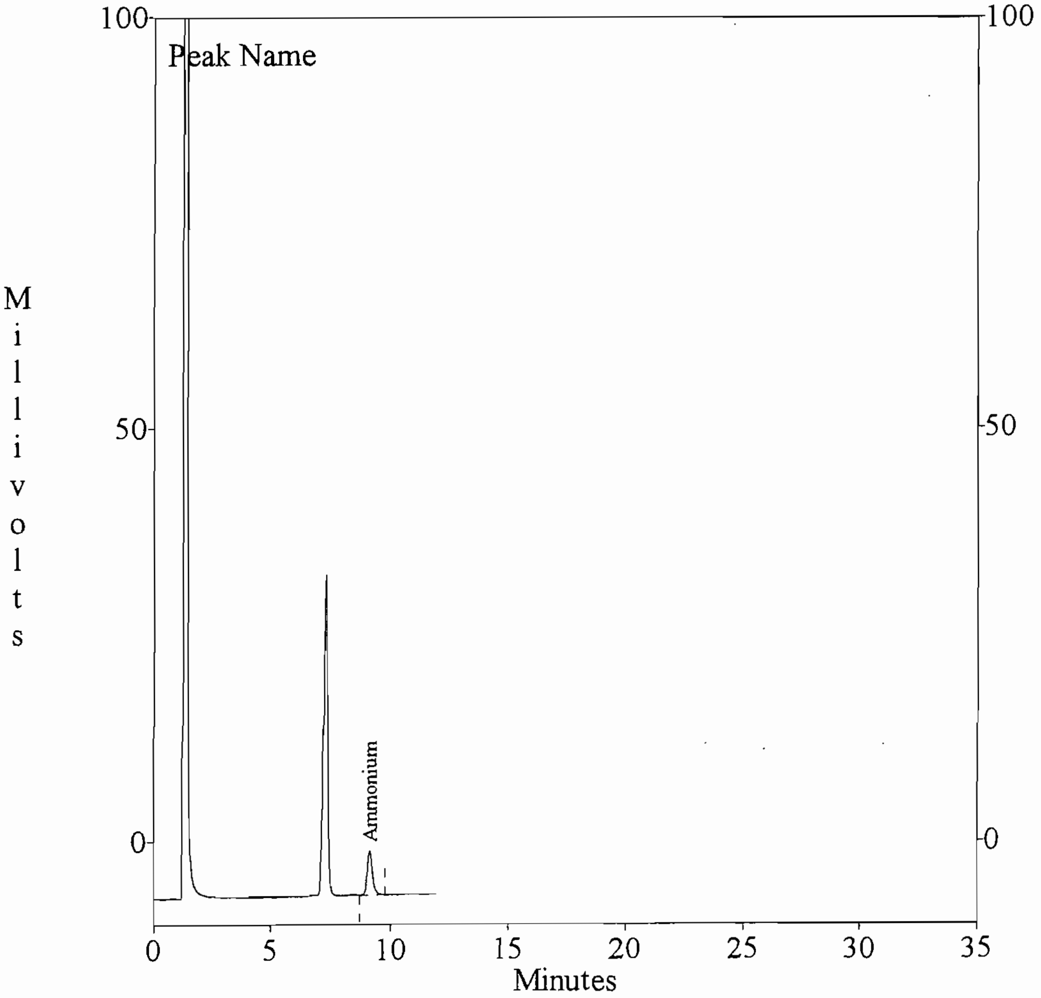
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.119
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-2 b
Acquired : Sep 09, 2009 16:02:34

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.15	85284

c:\ezchrom\chrom\10659.119 -- Channel A



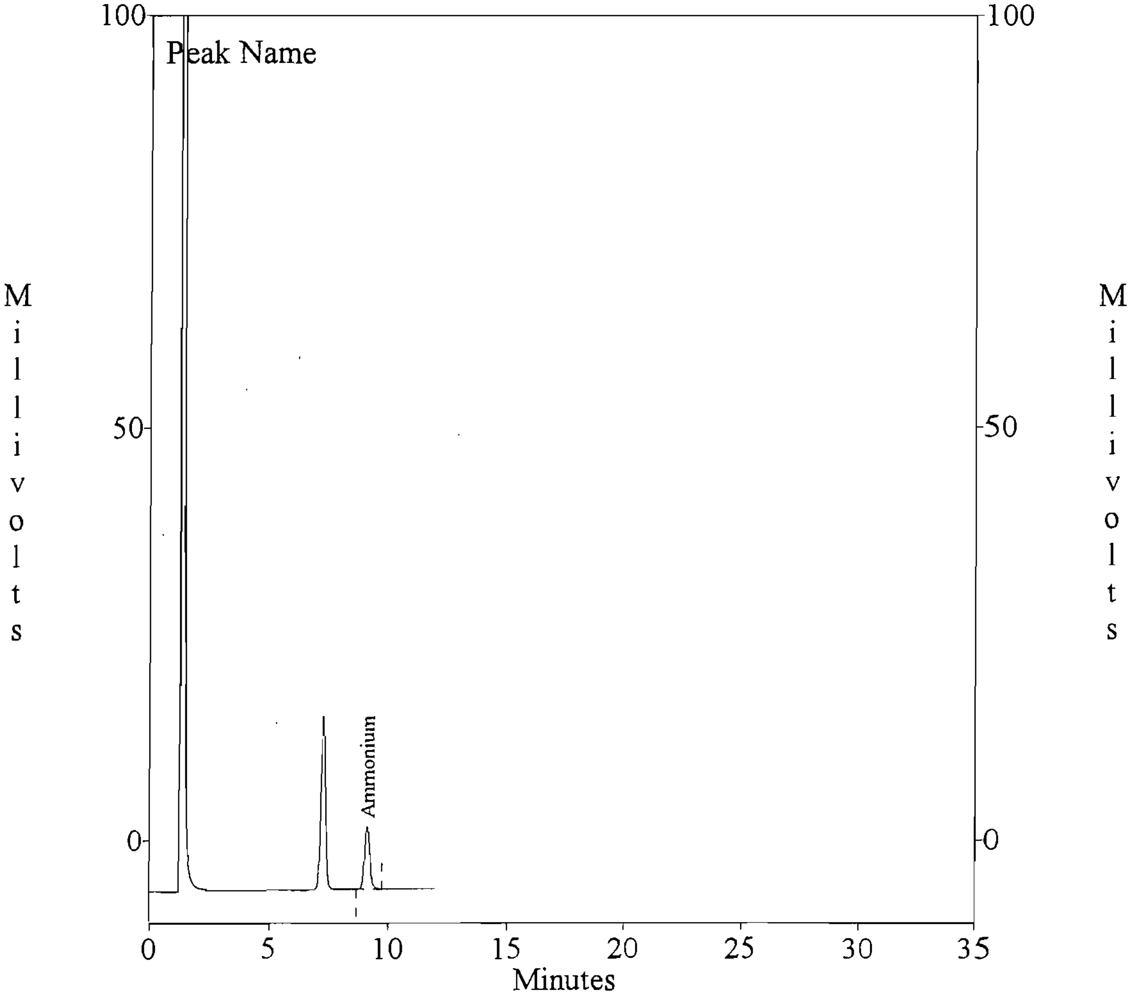
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.120
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-3 a
Acquired : Sep 09, 2009 16:15:20

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.15	123108

c:\ezchrom\chrom\10659.120 -- Channel A



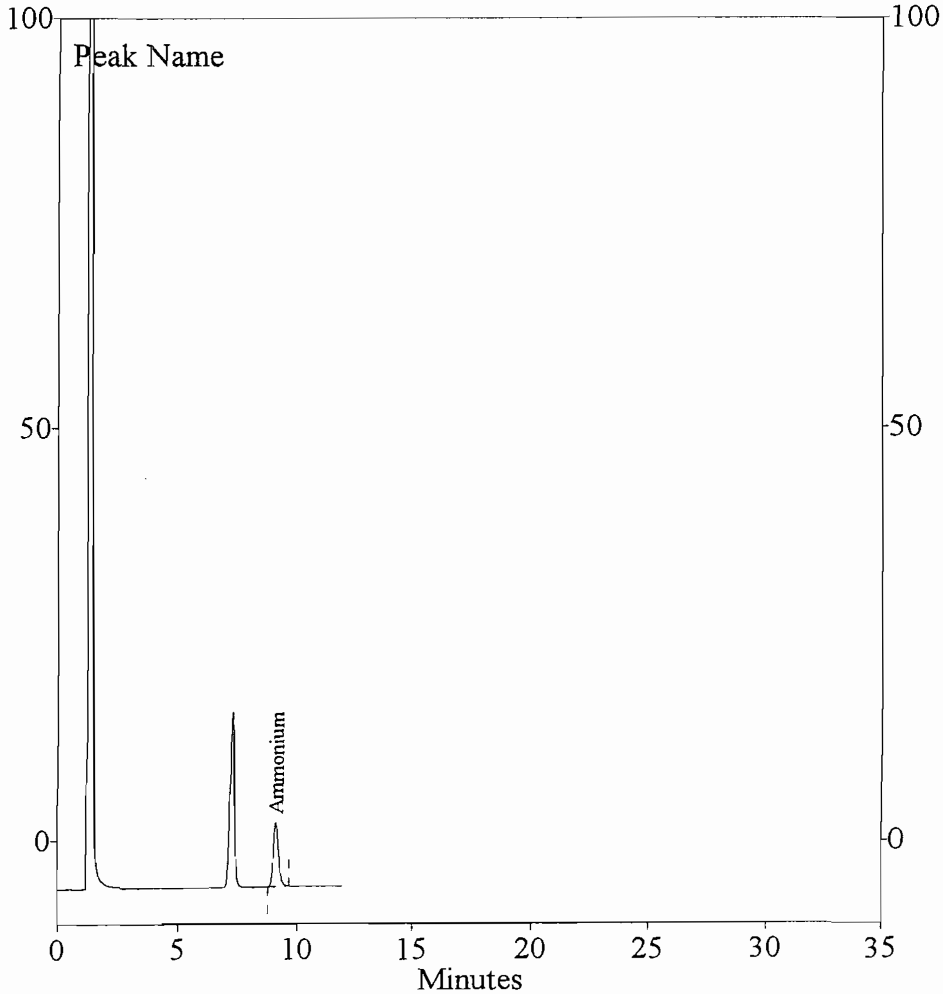
Instrument: Ion Chromatograph CDD-6A Column: Hamilton PRP-X200 250x4.1mm
Eluent: 4.28 mM HNO3 Flow Rate: 1.75 mls/min
Gain 0.4 µS/cm 20 µl Inj Vol Temp 40

File : c:\ezchrom\chrom\10659.121
Method : c:\ezchrom\methods\ctm-027.met
Sample ID : 4-3 b
Acquired : Sep 09, 2009 16:28:06

Channel A Results

Peak Name	Ret Time	Area
Ammonium	9.15	122091

c:\ezchrom\chrom\10659.121 -- Channel A



APPENDIX C.2
Analytical Data

Dioxins/Furans

ANALYTICAL PERSPECTIVES

10 September 2009

Herb Dixon
Testar, Inc.
7424 -108 ACC Blvd
Raleigh, NC 27617

Ph.: 919-957-9500
Fax: 919-957-9595
testarinc@netzero.net

Subject: Certificate of Results

Dear Herb;

Attached to this narrative are the analytical results you requested on samples submitted for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. The insert below summarizes the relevant information pertaining to your project. In particular, QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. Results reported relate only to the items tested.

Project Information Summary	When applicable, see QC Annotations for details
Client Project No.	10659
AP Project #	**P1620**
Analytical Protocol	Method 23
No. Samples Submitted	5 & 1 audit
No. Samples Analyzed	4 & 1 audit
No. Laboratory Method Blanks	1
No. OPRs / Batch CS3	1
No. Outstanding Samples	0
Date Received	4-Sep-2009
Condition Received	good
Temperature upon Receipt (C)	1 (traps and filters) / 23 (solvents)
Extraction within Holding Time	yes
Analysis within Holding Time	yes
Data meet QA/QC Requirements	yes
Exceptions	none
Analytical Difficulties	none

QC Annotations:

1. A "J" data qualifier is used for analytes with a concentration below the reporting limit.

2. The new ratio – [Ra] -- for 2,3,7,8-TCDD following the $^{37}Cl_4$-2,3,7,8-TCDD correction is shown between squared brackets in the DL column.

Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please do not hesitate to contact us. Thank you for choosing Analytical Perspectives as part of your analytical support team.

Sincerely,

Kimberly Mace, Ph.D.
Project Manager

2714 EXCHANGE DRIVE
WILMINGTON, NC 28405
PH.: 910-794-1613

The electronic version of this report contains 337 pages.
(add one page in count for the NELAC compliance statement) (+1)

P1620

ANALYTICAL PERSPECTIVES

Part 1
Narrative
17 pgs

- ✓Letter
- ✓QC Annotations
- ✓Project Information

ANALYTICAL PERSPECTIVES

Part 2
Path
20 pgs

- ✓Overview
- ✓Protocol
- ✓Extraction
- ✓Analysis
- ✓Spike Profile
- ✓SOPs
- ✓QC
- ✓Reporting
- ✓Special Requirements

Extraction
Tracking Sheets

Fractionation
Tracking Sheets

Injection
Tracking Sheets

ANALYTICAL PERSPECTIVES

Part 3
Results
83 pgs

- ✓Summary Topsheets
- ✓Raw Data
- ✓SICPs
- ✓Areas
- ✓Retention Times
- ✓S/N
- ✓Ion Abundance Ratios

ANALYTICAL PERSPECTIVES

Part 4
Performance
68 pgs
System Checks

- ✓Mass Spectrometry
- ✓Gas Chromatography
- ✓Initial Calibration
- ✓Continuing Calibration
- ✓BCS_3, OPR

Part 4D
ICAL
115 pgs

Part 4E
Audit
17

STATE CERTIFICATION ID #s

ARIZONA	AZ0696
CALIFORNIA	01166CA
FLORIDA	E87608
LOUISIANA	4024
MICHIGAN	9951
NEW JERSEY	NC005
NEW YORK	11735
NORTH CAROLINA	37783
PENNSYLVANIA	37-1849
SOUTH CAROLINA	99054

Picture File 16 pgs

P1620 - TEQ
Project : 10659

Sample Summary Part 1	ANALYTICAL PERSPECTIVES				Method 23
Analyte	**0_7129_MB001** pg	**O-M23-FB** pg	**4-O-M23-1** pg	**4-O-M23-2** pg	**4-O-M23-3** pg
2,3,7,8-TCDD	(2.93)	(3.56)	(3.44)	(2.4)	(3.11)
1,2,3,7,8-PeCDD	(5.46)	(5.84)	(5.77)	(5.51)	(4.69)
1,2,3,4,7,8-HxCDD	(5.76)	(4.65)	5.03	[4.93]	[3.07]
1,2,3,6,7,8-HxCDD	(5.92)	(4.59)	8.27	10.2	3.88
1,2,3,7,8,9-HxCDD	(6.56)	(5.39)	[2.7]	9	3.33
1,2,3,4,6,7,8-HpCDD	(4.86)	(7.2)	58.9	70.4	30.6
OCDD	(7.86)	(15.9)	115	154	78.6
2,3,7,8-TCDF	(2.53)	(2.47)	[9.43]	[4.65]	3.61
1,2,3,7,8-PeCDF	(3.43)	(5.19)	15.3	10.4	5.73
2,3,4,7,8-PeCDF	(2.9)	(4.1)	12.6	13.2	6.41
1,2,3,4,7,8-HxCDF	(3.5)	(6.41)	14	14.1	6.67
1,2,3,6,7,8-HxCDF	(2.96)	(5.85)	12.8	[13.2]	6.38
2,3,4,6,7,8-HxCDF	(3.37)	(6.98)	12.3	[14.1]	7.56
1,2,3,7,8,9-HxCDF	(4.69)	(9.42)	[1.83]	5.94	(3.3)
1,2,3,4,6,7,8-HpCDF	(2.94)	6.41	37.7	51	23.6
1,2,3,4,7,8,9-HpCDF	(4.71)	(5.55)	7.36	[7.68]	(3.72)
OCDF	(6.4)	(8.03)	[31.2]	41.4	[13.3]
ITEF TEQ (ND=0; EMPC=0)	**0.00**	**0.0641**	**13.4**	**12.5**	**7.26**
ITEF TEQ (ND=0; EMPC=EMPC)	**0.00**	**0.0641**	**14.9**	**16.2**	**7.58**
ITEF TEQ (ND=DL/2; EMPC=0)	**5.47**	**6.82**	**17.3**	**16.0**	**10.5**
ITEF TEQ (ND=DL/2; EMPC=EMPC)	**5.47**	**6.82**	**18.0**	**18.8**	**10.5**
ITEF TEQ (ND=DL; EMPC=EMPC)	**10.9**	**13.6**	**21.2**	**21.4**	**13.4**
Checkcode	2461	2737	3005	3269	1717

( ) = DL
[ ] = EMPC

10 Sept 09

Reviewer
Date

P1620 - Totals
Project No: 10659

Sample Summary Part 2 ANALYTICAL PERSPECTIVES **Method 23**

Analyte	0_7129_MB001 pg	O-M23-FB pg	4-O-M23-1 pg	4-O-M23-2 pg	4-O-M23-3 pg
Totals					
TCDDs	0	0	46.8	54.2	38.1
PeCDDs	0	0	43.3	55.5	33.9
HxCDDs	0	0	124	19.2	76.6
HpCDDs	0	0	111	144	60.6
OCDD	0	0	115	154	78.6
TCDFs	0	0	180	107	68.2
PeCDFs	0	0	134	97.8	50.7
HxCDFs	0	0	72.7	75.6	41
HpCDFs	0	14.6	45	83.4	30.1
OCDF	0	0	0	41.4	0
Total PCDD/Fs (ND=0; EMPC=0)	**0.00**	**14.6**	**872**	**832**	**478**
Total PCDD/Fs (ND=0; EMPC=EMPC)	**0.00**	**14.6**	**1,030**	**1,150**	**571**
Total PCDD/Fs (2378-X ND=DL; EMPC=EMPC)	**76.8**	**116**	**1,040**	**1,160**	**586**
Total 2378s (ND=0; EMPC=0)	**0.00**	**6.41**	**300**	**379**	**176**
Total 2378s (ND=0.5; EMPC=0)	**38.4**	**57.0**	**316**	**395**	**193**
Total 2378s (ND=1; EMPC=0)	**76.8**	**108**	**333**	**411**	**210**
Total 2378s (ND=0; EMPC=1)	**0.00**	**6.41**	**345**	**424**	**193**
Total 2378s (ND=0.5; EMPC=1)	**38.4**	**57.0**	**349**	**428**	**200**
Total 2378s (ND=1; EMPC=1)	**76.8**	**108**	**354**	**432**	**208**
Checkcode	2461 ✓	2737 ✓	3005 ✓	3269 ✓	1717 ✓

Total 2378s = Sum of 17 2378-substituted PCDD/PCDF congeners (SARA 313)

( ) = DL
[ ] = EMPC

10 Sept 09

Reviewer
Date 10 Sept 09

Sample Summary Part 3

ANALYTICAL PERSPECTIVES

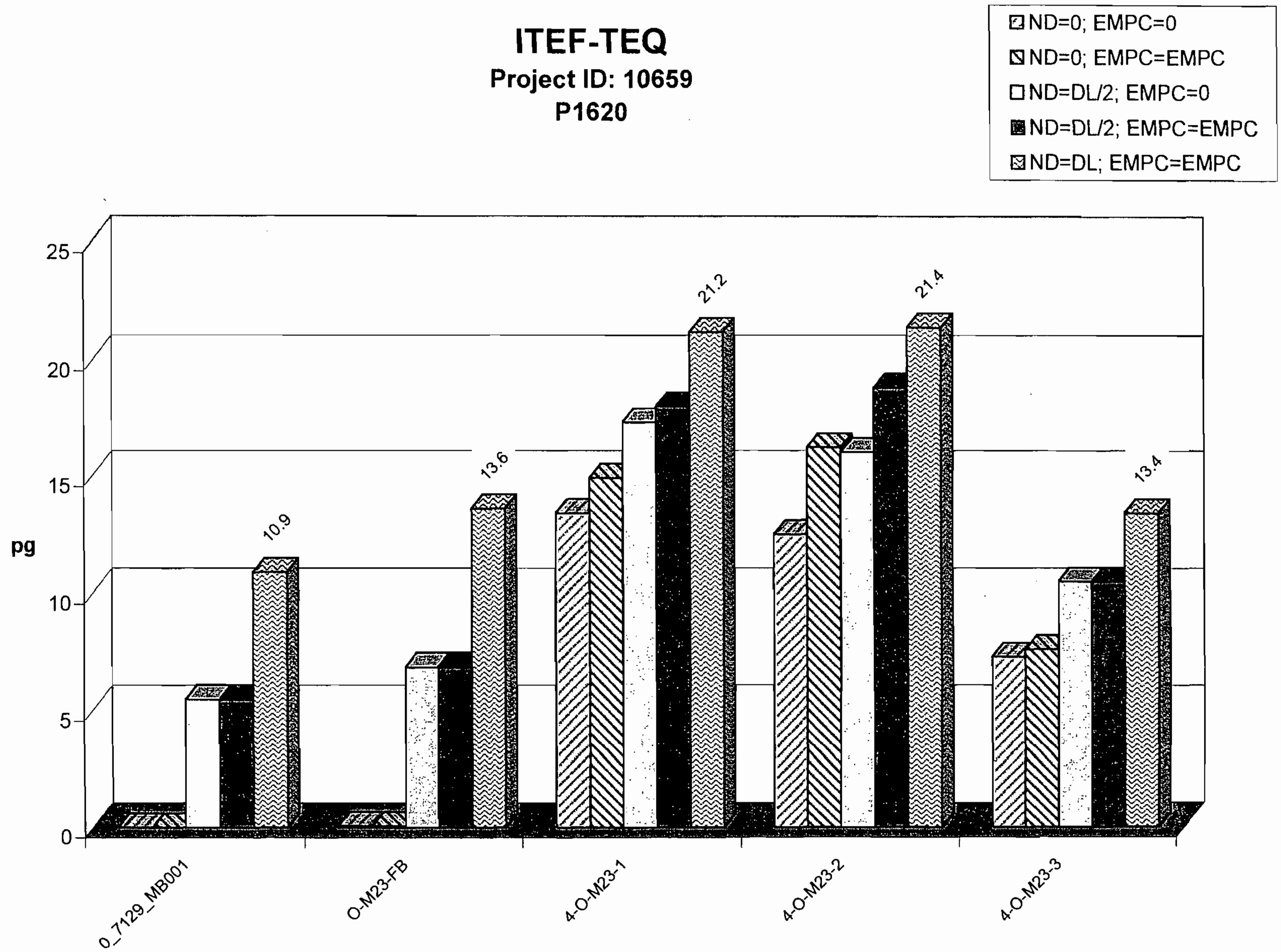
Method 23

Analyte	0_7129_MB001 pg	O-M23-FB pg	4-O-M23-1 pg	4-O-M23-2 pg	4-O-M23-3 pg
Other PCDD/Fs (ND=0, EMPC=0)					
Other TCDD	0	0	46.8	54.2	38.1
Other PeCDD	0	0	43.3	55.5	33.9
Other HxCDD	0	0	110	0	69.4
Other HpCDD	0	0	51.6	73.3	30.1
Other TCDF	0	0	180	107	64.6
Other PeCDF	0	0	106	74.2	38.5
Other HxCDF	0	0	33.6	55.5	20.4
Other HpCDF	0	8.19	0	32.4	6.52
Other PCDD/Fs (ND=0, EMPC=EMPC)					
Other TCDD	0	0	59.3	69.9	47.4
Other PeCDD	0	0	59.5	74	39.4
Other HxCDD	0	0	118	128	82.6
Other HpCDD	0	0	51.6	73.3	30.1
Other TCDF	0	0	187	145	83.8
Other PeCDF	0	0	127	121	53.4
Other HxCDF	0	0	68.1	87.1	29.6
Other HpCDF	0	8.19	17	32.4	11.7
Checkcode	2461	2737	3005	3269	1717

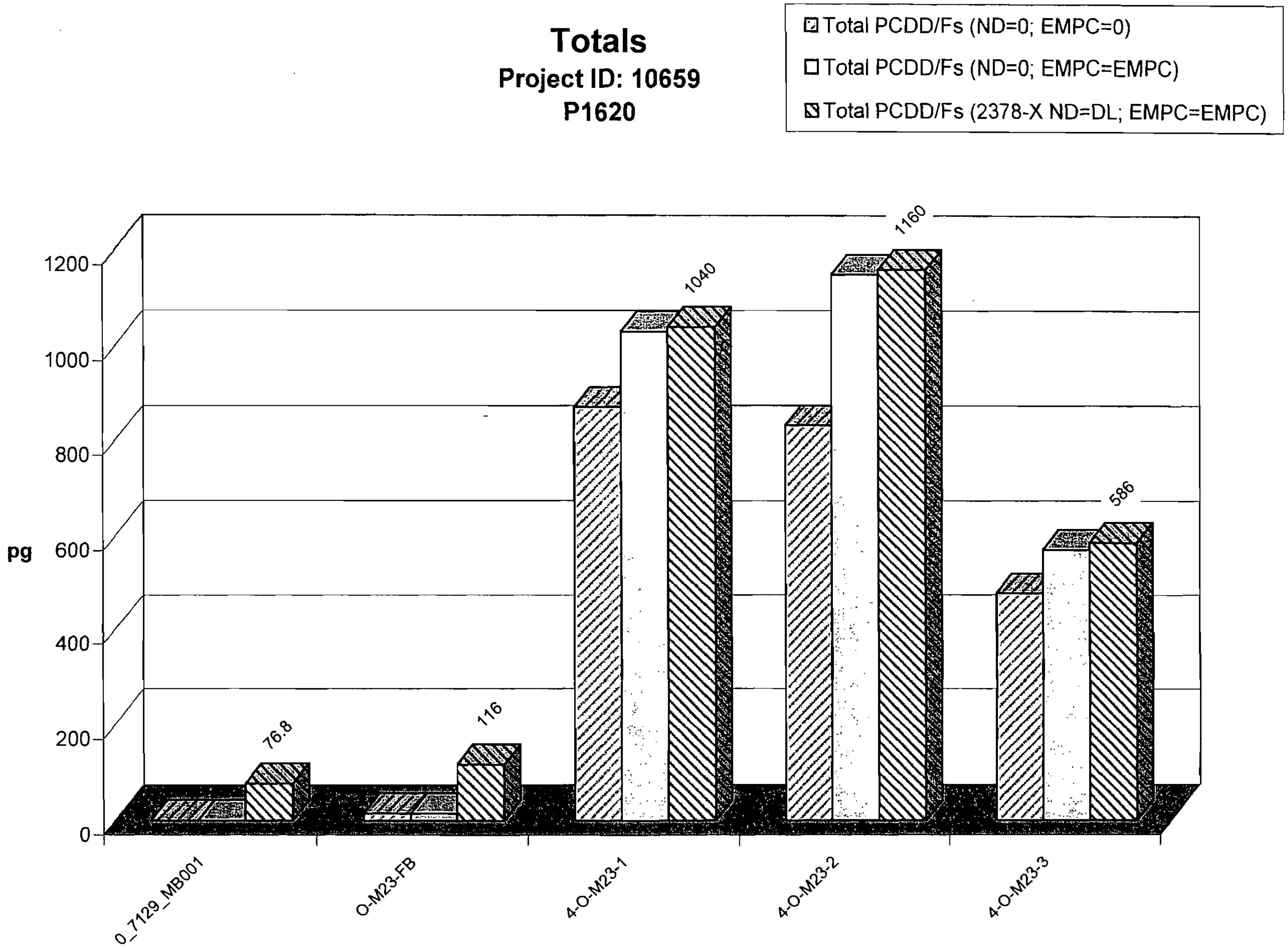
( ) = DL
[ ] = EMPC

10 Sept 09

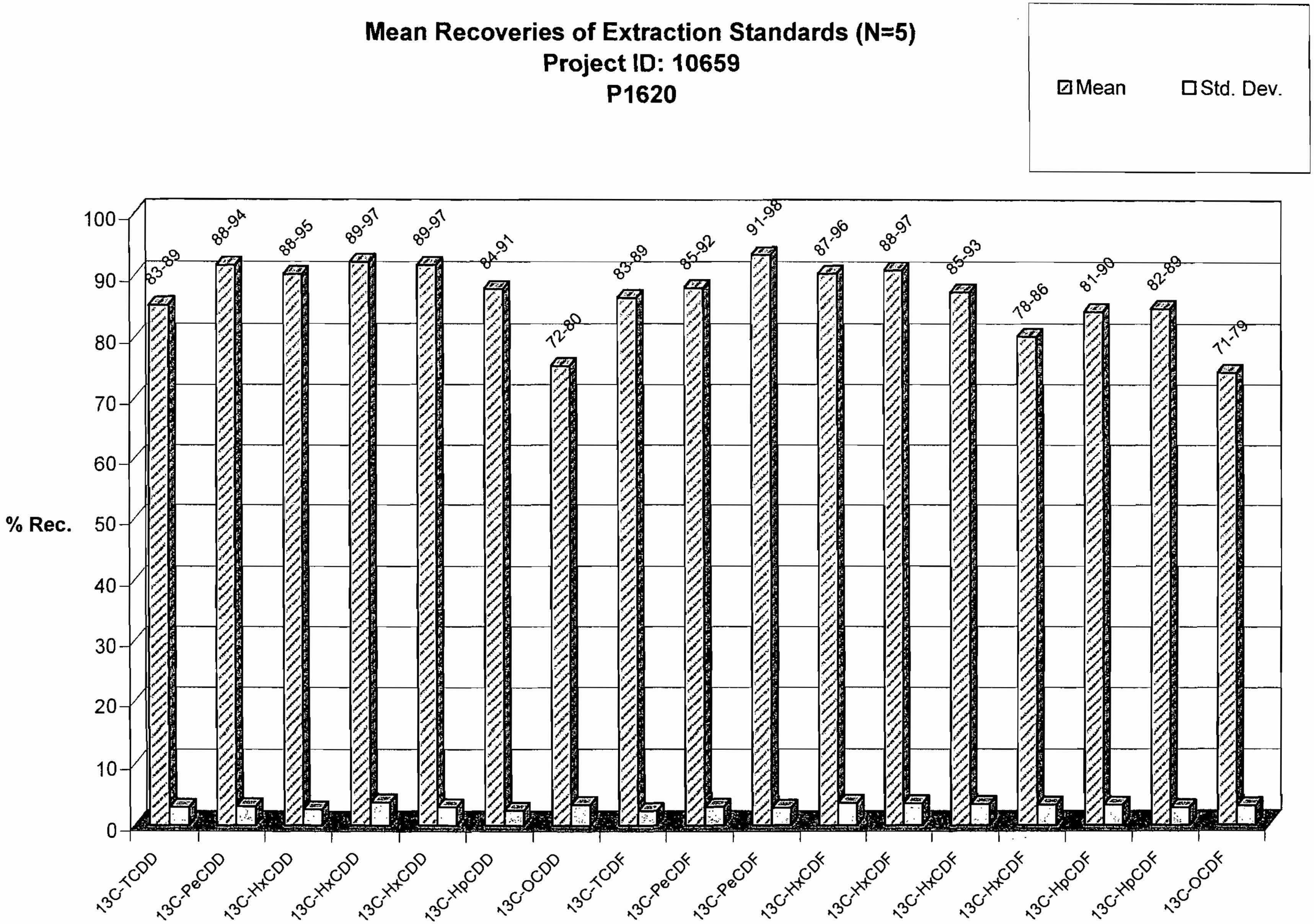
Reviewer
Date 10 Sept 09


ITEF-TEQ
Project ID: 10659
P1620
ND=0; EMPC=0
ND=0; EMPC=EMPC
ND=DL/2; EMPC=0
ND=DL/2; EMPC=EMPC
ND=DL; EMPC=EMPC
pg
0
5
10
15
20
25
10.9
13.6
21.2
21.4
13.4
0_7129_MB001
O-M23-FB
4-O-M23-1
4-O-M23-2
4-O-M23-3

Totals
Project ID: 10659
P1620

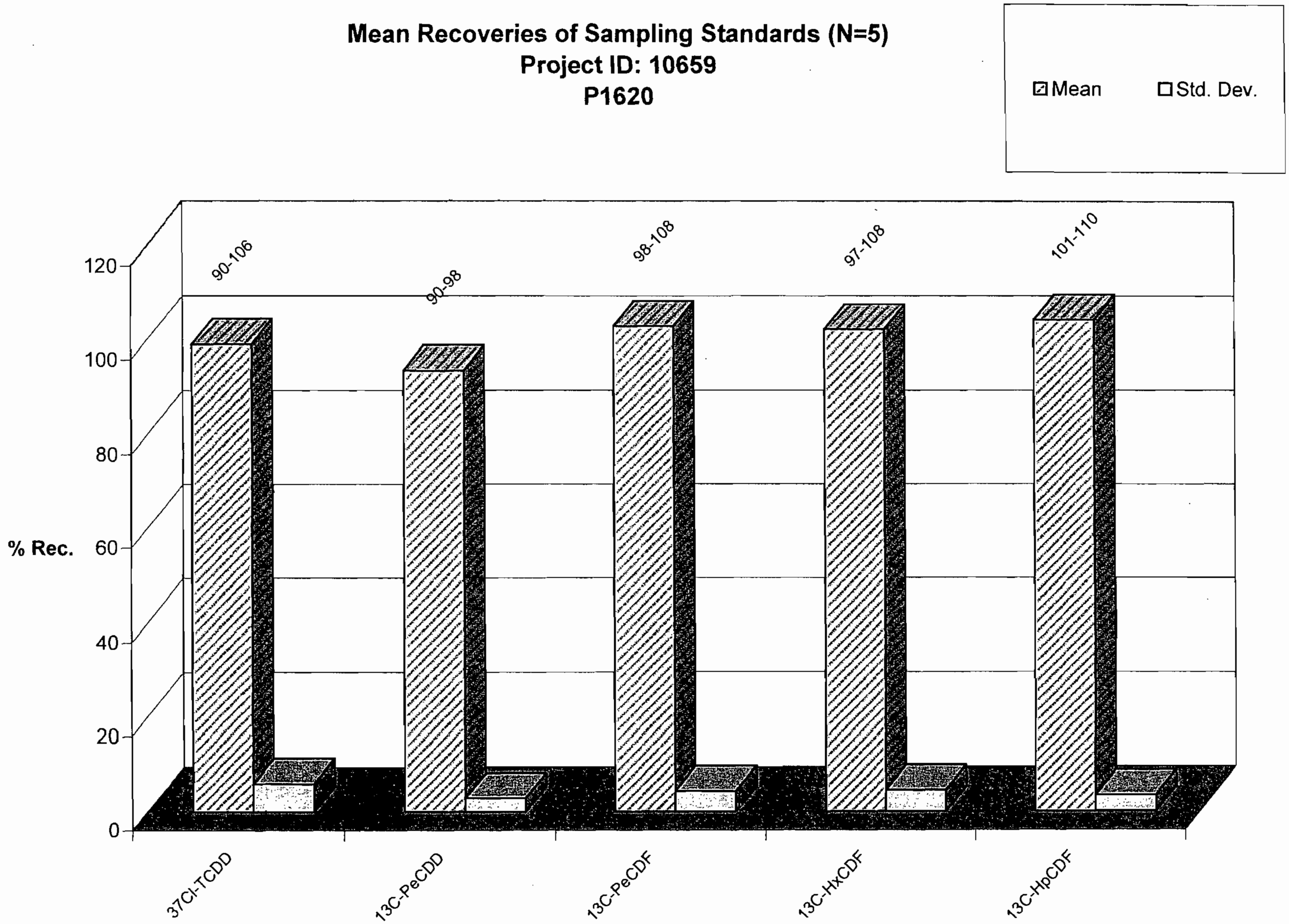


Mean Recoveries of Extraction Standards (N=5)
Project ID: 10659
P1620



Method Specification Limits: Tetra-Hexa ES: 40-130%, Hepta-Octa ES: 25-130% (F = fail)

Mean Recoveries of Sampling Standards (N=5)
Project ID: 10659
P1620



Method Specification Limits: Tetra-Octa SS: 70-130% (F = fail)

(Sa)mple ID: 0_7129_MB001 Method (.)

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	n/a
Project ID:	10659	Weight/Volume:	1	Sample ID:	MB1_7129_DF_SDS	Date Extracted:	04 Sep 2009
Date Collected:	n/a			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	11:23:04

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	ND	2.93			13C-2,3,7,8-TCDD	83.1	
1,2,3,7,8-PeCDD	ND	5.46			13C-1,2,3,7,8-PeCDD	87.7	
1,2,3,4,7,8-HxCDD	ND	5.76			13C-1,2,3,4,7,8-HxCDD	89.4	
1,2,3,6,7,8-HxCDD	ND	5.92			13C-1,2,3,6,7,8-HxCDD	89.3	
1,2,3,7,8,9-HxCDD	ND	6.56			13C-1,2,3,7,8,9-HxCDD	89.4	
1,2,3,4,6,7,8-HpCDD	ND	4.86			13C-1,2,3,4,6,7,8-HpCDD	84.2	
OCDD	ND	7.86			13C-OCDD	71.5	
2,3,7,8-TCDF	ND	2.53			13C-2,3,7,8-TCDF	86.3	
1,2,3,7,8-PeCDF	ND	3.43			13C-1,2,3,7,8-PeCDF	85.3	
2,3,4,7,8-PeCDF	ND	2.9			13C-2,3,4,7,8-PeCDF	90.7	
1,2,3,4,7,8-HxCDF	ND	3.5			13C-1,2,3,4,7,8-HxCDF	89.6	
1,2,3,6,7,8-HxCDF	ND	2.96			13C-1,2,3,6,7,8-HxCDF	90	
2,3,4,6,7,8-HxCDF	ND	3.37			13C-2,3,4,6,7,8-HxCDF	85.3	
1,2,3,7,8,9-HxCDF	ND	4.69			13C-1,2,3,7,8,9-HxCDF	77.9	
1,2,3,4,6,7,8-HpCDF	ND	2.94			13C-1,2,3,4,6,7,8-HpCDF	80.6	
1,2,3,4,7,8,9-HpCDF	ND	4.71			13C-1,2,3,4,7,8,9-HpCDF	81.7	
OCDF	ND	6.4			13C-OCDF	71.4	
Totals						**SS Recoveries**	
TCDDs	ND	2.93			37Cl-2,3,7,8-TCDD	102	
PeCDDs	ND	5.46			13C-1,2,3,4,7-PeCDD	98	
HxCDDs	ND	6.08			13C-1,2,3,4,6-PeCDF	108	
HpCDDs	ND	4.86			13C-1,2,3,4,6,9-HxCDF	103	
					13C-1,2,3,4,6,8,9-HpCDF	105	
TCDFs	ND	2.53					
PeCDFs	ND	3.14				**AS Recoveries**	
HxCDFs	ND	3.57			13C-1,3,6,8-TCDD	87.2	
HpCDFs	ND	3.7			13C-1,3,6,8-TCDF	87.9	
Total PCDD/Fs	0		0				
ITEF TEQs							
TEQ: ND=0	0		0				
TEQ: ND=DL/2	5.47		5.47				
TEQ: ND=DL	10.9		10.9				

ANALYTICAL PERSPECTIVES
2714 Exchange Drive
Wilmington, NC 28405
USA
Tel: +1 910 794-1613; Toll-Free 866 846-8290
Fax: +1 910 794-3919
info@ultratrace.com
www.ultratrace.com

Checkcode: 2461

AP D/F 2009 Rev. J

Reviewer
Date 10 Sep 09

mple ID: O-M23-FB — Method

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	04 Sep 2009
Project ID:	10659	Weight/Volume:	1	Sample ID:	P1620_7129_001	Date Extracted:	04 Sep 2009
Date Collected:	03 Sep 2009			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	12:12:15

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	ND	3.56			13C-2,3,7,8-TCDD	82.7	
1,2,3,7,8-PeCDD	ND	5.84			13C-1,2,3,7,8-PeCDD	89.1	
1,2,3,4,7,8-HxCDD	ND	4.65			13C-1,2,3,4,7,8-HxCDD	89.5	
1,2,3,6,7,8-HxCDD	ND	4.59			13C-1,2,3,6,7,8-HxCDD	89.1	
1,2,3,7,8,9-HxCDD	ND	5.39			13C-1,2,3,7,8,9-HxCDD	89.9	
1,2,3,4,6,7,8-HpCDD	ND	7.2			13C-1,2,3,4,6,7,8-HpCDD	86.8	
OCDD	ND	15.9			13C-OCDD	75.8	
2,3,7,8-TCDF	ND	2.47			13C-2,3,7,8-TCDF	82.6	
1,2,3,7,8-PeCDF	ND	5.19			13C-1,2,3,7,8-PeCDF	85.2	
2,3,4,7,8-PeCDF	ND	4.1			13C-2,3,4,7,8-PeCDF	91.7	
1,2,3,4,7,8-HxCDF	ND	6.41			13C-1,2,3,4,7,8-HxCDF	86.7	
1,2,3,6,7,8-HxCDF	ND	5.85			13C-1,2,3,6,7,8-HxCDF	88.8	
2,3,4,6,7,8-HxCDF	ND	6.98			13C-2,3,4,6,7,8-HxCDF	85.2	
1,2,3,7,8,9-HxCDF	ND	9.42			13C-1,2,3,7,8,9-HxCDF	77.5	
1,2,3,4,6,7,8-HpCDF	6.41			J	13C-1,2,3,4,6,7,8-HpCDF	82.3	
1,2,3,4,7,8,9-HpCDF	ND	5.55			13C-1,2,3,4,7,8,9-HpCDF	83.1	
OCDF	ND	8.03			13C-OCDF	74.3	
Totals						**SS Recoveries**	
TCDDs	ND	3.56			37Cl-2,3,7,8-TCDD	90.4	
PeCDDs	ND	5.84			13C-1,2,3,4,7-PeCDD	90.3	
HxCDDs	ND	4.88			13C-1,2,3,4,6-PeCDF	97.8	
HpCDDs	ND	7.2			13C-1,2,3,4,6,9-HxCDF	97.1	
					13C-1,2,3,4,6,8,9-HpCDF	101	
TCDFs	ND	2.47					
PeCDFs	ND	4.6				**AS Recoveries**	
HxCDFs	ND	7.03			13C-1,3,6,8-TCDD	82.4	
HpCDFs	14.6				13C-1,3,6,8-TCDF	79.9	
Total PCDD/Fs	**14.6**		**14.6**				
ITEF TEQs							
TEQ: ND=0	0.0641		0.0641				
TEQ: ND=DL/2	6.82		6.82				
TEQ: ND=DL	13.6		13.6				

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Checkcode: 2737

AP D/F 2009 Rev. J

Reviewer

Date 10 Sept 09

mple ID: 4-O-M23-1 Method

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	04 Sep 2009
Project ID:	10659	Weight/Volume:	1	Sample ID:	P1620_7129_002	Date Extracted:	04 Sep 2009
Date Collected:	02 Sep 2009			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	13:01:32

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	ND	3.44			13C-2,3,7,8-TCDD	88.5	
1,2,3,7,8-PeCDD	ND	5.77			13C-1,2,3,7,8-PeCDD	94.1	
1,2,3,4,7,8-HxCDD	5.03			J	13C-1,2,3,4,7,8-HxCDD	94.6	
1,2,3,6,7,8-HxCDD	8.27			J	13C-1,2,3,6,7,8-HxCDD	97.4	
1,2,3,7,8,9-HxCDD	EMPC		2.7	J	13C-1,2,3,7,8,9-HxCDD	96.8	
1,2,3,4,6,7,8-HpCDD	58.9				13C-1,2,3,4,6,7,8-HpCDD	90.7	
OCDD	115				13C-OCDD	79.5	
2,3,7,8-TCDF	EMPC		9.43	J	13C-2,3,7,8-TCDF	89	
1,2,3,7,8-PeCDF	15.3			J	13C-1,2,3,7,8-PeCDF	92.1	
2,3,4,7,8-PeCDF	12.6			J	13C-2,3,4,7,8-PeCDF	98	
1,2,3,4,7,8-HxCDF	14			J	13C-1,2,3,4,7,8-HxCDF	96.2	
1,2,3,6,7,8-HxCDF	12.8			J	13C-1,2,3,6,7,8-HxCDF	97.1	
2,3,4,6,7,8-HxCDF	12.3			J	13C-2,3,4,6,7,8-HxCDF	93.4	
1,2,3,7,8,9-HxCDF	EMPC		1.83	J	13C-1,2,3,7,8,9-HxCDF	85.6	
1,2,3,4,6,7,8-HpCDF	37.7			J	13C-1,2,3,4,6,7,8-HpCDF	89.5	
1,2,3,4,7,8,9-HpCDF	7.36			J	13C-1,2,3,4,7,8,9-HpCDF	89.2	
OCDF	EMPC		31.2	J	13C-OCDF	79.2	
Totals						**SS Recoveries**	
TCDDs	46.8		59.3		37Cl-2,3,7,8-TCDD	96.5	
PeCDDs	43.3		59.5		13C-1,2,3,4,7-PeCDD	92.3	
HxCDDs	124		134		13C-1,2,3,4,6-PeCDF	99	
HpCDDs	111				13C-1,2,3,4,6,9-HxCDF	98.4	
					13C-1,2,3,4,6,8,9-HpCDF	103	
TCDFs	180		197				
PeCDFs	134		155			**AS Recoveries**	
HxCDFs	72.7		109		13C-1,3,6,8-TCDD	86.5	
HpCDFs	45		62		13C-1,3,6,8-TCDF	90.6	
Total PCDD/Fs	**872**		**1,030**				
ITEF TEQs							
TEQ: ND=0	13.4		14.9				
TEQ: ND=DL/2	17.3		18				
TEQ: ND=DL	21.1		21.2				

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AP D/F 2009 Rev. J

10 Sept 09

Reviewer

Date

Sample ID: 4-O-M23-2 Method

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	04 Sep 2009
Project ID:	10659	Weight/Volume:	1	Sample ID:	P1620_7129_003	Date Extracted:	04 Sep 2009
Date Collected:	03 Sep 2009			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	13:50:42

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	ND	2.4			13C-2,3,7,8-TCDD	88.6	
1,2,3,7,8-PeCDD	ND	5.51			13C-1,2,3,7,8-PeCDD	93.9	
1,2,3,4,7,8-HxCDD	EMPC		4.93	J	13C-1,2,3,4,7,8-HxCDD	90.2	
1,2,3,6,7,8-HxCDD	10.2			J	13C-1,2,3,6,7,8-HxCDD	95.1	
1,2,3,7,8,9-HxCDD	9			J	13C-1,2,3,7,8,9-HxCDD	92.1	
1,2,3,4,6,7,8-HpCDD	70.4				13C-1,2,3,4,6,7,8-HpCDD	89.1	
OCDD	154				13C-OCDD	72.4	
2,3,7,8-TCDF	EMPC		4.65	J	13C-2,3,7,8-TCDF	87.4	
1,2,3,7,8-PeCDF	10.4			J	13C-1,2,3,7,8-PeCDF	90.3	
2,3,4,7,8-PeCDF	13.2			J	13C-2,3,4,7,8-PeCDF	94.1	
1,2,3,4,7,8-HxCDF	14.1			J	13C-1,2,3,4,7,8-HxCDF	91.2	
1,2,3,6,7,8-HxCDF	EMPC		13.2	J	13C-1,2,3,6,7,8-HxCDF	90.4	
2,3,4,6,7,8-HxCDF	EMPC		14.1	J	13C-2,3,4,6,7,8-HxCDF	87.1	
1,2,3,7,8,9-HxCDF	5.94			J	13C-1,2,3,7,8,9-HxCDF	81.1	
1,2,3,4,6,7,8-HpCDF	51				13C-1,2,3,4,6,7,8-HpCDF	84.5	
1,2,3,4,7,8,9-HpCDF	EMPC		7.68	J	13C-1,2,3,4,7,8,9-HpCDF	85.9	
OCDF	41.4			J	13C-OCDF	71.7	
Totals						**SS Recoveries**	
TCDDs	54.2		69.9		37Cl-2,3,7,8-TCDD	101	
PeCDDs	55.5		74		13C-1,2,3,4,7-PeCDD	94.7	
HxCDDs	19.2		152		13C-1,2,3,4,6-PeCDF	105	
HpCDDs	144				13C-1,2,3,4,6,9-HxCDF	108	
					13C-1,2,3,4,6,8,9-HpCDF	110	
TCDFs	107		150				
PeCDFs	97.8		144			**AS Recoveries**	
HxCDFs	75.6		134		13C-1,3,6,8-TCDD	91.1	
HpCDFs	83.4		91.1		13C-1,3,6,8-TCDF	89.8	
Total PCDD/Fs	**832**		**1,150**				
ITEF TEQs							
TEQ: ND=0	12.5		16.2				
TEQ: ND=DL/2	16		18.8				
TEQ: ND=DL	19.4		21.4				

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mple ID: 4-O-M23-3 Method

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	04 Sep 2009
Project ID:	10659	Weight/Volume:	1	Sample ID:	P1620_7129_004	Date Extracted:	04 Sep 2009
Date Collected:	03 Sep 2009			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	14:39:53

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	ND	3.11			13C-2,3,7,8-TCDD	83.7	
1,2,3,7,8-PeCDD	ND	4.69			13C-1,2,3,7,8-PeCDD	93.9	
1,2,3,4,7,8-HxCDD	EMPC		3.07	J	13C-1,2,3,4,7,8-HxCDD	87.6	
1,2,3,6,7,8-HxCDD	3.88			J	13C-1,2,3,6,7,8-HxCDD	90.3	
1,2,3,7,8,9-HxCDD	3.33			J	13C-1,2,3,7,8,9-HxCDD	90.5	
1,2,3,4,6,7,8-HpCDD	30.6			J	13C-1,2,3,4,6,7,8-HpCDD	88.7	
OCDD	78.6			J	13C-OCDD	77.7	
2,3,7,8-TCDF	3.61			J	13C-2,3,7,8-TCDF	86.9	
1,2,3,7,8-PeCDF	5.73			J	13C-1,2,3,7,8-PeCDF	87.5	
2,3,4,7,8-PeCDF	6.41			J	13C-2,3,4,7,8-PeCDF	92.7	
1,2,3,4,7,8-HxCDF	6.67			J	13C-1,2,3,4,7,8-HxCDF	88.2	
1,2,3,6,7,8-HxCDF	6.38			J	13C-1,2,3,6,7,8-HxCDF	88.3	
2,3,4,6,7,8-HxCDF	7.56			J	13C-2,3,4,6,7,8-HxCDF	85.8	
1,2,3,7,8,9-HxCDF	ND	3.3			13C-1,2,3,7,8,9-HxCDF	78.8	
1,2,3,4,6,7,8-HpCDF	23.6			J	13C-1,2,3,4,6,7,8-HpCDF	84.3	
1,2,3,4,7,8,9-HpCDF	ND	3.72			13C-1,2,3,4,7,8,9-HpCDF	84.1	
OCDF	EMPC		13.3	J	13C-OCDF	75.3	
Totals						**SS Recoveries**	
TCDDs	38.1		47.4		37Cl-2,3,7,8-TCDD	106	
PeCDDs	33.9		39.4		13C-1,2,3,4,7-PeCDD	92.9	
HxCDDs	76.6		92.9		13C-1,2,3,4,6-PeCDF	105	
HpCDDs	60.6				13C-1,2,3,4,6,9-HxCDF	105	
					13C-1,2,3,4,6,8,9-HpCDF	103	
TCDFs	68.2		87.4				
PeCDFs	50.7		65.6			**AS Recoveries**	
HxCDFs	41		50.2		13C-1,3,6,8-TCDD	88.3	
HpCDFs	30.1		35.4		13C-1,3,6,8-TCDF	86.6	
Total PCDD/Fs	**478**		**571**				
ITEF TEQs							
TEQ: ND=0	7.26		7.58				
TEQ: ND=DL/2	10.5		10.5				
TEQ: ND=DL	13.7		13.4				

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Reviewer
Date

10 Sept 09

123

mple ID: M23-3343-01-Audit

Method

Client Data		Sample Data		Laboratory Data			
Name:	Testar, Inc.	Matrix:	Air	Project No.:	P1620	Date Received:	04 Sep 2009
Project ID:	10659	Weight/Volume:	1	Sample ID:	P1620_7129_006	Date Extracted:	04 Sep 2009
Date Collected:	nr			QC Batch No.:	7129	Date Analyzed:	09 Sep 2009
		Split:	2	Dilution:	-	Time Analyzed:	15:29:05

Analyte	Conc. (pg)	DL (pg)	EMPC (pg)	Qualifiers	Standard	ES Recoveries	Qualifiers
2,3,7,8-TCDD	145	[Ra=0.82]			13C-2,3,7,8-TCDD	85.2	
1,2,3,7,8-PeCDD	148				13C-1,2,3,7,8-PeCDD	88.5	
1,2,3,4,7,8-HxCDD	150				13C-1,2,3,4,7,8-HxCDD	88.4	
1,2,3,6,7,8-HxCDD	142				13C-1,2,3,6,7,8-HxCDD	90.7	
1,2,3,7,8,9-HxCDD	143				13C-1,2,3,7,8,9-HxCDD	93.1	
1,2,3,4,6,7,8-HpCDD	143				13C-1,2,3,4,6,7,8-HpCDD	88.6	
OCDD	287				13C-OCDD	75.3	
2,3,7,8-TCDF	166				13C-2,3,7,8-TCDF	87.5	
1,2,3,7,8-PeCDF	145				13C-1,2,3,7,8-PeCDF	89.4	
2,3,4,7,8-PeCDF	273				13C-2,3,4,7,8-PeCDF	91.3	
1,2,3,4,7,8-HxCDF	198				13C-1,2,3,4,7,8-HxCDF	89.3	
1,2,3,6,7,8-HxCDF	185				13C-1,2,3,6,7,8-HxCDF	91	
2,3,4,6,7,8-HxCDF	184				13C-2,3,4,6,7,8-HxCDF	85.3	
1,2,3,7,8,9-HxCDF	294				13C-1,2,3,7,8,9-HxCDF	78	
1,2,3,4,6,7,8-HpCDF	134				13C-1,2,3,4,6,7,8-HpCDF	84.9	
1,2,3,4,7,8,9-HpCDF	95.9				13C-1,2,3,4,7,8,9-HpCDF	84.3	
OCDF	277				13C-OCDF	74.1	
Totals						**SS Recoveries**	
TCDDs	334				37Cl-2,3,7,8-TCDD	-	sampling standards not contained in audit sample 10 Sept 09
PeCDDs	369				13C-1,2,3,4,7-PeCDD	-	
HxCDDs	657				13C-1,2,3,4,6-PeCDF	-	
HpCDDs	256				13C-1,2,3,4,6,9-HxCDF	-	
					13C-1,2,3,4,6,8,9-HpCDF	-	
TCDFs	354						
PeCDFs	497		556			**AS Recoveries**	
HxCDFs	980				13C-1,3,6,8-TCDD	90.9	
HpCDFs	319				13C-1,3,6,8-TCDF	91.2	
Total PCDD/Fs	**4,330**		**4,390**				
ITEF TEQs							
TEQ: ND=0	513		513				
TEQ: ND=DL/2	513		513				
TEQ: ND=DL	513		513				

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Reviewer
Date 10 Sept 09

USEPA Stationary Compliance Audit Program
Dioxin/Furan Audit Form

Dept. Of Environmental Protection
OCT 16 2009
Southwest District

Auditor:	
Agency:	
Agency Address:	
Agency Phone #:	
Date Analyzed:	09 Sep 2009
Auditee Company:	Analytical Perspectives (Ph. 910 794-1613)
Auditee Address:	2714 Exchange Drive, Wilmington, NC 28405
Date Audit Sam Rec'd:	04 Sep 2009
Audit Sample #:	M23-3343-01-Audit P1620_7129_006
Confirmation Analysis Used:	Yes ____ No X
Auditee's Name:	Dr. Yves Tondeur
Signature:	Dr. Kimberly Mace for Dr. Yves Tondeur

Compound	Auditee Result (ng/sample)	Compound	Auditee Result (ng/sample)
2378-TCDD	0.145	2378-TCDF	0.166
Other TCDD	0.188	Other TCDF	0.188
12378-PeCDD	0.148	12378-PeCDF	0.145
Other PeCDD	0.221	23478-PeCDF	0.273
123478-HxCDD	0.150	Other PeCDF	0.139
123678-HxCDD	0.142	123478-HxCDF	0.198
123789-HxCDD	0.143	123678-HxCDF	0.185
Other HxCDD	0.223	123789-HxCDF	0.294
1234678-HpCDD	0.143	234678-HxCDF	0.184
Other HpCDD	0.113	Other-HxCDF	0.119
OCDD	0.287	1234678-HpCDF	0.134
		1234789-HpCDF	0.096
		Other HpCDF	0.089
		OCDF	0.277

* 1,2,3,7,8,9-HxCDF co-elutes with and is inseparable from the the last eluting HxCDF isomer. The reported value is a combined result of the two isomers.

OP[illegible]an on MM1 10-SEP-2009 09:33 checkcode: 5[illegible]

1[illegible]/8290 Sample Summary Analytical Perspectives [Form: DF]

Client ID: M23-3343-01-Audit Filename: 090909P1 S: 8 Vial: 52 Acq: 9-SEP-09 15:29:05
Lab ID: P1620_7129_006 GC column ID: db-5 Cal: Wt/Vol: 1.000
Sample text: P1620_7129_006 M23-3343-01-Audit Air Train Stds: JS (split adj.): 4000 CS/SS: 1600 ES: 4000

Typ	Name	Resp	RA	RT	RRF	Conc.	Noise	Fac	DL	Rec
Ax	2,3,7,8-TCDD	8.42e+05	0.82 y	26:35	1.15	145	1999	2.5	7.25	-
Ax	1,2,3,7,8-PeCDD	6.79e+05	1.60 y	32:17	1.08	148	719	2.5	4.42	-
Ax	1,2,3,4,7,8-HxCDD	5.73e+05	1.07 y	36:15	1.12	150	1306	2.5	6.38	-
Ax	1,2,3,6,7,8-HxCDD	5.94e+05	1.27 y	36:22	1.08	142	1306	2.5	6.60	-
Ax	1,2,3,7,8,9-HxCDD	6.02e+05	1.40 y	36:39	1.06	143	1306	2.5	7.21	-
Ax	1,2,3,4,6,7,8-HpCDD	4.73e+05	1.07 y	39:51	1.03	143	1386	2.5	8.36	-
Ax	OCDD	6.12e+05	0.92 y	43:22	1.20	287	1595	2.5	17.0	-
Ax2	OCDD-a	*	* n	NotF»	0.07	*	780	2.5	139 ok	-
Ax	2,3,7,8-TCDF	1.63e+06	0.78 y	25:38	1.23	166	1664	2.5	3.81	-
Ax	1,2,3,7,8-PeCDF	1.08e+06	1.58 y	30:45	1.08	145	30459	2.5	110	-
Ax	2,3,4,7,8-PeCDF	2.25e+06	1.52 y	31:55	1.09	273	30459	2.5	89.3	
Ax	1,2,3,4,7,8-HxCDF	1.18e+06	1.17 y	35:16	1.25	198	1977	2.5	4.29	-
Ax	1,2,3,6,7,8-HxCDF	1.30e+06	1.26 y	35:25	1.22	185	1977	2.5	4.22	-
Ax	2,3,4,6,7,8-HxCDF	1.15e+06	1.38 y	36:04	1.17	184	1977	2.5	4.24	-
Ax	1,2,3,7,8,9-HxCDF	1.45e+06	1.35 y	37:02	1.17	294	1977	2.5	6.19	-
Ax	1,2,3,4,6,7,8-HpCDF	7.53e+05	1.01 y	38:42	1.52	134	1915	2.5	4.37	-
Ax	1,2,3,4,7,8,9-HpCDF	4.07e+05	0.97 y	40:25	1.41	95.9	1915	2.5	7.14	-
Ax	OCDF	7.69e+05	0.97 y	43:35	0.98	277	1684	2.5	13.5	-
Ax2	OCDF-a	4.78e+04	1.95 n	43:34	0.06	305	834	2.5	118 ok	-
ES	13C-2,3,7,8-TCDD	2.02e+07	0.81 y	26:33	0.95	3410	2168	2.5	7.49	85.2
ES	13C-1,2,3,7,8-PeCDD	1.70e+07	1.63 y	32:16	0.77	3540	1328	2.5	5.66	88.5
ES	13C-1,2,3,4,7,8-HxCDD	1.36e+07	1.29 y	36:14	0.96	3530	2171	2.5	11.4	88.4
ES	13C-1,2,3,6,7,8-HxCDD	1.55e+07	1.29 y	36:21	1.07	3630	2171	2.5	10.3	90.7
ES	13C-1,2,3,7,8,9-HxCDD	1.60e+07	1.30 y	36:39	1.07	3720	2171	2.5	10.2	93.1
ES	13C-1,2,3,4,6,7,8-HpCDD	1.29e+07	1.06 y	39:50	0.91	3540	9036	2.5	50.2	88.6
ES	13C-OCDD	1.42e+07	0.84 y	43:21	0.59	6020	9790	2.5	83.9	75.3
ES	13C-2,3,7,8-TCDF	3.21e+07	0.85 y	25:36	1.03	3500	2570	2.5	6.70	87.5
ES	13C-1,2,3,7,8-PeCDF	2.75e+07	1.56 y	30:44	0.87	3580	22985	2.5	71.3	89.4
ES	13C-2,3,4,7,8-PeCDF	3.01e+07	1.58 y	31:54	0.93	3650	22985	2.5	66.5	91.3
ES	13C-1,2,3,4,7,8-HxCDF	1.92e+07	0.52 y	35:15	1.34	3570	16482	2.5	62.1	89.3
ES	13C-1,2,3,6,7,8-HxCDF	2.29e+07	0.53 y	35:24	1.57	3640	16482	2.5	52.9	91.0
ES	13C-2,3,4,6,7,8-HxCDF	2.13e+07	0.53 y	36:03	1.56	3410	16482	2.5	53.4	85.3
ES	13C-1,2,3,7,8,9-HxCDF	1.69e+07	0.53 y	37:00	1.35	3120	16482	2.5	61.7	78.0
ES	13C-1,2,3,4,6,7,8-HpCDF	1.48e+07	0.44 y	38:42	1.09	3400	10594	2.5	49.2	84.9
ES	13C-1,2,3,4,7,8,9-HpCDF	1.20e+07	0.45 y	40:24	0.89	3370	10594	2.5	60.2	84.3
ES	13C-OCDF	2.26e+07	0.88 y	43:35	0.95	5930	15465	2.5	82.0	74.1
CS	37Cl-2,3,7,8-TCDD	*		NotF»	0.94	*			3.08	*
CS	13C-1,2,3,4,7-PeCDD	*	* n	NotF»	0.85	*	1328	2.5	5.11	*
CS	13C-1,2,3,4,6-PeCDF	*	* n	NotF»	0.84	*	22985	2.5	73.2	*
CS	13C-1,2,3,4,6,9-HxCDF	*	* n	NotF»	1.36	*	16482	2.5	61.3	*
CS	13C-1,2,3,4,6,8,9-HpCDF	*	* n	NotF»	0.93	*	10594	2.5	57.3	*
NA	n/a	*	* n	NotF»	Div0	*	11726	2.5	*	*
JS/RT	13C-1,2,3,4-TCDD	2.50e+07	0.82 y	25:50	-	74.2	1624	2.5	-	-
JS	13C-1,2,3,4-TCDF	3.55e+07	0.86 y	24:05	-	73.8	4838616	2.5	-	-
JS/RT	13C-1,2,3,4,6,7-HxCDD	8.00e+06	1.29 y	36:32	-	36.1	2171	2.5	-	-

split corrected 10 Sept 09

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Analyst: [signature]

Date: 10 Sept 09

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SS	37Cl-2,3,7,8-TCDD	*			NotF»	0.99	*			2.92	*
SS	13C-1,2,3,4,7-PeCDD	*	*	n	NotF»	1.11	*	1328	2.5	7.96	*
SS	13C-1,2,3,4,6-PeCDF	*	*	n	NotF»	0.97	*	22985	2.5	92.4	*
SS	13C-1,2,3,4,6,9-HxCDF	*	*	n	NotF»	0.86	*	16482	2.5	49.9	*
SS	13C-1,2,3,4,6,8,9-HpCDF	*	*	n	NotF»	0.86	*	10594	2.5	43.0	*
SBS	2,4,6,8-TCDF	*	*	n	NotF»	1.23	*	1664	2.5	3.81	-
Ay	1,3,6,8-TCDD	5.53e+05	0.84	y	22:30	1.15	95.3	1999	2.5	7.25	-
Ay	1,2,3,9-TCDD	*	*	n	NotF»	1.15	*	1999	2.5	7.25	-
Ay	1,2,8,9-TCDD	5.41e+05	0.78	y	27:38	1.15	93.2	1999	2.5	7.25	-
Ay	1,2,4,7,9-PeCDD	5.36e+05	1.71	y	29:39	1.08	117	719	2.5	4.42	-
Ay	1,2,3,8,9-PeCDD	4.79e+05	1.41	y	32:44	1.08	104	719	2.5	4.42	-
Ay	1,2,4,6,7,9-HxCDD	5.03e+05	1.34	y	34:31	1.09	123	1306	2.5	6.74	-
Ay	1,2,3,4,6,7,9-HpCDD	3.75e+05	1.02	y	39:01	1.03	113	1386	2.5	8.36	-
Ay	1,3,6,8-TCDF	1.04e+06	0.78	y	20:20	1.23	106	1664	2.5	3.81	-
Ay	2,3,4,8-TCDF	*	*	n	NotF»	1.23	*	1664	2.5	3.81	-
Ay	1,2,8,9-TCDF	8.03e+05	0.71	y	27:49	1.23	81.7	1664	2.5	3.81	-
Ay	1,3,4,6,8-PeCDF	5.79e+05	1.95	n	27:45	1.23	58.9	2636	2.5	6.04	-
Ay	1,2,3,8,9-PeCDF	6.27e+05	1.58	y	33:02	1.09	79.8	30459	2.5	99.1	-
Ay	1,2,3,4,6,8-HxCDF	7.21e+05	1.17	y	33:51	1.20	119	1977	2.5	4.65	-
Tot	Total Tetra-Dioxins	1.94e+06	0.84	y	22:30	1.15	334	1999	2.5	7.25	-
Tot	Total Penta-Dioxins	1.69e+06	1.71	y	29:39	1.08	369	719	2.5	4.42	-
Tot	Total Hexa-Dioxins	2.68e+06	1.34	y	34:31	1.09	657	1306	2.5	6.74	-
Tot	Total Hepta-Dioxins	8.48e+05	1.02	y	39:01	1.03	256	1386	2.5	8.36	-
Tot	Total Tetra-Furans	3.48e+06	0.78	y	20:20	1.23	354	1664	2.5	3.81	-
Tot	Total Penta-Furans	3.96e+06	1.58	y	30:45	1.09	497	30459	2.5	99.1	-
Tot	Total Hexa-Furans	5.80e+06	1.17	y	33:51	1.20	980	1977	2.5	4.65	-
Tot	Total Hepta-Furans	1.60e+06	1.01	y	38:42	1.47	319	1915	2.5	5.56	-
Tot	TCDD EMPC	1.94e+06	0.84	y	22:30	1.15	334	1999	2.5	7.25	-
Tot	PeCDD EMPC	1.69e+06	1.71	y	29:39	1.08	369	719	2.5	4.42	-
Tot	HxCDD EMPC	2.68e+06	1.34	y	34:31	1.09	657	1306	2.5	6.74	-
Tot	HpCDD EMPC	8.48e+05	1.02	y	39:01	1.03	256	1386	2.5	8.36	-
Tot	TCDF EMPC	3.48e+06	0.78	y	20:20	1.23	354	1664	2.5	3.81	-
Tot	PeCDF EMPC	3.96e+06	1.58	y	30:45	1.09	497	30459	2.5	99.1	-
Tot	HxCDF EMPC	5.80e+06	1.17	y	33:51	1.20	980	1977	2.5	4.65	-
Tot	HpCDF EMPC	1.60e+06	1.01	y	38:42	1.47	319	1915	2.5	5.56	-
AS	13C-1,3,6,8-TCDD	2.45e+07	0.81	y	22:28	1.08	3640	2168	2.5	6.57	90.9
AS	13C-1,3,6,8-TCDF	4.51e+07	0.82	y	20:19	1.39	3650	4843307	2.5	9350	91.2
DPE	HxCDPE	*			NotF»	-	*			-	-
DPE	HpCDPE	*			NotF»	-	*			-	-
DPE	OCDPE	*			NotF»	-	*			-	-
DPE	NCDPE	*			NotF»	-	*			-	-
DPE	DCDPE	*			NotF»	-	*			-	-
LMC	Fn1 check mass	*			NotF»	-	*			-	-
LMC	Fn2 check mass	*			NotF»	-	*			-	-
LMC	Fn3 check mass	*			NotF»	-	*			-	-
LMC	Fn4 check mass	*			NotF»	-	*			-	-
LMC	Fn5 check mass	*			NotF»	-	*			-	-

ok 10 Sept US

sampling standards not contained in audit sample ✓ 10 Sept US

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OP[illegible]an on MM1 10-SEP-2009 09:34

T[illegible]s Results Analytical Perspectives [Form: TOT]

Totals class: TCDD EMPC Function: 1 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 333.66 Unnamed Conc.: * Homolog count: 3

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
22:30	2.526e+05	n	3.001e+05	n	0.84	y	5.527e+05	5.527e+05	2.59e+01	y	95.3	1,3,6,8-TCDD
26:35	3.795e+05	n	4.630e+05	n	0.82	y	8.425e+05	8.425e+05	5.35e+01	y	145	2,3,7,8-TCDD
27:38	2.372e+05	n	3.037e+05	n	0.78	y	5.409e+05	5.409e+05	3.70e+01	y	93.2	1,2,8,9-TCDD

Totals Results Analytical Perspectives [Form: TOT]

Totals class: PeCDD EMPC Function: 2 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 369.49 Unnamed Conc.: * Homolog count: 3

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
29:39	3.381e+05	n	1.980e+05	n	1.71	y	5.362e+05	5.362e+05	5.57e+01	y	117	1,2,4,7,9-PeCDD
32:17	4.177e+05	n	2.615e+05	n	1.60	y	6.792e+05	6.792e+05	8.87e+01	y	148	1,2,3,7,8-PeCDD
32:44	2.807e+05	n	1.985e+05	n	1.41	y	4.792e+05	4.792e+05	6.74e+01	y	104	1,2,3,8,9-PeCDD

Totals Results Analytical Perspectives [Form: TOT]

Totals class: HxCDD EMPC Function: 3 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 657.11 Unnamed Conc.: 99.320 Homolog count: 5

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
34:31	2.878e+05	n	2.148e+05	n	1.34	y	5.026e+05	5.026e+05	4.74e+01	y	123	1,2,4,6,7,9-HxCDD
36:15	2.965e+05	n	2.769e+05	n	1.07	y	5.734e+05	5.734e+05	6.34e+01	y	150	1,2,3,4,7,8-HxCDD
36:22	3.321e+05	n	2.622e+05	n	1.27	y	5.942e+05	5.942e+05	5.70e+01	y	142	1,2,3,6,7,8-HxCDD
36:33	2.161e+05	n	1.890e+05	n	1.14	y	4.051e+05	4.051e+05	3.67e+01	y	99.3	
36:39	3.508e+05	n	2.513e+05	n	1.40	y	6.021e+05	6.021e+05	4.93e+01	y	143	1,2,3,7,8,9-HxCDD

Totals Results Analytical Perspectives [Form: TOT]

Totals class: HpCDD EMPC Function: 4 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 256.30 Unnamed Conc.: * Homolog count: 2

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
39:01	1.895e+05	n	1.858e+05	n	1.02	y	3.753e+05	3.753e+05	4.18e+01	y	113	1,2,3,4,6,7,9-HpCDD

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39:51	2.444e+05	n	2.283e+05	n	1.07	y	4.727e+05	4.727e+05	4.04e+01	y	143	1,2,3,4,6,7,8-HpCDD

Totals Results Analytical Perspectives [Form: TOT]

Totals class: TCDF EMPC Function: 1 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 353.65 Unnamed Conc.: * Homolog count: 3

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
20:20	4.563e+05	n	5.860e+05	n	0.78	y	1.042e+06	1.042e+06	7.41e+01	y	106	1,3,6,8-TCDF
25:38	7.174e+05	n	9.142e+05	n	0.78	y	1.632e+06	1.632e+06	1.16e+02	y	166	2,3,7,8-TCDF
27:49	3.338e+05	n	4.694e+05	n	0.71	y	8.031e+05	8.031e+05	6.10e+01	y	81.7	1,2,8,9-TCDF

Totals Results Analytical Perspectives [Form: TOT]

Totals class: PeCDF EMPC Function: 2 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 497.30 Unnamed Conc.: * Homolog count: 3

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
30:45	6.621e+05	n	4.182e+05	n	1.58	y	1.080e+06	1.080e+06	3.91e+00	y	145	1,2,3,7,8-PeCDF
31:55	1.356e+06	n	8.945e+05	n	1.52	y	2.250e+06	2.250e+06	7.76e+00	y	273	2,3,4,7,8-PeCDF
33:02	3.836e+05	n	2.431e+05	n	1.58	y	6.267e+05	6.267e+05	1.94e+00	n	79.8	1,2,3,8,9-PeCDF

Totals Results Analytical Perspectives [Form: TOT]

Totals class: HxCDF EMPC Function: 3 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 979.92 Unnamed Conc.: * Homolog count: 5

RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name
33:51	3.890e+05	n	3.320e+05	n	1.17	y	7.210e+05	7.210e+05	4.80e+01	y	119	1,2,3,4,6,8-HxCDF
35:16	6.379e+05	n	5.444e+05	n	1.17	y	1.182e+06	1.182e+06	7.74e+01	y	198	1,2,3,4,7,8-HxCDF
35:25	7.247e+05	n	5.736e+05	n	1.26	y	1.298e+06	1.298e+06	8.82e+01	y	185	1,2,3,6,7,8-HxCDF
36:04	6.663e+05	n	4.829e+05	n	1.38	y	1.149e+06	1.149e+06	7.31e+01	y	184	2,3,4,6,7,8-HxCDF
37:02	8.355e+05	n	6.167e+05	n	1.35	y	1.452e+06	1.452e+06	6.25e+01	y	294	1,2,3,7,8,9-HxCDF

Totals Results Analytical Perspectives [Form: TOT]

Totals class: HpCDF EMPC Function: 4 Run #: 8 Checkcode: 5899
File Name: 090909P1 Sample #: 8 Sample text: P1620_7129_006 M23-3343-01-Audit Air Tr»

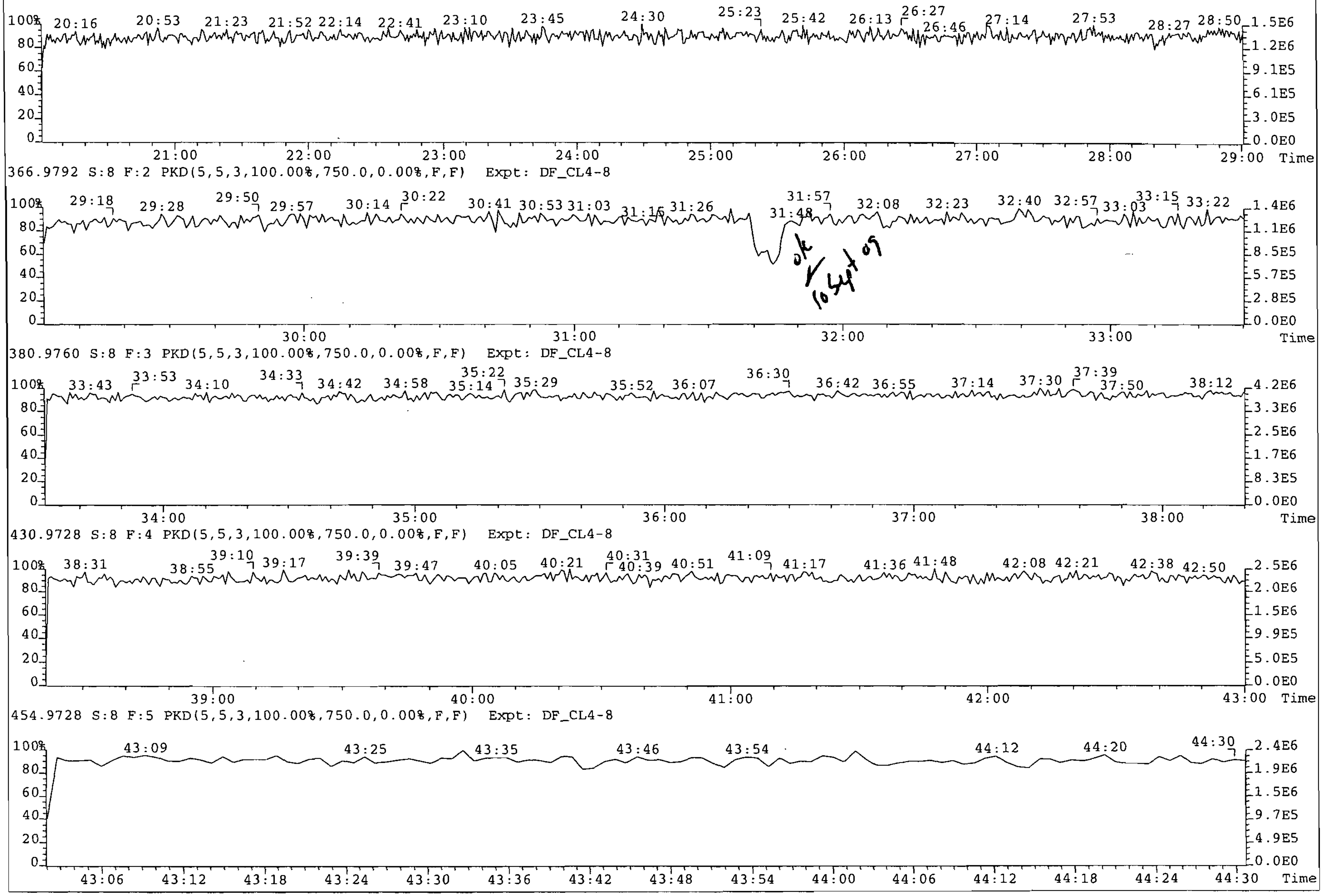
Acquired: 9-SEP-09 15:29:05 Processed: 9-SEP-09 18:32:41

Total Conc.: 318.82 Unnamed Conc.: 89.296 Homolog count: 3

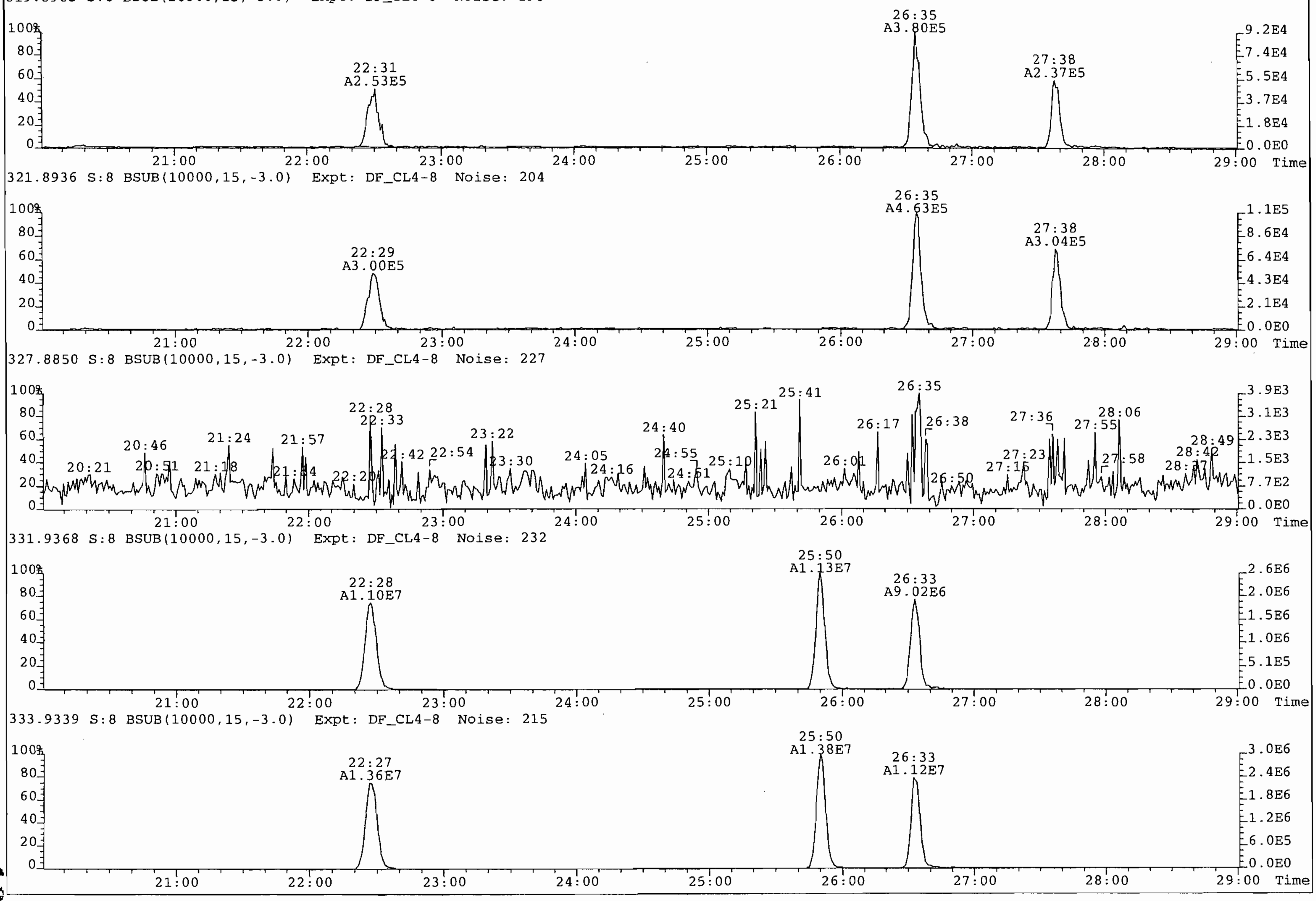
RT	m1 Resp	mod.	m2 Resp	mod.	RA		Resp	Adj_Resp	S/N		Conc.	Name

[illegible]2	3.783e+05	n	3.752e+05	n	1.01	y	7.535e+05	7.535e+05	6.08e+01	y	134	1,2,3,4,6,7,8-HpCDF
39:12	2.254e+05	n	2.157e+05	n	1.04	y	4.410e+05	4.410e+05	2.97e+01	y	89.3	
40:25	2.002e+05	n	2.065e+05	n	0.97	y	4.067e+05	4.067e+05	2.43e+01	y	95.9	1,2,3,4,7,8,9-HpCDF

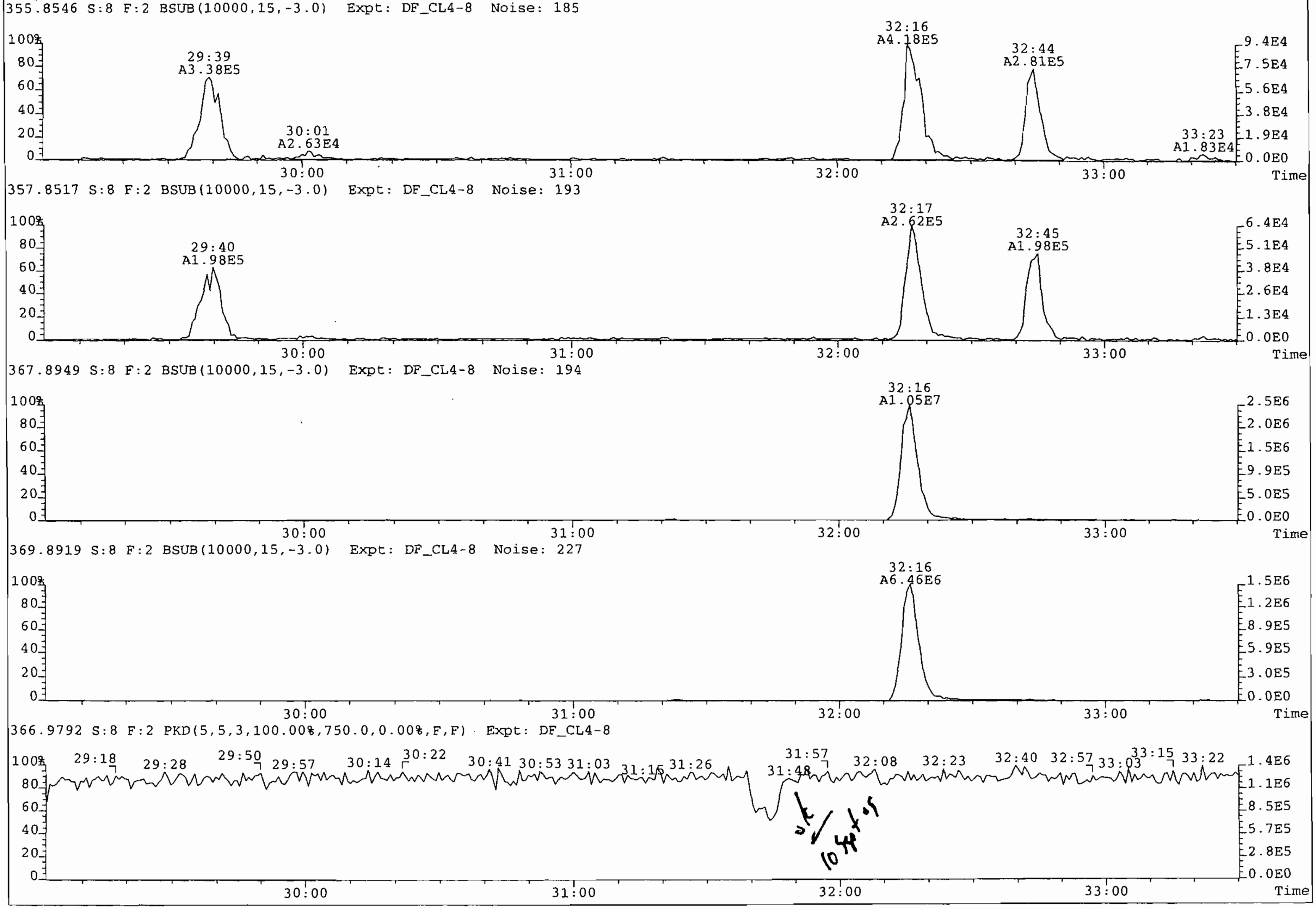
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
316.9824 S:8 PKD(5,5,3,100.00%,750.0,0.00%,F,F) Expt: DF_CL4-8



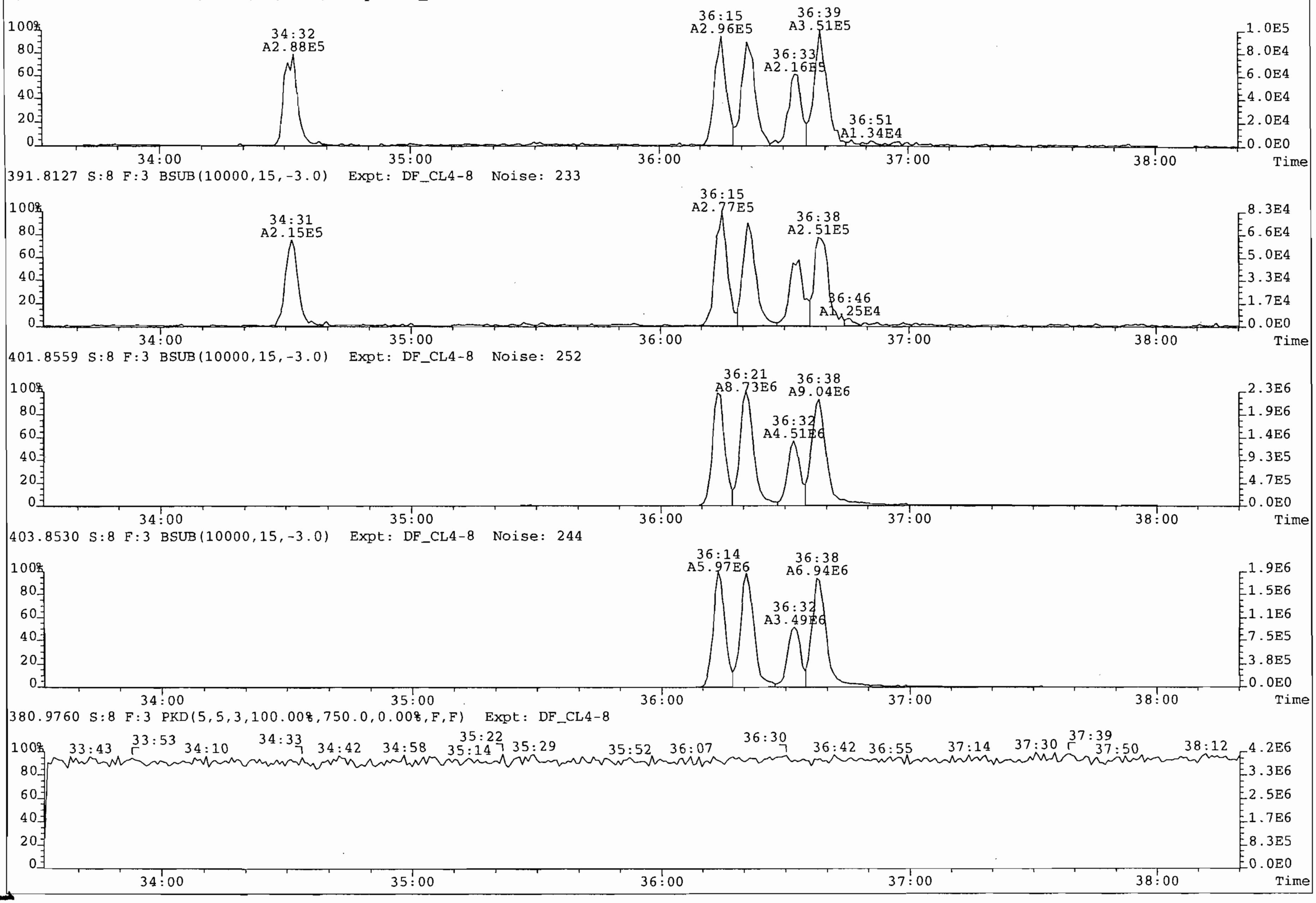
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5



File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5



File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5



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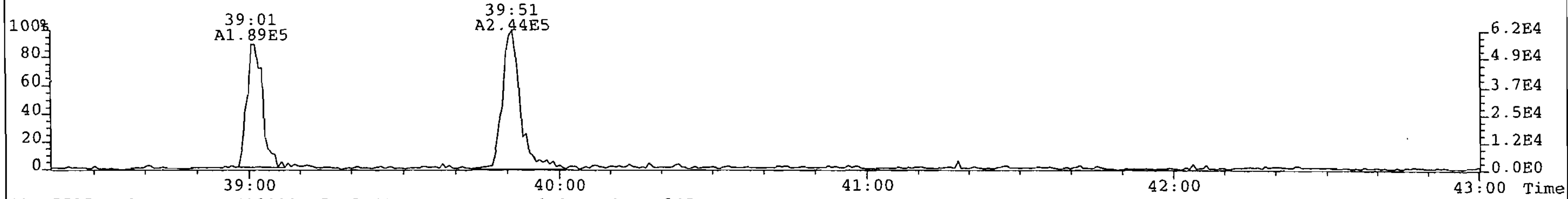
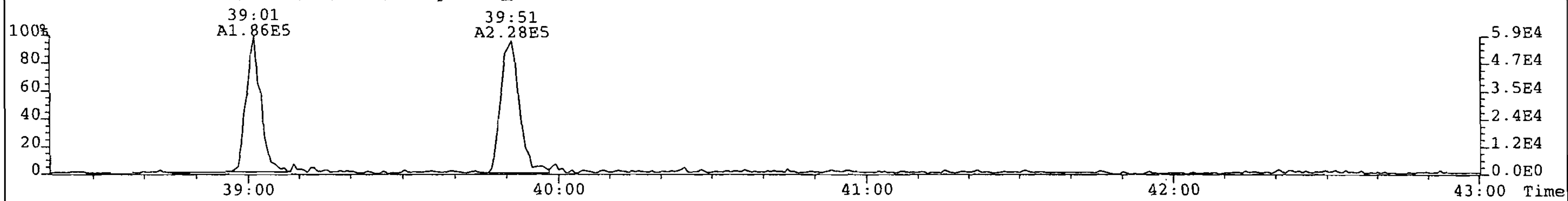
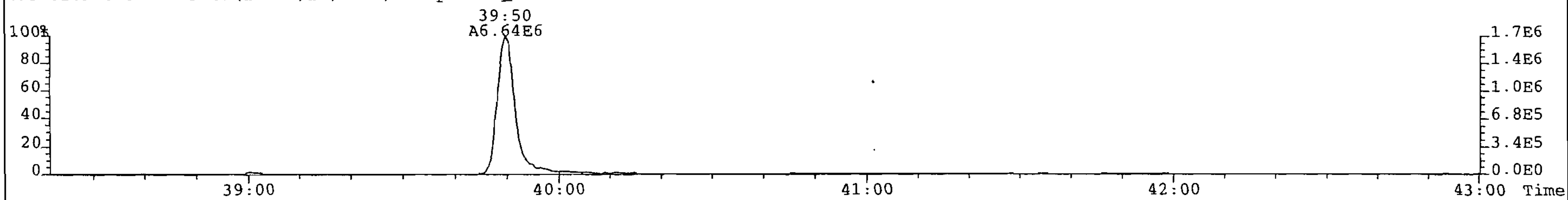
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
423.7767 S:8 F:4 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 291



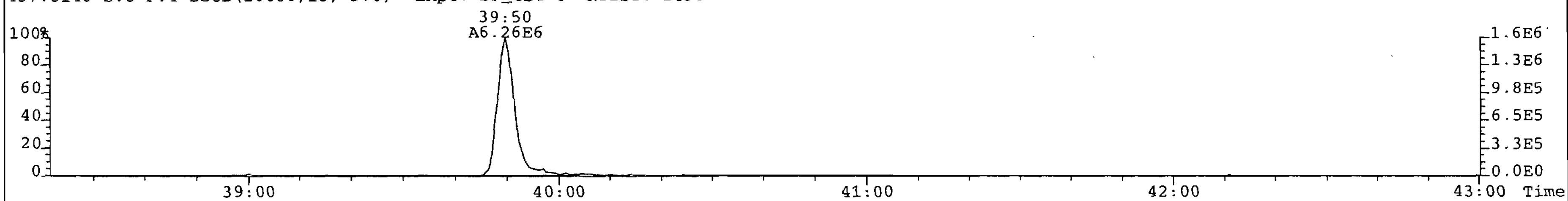
425.7737 S:8 F:4 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 247



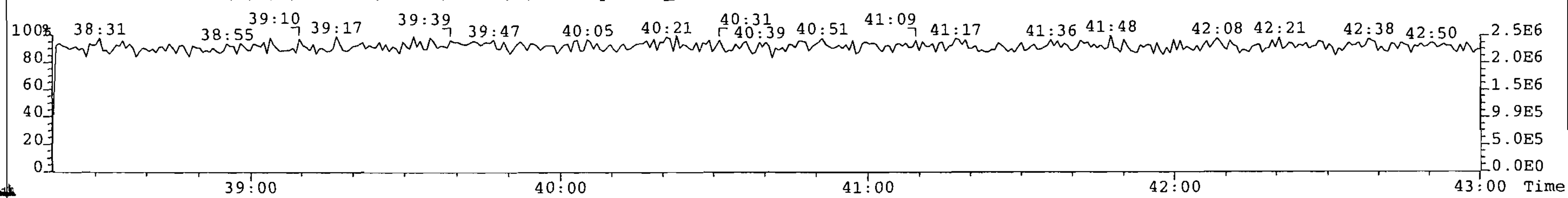
435.8169 S:8 F:4 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 1505



437.8140 S:8 F:4 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 1430

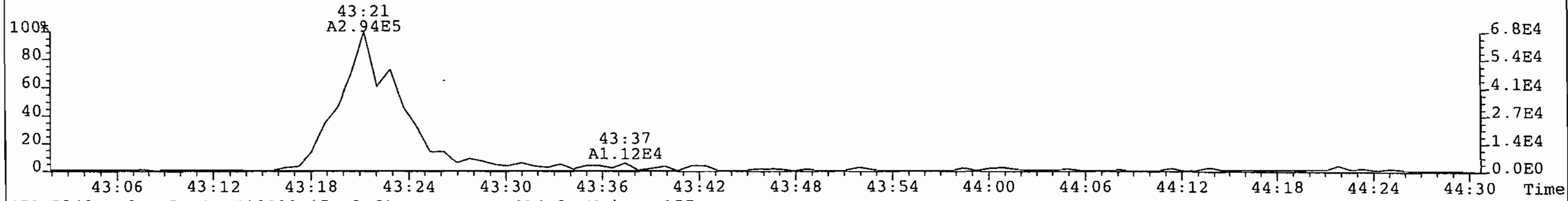


430.9728 S:8 F:4 PKD(5,5,3,100.00%,750.0,0.00%,F,F) Expt: DF_CL4-8

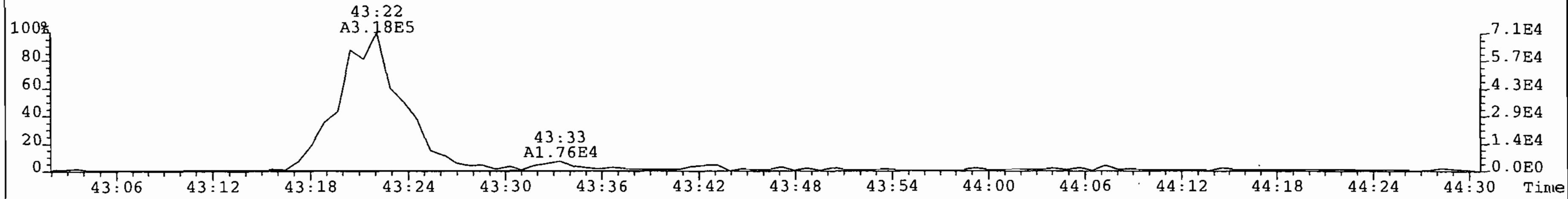


File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5

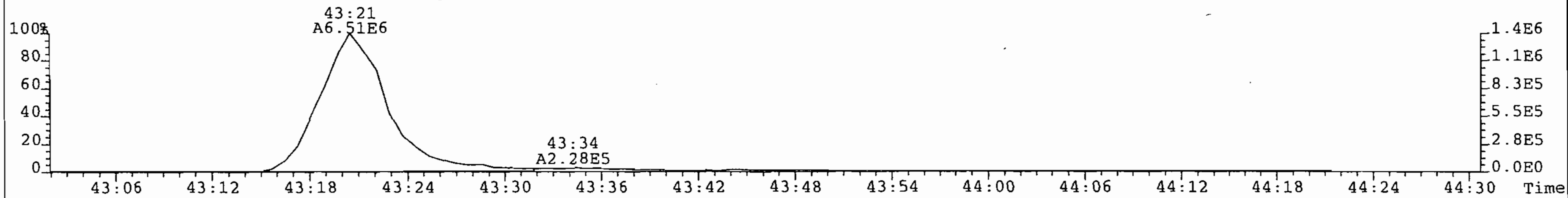
457.7377 S:8 F:5 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 140



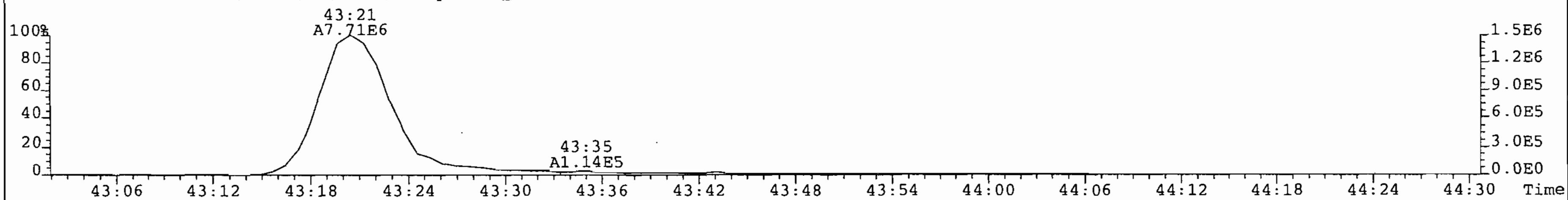
459.7348 S:8 F:5 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 157



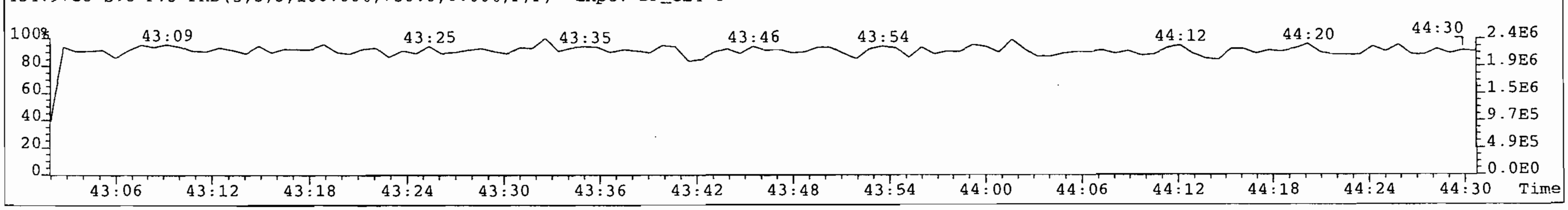
469.7780 S:8 F:5 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 1364



471.7750 S:8 F:5 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 1082



454.9728 S:8 F:5 PKD(5,5,3,100.00%,750.0,0.00%,F,F) Expt: DF_CL4-8



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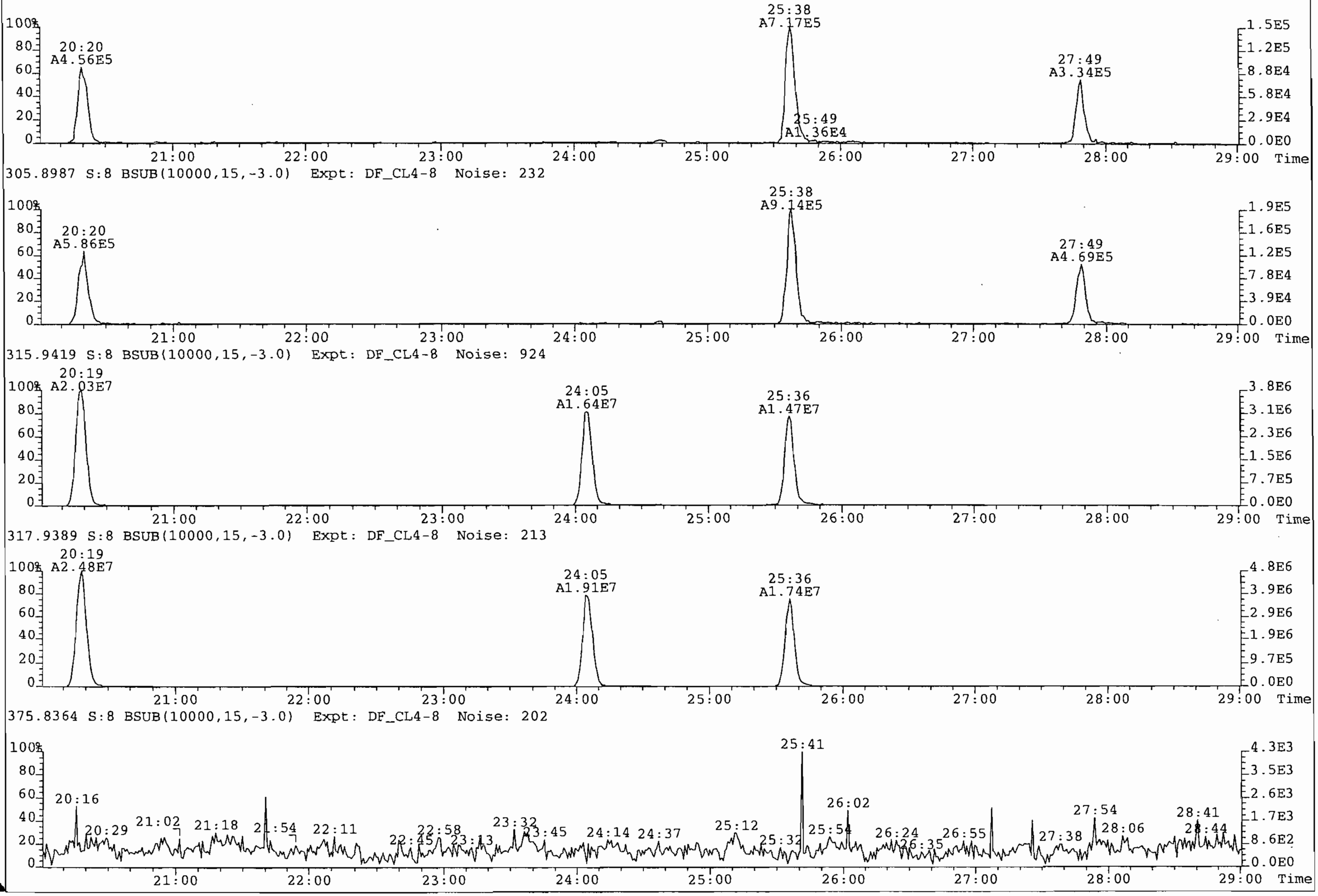
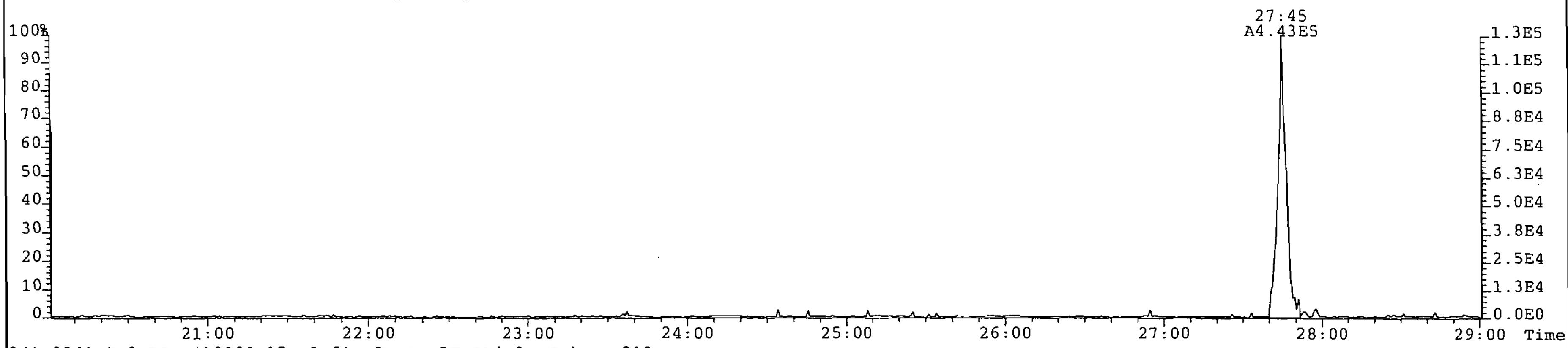
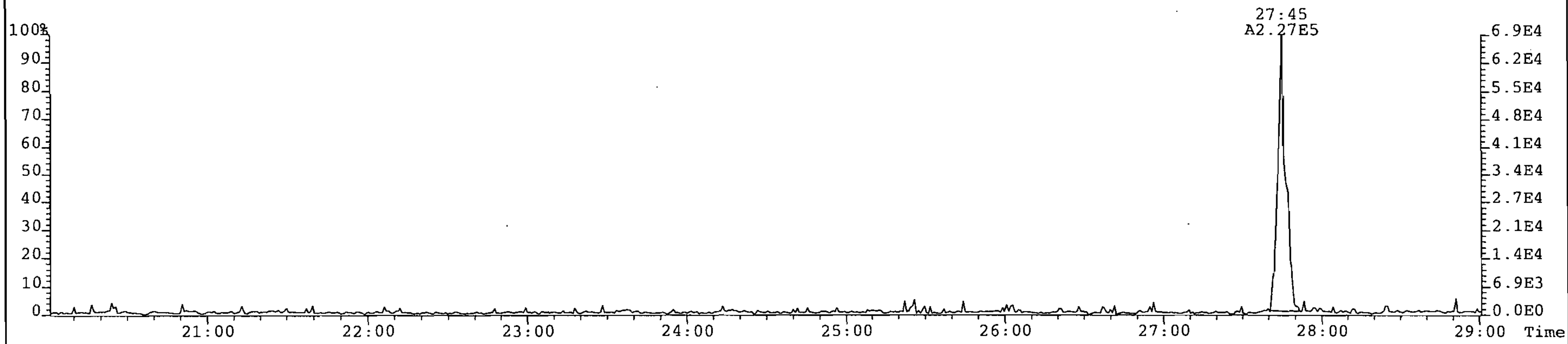
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
303.9016 S:8 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 214



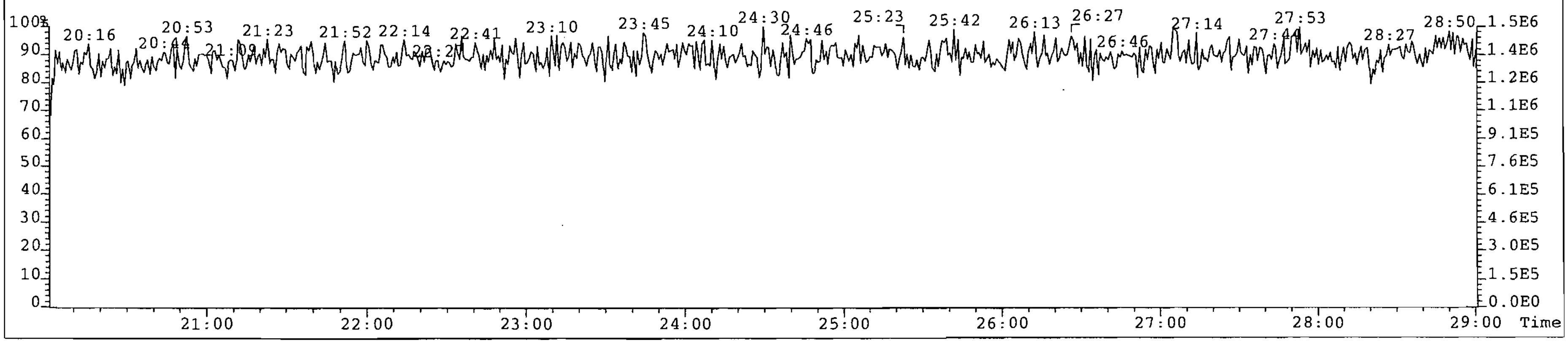
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
339.8597 S:8 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 210



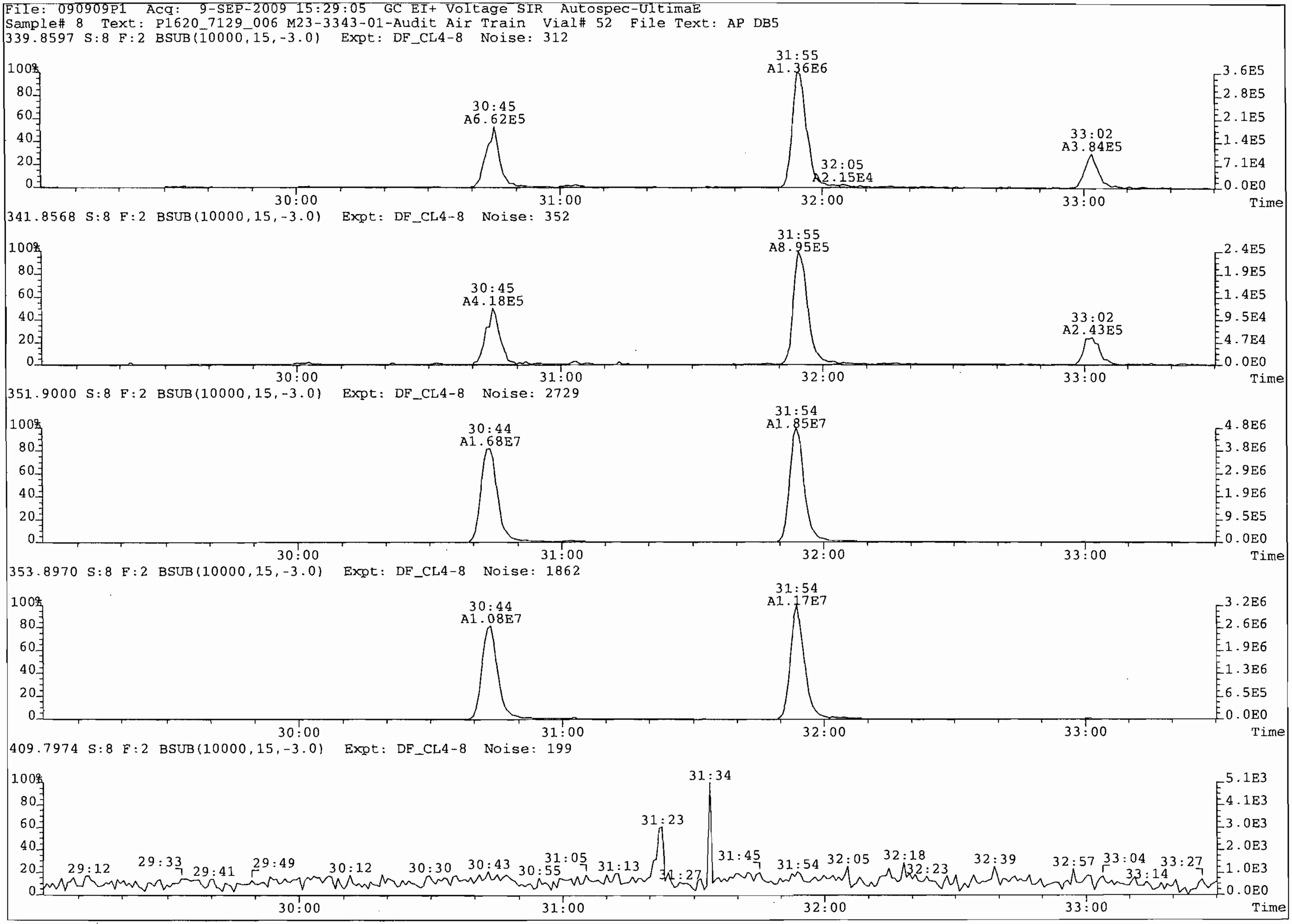
341.8568 S:8 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 212



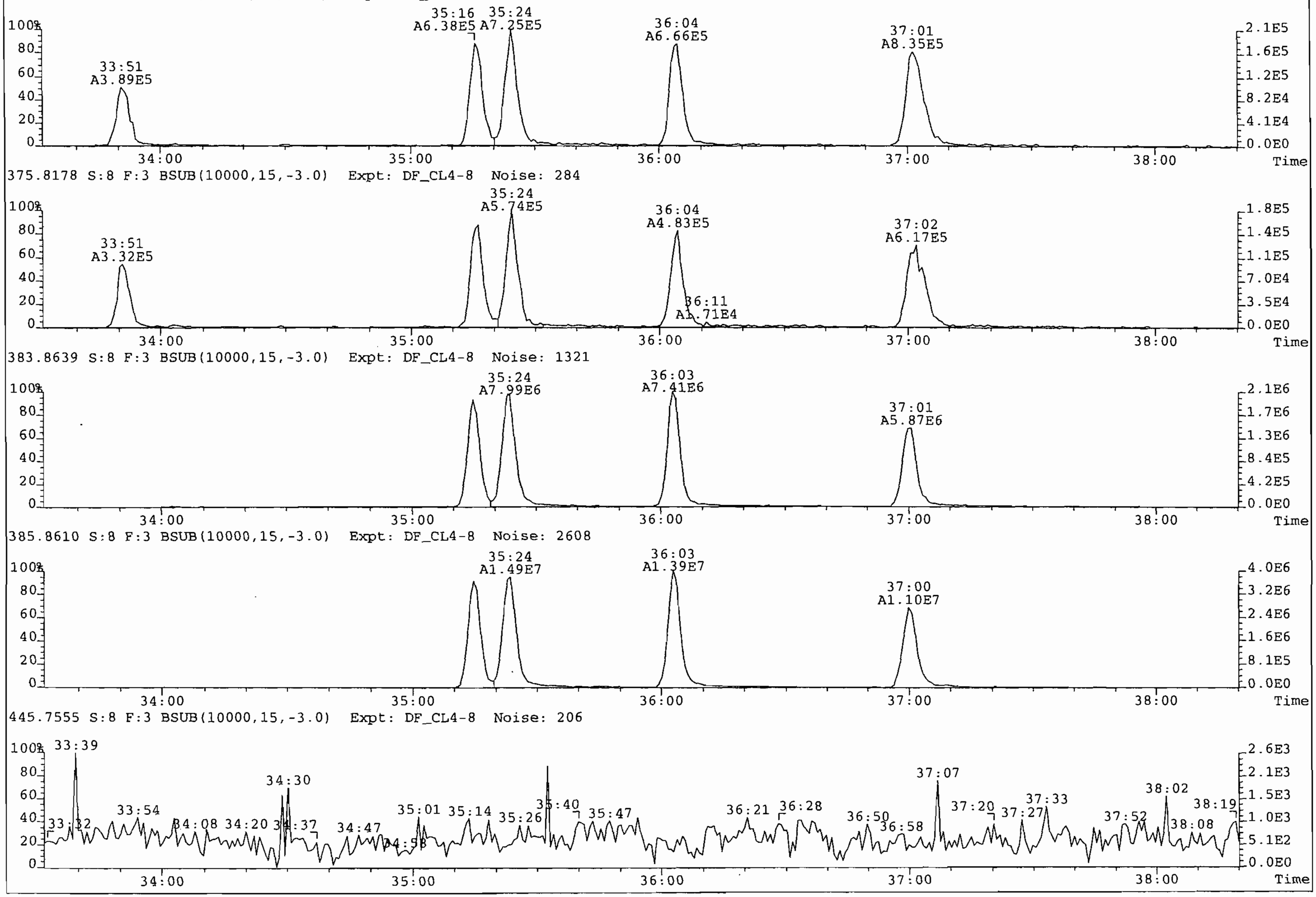
316.9824 S:8 PKD(5,5,3,100.00%,750.0,0.00%,F,F) Expt: DF_CL4-8



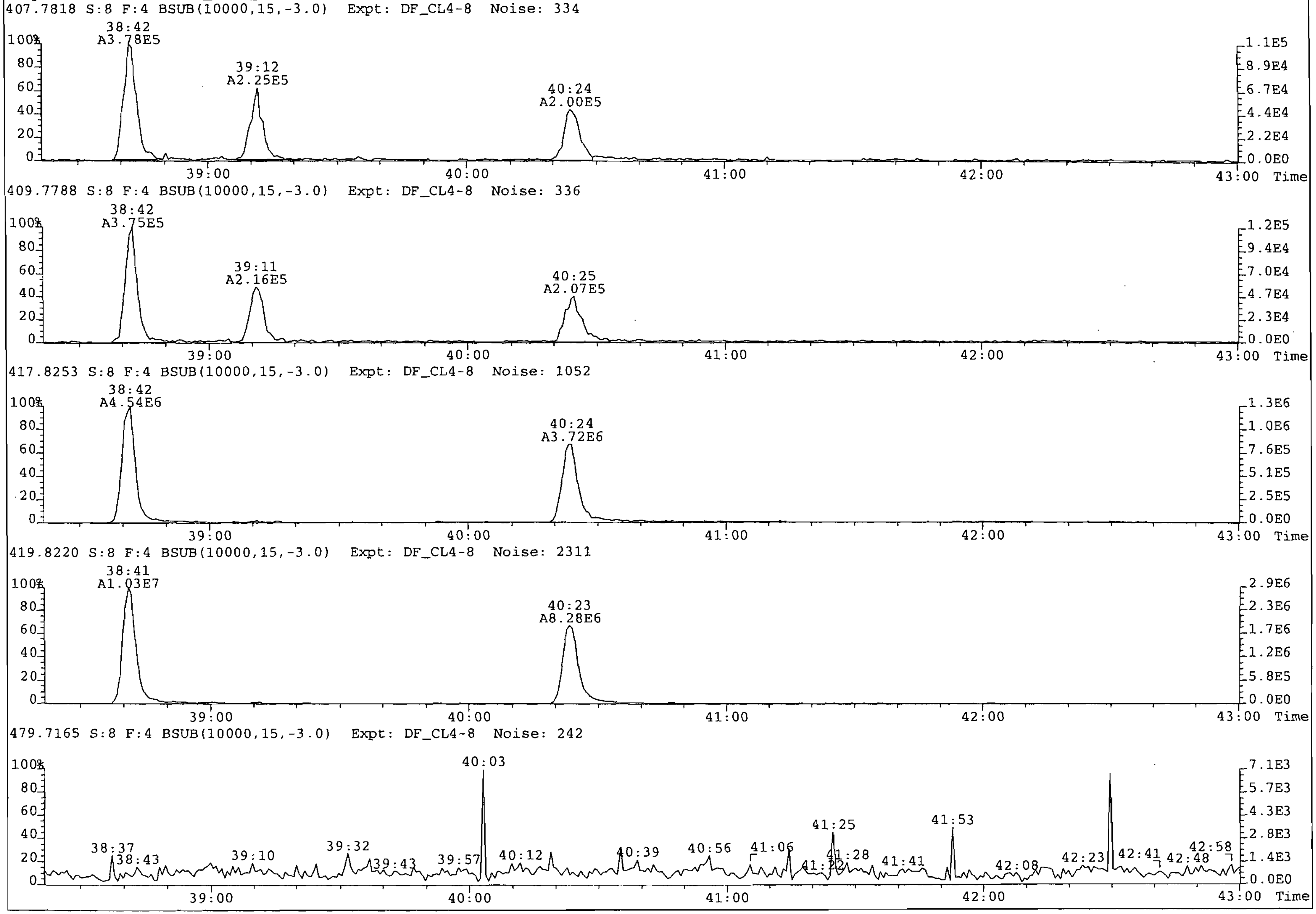
138


File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
339.8597 S:8 F:2 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 312
30:45 A6.62E5
31:55 A1.36E6
32:05 A2.15E4
33:02 A3.84E5
341.8568 S:8 F:2 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 352
30:45 A4.18E5
31:55 A8.95E5
33:02 A2.43E5
351.9000 S:8 F:2 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 2729
30:44 A1.68E7
31:54 A1.85E7
353.8970 S:8 F:2 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 1862
30:44 A1.08E7
31:54 A1.17E7
409.7974 S:8 F:2 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 199
29:12 29:33 29:41 29:49 30:12 30:30 30:43 30:55 31:05 31:13 31:23 31:27 31:34 31:45 31:54 32:05 32:18 32:23 32:39 32:57 33:04 33:14 33:27
30:00 31:00 32:00 33:00 Time

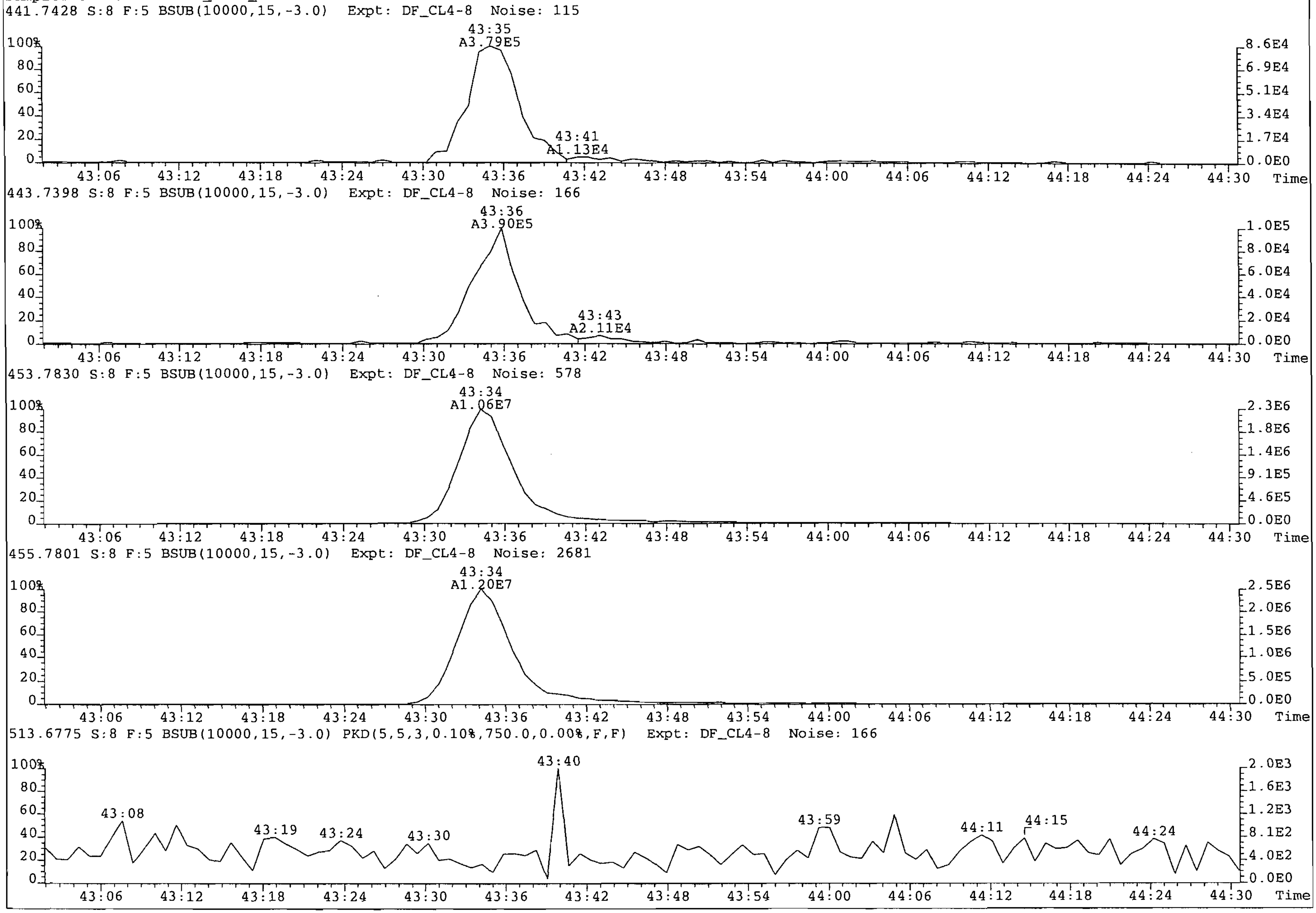
File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5
373.8207 S:8 F:3 BSUB(10000,15,-3.0) Expt: DF_CL4-8 Noise: 348



File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5



File: 090909P1 Acq: 9-SEP-2009 15:29:05 GC EI+ Voltage SIR Autospec-UltimaE
Sample# 8 Text: P1620_7129_006 M23-3343-01-Audit Air Train Vial# 52 File Text: AP DB5



APPENDIX C.3
Analytical Data

Hydrogen Chloride

RESOLUTION ANALYTICS, INC.
Specialists in High Performance Liquid Chromatography

REPORT SUMMARY

RFA#: 10659

SAMPLE ID	*HCl (EPA MM26)*
0.1 N H_2SO_4 BLANK	< 0.094 mg
4-I-MM26-1	811 mg
4-I-MM26-2	826 mg
4-I-MM26-3	691 mg
4-O-MM26-1	15.6 mg
4-O-MM26-2	13.6 mg
4-O-MM26-3	12.6 mg

Analytical Narrative

RFA # 10659

Client/Plant Name: Testar, Inc.

Date Rec'd in lab: 09/08/2009

Analyst: TCS

Date of Analysis: 09/08/2009

Analysis Method: EPA Method 26A

Analyte(s): HCl

Sample Matrix & Components:

0.1 N H_2SO_4 + DI H_2O rinses

Summary of Sample Prep:

Samples were final volumed in the laboratory prior to analysis by ion chromatography. See Data Sheets for dilution factors used throughout analysis.

Summary of Instrumentation:

Shimadzu LC-10AD Ion Chromatograph
PRP-X100 150x4.1mm
Eluent: 4mM Phthalic Acid pH 3.6
Gain 0.2 µS/cm

20 µl Inj Vol
Flow Rate: 1.75 mls/min
Temp: 40°C

Limit of Quantification: 0.470 ppm HCl

Summary of QA Audit Sample Analysis:

See Analytical Data Sheets for results of internal QC audit results. (All internal QC results were within ±10% limits.)

Summary of Sample Spike Analysis:

See Analytical Data Sheets for results of sample spike analyses. (All spike results were within 90-110% recovery limits.)

Miscellaneous Comments Regarding Sample Analysis: (Note unusual catch weights, interferences, odd sample behavior, and steps taken to confirm unusual results. Also note any deviations from standard analytical procedures, together with justification and possible affect on results. Specify samples when applicable.)

None

Confirmation of Data Review:

To the best of my knowledge this analytical data has been checked thoroughly for completeness and the results presented are accurate, error-free, legible, and have been performed and validated in accordance with the approved method(s).

Lab QA Officer Signature *Bruce Nett* Date 9/09/09

Sample Record of Custody

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	08/31/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #*	Broken By	Reason Broken	Sealed By	Run Number	Fraction	Filter ID	Filter Tare	XAD Resin ID	XAD Resin Tare
	PC				4-I-MM26-1	0.1N H2SO4				
					4-I-MM26-2	0.1N H2SO4				
					4-I-MM26-3	0.1N H2SO4				
					4-O-MM26-1	0.1N H2SO4				
					4-O-MM26-2	0.1N H2SO4				
					4-O-MM26-3	0.1N H2SO4				
					Reagent Blank	0.1N H2SO4				

Signature	[signature]	Date	8/31/09
Checked By	[signature]	Date	8/31/09
Received By	[signature]	Date	9/8/09
Analytical Parameters	HCl by EPA Method 26, results by noon Thursday 09-10-09		
Sample Condition			

* PC = Personal Custody

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Hydrogen Chloride (EPA Method 26/26A) Analytical Data Sheet

Client Name:	**TESTAR, Inc.**	Job Num.	**10659**
File Pathway:	C:\JOBS\TESTAR\10659\HCL.WB1	File:	HCL
Analyst:	TCS	Date:	09/08/2009

Chloride Standard Calibration Curve by Linear Regression

Cl- Conc. (ppm)	Standard Areas Inj. 1	Standard Areas Inj. 2	Average Area	% Diff.	Calculated Std Conc. (ppm)	% Deviation from Actual
1.00	21938	22488	22213	1.24%	1.05	4.70%
10.0	209307	205946	207627	0.81%	9.97	-0.28%
20.0	417422	412497	414960	0.59%	20.0	-0.24%
40.0	838541	825704	832123	0.77%	40.0	0.08%

Standard Curve — Slope: 20776 — Y-Int: 461 — LoQ (ppm): **0.459**

Field Samples in: 0.1 N H2SO4

SAMPLE ID	Inj. 1 AREA	Inj. 2 AREA	AVERAGE AREA	% Diff.	DILUTION FACTOR	SAMPLE VOLUME (ml)	**HCl CATCH (mg)**
0.1 N H2SO4	< 10000	< 10000	< 10000	0.00%	1	200	**< 0.094**
4-I-MM26-1	380252	382520	381386	0.30%	100	430	**811**
4-I-MM26-2	373008	369700	371354	0.45%	100	450	**826**
4-I-MM26-3	318778	316454	317616	0.37%	100	440	**691**
4-O-MM26-1	713873	719066	716470	0.36%	1	440	**15.6**
4-O-MM26-2	607231	616246	611739	0.74%	1	450	**13.6**
4-O-MM26-3	557655	550253	553954	0.67%	1	460	**12.6**

***** **AUDIT REPORT** *****

	Inj. 1	Inj. 2	Average Area	% Dev.	Expected ppm Cl-	Calculated ppm Cl-	Percent Diff.
IN-HOUSE AUDIT	307443	305742	306593	0.28%	15.0	14.7	-1.77%

MATRIX SPIKE

Sample I.D.	Inj. 1	Inj. 2	Average Area	% Dev.	Expected ppm Cl-	Calculated ppm Cl-	% Recovery
4-O-MM26-3	725263	683380	704322	2.97%	20.0	20.6	102.8%

Note: 0.50 mls of the above sample was spiked with 0.50 mls of a 40.0 ppm chloride standard.

Printing Date 09-Sep-2009 Printing Time 07:40 AM

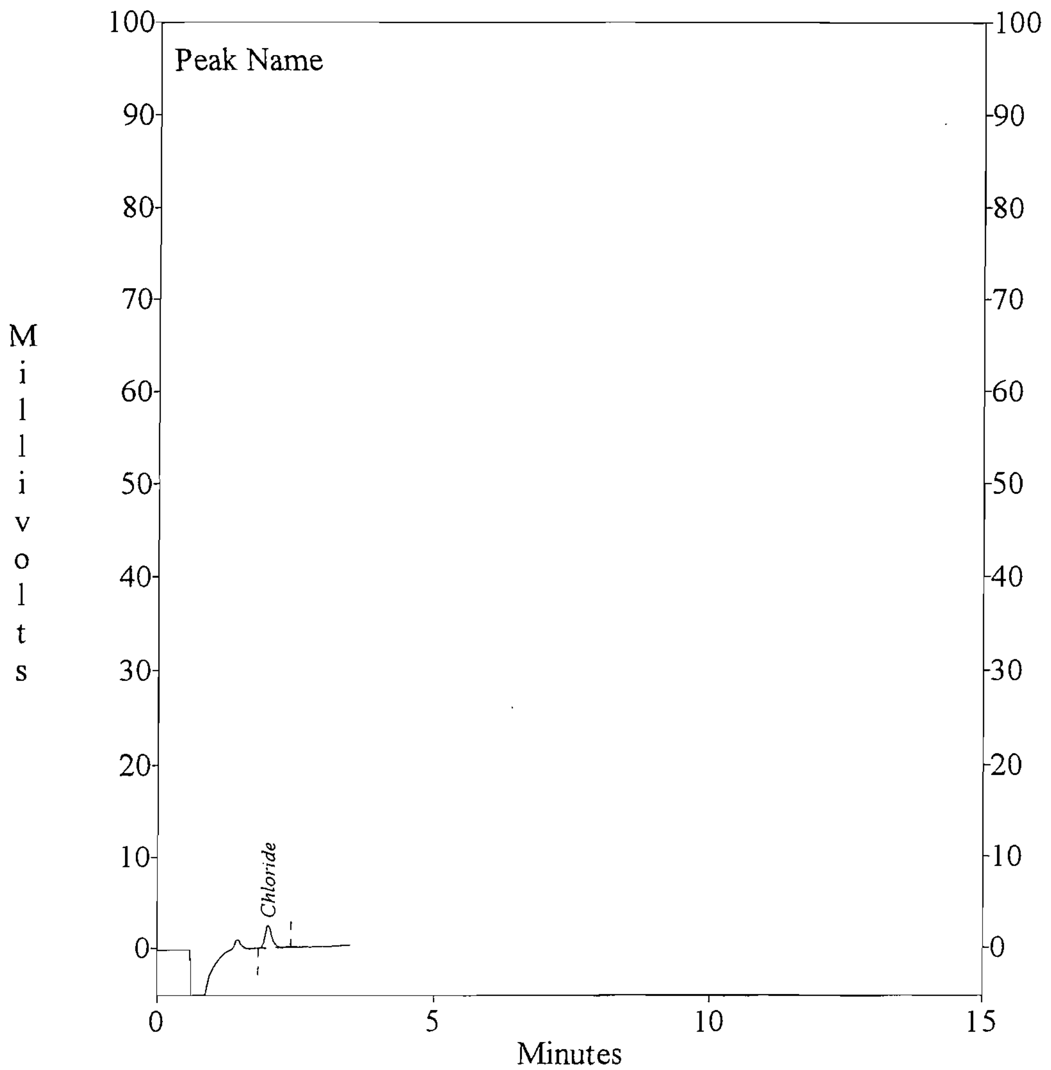
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10638.200
Method : c:\ezchrom\methods\M26-150.met
Sample ID : 1/1 PPM a
Acquired : Aug 29, 2009 09:29:17

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.03	21938

c:\ezchrom\chrom\10638.200 -- Channel A



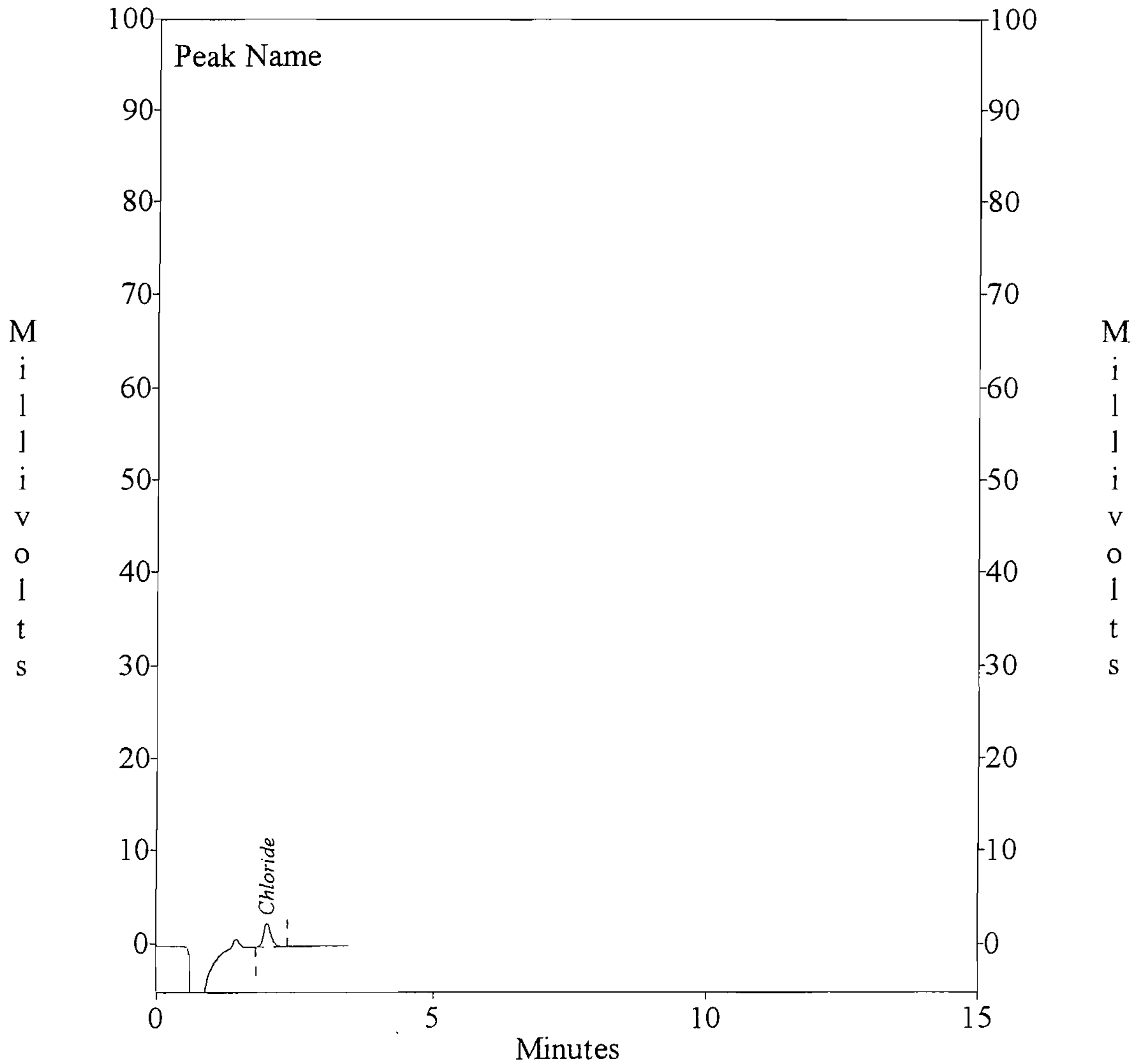
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10638.233
Method : c:\ezchrom\methods\M26-150.met
Sample ID : 1/1 PPM b
Acquired : Aug 31, 2009 05:10:44

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.03	22488

c:\ezchrom\chrom\10638.233 -- Channel A



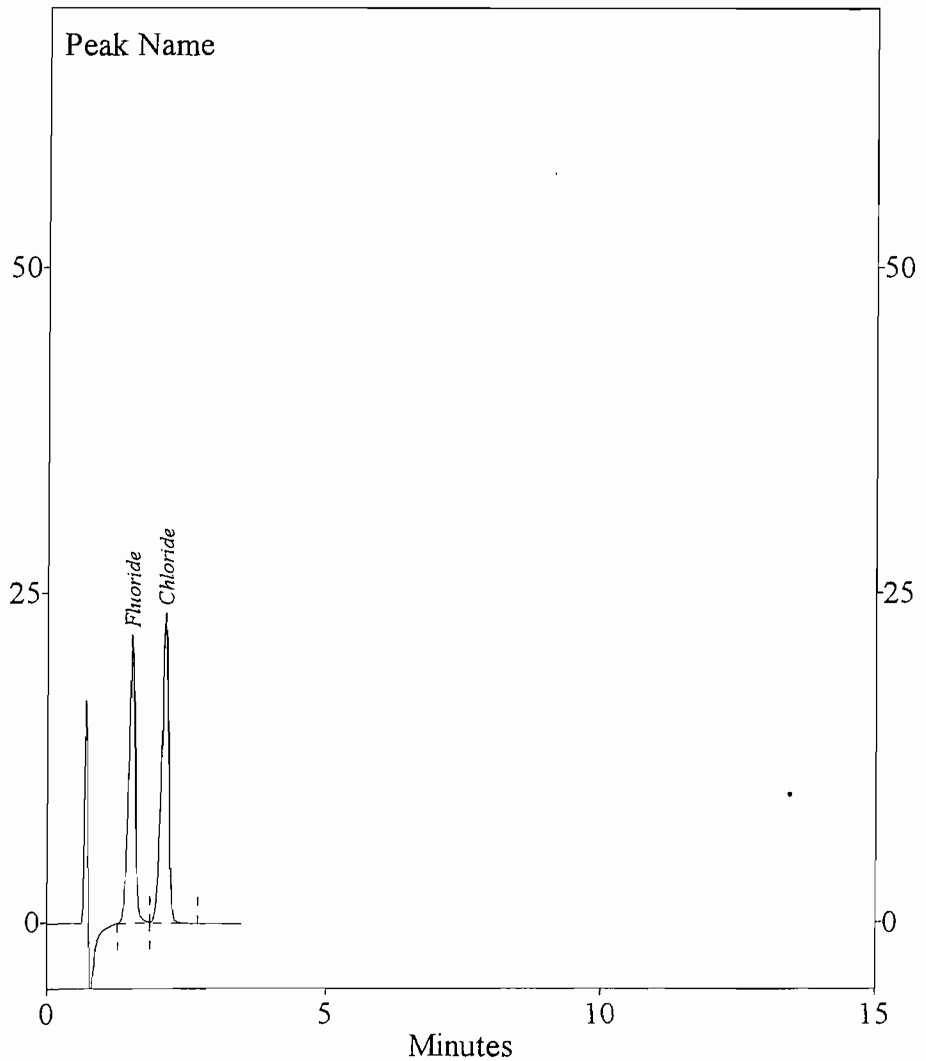
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10638.201
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 10/10 PPM a
Acquired : Aug 29, 2009 10:42:49

Channel A Results

Peak Name	Ret Time	Area
Fluoride	1.53	175651
Chloride	2.13	209307

c:\ezchrom\chrom\10638.201 -- Channel A



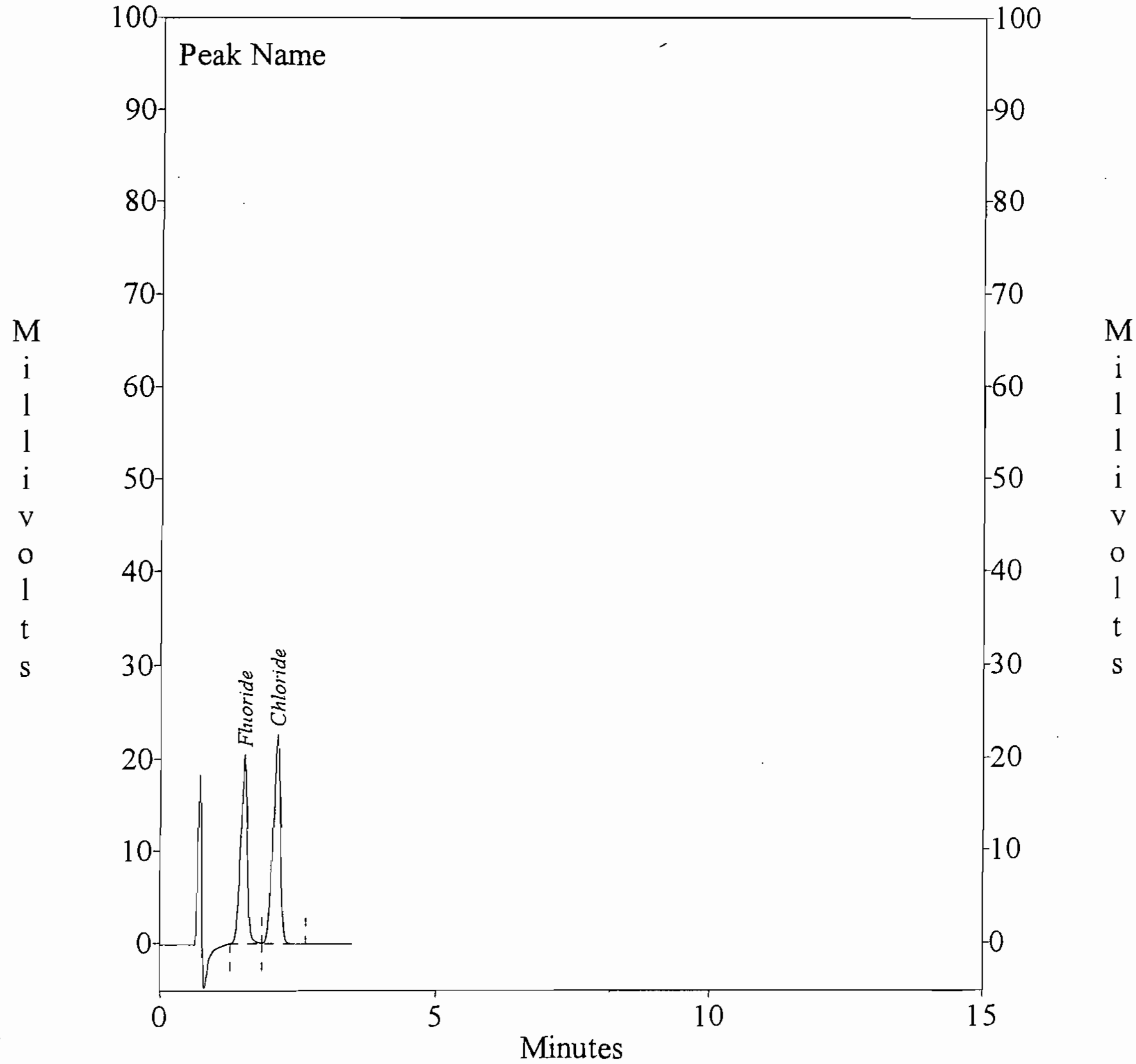
Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10638.234
Method : c:\ezchrom\methods\M26-150.met
ple ID : 10/10 PPM b
quired : Aug 31, 2009 05:51:14

Channel A Results

Peak Name	Ret Time	Area
Fluoride	1.53	168414
Chloride	2.13	205946

c:\ezchrom\chrom\10638.234 -- Channel A



Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm

Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min

Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10638.202

Method : c:\ezchrom\methods\m26-150.met

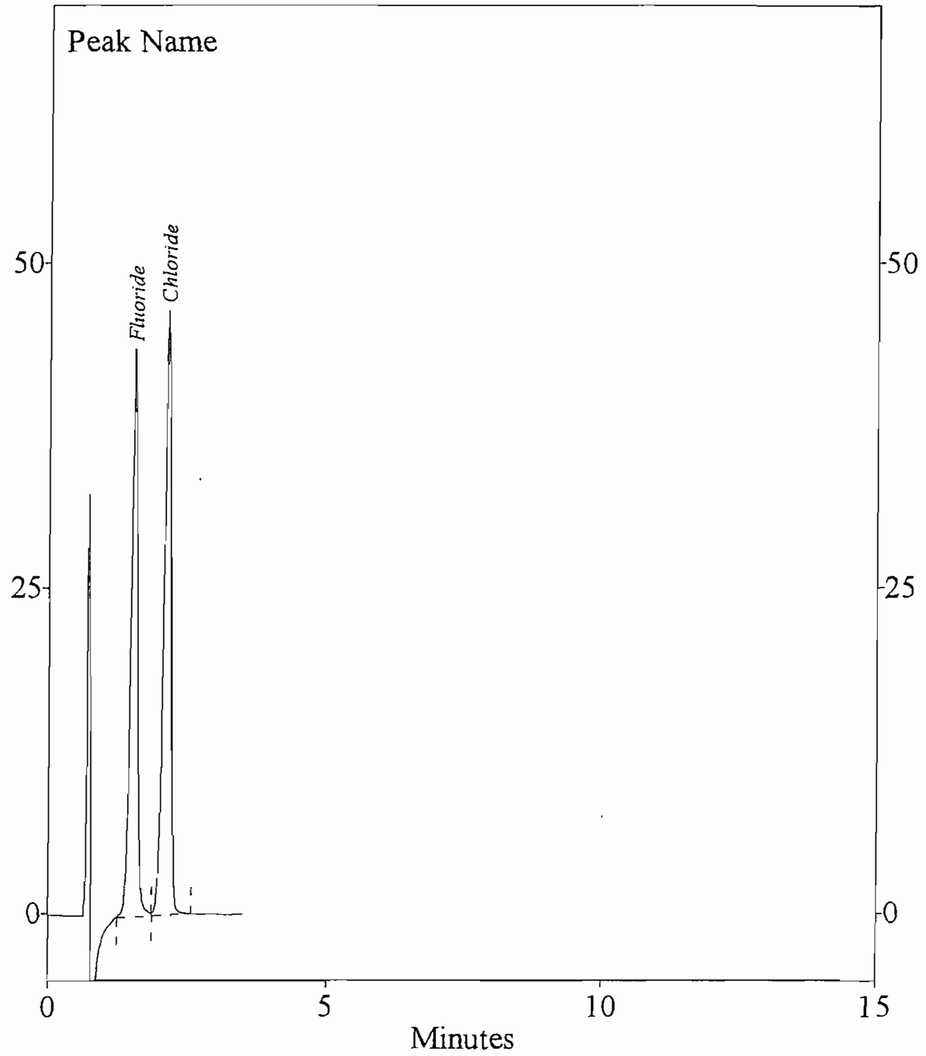
Sample ID : 20/20 PPM a

Acquired : Aug 29, 2009 11:02:33

Channel A Results

Peak Name	Ret Time	Area
Fluoride	1.53	356684
Chloride	2.12	417422

c:\ezchrom\chrom\10638.202 -- Channel A

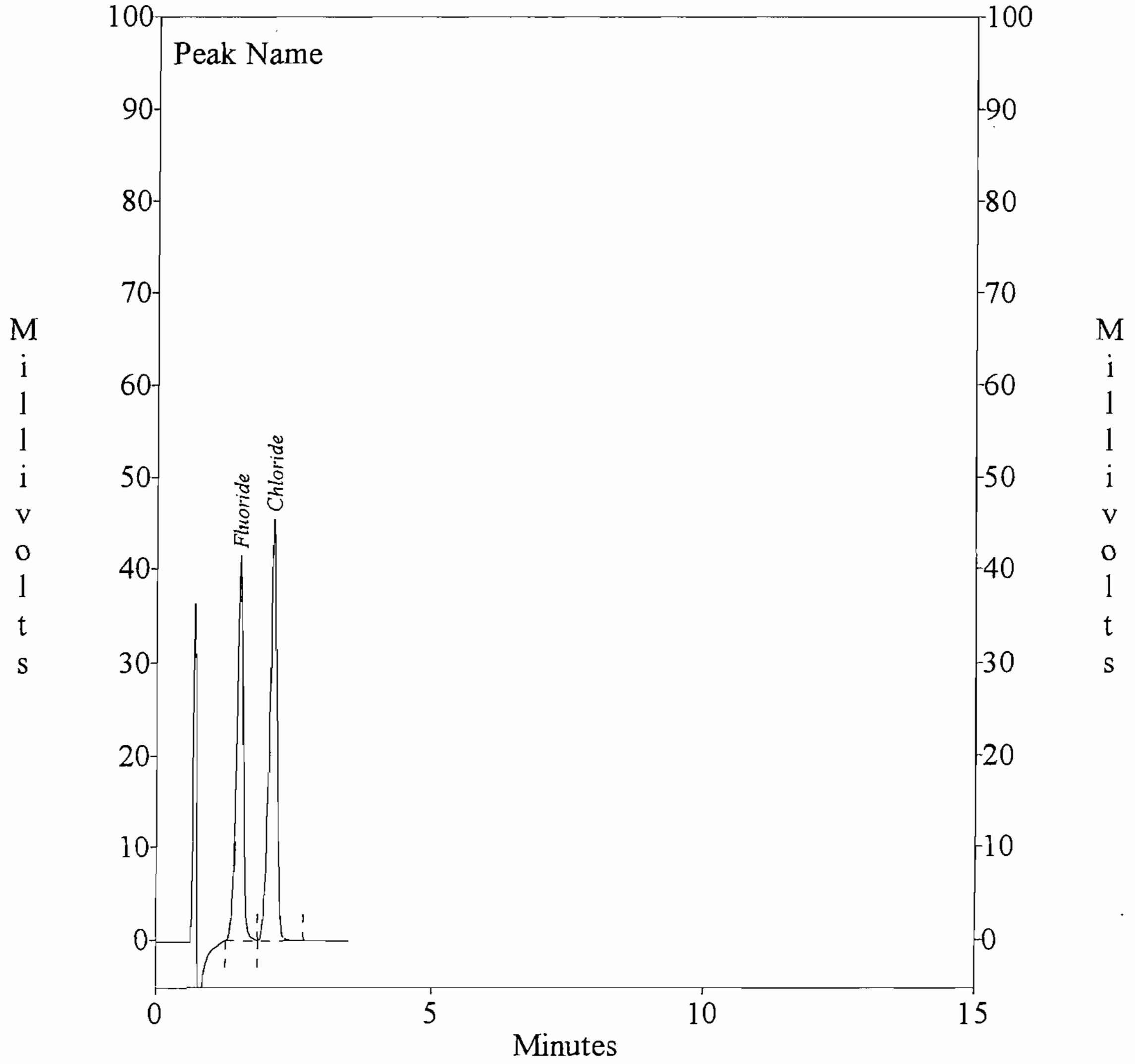


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10638.235
Method : c:\ezchrom\methods\M26-150.met
Sample ID : 20/20 PPM b
Acquired : Aug 31, 2009 06:06:14

Channel A Results

Peak Name	Ret Time	Area
Fluoride	1.53	338505
Chloride	2.13	412497

c:\ezchrom\chrom\10638.235 -- Channel A

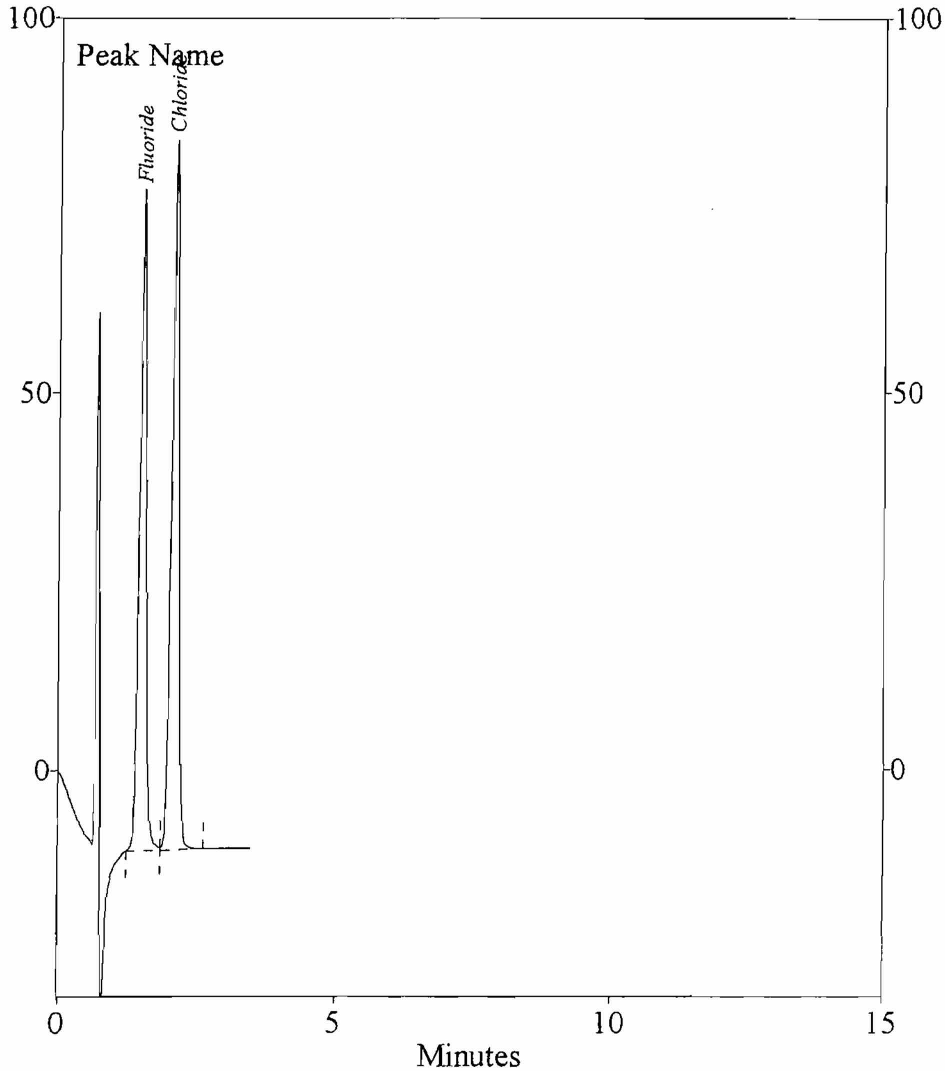


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10638.203
Method : c:\ezchrom\methods\m26-150.met
nple ID : 40/40 PPM a
quired : Aug 29, 2009 09:42:54

Channel A Results

Peak Name	Ret Time	Area
Fluoride	1.52	709184
Chloride	2.12	838541

c:\ezchrom\chrom\10638.203 -- Channel A



Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm

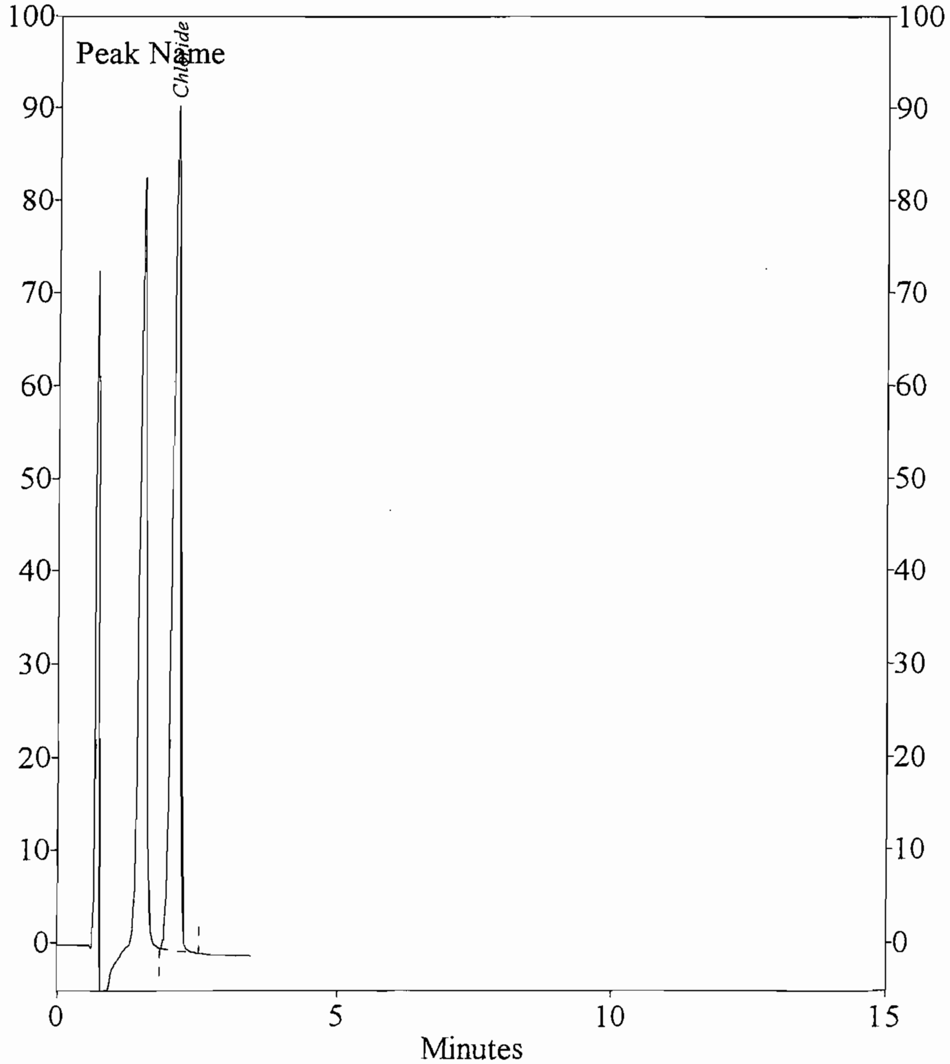
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10638.236
Method : c:\ezchrom\methods\m26-150.met
ıple ID : 40/40 PPM b
.quired : Aug 31, 2009 06:18:13

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.13	822854

c:\ezchrom\chrom\10638.236 -- Channel A

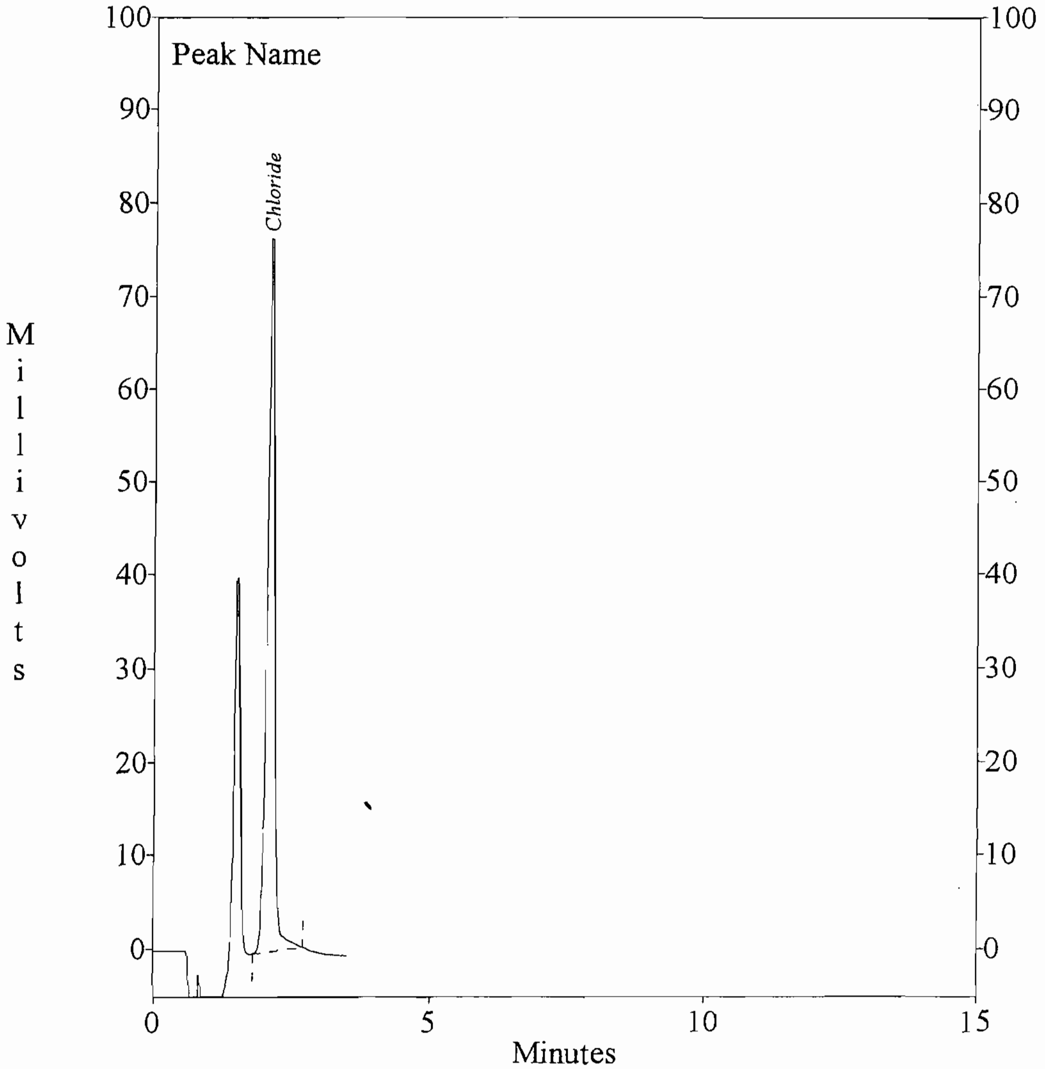


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.010
Method : c:\ezchrom\methods\m26-150.met
Sample ID : MATRIX SPIKE a
Acquired : Sep 08, 2009 14:08:14

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.10	725263

c:\ezchrom\chrom\10659.010 -- Channel A



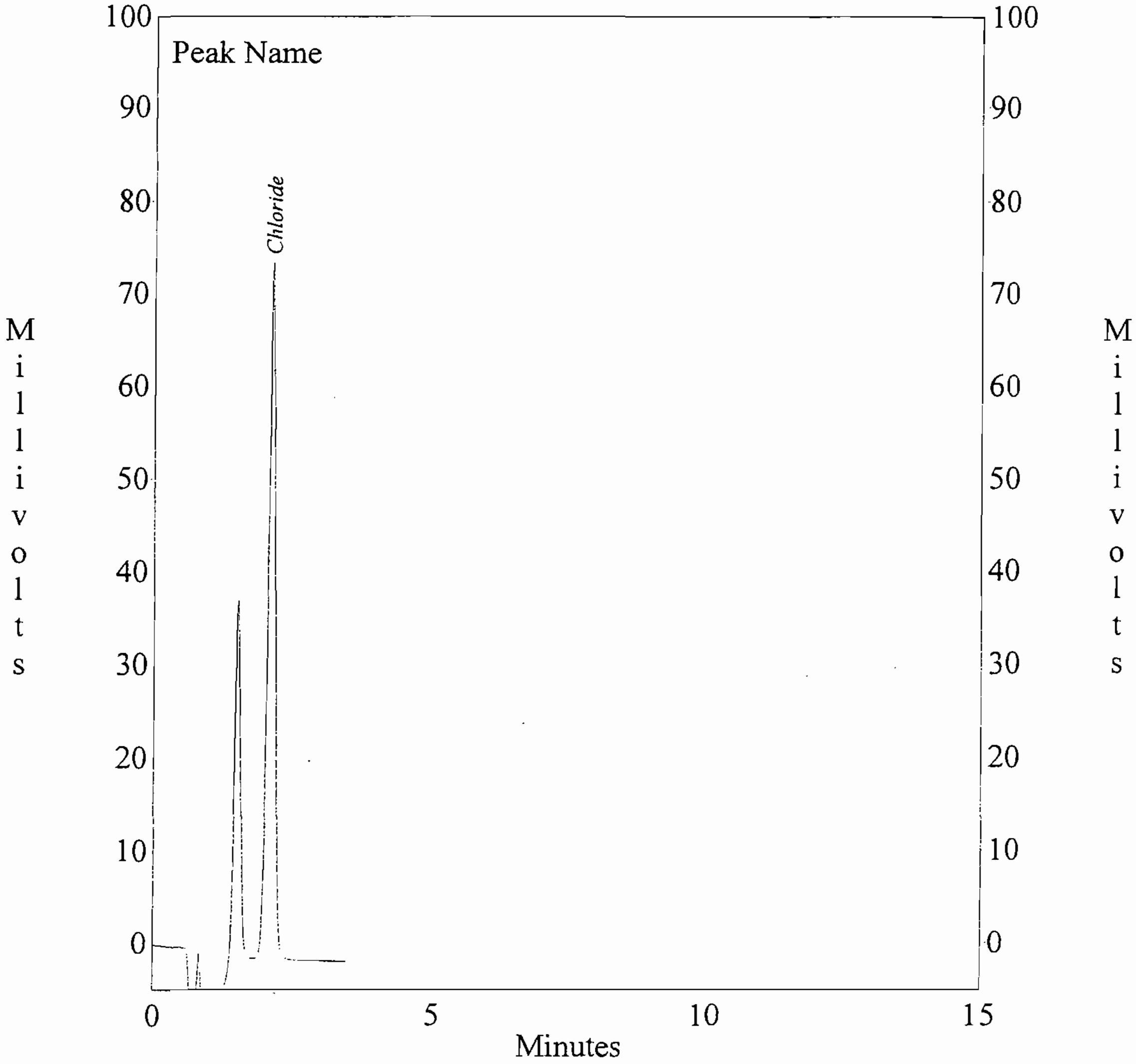
Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10659.011
Method : c:\ezchrom\methods\m26-150.met
Sample ID : MATRIX SPIKE b
ired : Sep 08, 2009 14:44:00

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.12	683380

c:\ezchrom\chrom\10659.011 -- Channel A



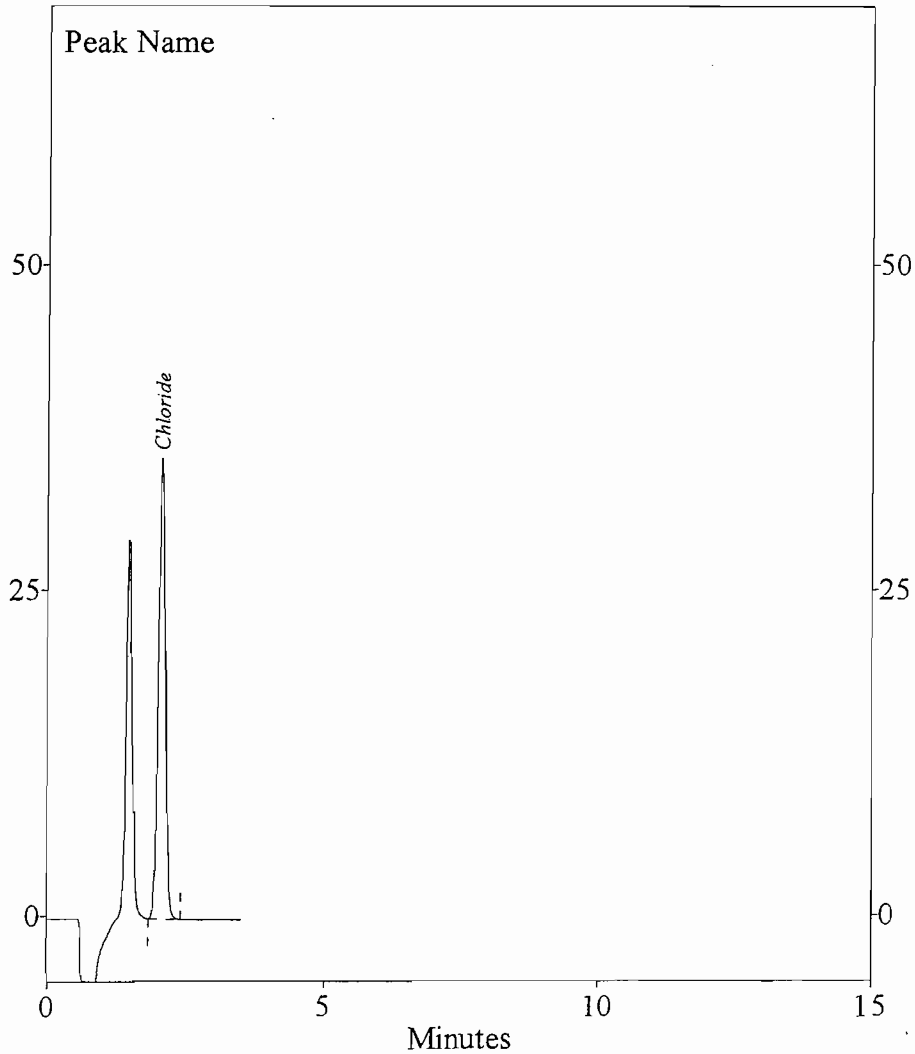
Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10659.001
Method : c:\ezchrom\methods\m26-150.met
ple ID : 15 PPM AUDIT a
uired : Sep 08, 2009 11:18:43

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.07	307443

c:\ezchrom\chrom\10659.001 -- Channel A

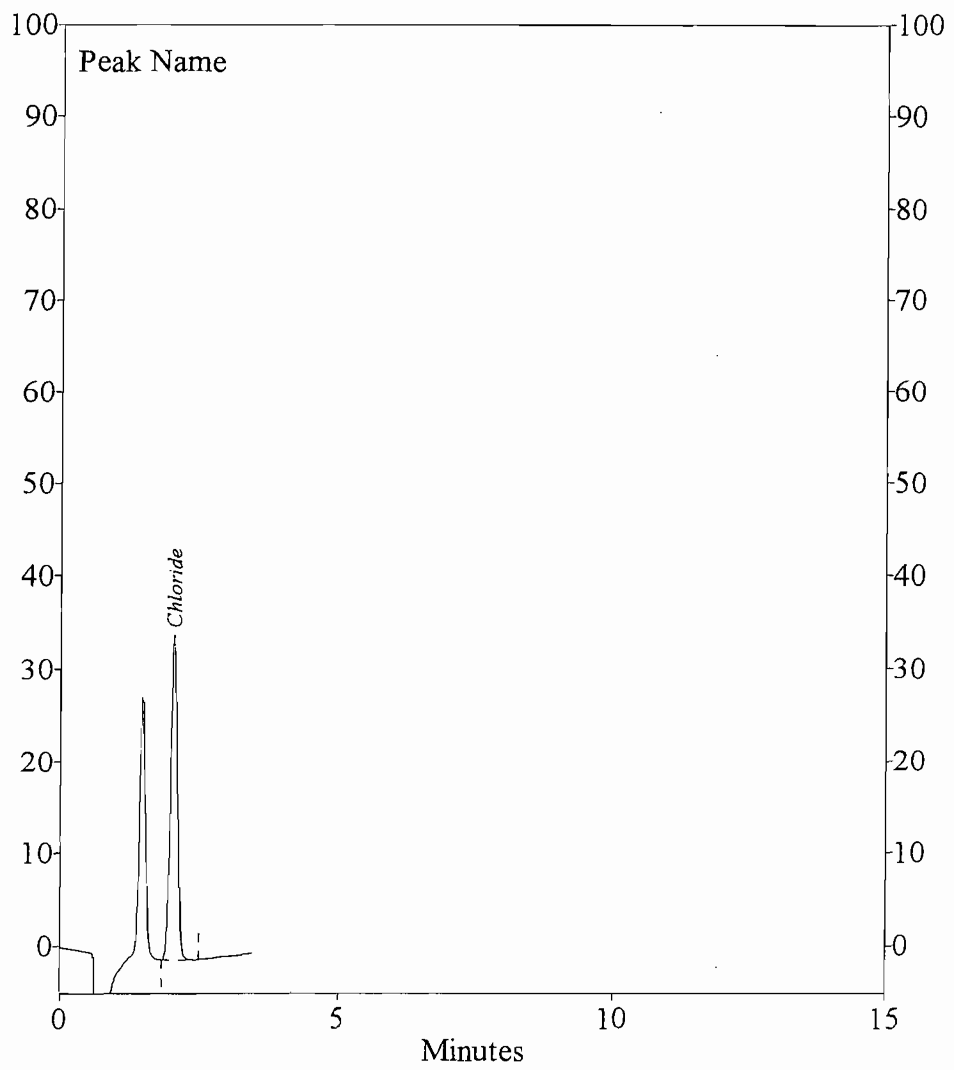


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.018
Method : c:\ezchrom\methods\m26-150.met
mple ID : 15 PPM AUDIT b
quired : Sep 08, 2009 16:36:19

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.07	305742

c:\ezchrom\chrom\10659.018 -- Channel A



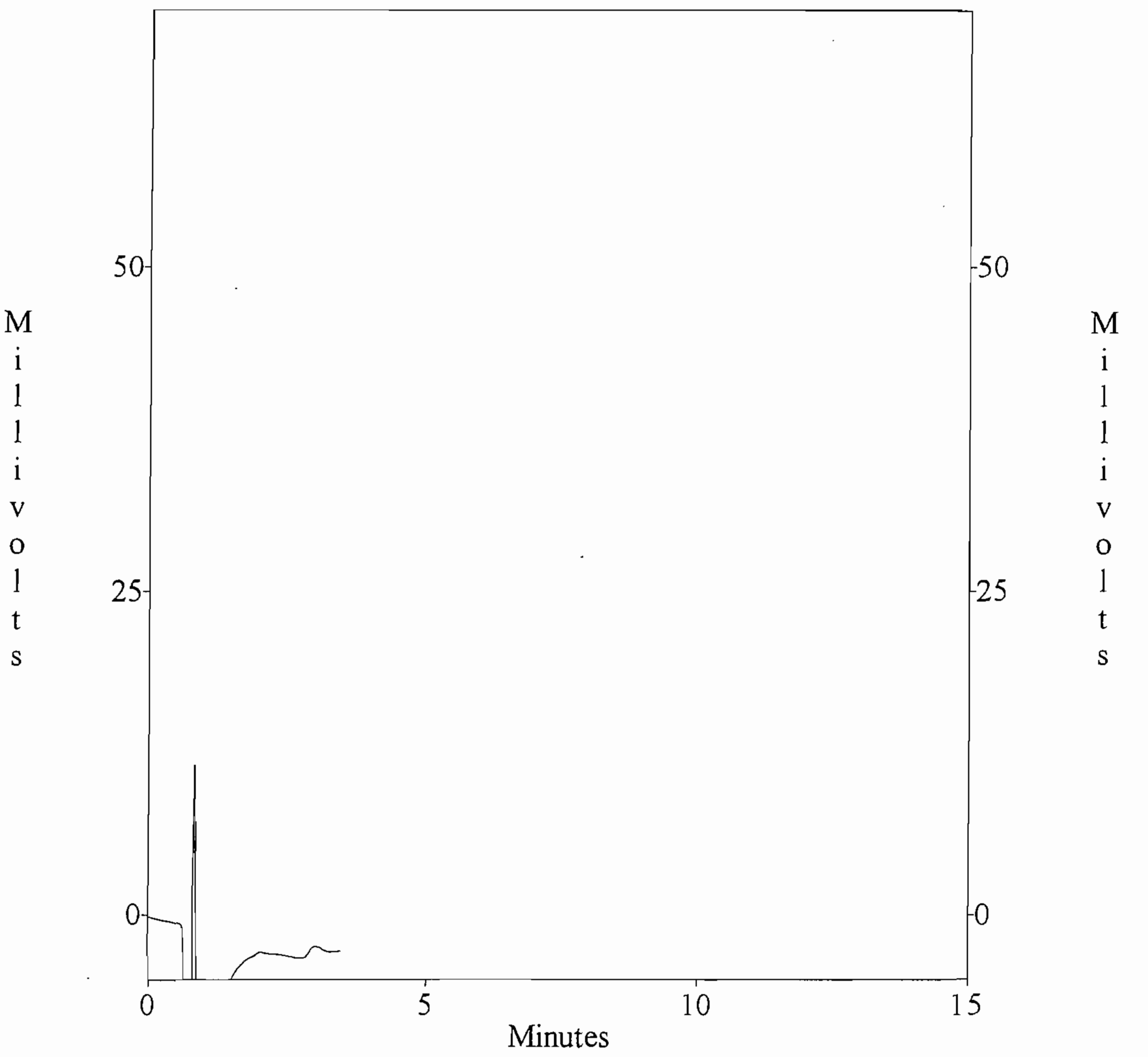
Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10659.002
Method : c:\ezchrom\methods\m26-150.met
ple ID : 0.1 N H2SO4 a
quired : Sep 08, 2009 11:31:28

Channel A Results

Peak Name	Ret Time	Area

c:\ezchrom\chrom\10659.002 -- Channel A

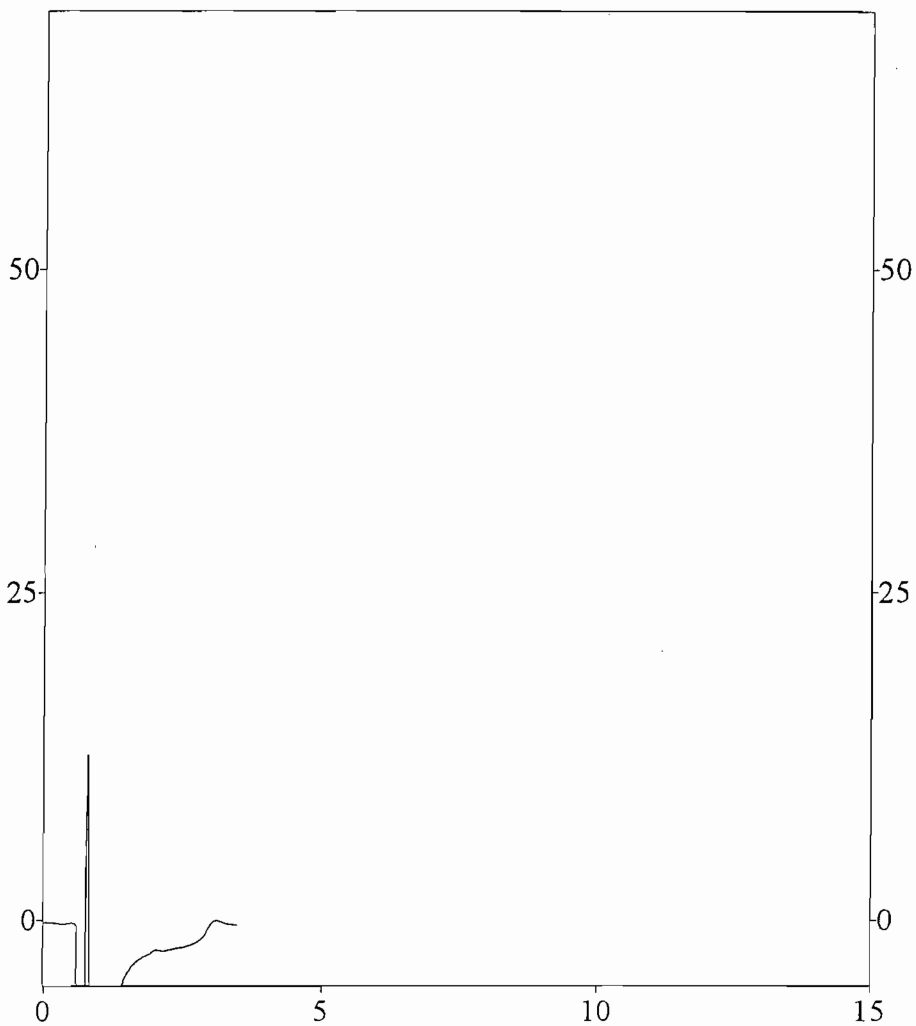


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.003
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 0.1 N H2SO4 b
Acquired : Sep 08, 2009 11:35:13

Channel A Results

Peak Name	Ret Time	Area

c:\ezchrom\chrom\10659.003 -- Channel A



Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm

Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min

Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10659.004

Method : c:\ezchrom\methods\m26-150.met

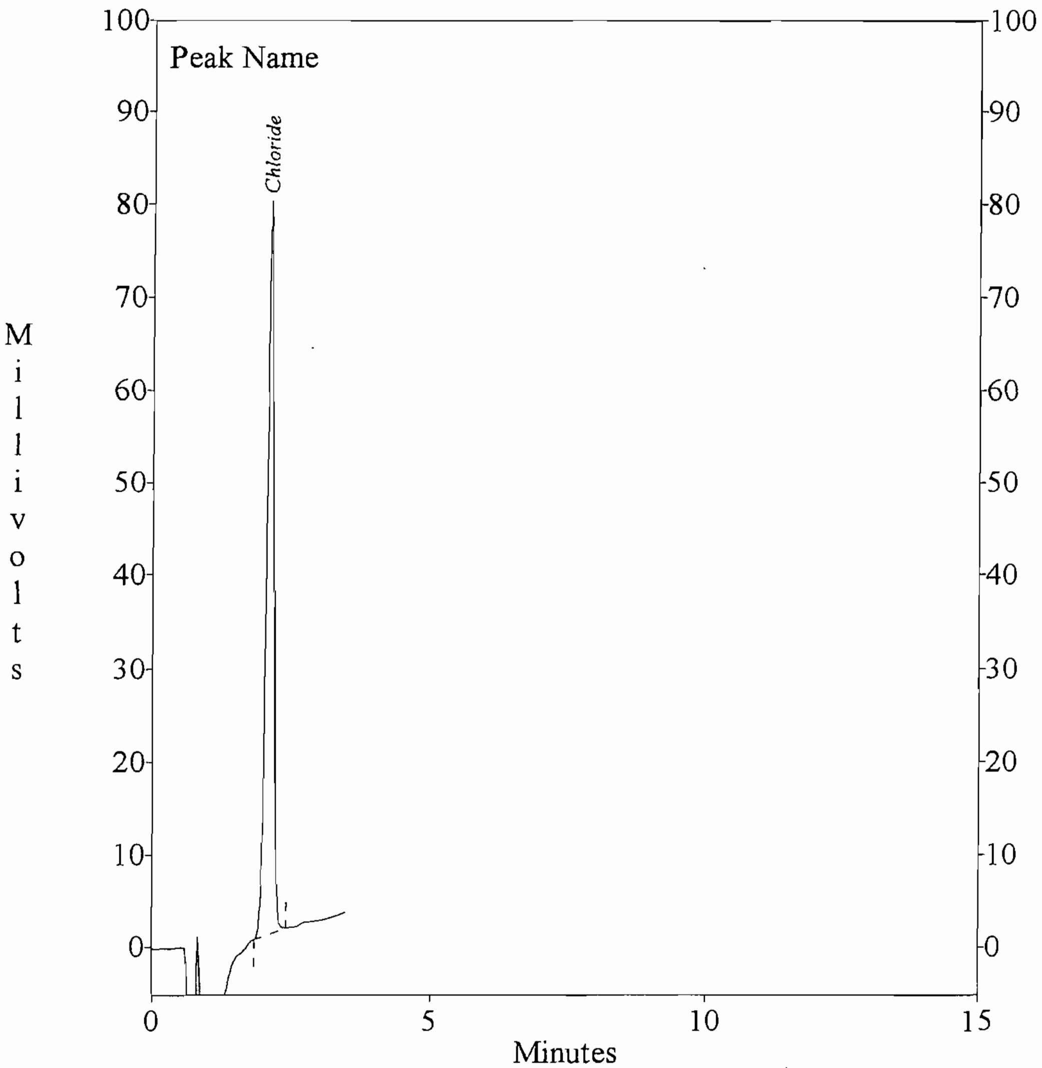
Sample ID : 4-O-1 a

uired : Sep 08, 2009 11:45:59

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.12	713873

c:\ezchrom\chrom\10659.004 -- Channel A



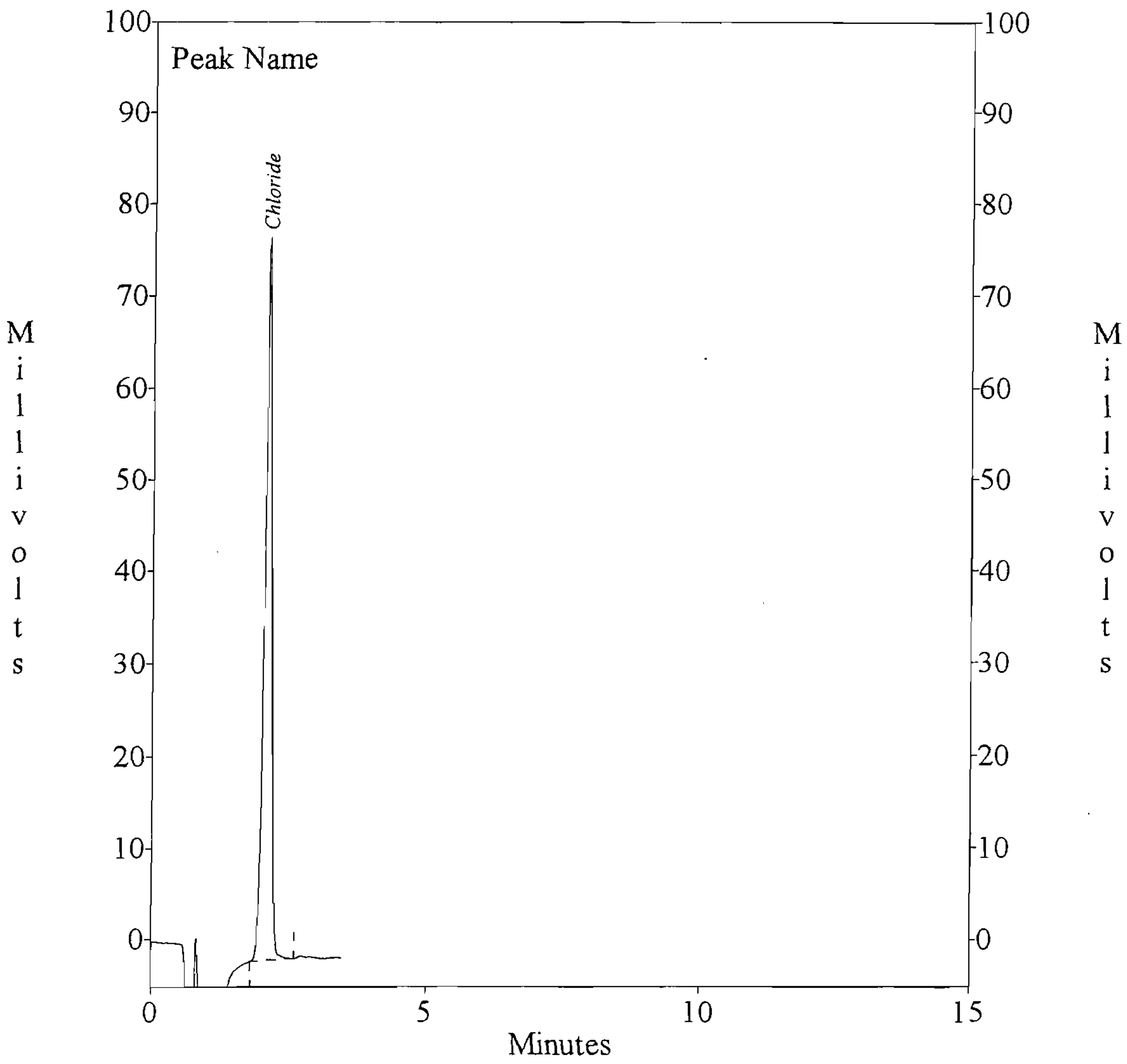
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10659.005
Method : c:\ezchrom\methods\m26-150.met
mple ID : 4-O-1 b
quired : Sep 08, 2009 12:21:44

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.12	719066

c:\ezchrom\chrom\10659.005 -- Channel A



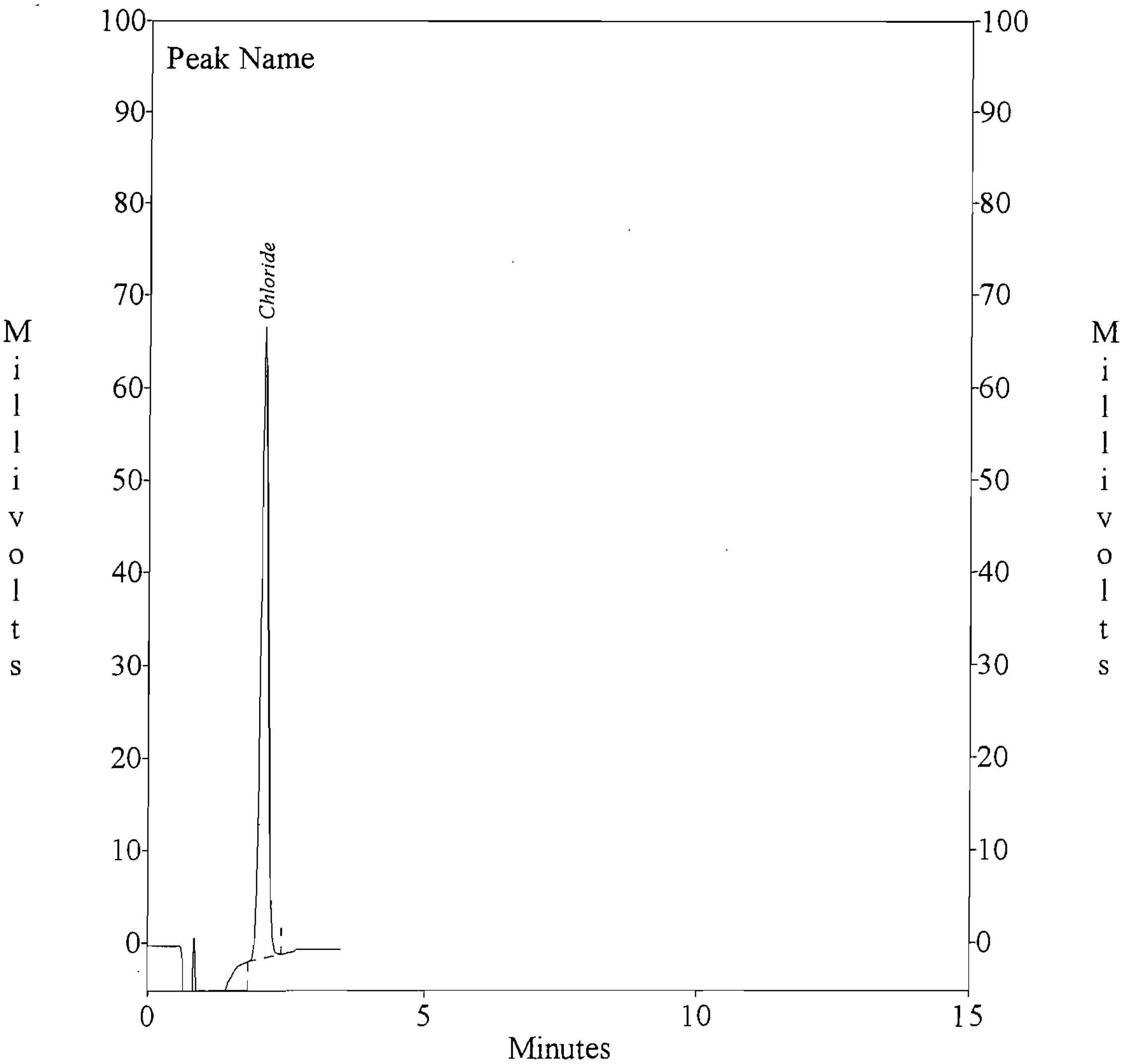
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm

Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.006
Method : c:\ezchrom\methods\m26-150.met
ple ID : 4-O-2 a
uired : Sep 08, 2009 12:25:29

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.10	607231

c:\ezchrom\chrom\10659.006 -- Channel A

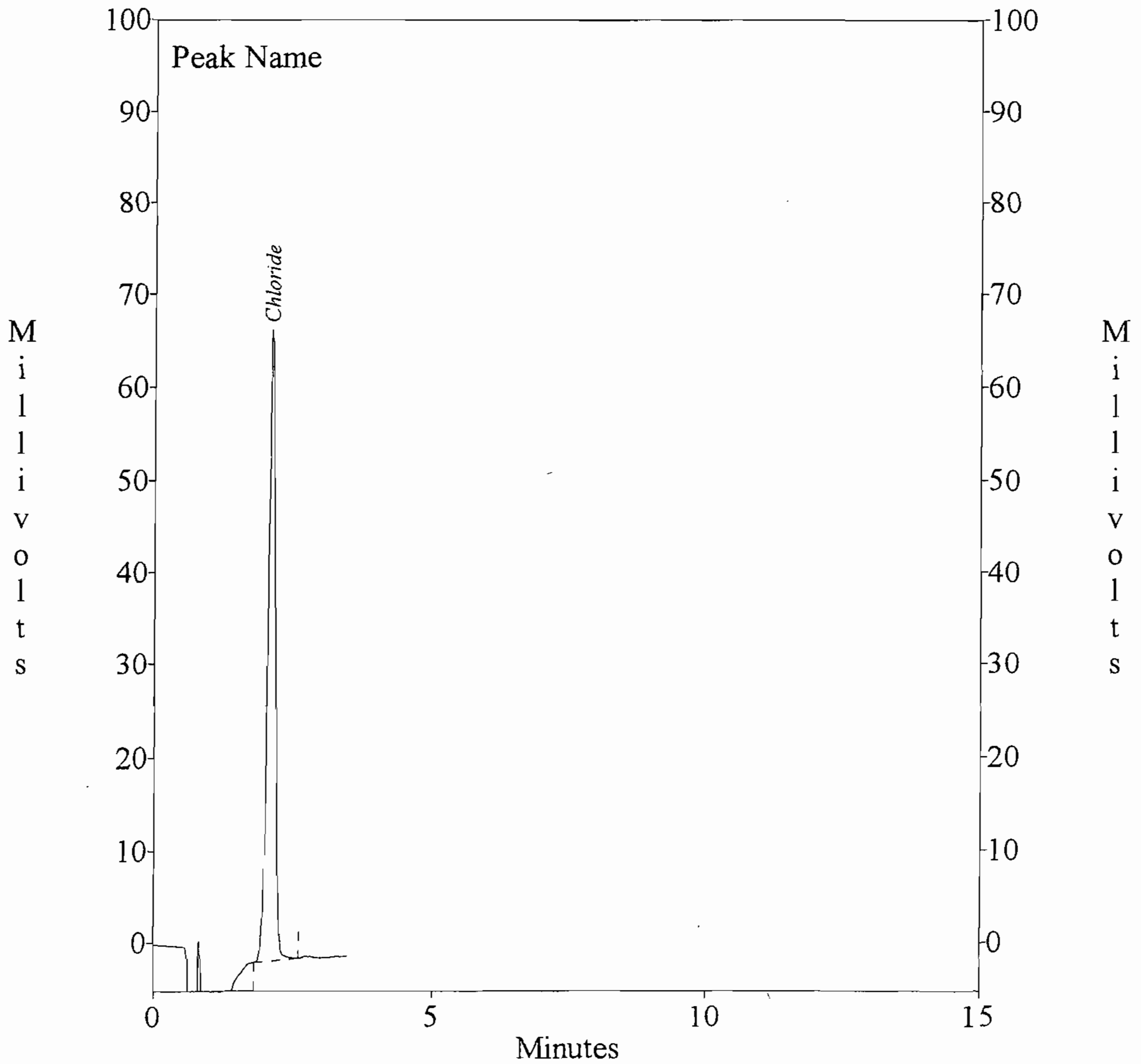


Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C
File : c:\ezchrom\chrom\10659.007
Method : c:\ezchrom\methods\m26-150.met
nple ID : 4-O-2 b
quired : Sep 08, 2009 12:36:14

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.10	616246

c:\ezchrom\chrom\10659.007 -- Channel A

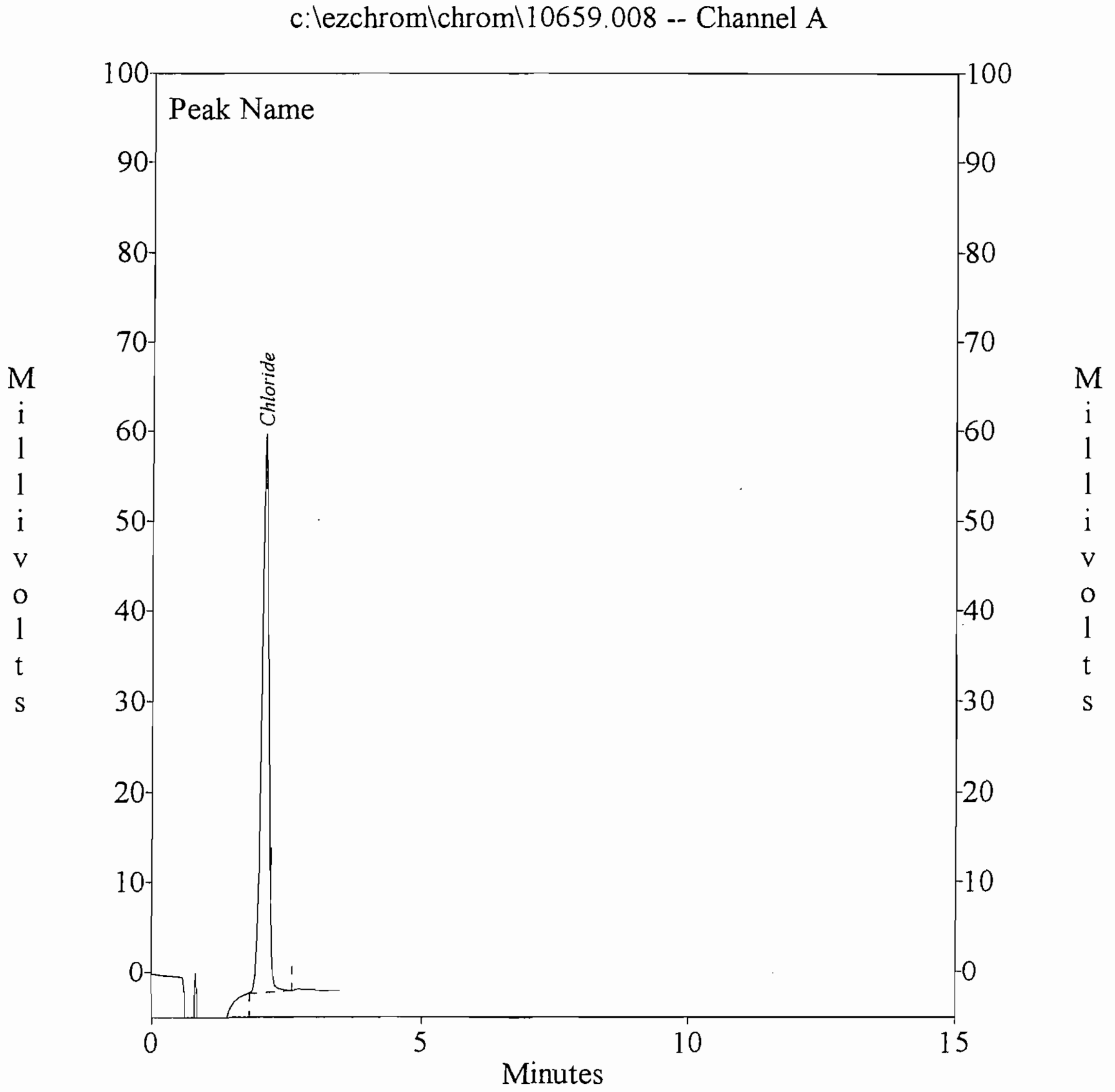


Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10659.008
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 4-O-3 a
ired : Sep 08, 2009 13:12:00

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.10	557655



Instrument: Shimadzu CDD-6A   Column: Hamilton PRP-X100 150x4.1mm

Eluent: 4 mM Phthalic Acid pH 3.6   Flow Rate: 1.75 mls/min

Gain 0.2 µS/cm   20 µl Inj Vol   Temp 40 C

File : c:\ezchrom\chrom\10659.009

Method : c:\ezchrom\methods\m26-150.met

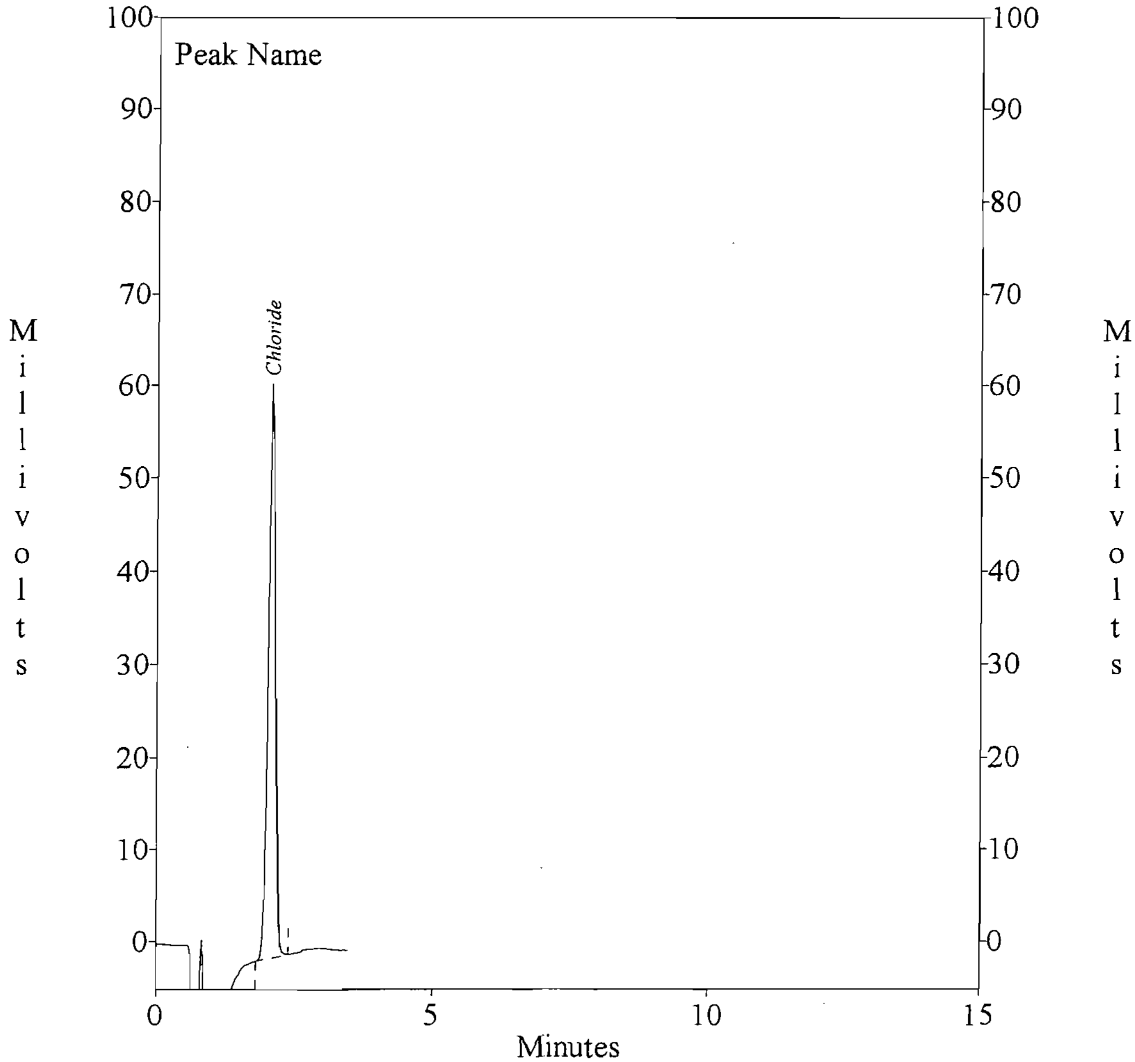
ple ID : 4-O-3 b

quired : Sep 08, 2009 13:15:45

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.08	550253

c:\ezchrom\chrom\10659.009 -- Channel A



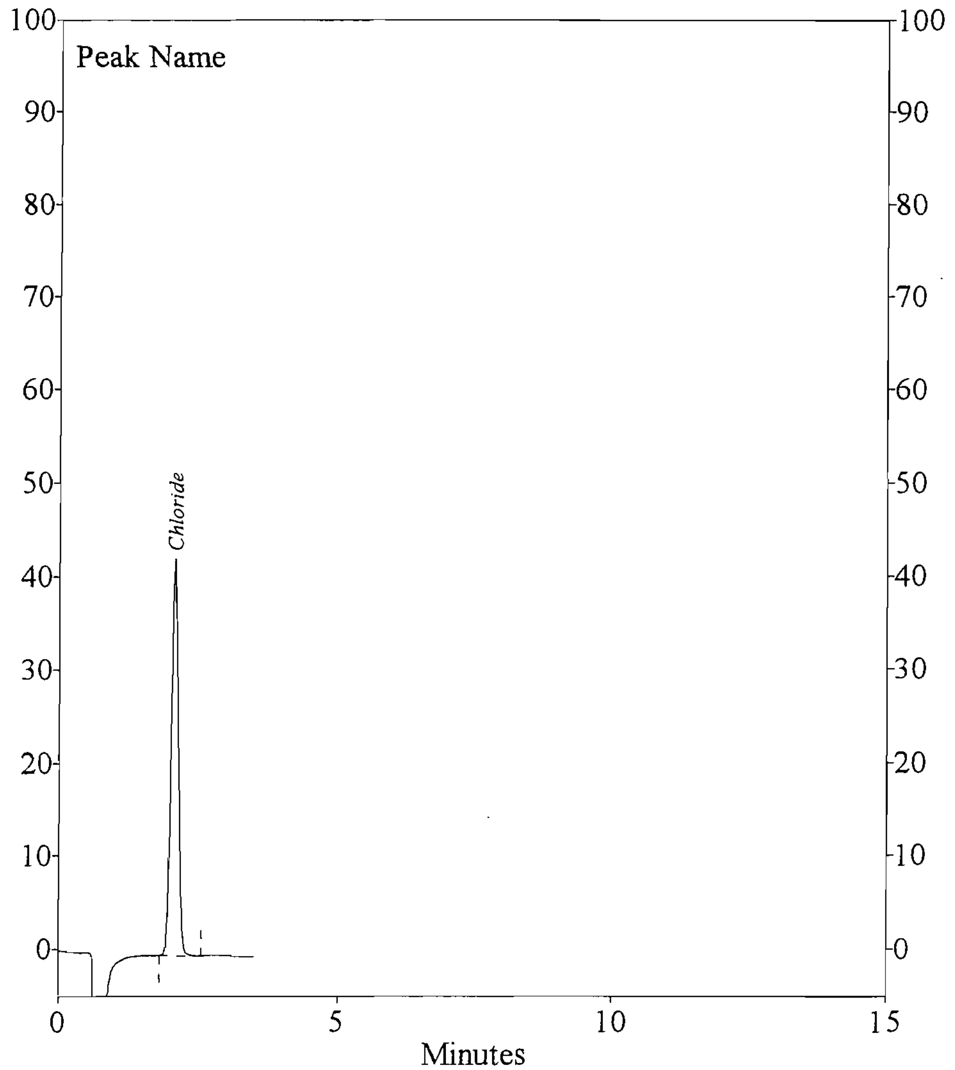
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10659.012
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 4-I-1 a
Acquired : Sep 08, 2009 15:19:46

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.08	380252

c:\ezchrom\chrom\10659.012 -- Channel A

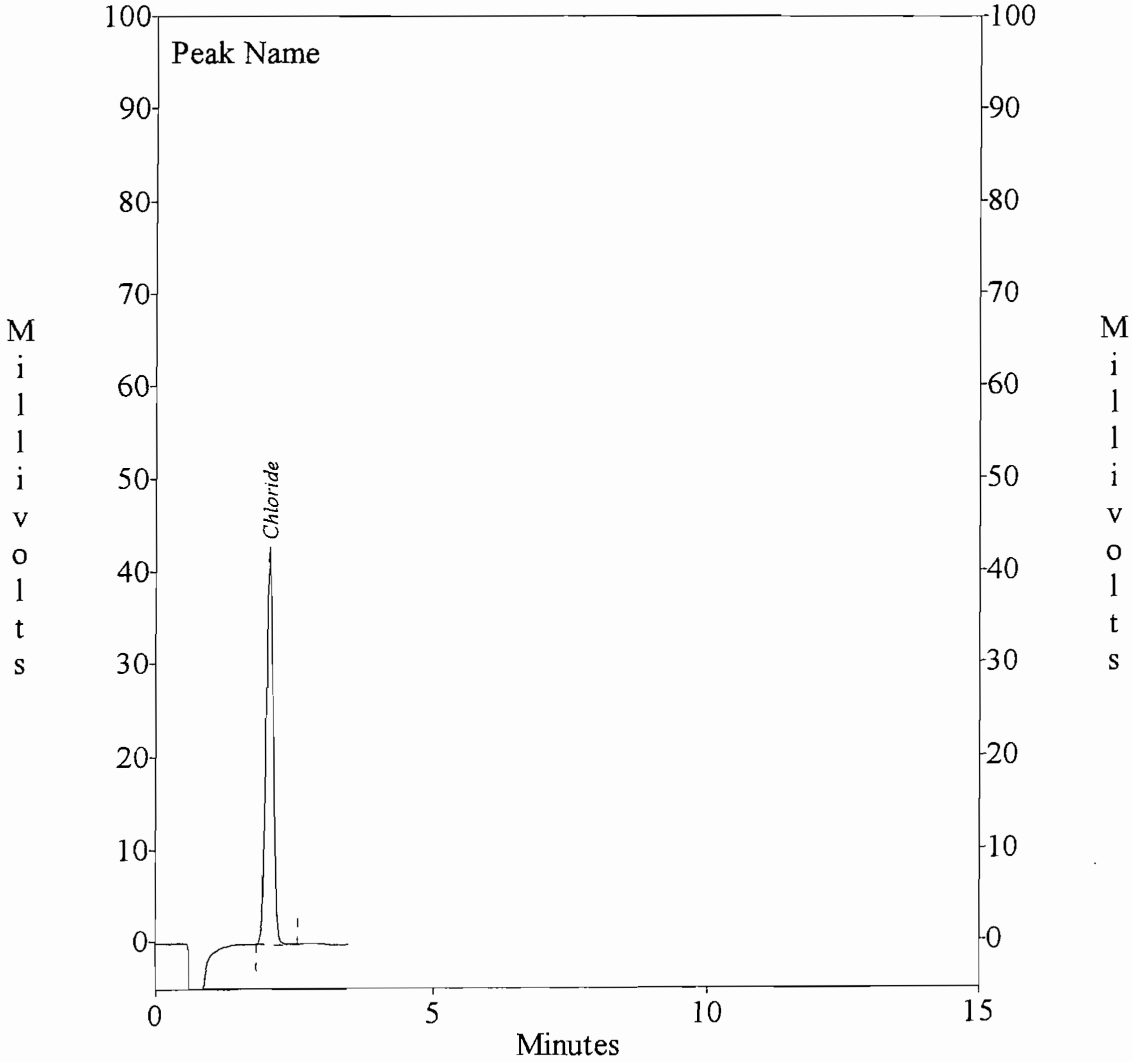


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.013
Method : c:\ezchrom\methods\m26-150.met
nple ID : 4-I-1 b
quired : Sep 08, 2009 15:32:31

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.08	382520

c:\ezchrom\chrom\10659.013 -- Channel A



Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm

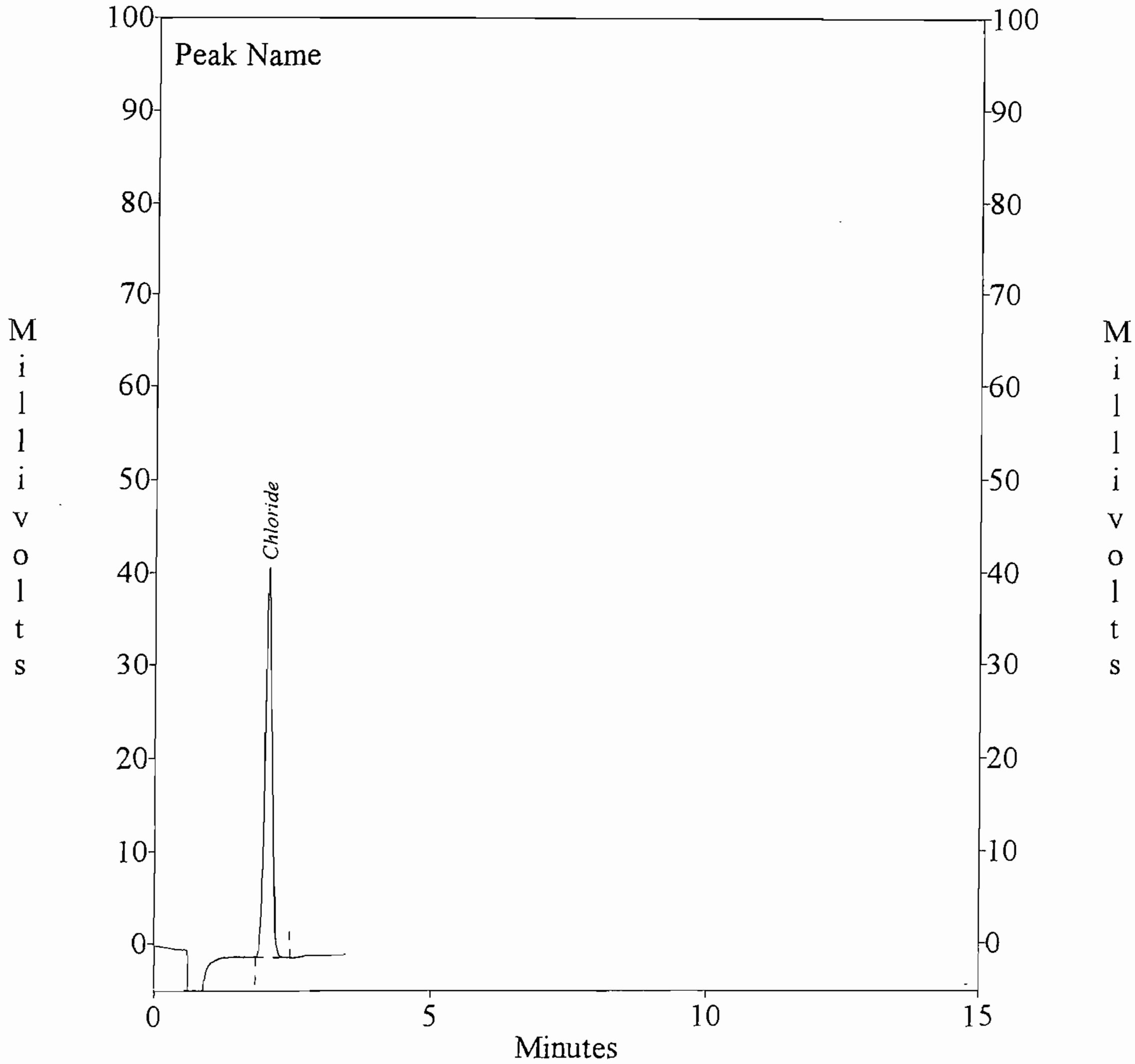
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10659.014
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 4-I-2 a
[illegible]uired : Sep 08, 2009 15:45:17

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.08	373008

c:\ezchrom\chrom\10659.014 -- Channel A

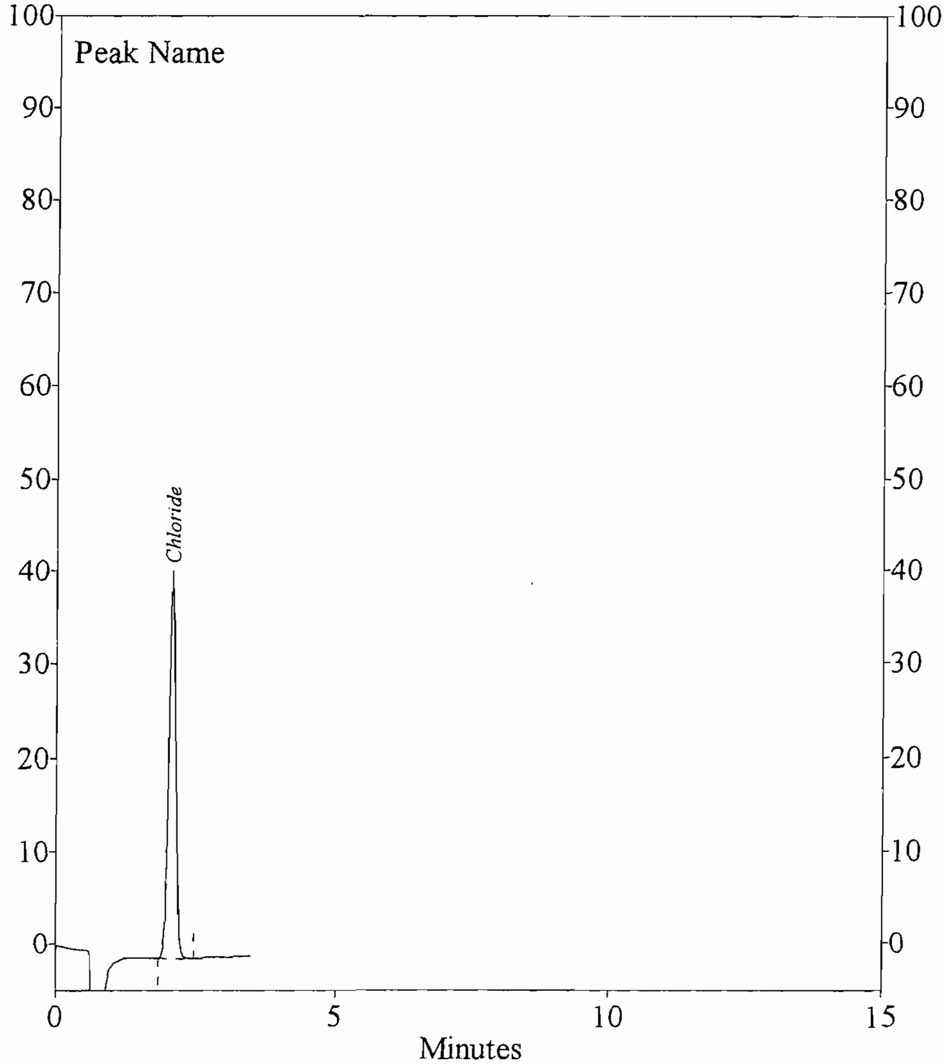


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.015
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 4-I-2 b
Acquired : Sep 08, 2009 15:58:03

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.08	369700

c:\ezchrom\chrom\10659.015 -- Channel A



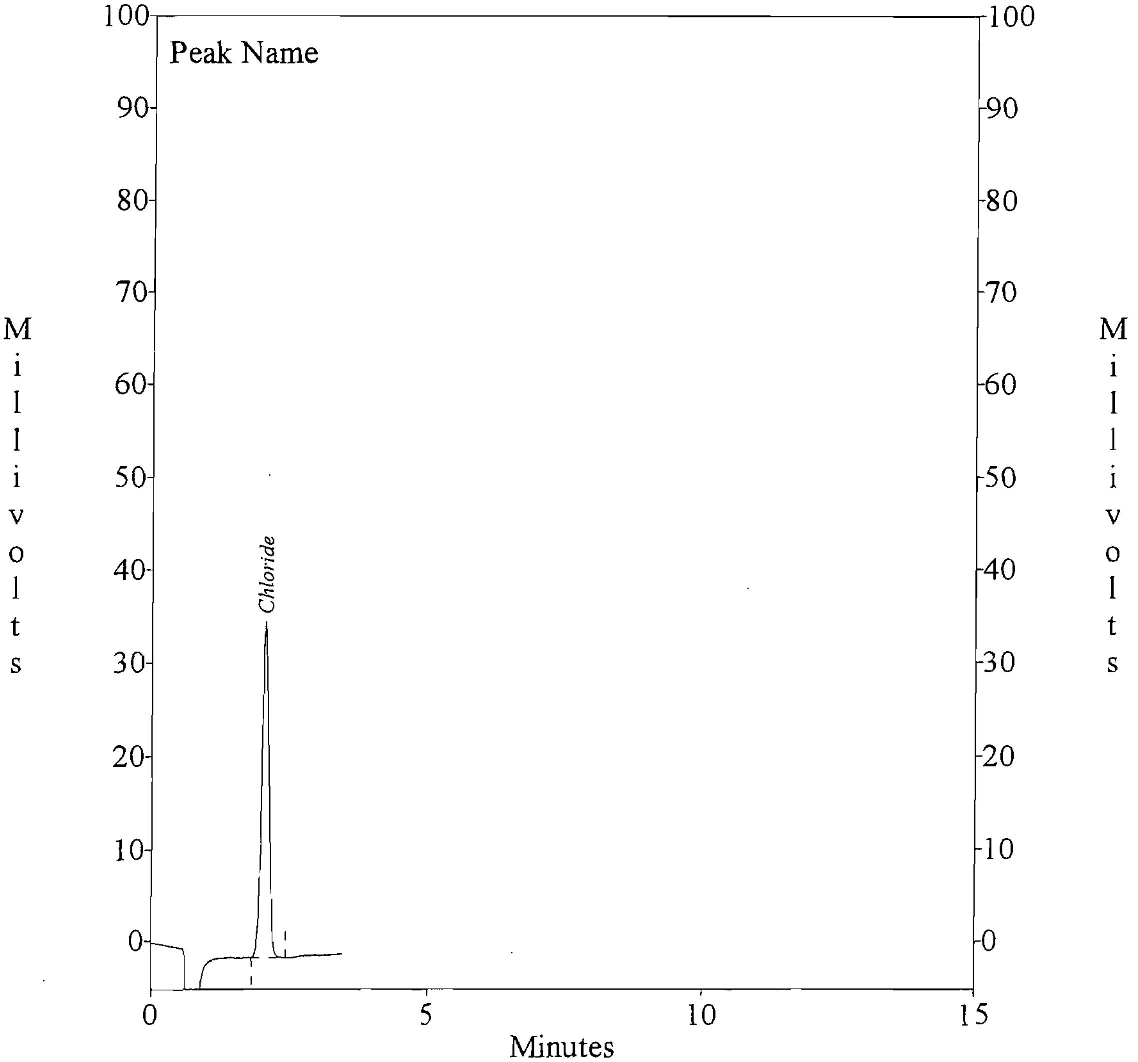
Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C

File : c:\ezchrom\chrom\10659.016
Method : c:\ezchrom\methods\m26-150.met
Sample ID : 4-I-3 a
Acquired : Sep 08, 2009 16:10:49

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.07	318778

c:\ezchrom\chrom\10659.016 -- Channel A

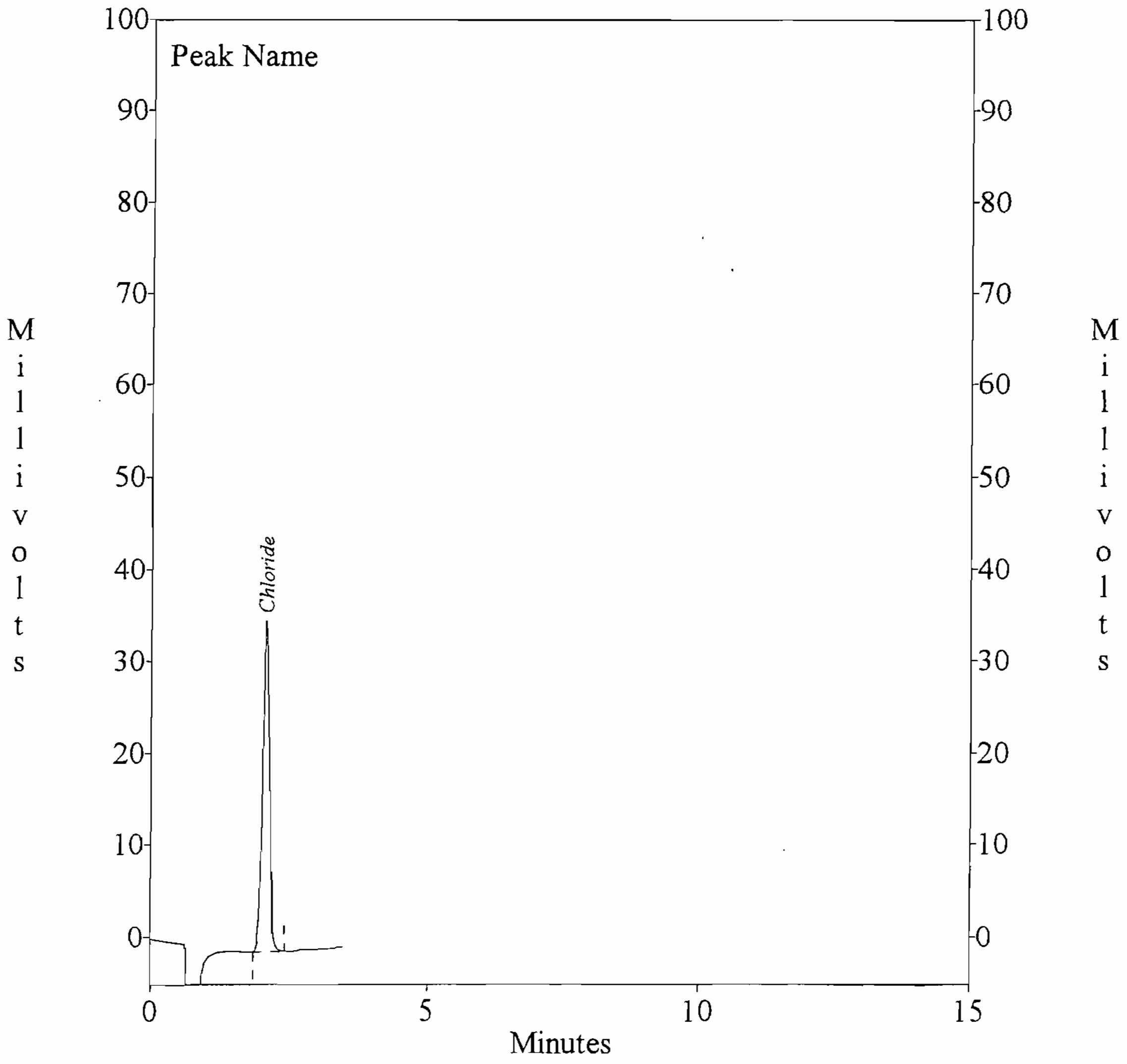


Instrument: Shimadzu CDD-6A Column: Hamilton PRP-X100 150x4.1mm
Eluent: 4 mM Phthalic Acid pH 3.6 Flow Rate: 1.75 mls/min
Gain 0.2 µS/cm 20 µl Inj Vol Temp 40 C
File : c:\ezchrom\chrom\10659.017
Method : c:\ezchrom\methods\m26-150.met
mple ID : 4-I-3 b
quired : Sep 08, 2009 16:23:34

Channel A Results

Peak Name	Ret Time	Area
Chloride	2.07	316454

c:\ezchrom\chrom\10659.017 -- Channel A



APPENDIX C.4
Analytical Data

Particulate and Metals

Testar, Inc.

7424 ACC Blvd # 108
Raleigh, NC 27617

Project Number: 10659

Particulate Matter, Cadmium, Lead and Mercury

EPA Methods 5 & 29 Analyses

Analytical Report
13108

el1 Element One, Inc.
5022-C Wrightsville Av., Wilmington, NC 28403
910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 13108
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

Daphne Woodman, Chemist
September 10, 2009

Report Reviewed and Finalized By:

Ken Smith, Laboratory Director
September 10, 2009

SUMMARY OF RESULTS

Summary of Analysis

Summary of Method 29 Mercury Analysis

Run Number		Average Total Catch, µg	Front half µg	H_2O_2 /HNO_3 µg	Empty Impinger µg	$KMnO_4$ µg	HCl µg
U4 Inlet R1	#1	101	38.4	61.9	< 0.2	< 0.5	0.831
	#2		38.2	61.1	< 0.2	< 0.5	0.838
U4 Inlet R2	#1	118	60.2	57.7	< 0.2	< 0.5	< 0.4
	#2		60.2	57.8	< 0.2	< 0.5	0.410
U4 Inlet R3	#1	135	39.4	93.5	0.269	1.35	< 0.4
	#2		39.2	94.2	0.269	1.37	< 0.4
U4 Outlet R1	#1	2.42	< 0.1	2.41	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.42	< 0.2	< 0.5	< 0.4
U4 Outlet R2	#1	2.37	< 0.1	2.36	< 0.2	< 0.5	< 0.4
	#2		< 0.1	2.37	< 0.2	< 0.5	< 0.4
U4 Outlet R3	#1	2.48	0.189	1.81	< 0.2	< 0.5	0.503
	#2		0.178	1.79	< 0.2	< 0.5	0.498
Field Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
Reagent Blank	#1	< 0.5	< 0.1	< 0.3	< 0.2	< 0.5	< 0.4
	#2		< 0.1	< 0.3	< 0.2	< 0.5	< 0.4

Summary of Analysis

Summary of Method 5 Particulate Analysis

Fraction	U4-O-M5-R1 e13108-4 Catch, mg	U4-O-M5-R2 e13108-5 Catch, mg	U4-O-M5-R3 e13108-6 Catch, mg
Filter	0.9	< 0.1	< 0.1
Rinse	< 0.1	1.3	2.4
Total PM	0.9	1.3	2.4

Summary of Method 29 Metals Analysis

Element	U4-O-R1 e13108-4 Total µg	U4-O-R2 e13108-5 Total µg	U4-O-R2 e13108-5 dup Total µg	U4-O-R3 e13108-6 Total µg
Cadmium	0.408	0.316	0.307	0.270
Lead	3.50	2.78	2.70	2.45

Summary of Analysis

Summary of Method 5 Particulate Analysis

Fraction	Reagent Blank e13108-16 Catch, mg
Filter	NA
Rinse	< 0.1
Total PM	< 0.1

Summary of Method 29 Metals Analysis

Element	Field Blank e13108-15 Total µg	Reagent Blank e13108-16 Total µg
Cadmium	< 0.2	< 0.2
Lead	0.465	< 0.2

ANALYTICAL NARRATIVE

Element One Analytical Narrative

Client:	Testar	Element One #:	13108
Client ID:	12108/Covanta Hillsborough	Analyst:	ESS & KMS
Method:	Methods 5 & 29	Dates Received:	09/04/09
Analytes:	PM, Cd, Pb, & Hg	Dates Analyzed:	09/08-10/09

Summary of Analysis

The Method 5 particulate samples were analyzed in accordance with EPA Method 5 guidelines. The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer. The samples were analyzed for the other metals on a PerkinElmer ELAN 6100 ICP-MS.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 µg per aliquot analyzed. The ICP-MS instrument reporting limit for cadmium and lead was 1.0µg/L.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD), spike sample recovery, and second source calibration verification data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The Method 5 blank correction factor has not been implemented. The ICP analysis of the Field Blank sample revealed detectable concentrations of lead.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < %10 for RPD)

Run Number	Front half	H_2O_2/HNO_3	Empty Imp	$KMnO_4$	HCl
U4 Inlet R1	0.5%	1.4%	NA	NA	0.8%
U4 Inlet R2	0.0%	0.2%	NA	NA	4.8%
U4 Inlet R3	0.4%	0.8%	0.0%	1.4%	NA
U4 Outlet R1	NA	0.6%	NA	NA	NA
U4 Outlet R2	NA	0.1%	NA	NA	NA
U4 Outlet R3	6.1%	0.9%	NA	NA	1.1%
Field Blank	NA	NA	NA	NA	NA
Reagent Blank	NA	NA	NA	NA	NA

Mercury Spike Recoveries

(Method 29 QC limits: ±25% for Spike Recoveries)

Run Number		Front half	H2O2/HNO4	Empty Imp	KMnO4	HCl
U4 Inlet R3	#1	97%	118%	104%	84%	104%
	#2	96%	117%	101%	83%	103%
U4 Outlet R3	#1	98%	106%	102%	107%	100%
	#2	98%	106%	103%	107%	100%

Summary of Quality Control Data

Metals Duplicate Analysis RPD

(Method 29 QC limits: < 20% for RPD)

Element	U4-O-R2 RPD
Cadmium	2.8%
Lead	3.0%

Metals Analysis Spike Recoveries

(Method 29 QC limits: ±25% for Spike Recoveries)

Element	U4-O-R3 Recovery
Cadmium	96%
Lead	103%

Second Source Calibration Check Recoveries

(Method 29 QC limits: ±10% for Second Source Continuing Check Standard)*

Element	1 ppb	50 ppb	100 ppb*	250 ppb
Cadmium	102%	105%	100%	99%
Lead	103%	97%	100%	90%

SAMPLE CUSTODY

Sample Record of Custody

13108

Client Name	Covanta Projects, Inc.		Project #	10659
Plant Name	Hillsborough County SWERF		Date	08/31/09
Plant City, State	Tampa, FL		Custodian Name	Blake Cone

Sample Box ID	Custody Seal #	Broken By	Reason Broken	Sealed By	Run Number	Sample Fraction	Filter ID	Filter Tare	Reagent pH	XAD ID
					4-I-M29-1	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-2	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-3	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					Reagent Blanks	Acetone				
						HNO3				
						HNO3/H2O2				
						Filter	UTQ			
						KMnO4/H2SO4				
						8N HCl & DI				

Signature		Company	TESTAR, Inc.	Date	9/1/09
Checked By		Company	TESTAR, Inc.	Date	9/1/09
Received By		Company	Element One	Date	9-4-9
Analytical Parameter	Mercury only by EPA Method 29 for samples, results by 09-10-09 noon				
Sample Condition	Particulate on acetone blank, Cd, Pb, and mercury on Reagent Blanks Condition: Good				

All samples for Testar 10659 Received in Sci-Spec containers

BEST AVAILABLE COPY

Sample Record of Custody

13108

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	08/31/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #	Broken By	Reason Broken	Sealed By	Run Number	Sample Fraction	Filter ID	Filter Tare	Reagent pH	XAD ID
					4-I-M29-1	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-2	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-3	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					Reagent Blanks	Acetone				
						HNO3				
						HNO3/H2O2				
						Filter	UTQ			
						KMnO4/H2SO4				
						8N HCl & DI				

Signature	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Checked By	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Received By	[signature]	Company	Element One	Date	9.4.9
Analytical Parameter	Mercury only by EPA Method 29 for samples, results by 09-10-09 noon				
Sample Condition	Particulate on acetone blank, Cd, Pb, and mercury on Reagent Blanks Condition: Good				

All samples for Testar 10659 Received in Sci-Spec containers

180

Sample Record of Custody

13108

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	08/31/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #	Broken By	Reason Broken	Sealed By	Run Number	Sample Fraction	Filter ID	Filter Tare	Reagent pH	XAD ID
					4-O-M5/29-1	Acetone rinse				
						FH HNO3				
						Filter	T106-07	0.359		
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-O-M5/29-2	Acetone rinse				
						FH HNO3				
						Filter	T107-15	0.4742		
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-O-M5/29-3	Acetone rinse				
						FH HNO3				
						Filter	T107-16	0.4596		
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					O-M5/29-FB	Acetone rinse				
						FH HNO3				
						Filter				
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				

Signature		Company	TESTAR, Inc.	Date	9/1/09
Checked By		Company	TESTAR, Inc.	Date	9/1/09
Received By		Company	Element One	Date	9-4-9
Analytical Parameters	Particulate per EPA Methods 5 and 29, Cd, Pb and Hg by EPA Method 29, results by 09-10-09 noon				
Sample Condition				Condition: Good	

Sample Record of Custody

13108

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	09/01/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #	Broken By	Reason Broken	Sealed By	Run Number	Sample Fraction	Filter ID	Filter Tare	Reagent pH	XAD ID
					4-I-M29-4	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-5	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-6	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-I-M29-7	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				

Signature	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Checked By	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Received By	Lisa Braden	Company	Element One	Date	9-4-9
Analytical Parameter	Mercury only by EPA Method 29 for samples, normal turnaround, separate report from runs 1, 2, and 3				
Sample Condition	Good				

Sample Record of Custody

13108

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County SWERF
Plant City, State	Tampa, FL

Project #	10659
Date	09/01/09
Custodian Name	Blake Cone

Sample Box ID	Custody Seal #	Broken By	Reason Broken	Sealed By	Run Number	Sample Fraction	Filter ID	Filter Tare	Reagent pH	XAD ID
					4-O-M29-4	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-O-M29-5	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-O-M29-6	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				
					4-O-M29-7	FH HNO3				
						Filter	UTQ			
						HNO3/H2O2				
						IMP 3 HNO3				
						KMnO4/H2SO4				
						8N HCl & DI				

Signature	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Checked By	[signature]	Company	TESTAR, Inc.	Date	9/1/09
Received By	Lu? Braton	Company	Element One	Date	9.4.9
Analytical Parameters	Mercury only by EPA Method 29 for samples, normal turnaround, separate report from runs 1, 2, and 3				
Sample Condition	Good				

ANALYTICAL DATA

Analytical Calculations

Metals-

Element Results (µg) =ICP Results (µg/L)*Dilution*Final Volume (L)

Where-

ICP Results= Raw sample concentration (ppb)--*ICP-Data Sheet*

Dilution= $\frac{\text{Diluted Volume}}{\text{Aliquot}}$--*ICP-MS Run Sheet*

Final Volume=FH=Final Volume (FV)--*Sample Submission*

BH= $\frac{\text{Received Volume (BV)}}{\text{Aliquot (Used)}}$ *Final Volume (FV)--*Sample Submission*

Combined Results=FH+BH

Mercury-

$$\textbf{Mercury Results (µg)} = \frac{\textbf{CVAA Results (µg)}}{\textbf{Aliquot (ml)}} \textbf{*Final Volume (ml)}$$

Where-

CVAA Results= Raw sample reading (µg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume=Final Volume (FV)*--*Sample Submission*
* With the exception of the BH fraction where-
=Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{\text{(Spiked Result (µg/L) – Sample Result (µg/L))}}{\text{Spike Amount (µg/L)}} \times 100$$

Where-

Spike Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Sample Result = Raw sample concentration (ppb)--*ICP-Data Sheet*

Spike Amount--*ICP-MS Spike Table*

Duplicate Analysis RPD-

$$\text{RPD (\%)} = \frac{\text{(Duplicate Result (µg/L) - Sample Result (µg/L))}}{\text{Average (µg/L)}} \times 100$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (ppb)--*ICP-Data Sheet*

$$\text{Average} = \frac{\text{(Duplicate + Sample Results)}}{2}$$

elementOne **AIR TESTING SAMPLE SUBMISSION FORM** **Lab ID 13108**

RUSH-Samples 1-6, 15-16 DUE BY NOON 09.10.09

Analysis Due Date 09.15.09
QA/QC/Report Due Date 09.17.09

Client: TESTAR	Date 09.04.09
Project No	Time 1420

HNO_3 Lot: 408210	HF Lot: 5108872	HCl Lot: 408210	**Ref. Method:**
Volume Marked Y / N	Volume Loss Y / N ?		**29/5**

Sample Identification

1	U4-I-M29-R1	7	U4-I-M29-R4	15	Field Blank
2	U4-I-M29-R2	8	U4-I-M29-R5	16	Reagent Blank Page 2
	U4-I-M29-R2 Duplicate		U4-I-M29-R5 Duplicate		
3	U4-I-M29-R3	9	U4-I-M29-R6		
	U4-I-M29-R3 Spike		U4-I-M29-R6 Spike		
		10	U4-I-M29-R7		
4	U4-O-M29/5-R1	11	U4-O-M29/5-R4		
5	U4-O-M29/5-R2	12	U4-O-M29/5-R5		
	U4-O-M29/5-R2 Duplicate		U4-O-M29/5-R5 Duplicate		
6	U4-O-M29/5-R3	13	U4-O-M29/5-R6		
	U4-O-M29/5-R3 Spike		U4-O-M29/5-R6 Spike		
		14	U4-O-M29/5-R7		

Analyses Requested		
	Samples 1-16	Hg
	Samples 4-6, 15-16	Cd, Pb
	Samples 4-6, 16	Particulate Matter

Runs / FB	Fil / Ace (FH)		HNO_3 (FH)		5% HNO_3/10% H_2O_2 (BH)			HNO_3 (A)		$KMnO_4$ (B)		HCl (C)	
	pH <2.0 Y / N		pH <2.0 Y / N		pH <2.0 Y / N			pH <2.0 Y / N		pH <2.0 Y / N		pH <2.0 Y / N	
Lab ID	Fil ID	BV ml s	BV ml	FV ml	BV ml	Used	FV ml	BV ml	FV ml	BV ml	FV ml	BV ml	FV ml
1		4.9	55 / 190	100	640			110	200	480	500	230	400
2.D			135		610			118		430		230	
3.S			180		620			108		440		240	
4	106-07		85		630	315	50	108		480		260	
5.D	107-15		100		640	320		108		450		250	
6.S	109-16		55		600	300		108		440		230	
7			170		570			112		430		230	
8.D			190		600			108		410		230.	
9.S			200		570			108		430		230	
10			188		560			108		440		230	
11			98		560			108		420		230	
12.D			112		560			105		420		230	
13.S			110		580			108		430		250	
14			105		590			108		410		230	
15			110		300	150	50	105		410		230	

Lab Communications

URB SPK A, B, C

SS Page1 of 2
9/4/2009 4:24:34 PM
SS by LLB
Labeled By/Date ESS 9.4.09

FH Prep By/Date 9.9.09 ESS
BH Prep By/Date 9.9.09 ESS
BH/FH Prep By/Date 9.9.09 ESS
PM Prep By/Date ESS 9.4.09

A Prep By/Date 9.5.09 ESS
B Prep By/Date 9.5.09 ESS
C Prep By/Date 9.8.09 ESS
ID Verification By / Date CML 09/04/09

elementOne **AIR TESTING SAMPLE SUBMISSION FORM** **Lab ID 13108**

Analysis Due Date	09.15.09
QA/QC/Report Due Date	09.17.09

Client:	TESTAR
Project No	

Date	09.04.09
Time	1420

HNO_3 Lot:	HF Lot:	HCl Lot:	**Ref. Method:**
Volume Marked Y / N	Volume Loss Y / N / ?		**29/5**

Sample Identification

16	Reagent Blank				

Analyses Requested	Sample 16	Cd, Pb, Hg
	Sample 16	Particulate Matter (Acetone Fraction)

M-29 Reagent Blank

Lab ID	Fraction			BV, ml	FV, ml	Comments
16	C-7	FH	Acetone Blank	9-5-09		
	C-8A	FH	$0.1N\ HNO_3$ 200	~~185~~	100	use 100 mL
	C-8A	A	$0.1N\ HNO_3$			
	C-8B	B	DI H_2O			
	C-9	BH	5% HNO_3/10% H_2O_2	250	200	bh + 100 fh < 300 150 Hg / 150 metals
	C-10	B	4% $KMnO_4$/10%H_2SO_4	410	500	
	C-11	C	8N HCl DI H_2O	240	400	
	C-12	FH	Filter			

Lab Communications

Fractions Received: Runs: C1, C2, C3, C4, C5A, C5B, C5C—RB; C7, C8A, C9, C10, C11, C12

SS Page2 of 2
9/4/2009 4:24:34 PM
SS by LLB
Labeled By/Date________

FH Prep By/Date________
BH Prep By/Date________
BH/FH Prep By/Date________
PM Prep By/Date________

A Prep By/Date________
B Prep By/Date________
C Prep By/Date________
ID Verification By / Date________

elementOne

Method 5 Particulate

Lab # 13108

Client Testar

Page 1of 1

Balance checks	Date: 09.08.09	2 g =	2.0001	Acetone Concentration
	Date: 09.09.09	2g =	1.9999	0.00E+00 mg/mg
	Date:			

Filters

Sample ID #	Filter ID	Bag ID	A	B		B		B		Catch Description and Loading
			Bag Tare, g	Date -09/08/09 Initials -RLC		Date - 09/08/09 Initials-RLC		Date- 9/09/09 Initials- RLC		
				Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	Time	Bag & Filter Weight, g	
13108-4	106-07	2332	3.8042	7:30	4.1641	15:30	4.1652	7:20	4.1646	
13108-5	107-15	852	3.4154	7:30	3.8888	15:30	3.8899	7:20	3.8887	
13108-6	107-16	2377	3.7026	7:30	4.1616	15:30	4.1624	7:20	4.1614	
Client Blk HERE										
E1 Blank										

Acetone Rinses

Sample ID #	Sample Volume, ml	Bag ID	C	D		D		D		Catch Description and Loading
			Bag Tare, g	Date -09/08/09 Initials -RLC		Date - 09/08/09 Initials-RLC		Date-9/09/09 Initials- RLC		
				Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	Time	Bag & Sample Weight, g	
13108-4	45	2	4.3566	7:30	4.3555	15:30	4.3571	7:20	4.3560	
13108-5	68	2399	3.7015	7:30	3.7028	15:30	3.7046	7:20	3.7033	
13108-6	50	2381	3.7125	7:30	3.7129	15:30	3.7151	7:20	3.7149	
13108-15	100	217	3.3938	7:30	3.3934	15:30	3.3947	7:20	3.3937	
Client Ace Blk HERE	205	791	4.1723	7:30	4.1703	15:30	4.1727	7:20	4.1722	
E1 Acetone Blank	100	2385	3.4785	7:30	3.4769	15:30	3.4787	7:20	3.4783	

Total Catches

Sample ID #	Filter ID	Filter Tare, g	Final Filter + Catch, g	Filter Catch, mg	Acetone Bag ID	Bag Tare, g	Final Bag + Acetone Weight, g	Acetone blank, mg	Acetone Catch, mg	Total Catch, mg
13108-4	106-07	0.3590	4.1641	0.9	2	4.3566	4.3555	0.0	<0.1	0.9
13108-5	107-15	0.4742	3.8887	<0.1	2399	3.7015	3.7028	0.0	1.3	1.3
13108-6	107-16	0.4596	4.1614	<0.1	2381	3.7125	3.7149	0.0	2.4	2.4
13108-15					217	3.3938	3.3934	0.0	<0.1	<0.1
Client Ace Blk HERE					791	4.1723	4.1722	0.0	<0.1	<0.1
E1 Acetone I					2385	3.4785	3.4783	0.0	<0.1	<0.1

Element One, Inc. Form 123 - Revision 1.10.23.07

APPENDIX D
Calibration Data

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

METER CONSOLE #: T2
DGM SERIAL #: 9739317

DATE: 06/29/09 | CRITICAL ORIFICE SET SERIAL #: 1345 | BAROMETRIC PRESSURE (in Hg): INITIAL 29, FINAL 29, AVG (P_{bar}) 29

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y CHECK < 0.02 VAR.	$\Delta H_@$	ΔH CHECK < 0.2 VAR.
23	1	0.6385	17	235.000	240.160	5.160	84	86	85	82	83	84.0	6.00	2.050	4.880	4.765	0.9763	OK	1.73	OK
23	2	0.6385	17	240.160	245.320	5.160	84	85	86	83	83	84.3	6.00	2.050	4.878	4.765	0.9768	OK	1.73	OK
23	3	0.6385	17	245.320	250.459	5.139	84	86	86	83	84	84.8	6.00	2.050	4.854	4.765	0.9817	OK	1.73	OK
															AVERAGES =>		0.9782		1.7284	
18	1	0.4913	17	251.000	257.277	6.277	84	86	86	84	84	85.0	9.50	1.200	5.913	5.805	0.9817	OK	1.70	OK
18	2	0.4913	17	257.277	263.554	6.277	85	86	86	84	84	85.0	9.50	1.200	5.913	5.800	0.9808	OK	1.71	OK
18	3	0.4913	17	263.554	269.778	6.224	85	86	86	84	85	85.3	9.50	1.200	5.861	5.800	0.9896	OK	1.71	OK
															AVERAGES =>		0.9840		1.7049	
12	1	0.3080	19	271.500	276.816	5.316	86	86	87	85	86	86.0	13.00	0.420	4.989	4.971	0.9964	OK	1.52	OK
12	2	0.3080	19	276.816	282.110	5.294	87	87	87	86	86	86.5	13.00	0.420	4.964	4.966	1.0005	OK	1.52	OK
12	3	0.3080	19	282.110	287.392	5.282	87	87	88	86	86	86.8	13.00	0.420	4.950	4.966	1.0032	OK	1.52	OK
															AVERAGES =>		1.0000		1.5172	

ALL VOLUMES GREATER THAN 5 ACF?	OK

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.9874

AVERAGE $\Delta H_@$ = 1.650

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

(1) $$V_m(\text{std}) = K_1 V_m \frac{P_{bar} + (\Delta H/13.6)}{T_m}$$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(\text{std})}\right)^2 \left(\frac{\Delta H \quad V_m(\text{std})}{V_m}\right)$$

(2) $$V_{cr}(\text{std}) = K' \sqrt{\frac{P_{bar}\,\theta}{T_{amt}}}$$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{V_{cr}(\text{std})}{V_m(\text{std})}$$ = DGM calibration factor

ORIFICE CHECKS:	GAMMA	RESULT	STATUS
IF Y VARIATION EXCEEDS 2.00%,	GAMMA 1	-0.93	OK
RECALIBRATE ORIFICE	GAMMA 2	-0.35	OK
	GAMMA 3	1.28	OK

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings below, shaded columns are automatically calculated.

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

METER CONSOLE #: T3
DGM SERIAL #: 933707

DATE: 06/29/09 CRITICAL ORIFICE SET SERIAL #: 1345

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	29	29	29

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y CHECK < 0.02 VAR.	$\Delta H_@$	ΔH CHECK < 0.2 VAR.
23	1	0.6385	18	936.000	941.140	5.140	89	92	92	89	89	90.5	6.00	2.250	4.806	4.743	0.9868	OK	1.89	OK
23	2	0.6385	18	941.140	946.273	5.133	89	92	92	89	89	90.5	6.00	2.250	4.800	4.743	0.9881	OK	1.89	OK
23	3	0.6385	18	946.273	951.429	5.156	89	92	92	89	90	90.8	6.00	2.250	4.819	4.743	0.9842	OK	1.89	OK
															AVERAGES =>		0.9864		1.8937	
18	1	0.4913	18	952.000	957.286	5.286	89	92	92	90	90	91.0	8.00	1.300	4.927	4.866	0.9877	OK	1.84	OK
18	2	0.4913	18	957.286	962.564	5.278	88	92	92	90	90	91.0	8.00	1.300	4.919	4.870	0.9901	OK	1.84	OK
18	3	0.4913	18	962.564	967.848	5.284	88	92	92	90	90	91.0	8.00	1.300	4.925	4.870	0.9890	OK	1.84	OK
															AVERAGES =>		0.9889		1.8399	
12	1	0.3080	18	968.500	973.615	5.115	88	91	91	90	90	90.5	12.50	0.470	4.762	4.771	1.0019	OK	1.69	OK
12	2	0.3080	18	973.615	978.731	5.116	88	91	90	90	90	90.3	12.50	0.470	4.765	4.771	1.0013	OK	1.69	OK
12	3	0.3080	18	978.731	983.848	5.117	88	90	90	90	89	89.8	12.50	0.470	4.770	4.771	1.0002	OK	1.69	OK
															AVERAGES =>		1.0011		1.6905	

ALL VOLUMES GREATER THAN 5 ACF? OK

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = **0.9921**

AVERAGE $\Delta H_@$ = **1.808**

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

(1) $V_m\,(std) = K_1\, V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(std)}\right)^2 \left(\frac{\Delta H \;\; V_m(std)}{V_m}\right)$$

(2) $V_{cr}\,(std) = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\,(std)}{V_m\,(std)}$ = DGM calibration factor

ORIFICE CHECKS:	GAMMA	RESULT	STATUS
IF Y VARIATION EXCEEDS 2.00%,	GAMMA 1	-0.58	OK
RECALIBRATE ORIFICE	GAMMA 2	-0.32	OK
	GAMMA 3	0.91	OK

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings below, shaded columns are automatically calculated.

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

METER CONSOLE #: T5
DGM SERIAL #: 6840714

DATE: 06/29/09 CRITICAL ORIFICE SET SERIAL #: 1345

BAROMETRIC PRESSURE (in Hg):	INITIAL	FINAL	AVG (P_{bar})
	29	29	29

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS FINAL	DGM READINGS NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y CHECK < 0.02 VAR.	$\Delta H_@$	ΔH CHECK < 0.2 VAR.
12	1	0.3080	18	385.000	390.131	5.131	90	89	86	84	84	85.8	12.50	0.450	4.818	4.762	0.9884	OK	1.64	OK
12	2	0.3080	18	390.131	395.261	5.130	90	86	86	84	85	85.3	12.50	0.450	4.821	4.762	0.9877	OK	1.64	OK
12	3	0.3080	18	395.261	400.390	5.129	90	86	86	85	85	85.5	12.50	0.450	4.818	4.762	0.9884	OK	1.64	OK
															AVERAGES =>		0.9882		1.6383	
23	1	0.6385	16	401.000	406.623	5.623	90	86	87	85	85	85.8	6.50	2.200	5.303	5.133	0.9680	OK	1.87	OK
23	2	0.6385	16	406.623	412.238	5.615	90	87	87	85	85	86.0	6.50	2.200	5.293	5.133	0.9698	OK	1.87	OK
23	3	0.6385	16	412.238	417.858	5.620	90	87	86	85	85	85.8	6.50	2.200	5.300	5.133	0.9685	OK	1.87	OK
															AVERAGES =>		0.9688		1.8709	
18	1	0.4913	18	418.500	423.810	5.310	90	86	85	85	85	85.3	8.00	1.300	5.001	4.862	0.9721	OK	1.86	OK
18	2	0.4913	18	423.810	429.102	5.292	89	85	85	85	85	85.0	8.00	1.300	4.987	4.866	0.9758	OK	1.86	OK
18	3	0.4913	18	429.102	434.399	5.297	89	85	85	85	85	85.0	8.00	1.300	4.991	4.866	0.9749	OK	1.86	OK
															AVERAGES =>		0.9743		1.8633	

ALL VOLUMES GREATER THAN 5 ACF?	OK

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = **0.9771**

AVERAGE $\Delta H_@$ = **1.791**

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

(1) $V_m\text{(std)} = K_1 V_m \dfrac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}\text{(std)}}\right)^2 \left(\frac{\Delta H\ V_m\text{(std)}}{V_m}\right)$$

(2) $V_{cr}\text{(std)} = K' \sqrt{\dfrac{P_{bar}\,\theta}{T_{amt}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \dfrac{V_{cr}\text{(std)}}{V_m\text{(std)}}$ = DGM calibration factor

ORIFICE CHECKS:	GAMMA	RESULT	STATUS
IF Y VARIATION EXCEEDS 2.00%,	GAMMA 1	1.14	OK
RECALIBRATE ORIFICE	GAMMA 2	-0.85	OK
	GAMMA 3	-0.29	OK

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings below, shaded columns are automatically calculated.

BEST AVAILABLE COPY

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

METER CONSOLE #: T7
DGM SERIAL #: 8822305

DATE: 06/30/09 CRITICAL ORIFICE SET SERIAL #: 1345

BAROMETRIC PRESSURE (in Hg): INITIAL 29 FINAL 29 AVG (P_{bar}) 29

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y CHECK < 0.02 VAR.	$\Delta H_@$	ΔH CHECK < 0.2 VAR.
23	1	0.6385	16	695.500	700.552	5.052	80	84	84	81	81	82.5	6.00	2.100	4.792	4.782	0.9980	OK	1.76	OK
23	2	0.6385	16	700.552	705.598	5.046	80	84	84	81	82	82.8	6.00	2.100	4.784	4.782	0.9996	OK	1.76	OK
23	3	0.6385	16	705.598	710.629	5.031	81	84	84	82	82	83.0	6.00	2.100	4.768	4.778	1.0021	OK	1.77	OK
															AVERAGES =>		0.9999		1.7640	
12	1	0.3080	18	711.000	716.044	5.044	82	83	85	82	83	83.3	12.50	0.440	4.758	4.797	1.0083	OK	1.59	OK
12	2	0.3080	18	716.044	721.096	5.052	82	85	86	83	84	84.5	12.50	0.440	4.754	4.797	1.0090	OK	1.58	OK
12	3	0.3080	18	721.096	726.132	5.036	84	86	87	84	84	85.3	12.50	0.440	4.733	4.788	1.0117	OK	1.59	OK
															AVERAGES =>		1.0097		1.5839	
18	1	0.4913	18	727.000	732.223	5.223	84	87	88	85	85	86.3	8.00	1.150	4.908	4.888	0.9959	OK	1.63	OK
18	2	0.4913	18	732.223	737.432	5.209	85	88	89	85	86	87.0	8.00	1.150	4.888	4.884	0.9990	OK	1.63	OK
18	3	0.4913	18	737.432	742.639	5.207	85	89	89	86	86	87.5	8.00	1.150	4.882	4.884	1.0003	OK	1.63	OK
															AVERAGES =>		0.9984		1.6282	

ALL VOLUMES GREATER THAN 5 ACF?	OK

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = **1.0027**

AVERAGE $\Delta H_@$ = **1.659**

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:
The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

(1) $V_m(std) = K_1 V_m \frac{P_{bar} + (\Delta H/13.6)}{T_m}$ = Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)

T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $V_{cr}(std) = K' \sqrt{\frac{P_{bar}\,\theta}{T_{amb}}}$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $Y = \frac{V_{cr}(std)}{V_m(std)}$ = DGM calibration factor

$$\Delta H_@ = \left(\frac{0.75\,\theta}{V_{cr}(std)}\right)^2 \left(\frac{\Delta H \quad V_m(std)}{V_m}\right)$$

ORIFICE CHECKS:	GAMMA	RESULT	STATUS
IF Y VARIATION EXCEEDS 2.00%,	GAMMA 1	-0.27	OK
RECALIBRATE ORIFICE	GAMMA 2	0.70	OK
	GAMMA 3	-0.42	OK

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record readings below, shaded columns are automatically calculated.

ONSITE METHOD 5 DRY GAS METER AUDIT AND PO... .EST CALIBRATION USING CRITICAL ORIFICE

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County Solid Waste ERF
Plant City, State	Tampa, FL
Test Location	Unit #4 SDA Inlet
Project Number	10659
Date of Pre-Test	08/30/09
Date of Post-Test	
Tester Signature	

Meterbox ID	T2	
Meter Y	0.9874	
Meter Delta Ha	1.650	
Reference Pressure	29.7	STATUS
Barometric Pressure	29.7	PASS
Pbar Pretest	29.7	
Pbar Posttest		

ORIFICE ID# INCLUDING SET-#	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	FINAL	TEMPERATURES °F AMB	DGM INLET INIT	DGM INLET FINAL	DGM OUTLET INIT	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	QA STATUS
PRETEST ONSITE 10 MINUTE AUDIT						PRE												
NA	1	NA	NA	737.600	745.255	NA	98	97	101	97	98.25	10.00	1.65	7.2134	NA	1.0115	2.45	PASS
POSTTEST CHECK		AVERAGE DELTA H =				POST												
	1	#N/A									0			0.0	#N/A	#N/A		
0	2	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
0	3	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
															AVG =	#N/A	#N/A	#N/A

FINAL - INITIAL VOLUMES > 5 CUBIC FEET? FAIL

PRETEST PROCEDURES:

1) Record barometric pressure and temperatures before calibration.
2) Run 10 minute audit at Delta Ha without an orifice.
3) Record ambient temperature and compare all thermocouple readings.
4) Record thermocouple IDs and readings in table.

POSTTEST PROCEDURES:

1) Record barometric pressure before calibration.
2) Select one critical orifice to calibrate the dry gas meter which best approximates the operating range. Compare the average Delta H from your results page with the Delta H in the orifice table. Input orifice number.
3) Run at 18" Hg vacuum for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Perform three repititions for the posttest, record readings, shaded columns are automatically calculated.
5) Compare thermocouples to ambient and record as posttest calibration check.

ONSITE METHOD 5 DRY GAS METER AUDIT AND POSTTEST CALIBRATION USING CRITICAL ORIFICE

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County Solid Waste ERF
Plant City, State	Tampa, FL
Test Location	Unit #4 FF Outlet
Project Number	10659
Date of Pre-Test	08/30/09
Date of Post-Test	
Tester Signature	[signature]

Meterbox ID	T3	
Meter Y	0.9921	
Meter Delta Ha	1.808	
Reference Pressure	29.7	STATUS
Barometric Pressure	29.7	PASS
Pbar Pretest	29.7	
Pbar Posttest		

ORIFICE ID# INCLUDING SET-#	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	TEMPERATURES °F AMB	DGM INLET INIT	DGM INLET FINAL	DGM OUTLET INIT	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	QA STATUS
PRETEST ONSITE 10 MINUTE AUDIT						PRE												
NA	1	NA	NA	416.000	423.591	NA	94	97	93	94	94.5	10.00	1.81	7.2043	NA	1.0166	2.47	PASS
POSTTEST CHECK		AVERAGE DELTA H =				POST												
	1	#N/A									0			0.0	#N/A	#N/A		
0	2	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
0	3	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
FINAL - INITIAL VOLUMES > 5 CUBIC FEET? FAIL															AVG =	#N/A	#N/A	#N/A

PRETEST PROCEDURES:

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3) Record ambient temperature and compare all thermocouple readings.
4) Record thermocouple IDs and readings in table.

POSTTEST PROCEDURES:

1) Record barometric pressure before calibration.
2) Select one critical orifice to calibrate the dry gas meter which best approximates the operating range. Compare the average Delta H from your results page with the Delta H in the orifice table. Input orifice number.
3) Run at 18" Hg vacuum for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Perform three repititions for the posttest, record readings, shaded columns are automatically calculated.
5) Compare thermocouples to ambient and record as posttest calibration check.

ONSITE METHOD 5 DRY GAS METER AUDIT AND POSTTEST CALIBRATION USING CRITICAL ORIFICE

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County Solid Waste ERF
Plant City, State	Tampa, FL
Test Location	Unit #4 FF Outlet
Project Number	10659
Date of Pre-Test	08/30/09
Date of Post-Test	
Tester Signature	

Meterbox ID	T5	
Meter Y	0.9771	
Meter Delta Ha	1.791	
Reference Pressure	29.7	STATUS
Barometric Pressure	29.7	PASS
Pbar Pretest	29.7	
Pbar Posttest		

ORIFICE ID# INCLUDING SET-#	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	TEMPERATURES °F AMB	DGM INLET INIT	DGM INLET FINAL	DGM OUTLET INIT	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	QA STATUS
PRETEST ONSITE 10 MINUTE AUDIT						PRE												
NA	1	NA	NA	806.000	813.714	NA	88	89	86	87	87.5	10.00	1.79	7.4143	NA	0.9941	1.74	PASS
POSTTEST CHECK		AVERAGE DELTA H =				POST												
	1	#N/A									0			0.0	#N/A	#N/A		
0	2	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
0	3	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
															AVG =	#N/A	#N/A	#N/A

FINAL - INITIAL VOLUMES > 5 CUBIC FEET? FAIL

PRETEST PROCEDURES:

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2) Run 10 minute audit at Delta Ha without an orifice.
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POSTTEST PROCEDURES:

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2) Select one critical orifice to calibrate the dry gas meter which best approximates the operating range. Compare the average Delta H from your results page with the Delta H in the orifice table. Input orifice number.
3) Run at 18" Hg vacuum for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Perform three repititions for the posttest, record readings, shaded columns are automatically calculated.
5) Compare thermocouples to ambient and record as posttest calibration check.

ONSITE METHOD 5 DRY GAS METER AUDIT AND POSTTEST CALIBRATION USING CRITICAL ORIFICE

Client Name	Covanta Projects, Inc.
Plant Name	Hillsborough County Solid Waste ERF
Plant City, State	Tampa, FL
Test Location	Unit #4 SDA Inlet
Project Number	10659
Date of Pre-Test	08/30/09
Date of Post-Test	
Tester Signature	[signature]

Meterbox ID	T7	
Meter Y	1.0027	
Meter Delta Ha	1.659	
Reference Pressure	29.7	STATUS
Barometric Pressure	29.7	PASS
Pbar Pretest	29.7	
Pbar Posttest		

ORIFICE ID# INCLUDING SET-#	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	TEMPERATURES °F AMB	DGM INLET INIT	DGM INLET FINAL	DGM OUTLET INIT	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)	QA STATUS
PRETEST ONSITE 10 MINUTE AUDIT						PRE												
NA	1	NA	NA	958.400	966.302	NA	101	102	99	99	100.25	10.00	1.66	7.4198	NA	0.9817	2.10	PASS
POSTTEST CHECK		AVERAGE DELTA H =				POST												
	1	#N/A									0			0.0	#N/A	#N/A		
0	2	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
0	3	#N/A	0	0.000		0	0		0		0		0.00	0.0	#N/A	#N/A		
															AVG =	#N/A	#N/A	#N/A

FINAL - INITIAL VOLUMES > 5 CUBIC FEET? FAIL

PRETEST PROCEDURES:

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3) Run at 18" Hg vacuum for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Perform three repititions for the posttest, record readings, shaded columns are automatically calculated.
5) Compare thermocouples to ambient and record as posttest calibration check.

GLASS NOZZLE CALIBRATION DATA, INCHES

07/22/09

CAL. DATE	NOZZLE ID NUMBER	AVG. DIAM.	DIA. 1	DIA. 2	DIA. 3	HIGH	LOW	QA/QC CHECK
04/10/98	GN100	0.114	0.113	0.115	0.114	0.115	0.113	OK
04/10/98	GN104	0.377	0.377	0.377	0.378	0.378	0.377	OK
04/10/98	GN105	0.389	0.388	0.389	0.389	0.389	0.388	OK
04/10/98	GN111	0.380	0.380	0.381	0.378	0.381	0.378	OK
04/10/98	GN112	0.393	0.392	0.393	0.395	0.395	0.392	OK
04/10/98	GN114	0.115	0.115	0.115	0.116	0.116	0.115	OK
04/10/98	GN118	0.378	0.378	0.378	0.377	0.378	0.377	OK
04/10/98	GN119	0.394	0.394	0.394	0.394	0.394	0.394	OK
04/11/98	GN127	0.497	0.497	0.497	0.498	0.498	0.497	OK
05/25/05	GN252	0.274	0.274	0.274	0.273	0.274	0.273	OK
01/06/00	GN290	0.311	0.310	0.311	0.312	0.312	0.310	OK
10/24/05	GN341	0.308	0.308	0.308	0.309	0.309	0.308	OK
10/24/05	GN344	0.310	0.310	0.311	0.310	0.311	0.310	OK
10/24/05	GN346	0.312	0.311	0.311	0.313	0.313	0.311	OK
10/24/05	GN348	0.310	0.310	0.310	0.311	0.311	0.310	OK
10/24/05	GN350	0.336	0.336	0.336	0.336	0.336	0.336	OK
10/24/05	GN355	0.336	0.336	0.336	0.337	0.337	0.336	OK
09/11/00	GN358	0.339	0.339	0.339	0.340	0.340	0.339	OK
01/06/06	GN387	0.192	0.192	0.192	0.192	0.192	0.192	OK
04/09/06	GN438	0.195	0.194	0.195	0.195	0.195	0.194	OK
04/09/06	GN441	0.193	0.193	0.193	0.193	0.193	0.193	OK
09/18/01	GN462	0.160	0.159	0.160	0.161	0.161	0.159	OK
07/10/06	GN466	0.258	0.258	0.258	0.259	0.259	0.258	OK
07/21/06	GN480	0.497	0.498	0.498	0.496	0.498	0.496	OK
07/21/06	GN481	0.496	0.495	0.496	0.496	0.496	0.495	OK
04/12/07	GN529	0.193	0.193	0.192	0.193	0.193	0.192	OK
04/12/07	GN530	0.194	0.193	0.194	0.194	0.194	0.193	OK
04/12/07	GN540	0.260	0.260	0.260	0.261	0.261	0.260	OK
04/12/07	GN545	0.279	0.280	0.279	0.279	0.280	0.279	OK
05/10/07	GN550	0.260	0.260	0.260	0.261	0.261	0.260	OK
05/10/07	GN555	0.269	0.269	0.268	0.269	0.269	0.268	OK
05/14/07	GN556	0.257	0.258	0.257	0.257	0.258	0.257	OK
05/14/07	GN560	0.257	0.258	0.257	0.257	0.258	0.257	OK
05/14/07	GN566	0.261	0.261	0.262	0.261	0.262	0.261	OK
08/20/07	GN583	0.214	0.214	0.215	0.214	0.215	0.214	OK
08/20/07	GN589	0.216	0.216	0.215	0.216	0.216	0.215	OK
08/20/07	GN594	0.216	0.216	0.215	0.216	0.216	0.215	OK
09/30/07	GN595	0.193	0.194	0.194	0.192	0.194	0.192	OK
09/30/07	GN596	0.192	0.192	0.193	0.192	0.193	0.192	OK
09/30/07	GN597A	0.194	0.194	0.195	0.194	0.195	0.194	OK
05/03/02	GN601	0.340	0.340	0.340	0.341	0.341	0.340	OK
09/30/07	GN606	0.280	0.280	0.281	0.280	0.281	0.280	OK
09/30/07	GN607	0.280	0.280	0.280	0.280	0.280	0.280	OK
09/30/07	GN608	0.280	0.280	0.279	0.282	0.282	0.279	OK
01/22/08	GN610	0.216	0.216	0.217	0.216	0.217	0.216	OK
01/22/08	GN612	0.217	0.217	0.217	0.217	0.217	0.217	OK
01/22/08	GN613	0.216	0.215	0.217	0.217	0.217	0.215	OK
01/22/08	GN621	0.269	0.268	0.269	0.270	0.270	0.268	OK
07/20/02	GN629	0.388	0.388	0.388	0.388	0.388	0.388	OK
01/22/08	GN631	0.262	0.262	0.262	0.262	0.262	0.262	OK
07/20/02	GN633	0.376	0.376	0.377	0.376	0.377	0.376	OK
07/20/02	GN635	0.388	0.389	0.388	0.388	0.389	0.388	OK
01/22/08	GN636	0.261	0.261	0.261	0.262	0.262	0.261	OK

03/09/08	GN637	0.192	0.192	0.193	0.192	0.193	0.192	OK
03/09/08	GN640	0.194	0.193	0.194	0.194	0.194	0.193	OK
03/09/08	GN645	0.194	0.194	0.194	0.193	0.194	0.193	OK
03/14/08	GN655	0.261	0.260	0.262	0.260	0.262	0.260	OK
03/31/08	GN662	0.206	0.206	0.206	0.206	0.206	0.206	OK
03/31/08	GN665	0.207	0.207	0.207	0.207	0.207	0.207	OK
04/14/08	GN688	0.278	0.278	0.277	0.278	0.278	0.277	OK
04/14/08	GN692	0.278	0.277	0.278	0.278	0.278	0.277	OK
05/13/08	GN701	0.256	0.256	0.255	0.256	0.256	0.255	OK
05/13/08	GN702	0.256	0.256	0.256	0.256	0.256	0.256	OK
06/03/08	GN708	0.213	0.213	0.213	0.212	0.213	0.212	OK
06/03/08	GN712	0.213	0.213	0.213	0.213	0.213	0.213	OK
06/03/08	GN714	0.215	0.215	0.215	0.215	0.215	0.215	OK
06/03/08	GN716	0.211	0.212	0.210	0.211	0.212	0.210	OK
06/03/08	GN722	0.193	0.194	0.194	0.192	0.194	0.192	OK
06/03/08	GN726	0.193	0.193	0.194	0.193	0.194	0.193	OK
06/16/08	GN730	0.257	0.257	0.256	0.257	0.257	0.256	OK
06/16/08	GN731	0.255	0.254	0.255	0.255	0.255	0.254	OK
06/16/08	GN732	0.258	0.257	0.258	0.258	0.258	0.257	OK
06/16/08	GN733	0.258	0.258	0.257	0.258	0.258	0.257	OK
06/16/08	GN738	0.257	0.256	0.257	0.257	0.257	0.256	OK
03/12/03	GN757	0.155	0.155	0.156	0.155	0.156	0.155	OK
10/02/08	GN759	0.195	0.195	0.194	0.195	0.195	0.194	OK
10/02/08	GN762	0.195	0.195	0.196	0.195	0.196	0.195	OK
10/02/08	GN764	0.195	0.195	0.196	0.194	0.196	0.194	OK
10/02/08	GN768	0.195	0.195	0.195	0.196	0.196	0.195	OK
10/22/08	GN770	0.276	0.277	0.276	0.276	0.277	0.276	OK
10/22/08	GN772	0.278	0.277	0.278	0.278	0.278	0.277	OK
10/22/08	GN773	0.278	0.278	0.278	0.277	0.278	0.277	OK
10/23/08	GN780	0.260	0.260	0.260	0.259	0.260	0.259	OK
10/23/08	GN783	0.215	0.215	0.215	0.215	0.215	0.215	OK
10/23/08	GN788	0.215	0.215	0.216	0.215	0.216	0.215	OK
10/23/08	GN790	0.214	0.214	0.215	0.214	0.215	0.214	OK
11/04/08	GN794	0.218	0.217	0.218	0.218	0.218	0.217	OK
11/04/08	GN799	0.215	0.215	0.215	0.215	0.215	0.215	OK
11/04/08	GN800	0.216	0.215	0.216	0.216	0.216	0.215	OK
11/04/08	GN802	0.216	0.216	0.216	0.217	0.217	0.216	OK
11/12/08	GN804	0.195	0.195	0.195	0.195	0.195	0.195	OK
11/12/08	GN805	0.195	0.196	0.195	0.195	0.196	0.195	OK
11/12/08	GN806	0.195	0.195	0.195	0.194	0.195	0.194	OK
11/12/08	GN807	0.195	0.195	0.195	0.196	0.196	0.195	OK
11/12/08	GN809	0.195	0.195	0.195	0.195	0.195	0.195	OK
11/12/08	GN813	0.195	0.195	0.196	0.195	0.196	0.195	OK
11/12/08	GN814	0.195	0.194	0.195	0.195	0.195	0.194	OK
11/12/08	GN815	0.195	0.195	0.196	0.195	0.196	0.195	OK
02/17/09	GN816	0.259	0.259	0.260	0.259	0.260	0.259	OK
02/17/09	GN821	0.258	0.258	0.257	0.259	0.259	0.257	OK
02/17/09	GN822	0.259	0.259	0.259	0.259	0.259	0.259	OK
02/17/09	GN826	0.260	0.260	0.260	0.261	0.261	0.260	OK
02/17/09	GN827	0.258	0.257	0.258	0.258	0.258	0.257	OK
04/20/09	GN828	0.275	0.275	0.276	0.275	0.276	0.275	OK
04/20/09	GN829	0.275	0.275	0.275	0.275	0.275	0.275	OK
04/15/09	GN829A	0.217	0.217	0.217	0.217	0.217	0.217	OK
04/20/09	GN830	0.275	0.276	0.275	0.274	0.276	0.274	OK
04/15/09	GN830A	0.215	0.215	0.215	0.215	0.215	0.215	OK
04/20/09	GN831	0.271	0.271	0.270	0.271	0.271	0.270	OK
04/15/09	GN831A	0.217	0.217	0.216	0.217	0.217	0.216	OK
04/20/09	GN832	0.271	0.272	0.270	0.271	0.272	0.270	OK

04/15/09	GN832A	0.215	0.216	0.215	0.215	0.216	0.215	OK
04/20/09	GN833	0.277	0.277	0.276	0.278	0.278	0.276	OK
04/15/09	GN833A	0.216	0.216	0.216	0.216	0.216	0.216	OK
04/20/09	GN834	0.278	0.277	0.278	0.278	0.278	0.277	OK
04/15/09	GN834A	0.217	0.217	0.217	0.217	0.217	0.217	OK
04/20/09	GN835	0.278	0.277	0.278	0.279	0.279	0.277	OK
04/15/09	GN835A	0.215	0.215	0.215	0.215	0.215	0.215	OK
04/20/09	GN836	0.277	0.276	0.278	0.278	0.278	0.276	OK
04/15/09	GN836A	0.216	0.216	0.216	0.217	0.217	0.216	OK
04/20/09	GN837	0.280	0.280	0.280	0.281	0.281	0.280	OK
04/20/09	GN838	0.280	0.281	0.280	0.279	0.281	0.279	OK
04/15/09	GN838A	0.215	0.215	0.215	0.215	0.215	0.215	OK
04/20/09	GN839	0.280	0.279	0.280	0.280	0.280	0.279	OK
04/15/09	GN839A	0.216	0.215	0.216	0.216	0.216	0.215	OK
04/20/09	GN840A	0.215	0.215	0.215	0.216	0.216	0.215	OK
04/20/09	GN841	0.153	0.153	0.153	0.152	0.153	0.152	OK
04/20/09	GN842	0.154	0.154	0.154	0.154	0.154	0.154	OK
04/20/09	GN843	0.155	0.154	0.155	0.155	0.155	0.154	OK
04/20/09	GN844	0.155	0.155	0.153	0.156	0.156	0.153	OK
04/20/09	GN845	0.158	0.158	0.157	0.158	0.158	0.157	OK
04/20/09	GN846	0.158	0.157	0.158	0.158	0.158	0.157	OK
04/20/09	GN847	0.158	0.158	0.158	0.158	0.158	0.158	OK
04/23/09	GN848	0.195	0.195	0.195	0.195	0.195	0.195	OK
04/23/09	GN851	0.195	0.194	0.195	0.195	0.195	0.194	OK
04/23/09	GN852	0.195	0.195	0.195	0.195	0.195	0.195	OK
04/23/09	GN853	0.195	0.195	0.195	0.196	0.196	0.195	OK
04/23/09	GN854	0.195	0.195	0.195	0.196	0.196	0.195	OK
04/23/09	GN855	0.195	0.195	0.195	0.195	0.195	0.195	OK
04/23/09	GN857	0.195	0.195	0.195	0.195	0.195	0.195	OK
04/23/09	GN858	0.195	0.194	0.195	0.195	0.195	0.194	OK
04/23/09	GN859	0.195	0.195	0.196	0.195	0.196	0.195	OK
04/29/09	GN872	0.258	0.259	0.257	0.259	0.259	0.257	OK
04/29/09	GN873	0.258	0.257	0.259	0.258	0.259	0.257	OK
04/29/09	GN874	0.256	0.255	0.257	0.257	0.257	0.255	OK
04/29/09	GN875	0.258	0.258	0.258	0.258	0.258	0.258	OK
04/29/09	GN876	0.257	0.257	0.258	0.257	0.258	0.257	OK
04/29/09	GN877	0.259	0.259	0.260	0.258	0.260	0.258	OK
04/29/09	GN878	0.257	0.256	0.258	0.257	0.258	0.256	OK
04/29/09	GN879	0.258	0.258	0.258	0.259	0.259	0.258	OK
04/29/09	GN880	0.258	0.258	0.258	0.259	0.259	0.258	OK
04/29/09	GN881	0.258	0.258	0.258	0.258	0.258	0.258	OK
05/18/09	GN882	0.217	0.217	0.217	0.216	0.217	0.216	OK
05/18/09	GN883	0.214	0.214	0.214	0.215	0.215	0.214	OK
05/18/09	GN884	0.215	0.215	0.215	0.214	0.215	0.214	OK
05/18/09	GN885	0.216	0.216	0.216	0.216	0.216	0.216	OK
05/18/09	GN886	0.215	0.215	0.216	0.215	0.216	0.215	OK
05/18/09	GN887	0.217	0.216	0.217	0.217	0.217	0.216	OK
05/18/09	GN888	0.215	0.216	0.215	0.215	0.216	0.215	OK
05/18/09	GN889	0.215	0.216	0.215	0.215	0.216	0.215	OK
05/18/09	GN890	0.215	0.215	0.215	0.216	0.216	0.215	OK
05/18/09	GN891	0.214	0.215	0.214	0.214	0.215	0.214	OK
05/18/09	GN892	0.214	0.214	0.214	0.214	0.214	0.214	OK
05/18/09	GN893	0.215	0.215	0.215	0.214	0.215	0.214	OK
05/18/09	GN894	0.261	0.260	0.261	0.261	0.261	0.260	OK
05/18/09	GN895	0.259	0.259	0.258	0.259	0.259	0.258	OK
05/18/09	GN896	0.261	0.261	0.261	0.261	0.261	0.261	OK
05/18/09	GN897	0.259	0.259	0.259	0.259	0.259	0.259	OK
05/18/09	GN898	0.259	0.259	0.259	0.260	0.260	0.259	OK

05/18/09	GN899	0.260	0.259	0.260	0.260	0.260	0.259	OK
05/18/09	GN900	0.260	0.260	0.260	0.261	0.261	0.260	OK
05/18/09	GN901	0.258	0.258	0.257	0.258	0.258	0.257	OK
05/18/09	GN902	0.260	0.260	0.259	0.260	0.260	0.259	OK
05/18/09	GN903	0.260	0.260	0.261	0.260	0.261	0.260	OK
05/18/09	GN904	0.260	0.260	0.260	0.261	0.261	0.260	OK
05/18/09	GN905	0.259	0.259	0.259	0.260	0.260	0.259	OK
05/18/09	GN906	0.426	0.426	0.426	0.426	0.426	0.426	OK
05/18/09	GN907	0.425	0.425	0.426	0.425	0.426	0.425	OK
05/18/09	GN908	0.158	0.157	0.158	0.158	0.158	0.157	OK
05/18/09	GN909	0.157	0.156	0.157	0.157	0.157	0.156	OK
05/18/09	GN910	0.153	0.153	0.153	0.153	0.153	0.153	OK
05/18/09	GN911	0.155	0.154	0.155	0.155	0.155	0.154	OK
05/18/09	GN912	0.157	0.157	0.157	0.156	0.157	0.156	OK
05/18/09	GN913	0.156	0.156	0.155	0.156	0.156	0.155	OK
07/22/09	GN914	0.194	0.194	0.193	0.195	0.195	0.193	OK
07/22/09	GN915	0.215	0.216	0.215	0.215	0.216	0.215	OK
07/22/09	GN916	0.255	0.255	0.256	0.255	0.256	0.255	OK
07/22/09	GN917	0.258	0.258	0.257	0.259	0.259	0.257	OK
07/22/09	GN918	0.260	0.260	0.260	0.260	0.260	0.260	OK
07/22/09	GN919	0.260	0.260	0.260	0.261	0.261	0.260	OK
07/22/09	GN920	0.260	0.261	0.260	0.260	0.261	0.260	OK
07/22/09	GN921	0.335	0.335	0.336	0.335	0.336	0.335	OK
07/22/09	GN922	0.335	0.335	0.335	0.335	0.335	0.335	OK
07/22/09	GN923	0.338	0.337	0.338	0.338	0.338	0.337	OK
07/22/09	GN924	0.338	0.338	0.337	0.339	0.339	0.337	OK
07/22/09	GN925	0.338	0.338	0.338	0.337	0.338	0.337	OK
07/22/09	GN926	0.338	0.339	0.338	0.338	0.339	0.338	OK
07/22/09	GN927	0.340	0.340	0.341	0.339	0.341	0.339	OK
07/22/09	GN928	0.340	0.340	0.340	0.340	0.340	0.340	OK
07/22/09	GN929	0.340	0.341	0.340	0.340	0.341	0.340	OK
07/22/09	GN930	0.340	0.340	0.339	0.341	0.341	0.339	OK
07/22/09	GN931	0.340	0.342	0.340	0.339	0.342	0.339	OK
07/22/09	GN932	0.340	0.340	0.340	0.340	0.340	0.340	OK
07/14/04	GN985	0.300	0.300	0.299	0.300	0.300	0.299	OK
07/14/04	GN986	0.310	0.310	0.311	0.310	0.311	0.310	OK
07/14/04	GN996	0.302	0.303	0.302	0.302	0.303	0.302	OK

THERMOCOUPLE CALIBRATION DATA, °F

DATE	THERMOCOUPLE ID NUMBER	THERMOCOUPLE TEMPERATURE	REFERENCE TEMPERATURE	< or = 2 degrees F DIFFERENCE ??
Dry Gas Meters:				
	T1 IN	81	81	YES
	T1 OUT	81	81	YES
	T2 IN	77	77	YES
	T2 OUT	77	77	YES
	T3 IN	64	64	YES
	T3 OUT	64	64	YES
	T4 IN	77	77	YES
	T4 OUT	77	77	YES
	T5 IN	77	77	YES
	T5 OUT	77	77	YES
	T6 IN	86	86	YES
	T6 OUT	86	86	YES
	T7 IN	65	64	YES
	T7 OUT	65	64	YES
	T8 IN	65	64	YES
	T8 OUT	65	64	YES
	T9 IN	72	71	YES
	T9 OUT	71	71	YES
	TLF-1 IN	76	76	YES
	TLF-1 OUT	75	76	YES
	TLF-2 IN	64	64	YES
	TLF-2 OUT	64	64	YES

Thermocouples:				
	8	85	85	YES
	12	85	85	YES
	15	85	85	YES
	17	85	85	YES
	18	82	82	YES
	19	85	85	YES
	21	85	85	YES
	23	85	85	YES
	26	85	85	YES
	29	85	85	YES
	36	85	85	YES
	38	85	85	YES
	39	85	85	YES
	141	85	85	YES
	142	85	85	YES
	143	85	85	YES
	144	85	85	YES
	145	85	85	YES
	146	85	85	YES
	147	85	85	YES
	148	85	85	YES
	149	85	85	YES
	150	85	85	YES
	151	84	85	YES
	152	84	85	YES
	153	84	85	YES
	154	84	85	YES
	155	85	85	YES
	156	88	88	YES
	157	84	85	YES
	158	84	85	YES
	159	85	85	YES
	160	84	85	YES
	161	85	85	YES
	162	88	88	YES
	163	85	85	YES
	164	88	88	YES
	165	86	86	YES
	166	88	88	YES
	167	85	85	YES
	168	85	85	YES
	169	85	85	YES
	170	85	85	YES
	171	88	88	YES
	172	86	85	YES
	173	87	88	YES
	174	85	85	YES
	194	85	85	YES
	195	85	85	YES
	196	85	85	YES
	197	86	85	YES
	198	85	85	YES
	199	88	88	YES
	200	84	85	YES
	201	87	88	YES

	233	85	85	YES
	234	85	85	YES
	238	84	85	YES
	264	84	85	YES
	265	84	85	YES
	266	84	85	YES
	267	84	85	YES
				YES

Environmental Supply Co., Inc
800-STACKS-5
(782-2575)

PITOT TUBE CALIBRATION – VERIFICATION OF CONSTRUCTION SPECIFICATIONS

Pitot ID: P-175 Date: 3/27/98
Technician: Ruff

1. D_t external tubing diameter D_t = .375 inches

0.188" < D_t 0.375" *

$\rho_A + \rho_B$ = .960 inches

2. $\rho = \frac{\rho_A + \rho_B}{2}$ ρ = 0.480 inches

3. $Z = (\rho_A + \rho_B)\sin\gamma$ γ = 1°

Z < 0.125" **

Z = 0.017 inches

4. $W = (\rho_A + \rho_B)\sin\sigma$ σ = 0°

W < 0.031" **

W = 0.00 inches

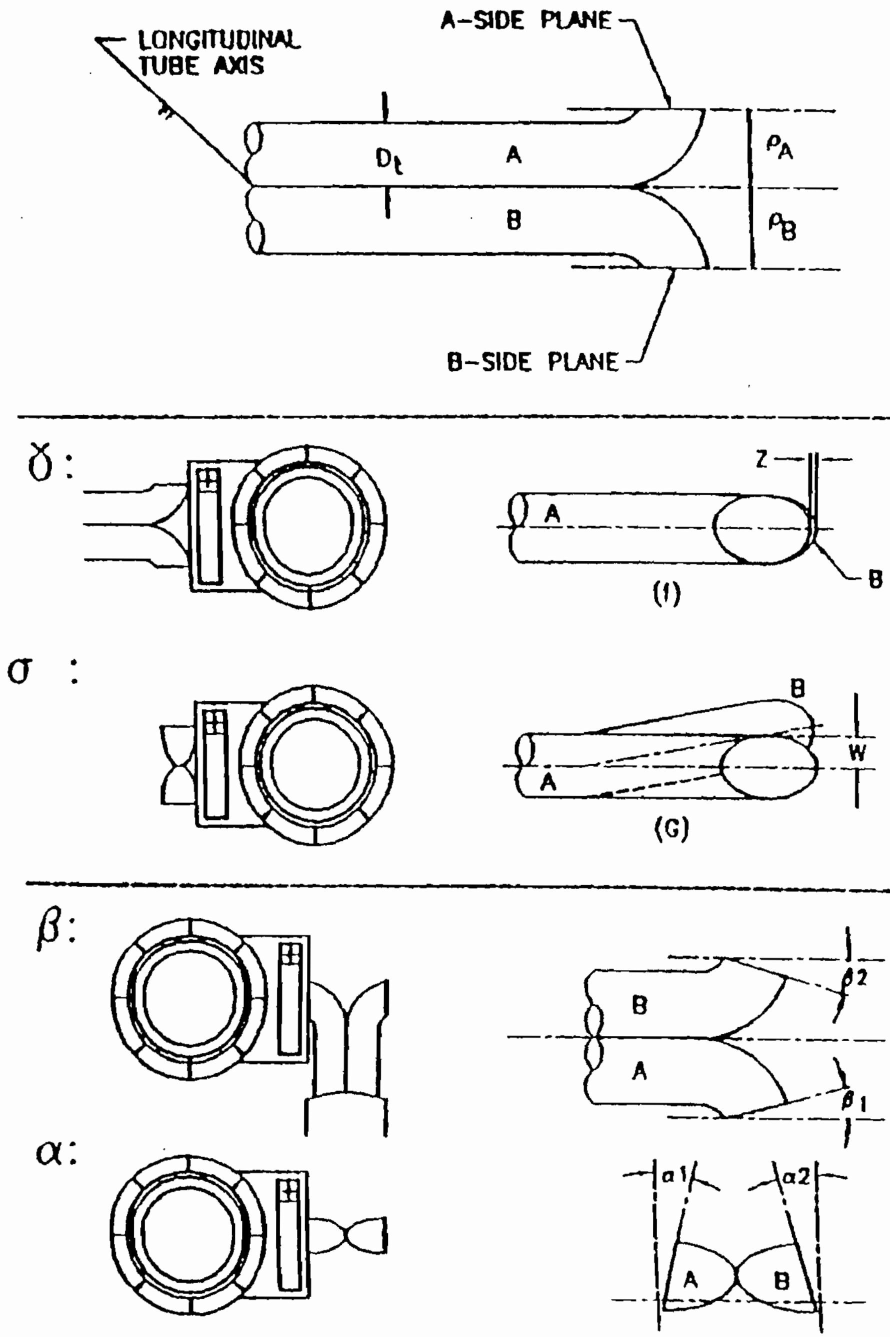
5. | β_A, β_B < 5° ** |
|---|

β_A = 2°
β_B = 2°

6. | α_A, α_B < 10° ** |
|---|

α_A = 1°
α_B = 1°

*, ** Acceptable Limits.



* Standards of Performance for New Stationary Sources, Federal Register, 36 (247), December 23, 1971.

** Vollaro, R.F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Tube Coefficient", U.S. EPA Emission Measurement Branch, Research Triangle Park, N.C., October 1976

Environmental Supply Co, Inc
800-STACKS-5
(782-2575)

PITOT TUBE CALIBRATION – VERIFICATION OF CONSTRUCTION SPECIFICATIONS

Pilot ID: P-146 Date: 3/27/98
Technician: [illegible]

1. D_t external tubing diameter — D_t = .375 inches

   $0.188" < D_t$ 0.375" •

2. $\rho = \dfrac{\rho_A + \rho_B}{2}$ — $\rho_A + \rho_B$ = .950 inches; ρ = .475 inches

3. $Z = (\rho_A + \rho_B) \sin \gamma$ — γ = 3°; Z = .050 inches

   Z < 0.125" ••

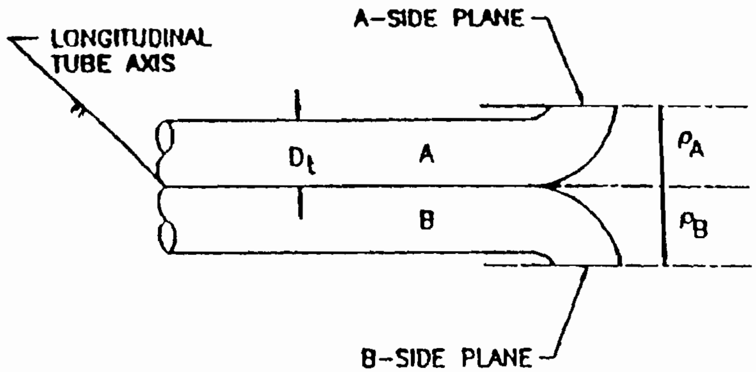
4. $W = (\rho_A + \rho_B) \sin \sigma$ — σ = 1°; W = 0.017 inches

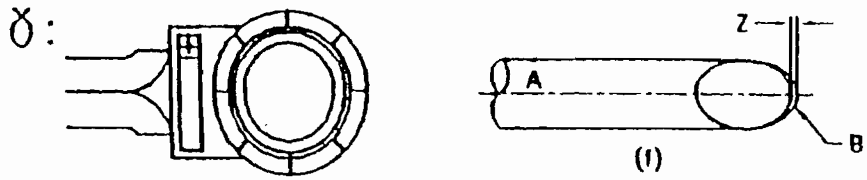
   W < 0.031" ••

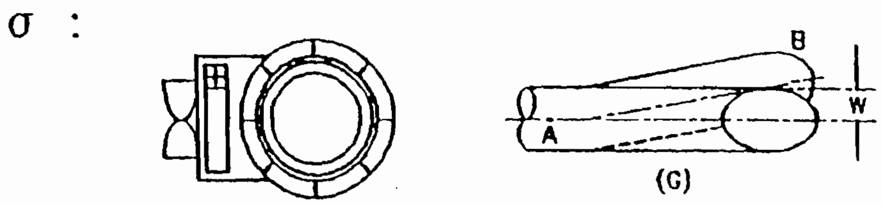
5. $\beta_A, \beta_B < 5°$ •• — β_A = 1°; β_B = 1°

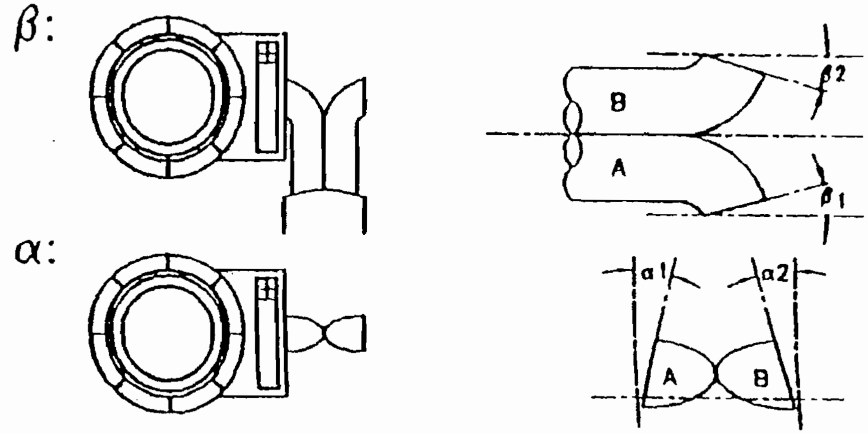
6. $\alpha_A, \alpha_B < 10°$ •• — α_A = 1°; α_B = 1°

•, •• Acceptable Limits.









• Standards of Performance for New Stationary Sources, Federal Register, 36 (247), December 23, 1971.

•• Valbra, R.F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Tube Coefficient", U.S. EPA Emission Measurement Branch, Research Triangle Park, N.C., October 1976

PITOT ID: 600	THIS DRAWING AND THE INFORMATION CONTAINED IS THE PROPERTY OF ENVIRONMENTAL SUPPLY COMPANY, INC. NO REPRODUCTION	REV	DESCRIPTION	(WAS)	DATE
Technician: DH	OF THIS DRAWING IN ANY FORM MAY OCCUR WITHOUT THE EXPLICIT WRITTEN CONSENT OF ENVIRONMENTAL SUPPLY COMPANY, INC.	–	INITIAL DRAWING		22 NOV 1999
Date performed: 07/02/2009					

1. Dt external tubing diameter. — Dt = **0.375** inches

$\boxed{0.188" < Dt\ 0.375"\ *}$

2. $\rho = \frac{\rho_A + \rho_B}{2}$ — $\rho_A + \rho_B$ = **0.934** inches; ρ = **0.467** inches

3. $Z = (\rho_A + \rho_B) \sin \delta$ — δ = **1.1** °; Z = **0.018** inches

$\boxed{Z < 0.125"\ *}$

4. $W = (\rho_A + \rho_B) \sin \sigma$ — σ = **0.3** °; W = **0.005** inches

$\boxed{W < 0.031"\ **}$

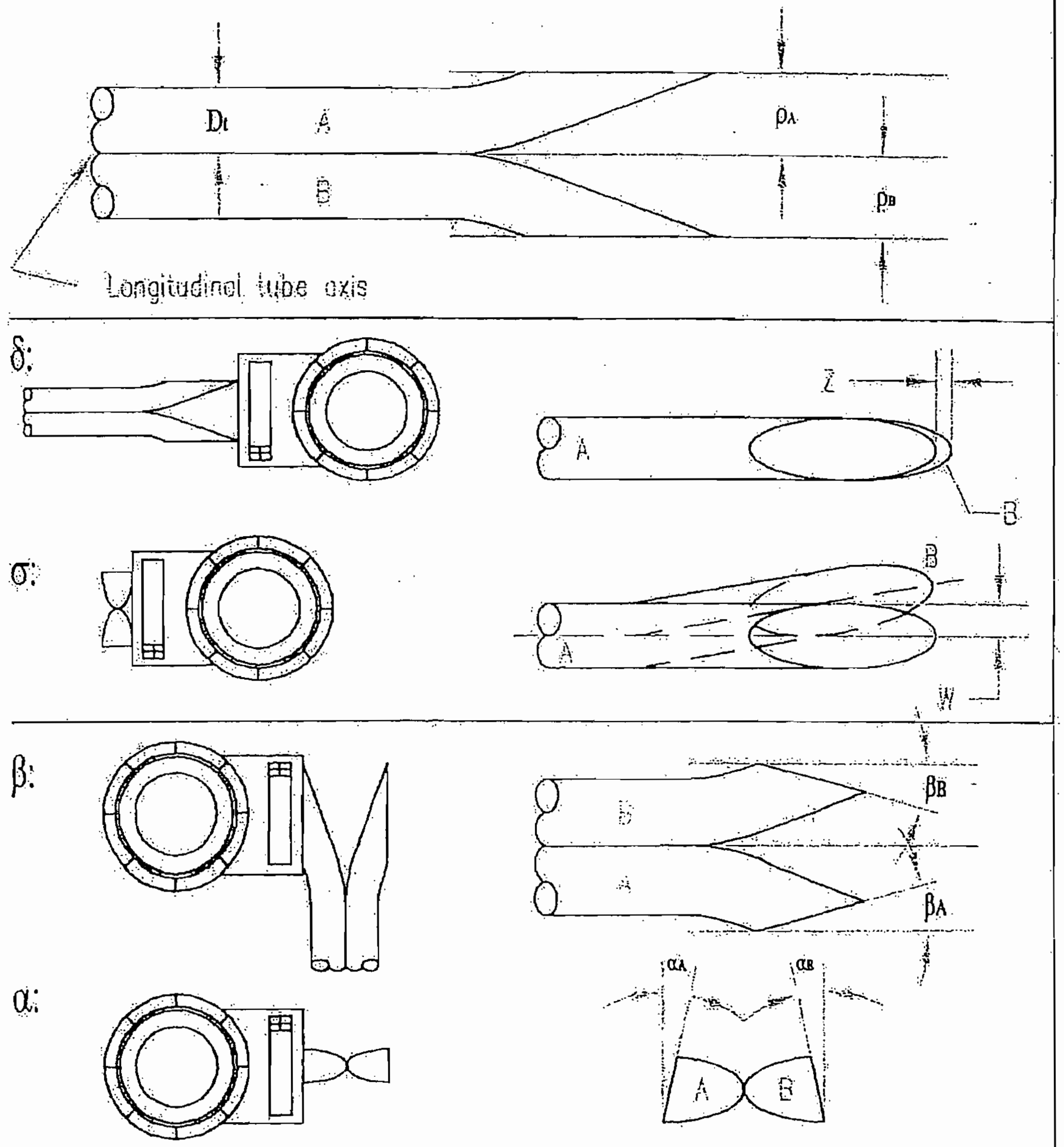
5. $\boxed{\beta_A, \beta_B < 5°\ **}$ — β_A = **0.5** °; β_B = **0.4** °

6. $\boxed{\alpha_A, \alpha_B < 10°\ **}$ — α_A = **0.4** °; α_B = **0.5** °

*, ** Acceptable Limits

* Standards of Performance for New Stationary Sources, Federal Register, 36 (247), December 23, 1971.

** Valbra, R. F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Tube Coefficient". U.S. EPA Emission Measurement Branch, Research Triangle Park, NC October 1976.

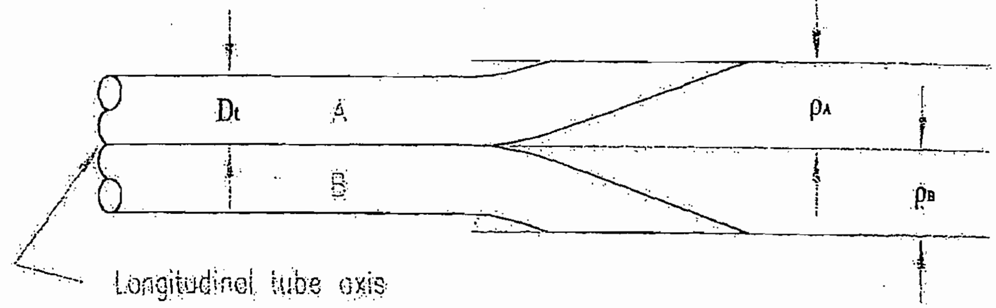


Environmental Supply Company, Inc. 2142 E. GEER STREET DURHAM, NC 27704	TITLE: Type S Pitot Tube Dimensional Calibration sheet	FILE NAME: PitotDimCal	ESC Part #: –
		DRAFTSMAN: BARRY ALLEN	DATE: 11-22-99 / SHEAR: XX.XXX" X XX.XXX"
	SHEET: 1 OF 1	LAYER CONTROL 1-☒ 2-☒ 3-☒ 4-☐ 5-☐ 6-☒ 7-☒ 8-☒	SCALE 1"=1" / SIZE A

PITOT ID: **601**	THIS DRAWING AND THE INFORMATION CONTAINED IS THE PROPERTY OF ENVIRONMENTAL SUPPLY COMPANY, INC. NO REPRODUCTION	REV	DESCRIPTION (WAS)	DATE
Technician: **DH**	OF THIS DRAWING IN ANY FORM MAY OCCUR WITHOUT THE EXPLICIT WRITTEN CONSENT OF ENVIRONMENTAL SUPPLY COMPANY, INC.	–	INITIAL DRAWING	22 NOV 1999
Date performed: **07/02/2009**				

1. Dt external tubing diameter. Dt = **0.375** inches

$\boxed{0.188'' < Dt\ 0.375''\ *}$



2. $p = \frac{p_A + p_B}{2}$ $p_A + p_B$ = **0.932** inches
p = **0.466** inches

3. $Z = (p_A + p_B) \sin \delta$ δ = **1.8** °
$\boxed{Z < 0.125''\ *}$ Z = **0.029** inches

4. $W = (p_A + p_B) \sin \sigma$ σ = **1.5** °
$\boxed{W < 0.031''\ **}$ W = **0.024** inches

5. $\boxed{\beta_A, \beta_B < 5°\ **}$ β_A = **0.7** °
β_B = **0.6** °

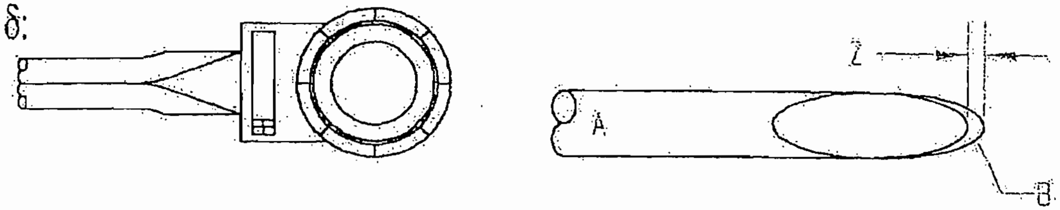
6. $\boxed{\alpha_A, \alpha_B < 10°\ **}$ α_A = **0.6** °
α_B = **0.1** °

*, ** Acceptable Limits

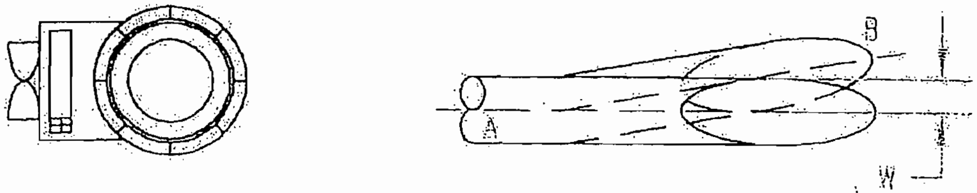
* Standards of Performance for New Stationary Sources, Federal Register, 36 (247), December 23, 1971.

** Valbra, R. F., "The Effects of Impact Opening Misalignment on the Value of the Type-S Pitot Tube Coefficient". U.S. EPA Emission Measurement Branch, Research Triangle Park, NC October 1976.

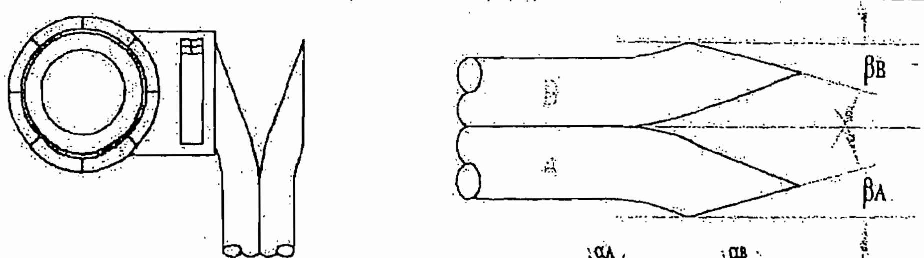
δ:



σ:



β:



α:

Environmental Supply Company, Inc.	TITLE: Type S Pitot Tube	FILE NAME: PitotDimCal	ESC Part #: –	
	Dimensional Calibration sheet	DRAFTSMAN: BARRY ALLEN	DATE: 11-22-99	SHEAR: XX.XXX" X XX.XXX"
2142 E. GEER STREET DURHAM, NC 27704	SHEET: 1 OF 1	LAYER CONTROL 1-☒ 2-☒ 3-☒ 4-☐ 5-☐ 6-☒ 7-☒ 8-☒	SCALE 1"=1"	SIZE A

Individual Audit Sample Report

Audit Sample Number: M23-3343-01

Method: 23

Concentration Results

Compound	Measured Concentration	Actual Concentration	Pass/Fail
2378-TCDD	0.15 ng/sample	0.15 ng/sample	PASS
Other TCDD	0.19 ng/sample	0.20 ng/sample	PASS
12378-PeCDD	0.15 ng/sample	0.15 ng/sample	PASS
Other PeCDD	0.22 ng/sample	0.20 ng/sample	PASS
123478-HxCDD	0.15 ng/sample	0.15 ng/sample	PASS
123678-HxCDD	0.14 ng/sample	0.15 ng/sample	PASS
123789-HxCDD	0.14 ng/sample	0.15 ng/sample	PASS
Other HxCDD	0.22 ng/sample	0.20 ng/sample	PASS
1234678-HpCDD	0.14 ng/sample	0.15 ng/sample	PASS
Other HpCDD	0.11 ng/sample	0.10 ng/sample	PASS
OCDD	0.29 ng/sample	0.30 ng/sample	PASS
2378-TCDF	0.17 ng/sample	0.20 ng/sample	PASS
Other TCDF	0.19 ng/sample	0.20 ng/sample	PASS
12378-PCDF	0.15 ng/sample	0.15 ng/sample	PASS
23478-PCDF	0.27 ng/sample	0.30 ng/sample	PASS
Other PCDF	0.14 ng/sample	0.20 ng/sample	PASS
123478-HxCDF	0.20 ng/sample	0.20 ng/sample	PASS
123678-HxCDF	0.19 ng/sample	0.20 ng/sample	PASS
123789-HxCDF	0.29 ng/sample	0.20 ng/sample	PASS
234678-HxCDF	0.18 ng/sample	0.20 ng/sample	PASS
Other HxCDF	0.12 ng/sample	0.20 ng/sample	PASS
1234678-HpCDF	0.13 ng/sample	0.15 ng/sample	PASS
1234789-HpCDF	0.10 ng/sample	0.10 ng/sample	PASS
Other HpCDF	0.09 ng/sample	0.10 ng/sample	PASS
OCDF	0.28 ng/sample	0.30 ng/sample	PASS

Audit Sampling Dates

Audit Starting Date:	**09/02/2009**
Audit Ending Date:	**No date provided**

Collection Firm

Collection Firm Name:	**Testar, Inc.**
Street Address:	**7424 ACC Blvd., Suite 108**
City:	**Raleigh**
State:	**NC**
ZIP:	**27613**
Office Telephone No.:	**919-957-9500**

Analyzing Laboratory

Laboratory Name:	**Analytical Perspectives**
Street Address:	**2714 Exchange Drive**
City:	**Wilmington**
State:	**NC**
ZIP:	**28405**
Telephone No.:	**910-794-1613**

Audit Test Site Information

Audit Site Name:	**Hillsborough County Resource Recovery Facility**
Street Address:	**350 N. Falkenburg Road**
City:	**Tampa**
State:	**FL**
ZIP:	**33619**

COVANTA
ENERGY
for a cleaner world

Covanta Hillsborough
350 North Falkenburg Road
Tampa, FL 33619-0903
Tel 813 684 5688
Fax 813 684 7964

September 16, 2009

Ms. Danielle Henry
Florida Department of Environmental Protection
Division of Air Resource Management
13051 North Telecom Parkway
Temple Terrace, FL 33637

Dept. Of Environmental Protection
SEP 18 2009
Southwest District

SUBJECT: Hillsborough County Resource Recovery Facility MWC Unit #4 RATA Report

Dear Ms. Henry,

Attached, please find the relative accuracy test audit (RATA) report on the continuous emission monitoring (CEM) system for municipal waste combustor (MWC) Unit #4. The testing was performed on August 12, 2009 by TRC Environmental Corporation (TRC).

Also attached, please find the Unit 4 Continuous Opacity Monitoring system (COM) and Continuous Emissions Monitoring System (CEMS) Performance Specification Test Results for MWC Unit #4. The objective of this test program was to determine compliance with the Performance Specification in 40 CFR 60, Appendix B on the COM/CEMS system. Included are manufacturer's certificates of conformance, facility opacity monitoring data, and results of the testing performed to determine zero alignment, response time, calibration error, and zero and span calibration drifts as well as the 7 day (168 hour) calibration drift test results. No adjustments were required or performed during the 168 hour calibration drift period.

Based upon information and belief formed after reasonable inquiry, the statements and information in the attached document are true, accurate and complete.

If you have any questions, please feel free to contact me. I can be reached during the day at (813) 684-5688.

Sincerely,

Glenn M. Hoag
Facility Manager

ARMS UPDATED
3/26/10

cc: J. Waters (HC-EPC) – 1 CD Copy
T. Smith (HC-SWMD) – w/o copy
D. Strobridge (CDM) – w/o copy
J. Aldina(Covanta) – w/o copy
File – 1 paper copy, 1 CD Copy

Permit File Scanning Request from ______________________________

Priority: ☐-ASAP (Public Records Request, etc.) ☒-Place in Normal Scanning Queue

Facility ID	Project#/PATS#	Type	PSD #	Submittal Date	Batch #
0570261					

☒ File Approved For Disposal ☒ Correspondence ☐ Intent ☐ Permit ☐ Draft (Title V)

☐ Return File to ~~BAR~~ AL Linero ☐ Amendment ☐ Application ☐ OGC ☐ Proposed (Title V)

Document Date 9/16/09

TEST REPORT

COVANTA HILLSBOROUGH, INC.
RELATIVE ACCURACY TEST AUDIT
TAMPA, FLORIDA

Prepared for

Covanta Hillsborough, Inc.
Tampa, Florida

Prepared by

TRC Environmental Corporation
Windsor, Connecticut

August, 2009

COVANTA HILLSBOROUGH, INC.
RELATIVE ACCURACY TEST AUDIT
HILLSBOROUGH, CONNECTICUT

Presented to

Covanta Hillsborough, Inc.
Tampa, Florida

Prepared by
TRC Environmental Corporation
Windsor, Connecticut

Richard Kopacz
Project Engineer

TRC Project No. 170497-0000-00000
August, 2009

TRC Environmental Corporation
21 Griffin Road North
Windsor, Connecticut 06095
Telephone (860) 298-9692
Facsimile (860) 298-6399

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APPENDICES

1.0 <u>INTRODUCTION</u>

Covanta Hillsborough Inc. (Covanta) of Tampa, Florida retained TRC Environmental Corporation (TRC) of Windsor, Connecticut to conduct a relative accuracy test audit (RATA) on two continuous emission monitoring (CEM) systems operated a 600 ton-per-day resource recovery unit. The audits were conducted to demonstrate compliance with *Florida Department of Environmental Protection, Permit No. PSD-FL-369 and Code of Federal Regulations Title 40, Part 60 (40 CFR 60), Subpart Eb.*

The stack CEM unit consists of oxygen (O_2) oxides of nitrogen (NO_X), sulfur dioxide (SO_2) and carbon monoxide (CO) low/high and analyzers. The inlet CEM units consist of O_2, and SO_2 analyzers. TRC conducted eleven 24-minute sampling runs for Unit 4 and compared the reference method data to the CEM data.

The testing was conducted on August 12, 2009. Mr. Evan Bali of TRC conducted the emissions testing. Mr. Joe Aldina of Covanta coordinated the test program. The program was not witnessed by a Florida DEP representative.

Section 2.0 of this document provides a summary and discussion of the RATA results. A brief discussion of the measurement methods and instrumentation is provided in Section 3. Quality assurance procedures are outlined in Section 4 and the appendices of this document provide the measurement documentation.

2.0 SUMMARY AND DISCUSSION OF RESULTS

The results of the RATA tests from Unit 4 are provided in **Table 2-1**. Pollutant data is reported on a dry basis in parts per million (ppm_{dry}) and diluent results are reported on a percent basis ($\%_{dry}$). Oxides of nitrogen (NO_X), sulfur dioxide (SO_2), and carbon monoxide data is also reported in parts per million, dry basis, corrected to 7% oxygen (ppm, dry@ 7%O_2) and pounds per hour (lb/hr). Relative accuracy (RA) for each analyzer was in compliance with the applicable regulation. During the relative accuracy testing the units were operating at greater than 50% capacity.

Appendix A contains all pertinent calibration data. A more detailed summary of TRC's sampling data is presented in **Appendices B**. The facility process data is presented in **Appendix D**.

Table 2-1

Relative Accuracy Test Audit Summary
Covanta of Hillsborough
12-Aug-09

Unit 4 Inlet and Outlet

Parameters/Analyzer	O_2 %	SO_2[1] ppm@7%O2	NO_X lb/hr	SO_2[2] lb/hr	CO low[4] lb/hr
	Inlet		Outlet		
Reference Method	3A	6C	7E	6C	10
Performance Specification	3	2	6	6	6
Emission Standard	NA	NA	79.8	19.2	25.9
Average RM Value	9.60	51.24	43.51	0.01	43.51
Average CEMS Value	9.44	50.82	44.38	0.82	44.38
Relative Accuracy Standard	+/- 1%	20%	20%	10%	5%
Relative Accuracy			7.77		
Absolute Difference	0.16				
Relative Accuracy Limit		13.9%		4.90	3.2

Unit No. 4 Outlet

Parameters/Analyzer	O_2 %	NO_X ppm@7%O2	SO_2[2] ppm@7%O2	CO[3] ppm@7%O2 Low	CO[3] ppm@7%O2 High
Reference Method	3A	7E	6C	10	10
Performance Specification	3	2	2	4	4
Emission Standard	NA	200	29	100	100
Average RM Value	9.99	108.34	0.55	23.18	24.91
Average CEMS Value	10.01	109.23	2.11	25.01	22.33
Relative Accuracy Standard	+/- 1%	20%	10%	5%	5%
Relative Accuracy		1.22			
Absolute Difference	-0.02				
Relative Accuracy Limit			8.10	2.1	3.1

[1] SO_2 Inlet relative accuracy is based on the calculation using the emission standard.

[2] SO_2 Outlet relative accuracy is based on the calculation using the emission standard.

[3] CO Low and High relative accuracy is based on the calculation using the emission standard.

[4] CO Low relative accuracy is based on the calculation using the emission standard.

3.0 PROCESS DESCRIPTION

The HCRRF has been expanded in 2008-09 to include MWC Unit 4, a solid waste-fired boiler of Martin GmbH Stoker Combustion System design (Figure 2-1). The nominal design rate capacity is 600 tons municipal solid waste (MSW) per day, with a nominal heat input of 288 MMBtu per hour and nominal steam production of 163,780 pounds per hour (maximum 190,000 lb/hr). Air pollution equipment (APC) for this unit includes dry scrubbers (SDA) for acid gas control, fabric filter (FF) for particulate removal, a flue gas recirculation system (FGR) and selective noncatalytic reduction (SNCR) for control of nitrogen oxides, and dry activated carbon injection (ACI) to enhance mercury removal. This unit is also equipped with a CEMS to measure and record NOx, CO, SO_2 as well as instrumentation to monitor steam flow, flue gas flow rate, oxygen , temperature, and opacity, which provide feedback on the effectiveness of the APC equipment.

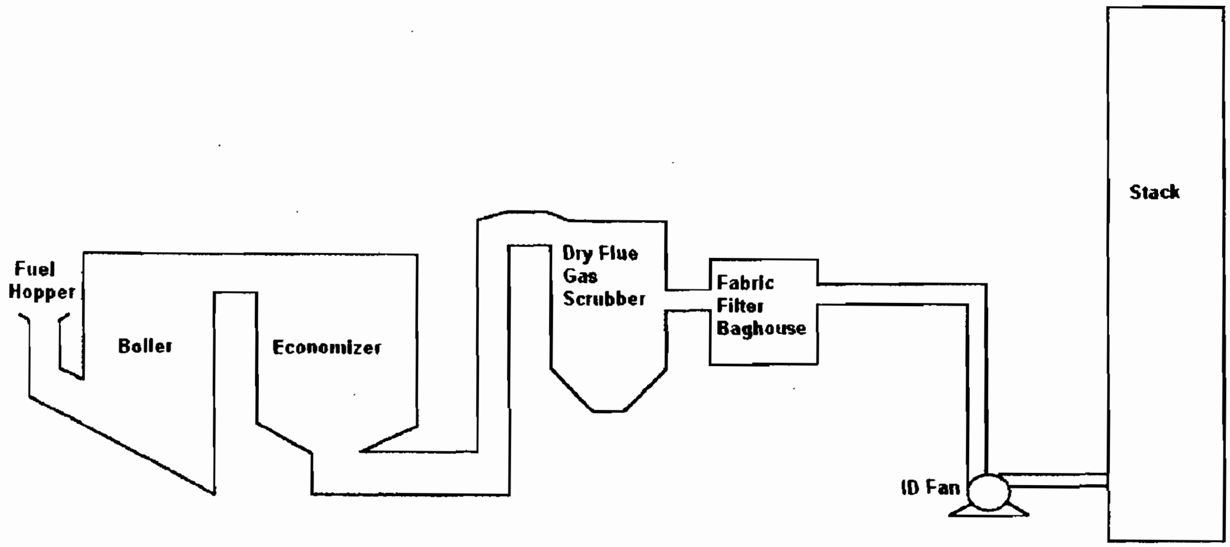

Figure 2-1: Diagram of Installation

Schematics of the process and sampling locations are shown in **Appendix D**.

Table 1-1: Continuous Emission Monitors for MWC Unit 4

Pollutant Monitor	Location	Range (ppm) Unless otherwise noted	Manufacturer	Model Number	Serial Number
O_2	Inlet	0 - 25	Servomex	1440	01440D1/4193
O_2	Outlet	0 - 25	Servomex	1440	01440D1/4194
$O_{2\,(wet)}$	Outlet	0 – 25	Rosemount	XI0101	F-08001793
SO_2	Inlet	0 – 500	Western Research	921 CE	AE-921-S400
SO2	Outlet	0 – 200	Western Research	921 CE	AE-921-S399
Hg	Outlet	n/a	n/a	n/a	n/a
Hg	Inlet	n/a	n/a	n/a	n/a
CO – H	Outlet	0 – 2,000	TECO	48i	CM08140014-H
CO - L	Outlet	0 - 500	TECO	48i	CM08140014-L
NO_x	Outlet	0 -500	TECO	42i –HL	0825631827
Flow	Outlet	0 – 225 kscfm	Trace	CEMSFLOW 500	TS - 080220
Opacity	Outlet	0 – 100 %	Sick Maihak	OMD41	074668018

4.0 SAMPLING AND ANALYTICAL METHODS

4.1 Program Overview

The field program was comprised of Reference Method testing in determining relative accuracy for the existing concentration CEMs. The gaseous measurements were conducted using real-time continuous pollutant monitors. All measurements were conducted in accordance with accepted EPA Reference Method procedures.

Gaseous pollutants (SO_2, NO_x, CO, and O_2) measurements were conducted in accordance with EPA Reference Methods 6C, 7E, 10, and 3A. The sampling procedures and sample runs were conducted in accordance with *40 CFR 60, Appendices B&F, and the FlDEP Continuous Emission Monitoring Guidelines*.

Measurements for gaseous pollutants were conducted using three sample points on a traverse. Each point was sampled for twenty-four minutes. The gaseous pollutant data is calculated on a dry basis for direct comparison to the facility CEMs output. All reference method data were recorded by a Data Shuttle data logger calculating 1-minute and 24-minute averages.

4.2 Sample Port and Traverse Location

Sampling was conducted from Unit No. 4 exhaust stack. Three sample points were used to measure emissions of pollutant and diluent gases from the stack. The selection of sample points followed *40CFR60 Appendix B, Performance Specification 2, Section 3.2*. The exhaust sampling points are presented in **Table 4-1** and the Economizer sampling points are shown in **Table 4-2**. Schematic of the sampling locations are shown in **Appendix D**.

4.3 TRC Emission Monitoring System

4.3.1 Emissions Monitoring System Components

Gaseous measurements were conducted at the facility with the use of TRC's Emissions Monitoring System. The system is a complete stand alone measurement trailer that houses the Reference Method instrumentation and the data acquisition system. TRC uses an extractive system for sample gas collection and measurement that measures concentrations on a dry basis. A schematic of the Emissions Monitoring System used by TRC is presented in **Appendix D**.

Table 4-1 Sample and Traverse Points for Gaseous Sampling Covanta Hillsborough, Inc. - Unit No. 4 Stack		
Point	**% of Stack Diameter**	**Point (inches)**
1	**16.7**	**27.6**
2	**50.0**	**48**
3	**83.3**	**80**

Table 4-2 Sample and Traverse Points for Gaseous Sampling Covanta Hillsborough, Inc. – Unit No. 4 Economizer		
Point	**% of Stack Diameter**	**Point (inches)**
1	**16.7**	**11.9**
2	**50.0**	**35.5**
3	**83.3**	**59.1**

Table 4-3 presents a list of analyzers, which were used during this program.

Table 4-3 TRC Environmental Corporation Emissions Monitoring System Instrumentation				
Parameter	**Manufacture**	**Model Number**		**Measurement Range**
CO	TECO	48		0-45.5 ppm
SO_2	Ametek Ametek	721AT2 721AT2		0-85 ppm 0-85 ppm
NO_x	TECO	42H		0-253 ppm
O_2	Servomex	1440		0-21.92 %
CO_2	Servomex	1440		0-14.4 %

Oxides of Nitrogen Measurements

A Thermo Electron Corporations (TECO) Model 42H chemiluminescent NO/NO_x monitor was used to measure NO_x. The instrument operation is based on the principal of the chemiluminescent reaction of nitric oxide (NO) and ozone. Light emission results when electronically excited nitrogen dioxide (NO_2) molecules revert to their ground state. To measure NO concentrations, the gas sample to be analyzed, is blended with ozone (O_3) in the instrument's reaction chamber. The resulting chemiluminescence is monitored through an optical filter by a highly sensitive photomultiplier tube (PMT) positioned at one end of the reaction chamber. The filter/photomultiplier combination responds to light in a narrow wavelength band unique to this chemiluminescent reaction (detailed below) the filter assists in eliminates interferences in this wavelength:

$$\mathbf{NO + O_3 \rightarrow NO_2 + O_2 + hv}$$

To measure NO_x concentrations (NO plus NO $_2$), the sample gas flow is diverted through an NO_2-to-NO converter. The chemiluminescent response in the reaction chamber to the converter effluent is linearly proportional to the NO_x concentration entering the converter (sample gas). The system was operated in the NO_x mode during all phases of the program.

Carbon Dioxide Measurements

A Servomex 1440/NDIR CO_2 analyzer was used to measure concentrations of CO_2. The instrument operates on the principle of absorption of filtered infrared frequencies by the molecular bonds of the target gas molecules in the sample cell. This analyzer utilizes dual-in-line reference and sample detectors to measure the attenuation of the infrared energy, which is proportional to the concentration of the CO_2 present. The raw signals from the two detectors are subtracted, and the difference then linearized and amplified prior to electronic output from the analyzer. The signal generated is an analog voltage linearly proportional to the carbon dioxide concentration in the gas stream.

Oxygen Measurements

A Servomex O_2 analyzer wase used to determine the concentration of O_2 in the stack gas. This instrument uses the paramagnetic principle, whereby the magnetic susceptibility of the gas volume is measured by the force acting on a nonmagnetic test body suspended in a magnetic field. The force is converted to an output current proportional to the O_2 concentration.

Carbon Monoxide Measurements

A TECO Model 48 nondispersive infrared gas analyzer measured CO concentrations. The analyzer contains an infrared detector that uses the signal nondispersive beam technique with alternate modulations of the sample and reference cells. Radiation absorbed by CO in the sample cell results in a capacitance change in the detector, which is proportional to the CO concentration.

Sulfur Dioxide Measurements

A Western Research model 721M microprocessor controlled fluorescent analyzer was to measure SO_2. The instrument operates on the principle of fluorescence, by excitation of sulfur dioxide molecules by pulsing high intensity ultraviolet (UV) light. The resulting fluorescence is measured by a photo multiplier tube (PMT) sensitive in the near UV. The signal generated is an analog voltage linearly proportional to the sulfur dioxide concentration in the gas stream.

4.3.2 Reference Method Monitoring System Calibrations

Calibrations (zero and span) were performed using EPA Protocol 1 calibration gases at the beginning and end of each test period. Calibration gases are introduced to the system through a three-way tee at the back end of the probe.

4.3.3 Data Reduction

Using Equation 6C-1 (40CFR60, Appendix A), the ppm and percent values were corrected to account for the zero and span instrument drift as follows:

$$C_{gas} = (\bar{C} - C_o) \times \frac{C_{ma}}{C_m - C_o},$$

Where:	C_{gas}	=	emissions concentration (ppm or %)
	$\bar{C}$	=	average emissions reading (ppm or %)
	C_o	=	average zero reading (ppm or %)
	C_m	=	average span reading (ppm or %)
	C_{ma}	=	span gas concentration (ppm or %)

The relative accuracy (%RA) determinations are based on Equations 2-1 through 2-4 as presented in Specification 2 of 40CFR60, Appendix B. They are summarized as follows:

$$\% \text{RA} = \frac{|\bar{d}| + CI_{95}}{\text{avg reference method value}^{1}} \times 100$$

1 The average reference method value or applicable emission standard.

Where: $|\bar{d}|$ = Absolute value of the mean of differences, $\frac{1}{n} \Sigma d_i$

Using Equation 2-3 (40CFR60, Appendix B, Performance Specification 2), the 95 percent confidence interval (CI_{95}) is determined using the following equation:

$$CI_{95} = t_{0.975} \frac{S_d}{\sqrt{n}}$$

Where:	$t_{0.975}$	=	student t distribution value at 2.5% upper tail area with n degrees of freedom
	S_d	=	standard deviation
	n	=	number of samples

The standard deviation is calculated using Equation 2-2 (40CFR60, Appendix B, Performance Specification 2) as shown below:

$$S_d = \sqrt{\frac{\Sigma d_i^2 - \frac{(\Sigma d_i)^2}{n}}{n - 1}}$$

Where: Σd_i^2 = the algebraic sum of the squared individual measurements

$\Sigma(d_i^2)$ = the square of the algebraic sum of the individual measurements

The NO_X, CO and SO_2 concentration rate (ppm @ 7% O_2) is calculated using the following equation as shown below:

$$C_{dry} @ 7\% O_{2dry} = C_{dry} \frac{20.9 - 7}{20.9 - \% O_{2dry}}$$

Where: C_{dry} = Gas concentration, dry basis

$\%O_{2dry}$ = Percent oxygen, dry basis

The NO_X and SO_2 emission rate (lbs/MMBtu) is calculated using Equation 19-6 (40CFR60, Appendix A) as shown below:

$$ER = C_{dry} \; MW \; 2.5962E\text{-}9 \; F_C \frac{100}{\% CO_{2dry}}$$

Where: C_{dry} = Gas concentration, dry basis

MW = Molecular weight NOX (as NO_2) - 46.01

F_C = F-factor, dscf/mmBtu, wet basis

$\%CO_{2dry}$ = Percent carbon dioxide, dry basis

The NO_X and SO_2 emission rate (lbs/MMBtu) is also calculated using Equation 19-1 (40CFR60, Appendix A) as shown below:

$$ER = C_{dry}\ MW\ 2.5962E\text{-}9\ F_d\ \frac{20.9}{20.9 - \%O2}$$

Where:	C_{dry}	=	Gas concentration, dry basis
	MW	=	Molecular weight NOX (as NO_2) - 46.01
	F_C	=	F-factor, dscf/mmBtu, wet basis
	$\%CO_{2dry}$	=	Percent carbon dioxide, dry basis

5.0 **QUALITY ASSURANCE**

The TRC quality assurance program (QA) is designed to ensure that emission measurement work is performed by qualified people using proper equipment following written procedures in order to provide accurate, defensible data. This program is based upon the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III (EPA-600/4-77-027b).

At the beginning of each test day, a meeting was held to orient personnel to the activities scheduled for that day, to discuss results from the previous day, and to determine if any special considerations need to be addressed for the proposed work.

5.1 Measurement Methods

Sampling and measurement equipment including continuous analyzers, recorders, pitot tubes, dry-gas meters, orifice meters, thermocouples, nozzles, and any other pertinent apparatus are uniquely identified, undergo preventive maintenance, and are calibrated before and after the test program. Most calibrations are performed with standards traceable to the National Institute for Standards and Technology (NIST) or other appropriate references. These standards include wet test meters and NIST Standard Reference Materials. Records of all calibration data are maintained within TRC files and will be made available to Covanta and on-site personnel prior to the first test period.

During the field tests, sampling performance and progress are continually evaluated, and deviations from sampling method criteria are reported to the Field Team Leader who then determines the validity of the test run. The Field Team Leader maintains a written log describing the events of each day.

5.2 Emission Monitoring System

The system is calibrated, leak checked, and bias checked at the beginning and end of each emission test in accordance with 40 CFR Part 60, Methods 3A, 7E and 10. All calibration gases are Protocol 1 or equivalent (±2%). Multi point calibrations are performed on the analyzers prior to the field program to establish linearity. During the data reduction process, all calculations are reviewed by a person intimately associated with the emission test program, and finally by a senior scientist or engineer not associated with the program. These quality control checks provide a means to ensure that the calculations are performed correctly and that the data are reasonable.

APPENDIX A

REFERENCE METHOD CALIBRATION DATA

APPendix A

Spectra
Spectra Gases, Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: TRC Environmental
SGI ORDER # : 125363
ITEM# : 6
P.O.# : G49048

CYLINDER # : CC-250095
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660
PRODUCT CODE: TRC 4

CERTIFICATION DATE: 3/12/2008
EXPIRATION DATE: 3/12/2010

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Nitric Oxide	3/4/2008 3/12/2008	147.8 ppm 146.9 ppm	147.3 ppm	+/- 1%
NOx			147.3 ppm	Reference Value Only

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Nitric Oxide	GMIS-1	CC-256058	254 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Nitric Oxide	CAI-400-CLD	6L09004	Cheml	2/26/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: [signature]
FRED PIKULA

DATE: 3/12/2008

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Spectra
Spectra Gases, Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: TRC Environmental
SGI ORDER # : 125363
ITEM# : 7
P.O.# : G49048

CYLINDER # : CC-118522
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660
PRODUCT CODE: TRC 4

CERTIFICATION DATE: 3/12/2008
EXPIRATION DATE: 3/12/2010

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Nitric Oxide	3/4/2008 3/12/2008	253.1 ppm 252.8 ppm	253 ppm	+/- 1%
NOx			253 ppm	Reference Value Only

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Nitric Oxide	GMIS-1	CC-256058	254 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Nitric Oxide	CAI-400-CLD	6L09004	Cheml	2/26/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: ______________ **FRED PIKULA**

DATE: 3/12/2008

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	TRC Environmental (Gainesville, Florida)
Date	April 27, 2009
Delivery Receipt	DR-24528
Gas Standard	50.0 ppm NO2, 1.00% Oxygen/Nitrogen - EPA PROTOCOL
Final Analysis Date	April 17, 2009
Expiration Date	October 17, 2009

DO NOT USE BELOW 150 psig

Cylinder Data

Cylinder Serial Number:	CC-56675	Cylinder Outlet:	CGA 660
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F
Expiration Date:	October 17, 2009		

Analytical Data

EPA Protocol, Section No. 2.2, Procedure G-1

- Replicate Concentrations (NO2) -

Nitrogen Dioxide: 52.4 ppm +/- 0.52 ppm

Oxygen: 0.995% +/- 0.009%

Nitrogen: Balance

Reference Standard(s):

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-178320	CC-231346
Concentration:	50.9 ppm NO2/Nitrogen	1.00% Oxygen/Nitrogen
Expiration Date:	March 26, 2011	March 04, 2011

Certification Instrumentation

Component:	Nitrogen Dioxide	Oxygen
Make/Model:	Nicolet - NEXUS 470	Servomex 244a
Serial Number:	AEP99000154	1847
Principal of Measurement:	FTIR	Paramagnetic
Last Calibration:	March 20, 2009	April 07, 2009

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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~ www.liquidtechcorp.com ~

Airgas
National Welders™

Airgas National Welders
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	Airgas National Welders Raleigh, NC		
Part Number:	E02NI99E15AC2T7	Reference Number:	122-7190015-1
Cylinder Number:	CC104344	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Durham - NC	Cylinder Pressure:	2015 PSIG
Analysis Date:	Jan 22, 2009	Valve Outlet:	660

Expiration Date: Jan 22, 2011

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
SULFUR DIOXIDE	49.50 PPM	49.38 PPM	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	060613	CC207608	45.91PPM SULFUR DIOXIDE/NITROGEN	Sep 01, 2010

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 SO2	FTIR	Jan 02, 2009

Triad Data Available Upon Request

Notes:

QA Approval

Spectra
Spectra Gases, Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

RECERTIFICATION OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: TRC Environmental Corp
SGI ORDER # : 127450
ITEM# : 1
P.O.# : G49054

CYLINDER # : CC-85197
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 660

CERTIFICATION DATE: 4/14/2008
EXPIRATION DATE: 4/14/2011

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Sulfur Dioxide	8/3/2006 4/14/2008	85.10 ppm 84.87 ppm	85.0 ppm	+/- 1%

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: 8/3/2006 by Spectra Gases

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Sulfur Dioxide	NTRM-81694	CC-162985	96.1 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Sulfur Dioxide	Horiba VIA-510	851221093	NDIR	4/1/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: ______________
FRED PIKULA

DATE: 4/14/2008

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Spectra
Spectra Gases, Inc.
3434 Route 22 West, Branchburg, New Jersey 08876 USA
ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE
PROCEDURE # : G1

CUSTOMER: TRC CUbix
SGI ORDER # : 134314
ITEM# : 1
P.O.# : G49617

CYLINDER # : CC-99012
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590
PRODUCT CODE: TRC 21

CERTIFICATION DATE: 9/4/2008
EXPIRATION DATE: 8/13/2011

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	8/11/2008 9/4/2008	25.25 ppm 25.01 ppm	25.1 ppm	+/- 1%
Methane	8/13/2008	24.8 ppm	24.8 ppm	+/- 1%

BALANCE Air

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	NTRM-81679	CC-135140	101 ppm
Methane	GMIS-1	CC-53279	98.8 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Horiba VIA-510	H0002L2Y	NDIR	8/8/2008
Methane	H. Packard 6890	US00001434	GC - FID	7/14/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: Matt Booth
MATTHEW BOOTH

DATE: 9/4/2008

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Spectra
Spectra Gases, Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: TRC Environmental Corp
SGI ORDER # : 108735
ITEM# : 8
P.O.# : G48042

CYLINDER # : CC-99137
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 590

CERTIFICATION DATE: 5/22/2007
EXPIRATION DATE: 5/21/2010

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Carbon Monoxide	5/15/2007 5/22/2007	45.59 ppm 45.35 ppm	45.5 ppm	+/- 1%
Methane	5/21/2007	45.4 ppm	45.4 ppm	+/- 1%

BALANCE Air

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Carbon Monoxide	GMIS-1	CC-135374	101.0 ppm
Methane	GMIS-1	CC-60179	50.1 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Carbon Monoxide	Nicolet 560	ADL9600109	FTIR	5/17/2007
Methane	H. Packard 6890	US00001434	GC - FID	5/18/2007

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES. DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: CP
CHERYL PATINO

DATE: 5/22/2007

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	TRC Environmental (Gainesville, Florida)
Date	December 23, 2008
Delivery Receipt	DR-23361
Gas Standard	80.0 ppm CO, 85.0 ppm Methane/Air - EPA PROTOCOL
Final Analysis Date	December 23, 2008
Expiration Date	December 23, 2011

Component	Carbon Monoxide, Methane
Balance Gas	Air

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Monoxide: 81.4 ppm +/- 0.81 ppm

Methane: 87.6 ppm +/- 0.87 ppm

Air: Balance

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-125480/CC-129288	CC-166617/CC-231409
Concentration:	53.3 ppm CH4/113.4 ppm CH4	51.0 ppm CO/98.6 ppm CO
Expiration Date:	08/14/10 - 08/14/10	09/18/10 - 11/30/09

Certification Instrumentation

Component:	Methane	Carbon Monoxide
Make/Model:	HP5890-II	Nicolet-Nexus 470
Serial Number:	3336A59393	AEP99000154
Principal of Measurement:	GC-FID	FTIR
Last Calibration:	December 02, 2008	December 05, 2008

Cylinder Data

Cylinder Serial Number:	CC-115835	Cylinder Outlet:	CGA 590
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike D[illegible]

Date: December 23, 2008

Unmatched Excellence

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Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	TRC Environmental (Gainesville, Florida)
Date	June 04, 2009
Delivery Receipt	DR-24976
Gas Standard	14.50% CO2, 8.50% Oxygen/Nitrogen-EPA PROTOCOL
Final Analysis Date	June 04, 2009
Expiration Date	June 04, 2012

Component	Carbon Dioxide, Oxygen
Balance Gas	Nitrogen

Analytical Data:

DO NOT USE BELOW 150 psig

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Dioxide: 14.43% +/- 0.14%

Oxygen: 8.56% +/- 0.08%

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS	GMIS/GMIS
Cylinder Number:	CC-125534	CC-231332/CC-85458
Concentration:	13.2% CO2/N2	10.1% Oxygen/20.97% O2/N2
Expiration Date:	04/01/11	03/04/11 - 04/15/11

Certification Instrumentation

Component:	Carbon Dioxide	Oxygen
Make/Model:	Agilent 7890A	Servomex 244a
Serial Number:	CN10736166	1847
Principal of Measurement:	GC-TCD	Paramagnetic
Last Calibration:	May 07, 2009	May 07, 2009

Cylinder Data

Cylinder Serial Number:	CC-125611	Cylinder Outlet:	CGA 590
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	TRC Environmental (Gainesville, Florida)
Date	April 27, 2009
Delivery Receipt	DR-24528
Gas Standard	8.50% CO2, 12.00% Oxygen/Nitrogen-EPA PROTOCOL
Final Analysis Date	April 10, 2009
Expiration Date	April 10, 2012

Component	Carbon Dioxide, Oxygen
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Dioxide: 8.52% +/- 0.08%

Oxygen: 12.17% +/- 0.12%

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-159114/CC-165377	CC-231332/CC-85458
Concentration:	7.11% CO2/N2-10.05% CO2/N2	10.1% Oxygen/20.97% O2/N2
Expiration Date:	04/04/11 - 04/06/11	03/04/11 - 04/15/11

Certification Instrumentation

Component:	Carbon Dioxide	Oxygen
Make/Model:	Agilent 7890A	Servomex 244a
Serial Number:	CN10736166	1847
Principal of Measurement:	GC-TCD	Paramagnetic
Last Calibration:	April 01, 2009	April 07, 2009

Cylinder Data

Cylinder Serial Number:	EB-0015827	Cylinder Outlet:	CGA 590
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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Certificate of Analysis

- EPA PROTOCOL GAS -

Customer	TRC Environmental (Gainesville, Florida)
Date	April 27, 2009
Delivery Receipt	DR-24528
Gas Standard	4.50% CO2, 22.00% Oxygen/Nitrogen-EPA PROTOCOL
Final Analysis Date	April 10, 2009
Expiration Date	April 10, 2012

Component	Carbon Dioxide, Oxygen
Balance Gas	Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**

EPA Protocol, Section No. 2.2, Procedure G-1

Reported Concentrations

Carbon Dioxide: 4.61% +/- 0.04%

Oxygen: 21.92% +/- 0.21%

Nitrogen: Balance

Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-184980/CC-159026	CC-85458/CC-85469
Concentration:	1.02% CO2/N2-5.14% CO2/N2	20.97% O2/N2 - 25.30% O2/N2
Expiration Date:	11/24/10 - 03/31/11	04/15/11 - 08/09/10

Certification Instrumentation

Component:	Carbon Dioxide	Oxygen
Make/Model:	Agilent 7890A	Servomex 244a
Serial Number:	CN10736166	1847
Principal of Measurement:	GC-TCD	Paramagnetic
Last Calibration:	April 01, 2009	April 07, 2009

Cylinder Data

Cylinder Serial Number:	EB-0015963	Cylinder Outlet:	CGA 590
Cylinder Volume:	140 Cubic Feet	Cylinder Pressure:	2000 psig, 70°F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by: Mike Duncan

Mike Duncan

Unmatched Excellence

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EPA Method 5
Initial Dry Gas Meter Calibration
Critical Orifice Calibration

Model #: 2010
Serial #: 80893 Meter Box E

Date: 22-Apr-09
Barometric Pressure: 29.91 in Hg

METER CALIBRATION READINGS

dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Initial Temperatures Inlet (deg F)	Initial Temperatures Outlet (deg F)	Final Temperatures Inlet (deg F)	Final Temperatures Outlet (deg F)	Vacuum (in Hg)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Ambient Temperatures Initial (deg F)	Ambient Temperatures Final (deg F)
0.110	35.00	912.507	919.924	7.417	72.0	71.0	75.0	73.0	17.0	BN-31	0.1601	75.2	76.1
0.280	18.00	920.139	926.263	6.124	75.0	75.0	76.0	75.0	17.0	BN40	0.2536	77.0	77.9
0.560	15.00	905.497	912.507	7.010	68.0	68.0	69.0	70.0	17.0	BN48	0.3485	68.0	74.3
1.030	18.00	927.014	938.139	11.125	76.0	75.0	77.0	76.0	17.0	BN55	0.4565	78.8	79.7
1.700	15.00	938.935	950.910	11.975	78.0	76.0	78.0	77.0	15.0	BN63	0.5881	79.7	79.7

METER CALIBRATION RESULTS

********* DRY GAS METER ********* VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	FLOW RATE (SCFM)	******* ORIFICE ******* VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	*** DRY GAS METER ** CALIBRATION FACTOR Y Value (number)	Variation (number)	****** ORIFICE ****** CALIBRATION FACTOR dH@ Value (in H2O)	Variation (in H2O)
7.350	208.1	0.210	7.242	205.1	0.985	0.015	1.434	-0.115
6.043	171.1	0.336	5.889	166.8	0.975	0.004	1.454	-0.095
7.007	198.4	0.467	6.784	192.1	0.968	-0.002	1.543	-0.006
10.983	311.0	0.610	10.584	299.7	0.964	-0.007	1.660	0.111
11.814	334.5	0.788	11.357	321.6	0.961	-0.009	1.654	0.105

FACTOR	CRITERIA	CALIBRATION TEST RESULTS	PASS/FAIL
Y	Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.	Average Y: 0.9706	PASS
dH@	For Orifice Calibration Factor dH@, the orifice differential pressure in inches of H20 that equates to 0.75 cfm at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +-0.2.	Average dH 1.549	PASS

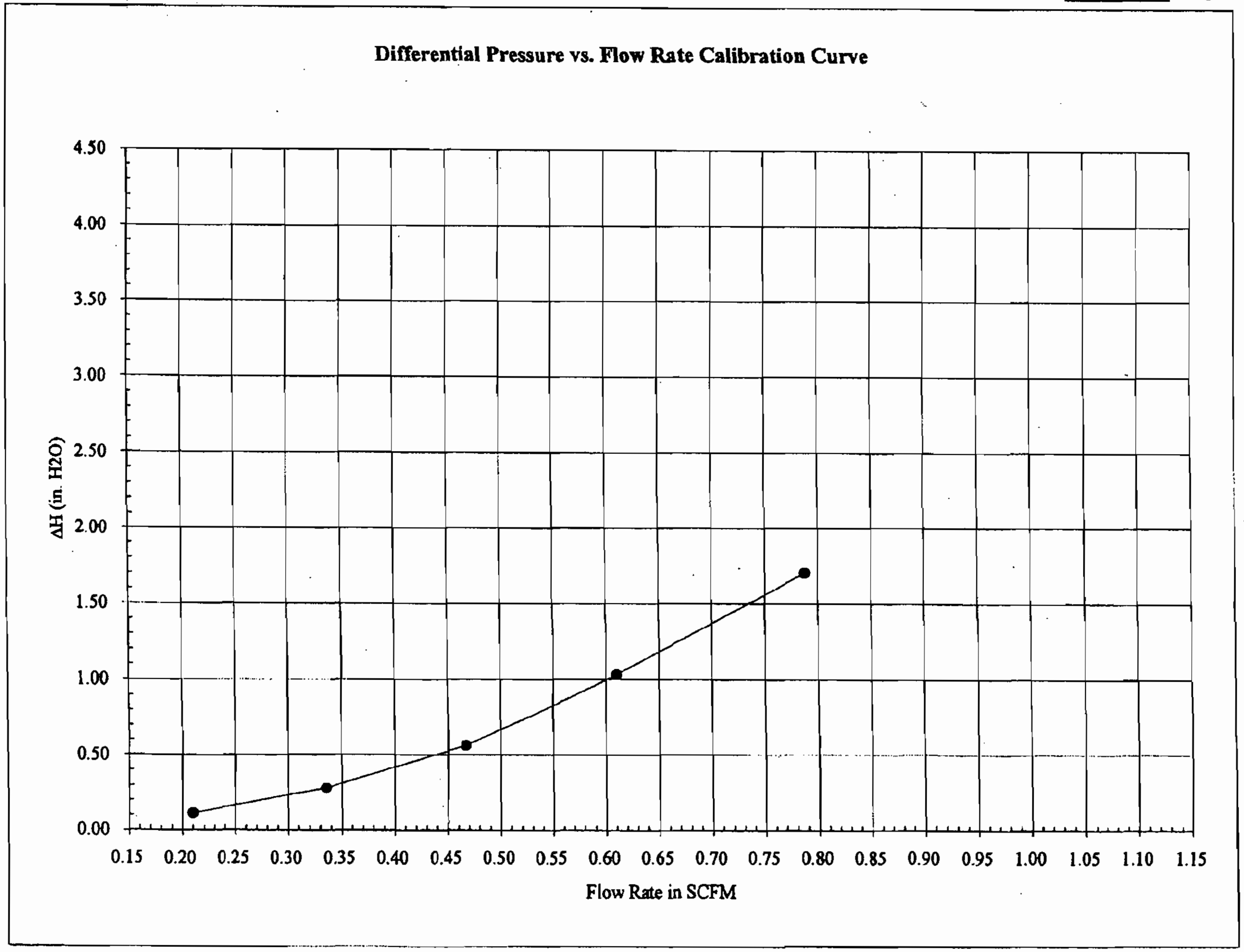
SIGNED: Richard Hefler

EPA Method 5
Initial Dry Gas Meter Calibration
K-Factor Selection Curve

Meter Box E

Model #:	2010	
Serial #:	80893	Meter Box E

Date:	22-Apr-09	
Barometric Pressure:	29.91	in Hg



Dry Gas Meter Temperature Display Calibration

Meter Box ID	Meter Box E	**Reference Calibrator**	CL 23A
Date	12/4/2008	**Serial Number**	T 243911
Calibrated By	R.Osier	**Reference Calibration Date**	11/24/2008

Input Temperature		Temperature Reading from Individual Thermocouple Input[1]									
		Channel Number									
Deg. F	Deg. R	1	% Diff	2	% Diff	3	% Diff	4	% Diff	5	% Diff
0	460	1	-0.2%	1	-0.2%	1	-0.2%	1	-0.2%	1	-0.2%
50	510	49	0.2%	48	0.4%	49	0.2%	49	0.2%	49	0.2%
100	560	98	0.4%	99	0.2%	99	0.2%	99	0.2%	99	0.2%
500	960	498	0.2%	498	0.2%	498	0.2%	498	0.2%	498	0.2%
900	1360	901	-0.1%	901	-0.1%	901	-0.1%	901	-0.1%	901	-0.1%
1900	2360	1902	-0.1%	1902	-0.1%	1902	-0.1%	1901	0.0%	1902	-0.1%
		Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

[1] - Channel temperatures must agree with +/- 5 °F or 3 °C

[2] - Acceptable temperature difference is less than 1.5 %

Dry Gas Meter Thermocouple Calibration[3]

	Readout Display Temperature oF	Reference Thermometer °F	Percent Difference
Inlet Temp	70	71.2	-0.2%
Outlet Temp	72	73	-0.2%

[3] - Dry gas meter thermicouple is compared to an ASTM type mercury in glass reference thermometer

TRC

QA / QC Check: Sign and Date Roger Paul Osier

APEX INSTRUMENTS METHOD 5 (M5CO-SET) ORIFICE SET CALIBRATION

Orifice Series	BN
Serial Number	40-73
Meter Gamma	0.9922

Calibration Conditions	
Date Started	21-Nov-08
Date Completed	21-Nov-08
Calibration Technician	EW

	Factors/Conversions	
Std Temp	293	K
Std Press	760	mm Hg
K_1	0.386	K/mm Hg

APEX INSTRUMENTS

[1]The Critical Orifice Coefficient, K', in English units, $(ft^3 \cdot R^{1/2})/(in.Hg \cdot min)$.
[2]The Critical Orifice Coefficient, K', in Metric units, $(m^3 \cdot K^{1/2})/(mmHg \cdot min)$.

Standard Flow is in Liters/minute

Calibration Data															Results			
					Reference Meter										Critical Orifice			
Date	Orifice Number	Barometric Pressure	Theoretical Critical Vacuum[1]	Run Time Elapsed	DGM Orifice ΔH	Volume Initial	Volume Final	Volume Total	Standardized Volume	Outlet Temp Initial	Outlet Temp Final	Amb Temp Initial	Amb Temp Final	Actual Vacuum	Coefficient Metric Units	Coefficient English Units	% Variation from Avg	Standard Flow
				(Θ)	(P_m)	(V_{mi})	(V_{mf})	(V_m)	(Vstd)	(t_{mi})	(t_{mf})	(t_{amb})	(t_{amb})		K'	K'	(<0.5%)	Q'
		mm Hg	mm Hg	min	mm H_2O	m^3	m^3	m^3	m^3	°C	°C	°C	°C	mm Hg	see above[2]	see above[1]	%	Lpm
21-Nov-08	BN-73	757	357.304	10	76	9.3642	9.6630	0.2988	0.2968	23	23	24	24	393.7	6.704E-04	0.8068	-0.15	29.4464
21-Nov-08	BN-73	757	357.304	10	76	9.6630	9.9629	0.2999	0.2974	23	24	24	24	393.7	6.717E-04	0.8084	0.05	29.5050
21-Nov-08	BN-73	757	357.304	10	76	9.9629	10.2632	0.3003	0.2973	24	24	24	25	393.7	6.720E-04	0.8088	0.10	29.4946
														Average	6.714E-04	0.8080		29.4820
21-Nov-08	BN-81	757	357.304	10	114	10.2632	10.6290	0.3658	0.3634	24	24	25	24	355.6	8.216E-04	0.9888	-0.27	36.0594
21-Nov-08	BN-81	757	357.304	10	114	10.6290	10.9960	0.3670	0.3646	24	24	24	25	355.6	8.243E-04	0.9920	0.08	36.1777
21-Nov-08	BN-81	757	357.304	10	114	10.9960	11.3639	0.3679	0.3649	24	25	25	25	355.6	8.256E-04	0.9936	0.22	36.2055
														Average	8.239E-04	0.9915		36.1476

I certify that the above Orifice Set was calibrated in accordance with USEPA Methods, CFR 40 Part 60, Appendix A, Method 5, Item 7.

Signature [signature] Date 11/21/08

$$V_{m(std)} = \frac{K_1 V_m \left(P_{bar} + \frac{\Delta H}{13.6}\right)}{T_m}$$

Equation to Calculate Standardized Flowrate
(Given Ambient Barometric Pressure and Temperature Conditions: P_{bar} & T_{amb}):

$$Q_{cr(std)} = K' \cdot P_{bar} / T_{amb}^{1/2}$$

TRC

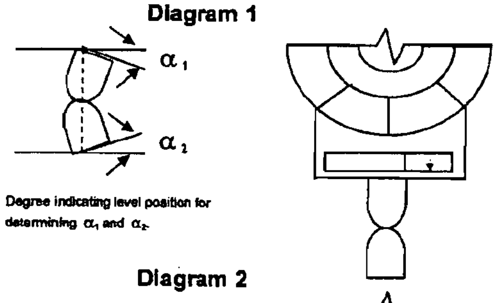
S-TYPE PITOT TUBE INSPECTION - CONFIRMATION OF CONSTRUCTION

Project No. 170497.0000.0000	Pitot Number 9 ft			Date 8-10-09
Client Covanta Energy Inc.				Operator [signature]
Facility Hillsborough County Resource Recovery Facility	Coefficient	Side A 0.84		PRE or POST Test ? PRE
Source Unit 4		Side B 0.84		Measuring Device ID ANGLE 2

General

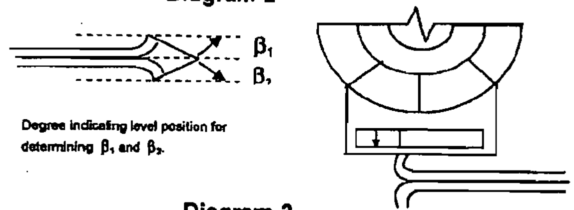
Level and Perpendicular?	✓ Yes	___ No
Damaged?	___ Yes	✓ No
Obstructions?	___ Yes	✓ No

Diagram 1



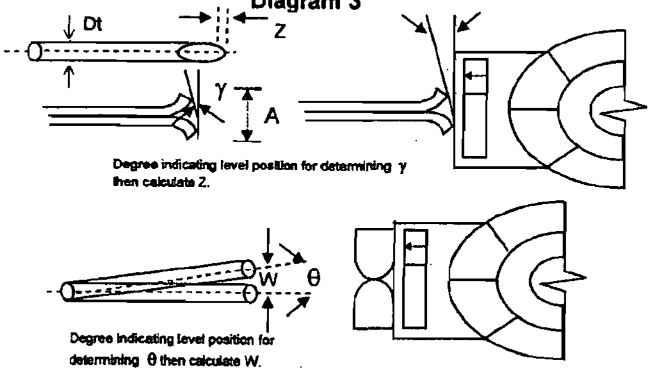
Degree indicating level position for determining α_1 and α_2.

Diagram 2



Degree indicating level position for determining β_1 and β_2.

Diagram 3



Degree indicating level position for determining γ then calculate Z.

Degree indicating level position for determining θ then calculate W.

Diagram 1

	Measured Value (degrees)	Specification (EPA Method 2)	Okay?
α_1:	0	$-10° \leq \alpha_1 \leq +10°$	Yes
α_2:	0	$-10° \leq \alpha_2 \leq +10°$	Yes

Diagram 2

	Measured Value (degrees)	Specification (EPA Method 2)	Okay?
β_1:	0	$-5° \leq \beta_1 \leq +5°$	Yes
β_2:	1	$-5° \leq \beta_2 \leq +5°$	Yes

Diagram 3

	Measured Value (degrees or inches)	Specification (EPA Method 2)	Okay?
γ:	1		
θ:	1		
A:	0.950		
D_t:	0.375	$3/16" \leq D_t \leq 3/8"$	Yes
$A/2 = P_a = P_b = P$:	.475	$1.05\ D_t \leq P \leq 1.50\ D_t$	Yes
$Z = A \tan\gamma$:	.017	$A \tan\gamma \leq 0.125"$	Yes
$W = A \tan\theta$:	.017	$A \tan\theta \leq 0.03125"$	Yes

Notes: 40 CFR Part 60, Appendix A, Method 2 provides the criteria for an acceptably constructed Type S pitot tube.

1. Use a vise with parallel and perpendicular faces. Use a calibrated angle-measuring device (analog or digital) for these checks.
2. Place the pitot in the vise and level the pitot tube horizontally using the angle-measuring device.
3. Place the angle-measuring device as shown in the diagrams above.
4. Measure distance A which is P_a plus P_b. (Method 2 specifies that $P_a = P_b$, but does not provide a tolerance for this measurement. Because the measurements are very difficult, it is suggested that Pa = Pb = A/2.
5. Measure the external tube diameter (Dt) with a calibrated micrometer, machinist's rule, or internal caliper.
6. Record all data as shown in the tables above.

Thermocouple Calibration: (Criteria ± 2 °F per EMTIC GD-28 - 1 point ambient and 1 -point ice bath or hot water bath)

ASTM Thermometer Serial No.: N/A

Thermometer ID:

Make: OMEGA Model: CL23A Serial No.: T243911

Thermocouple ID:

Type: K Serial No.: 10 ft

Reference Temp, °F	Actual Temp, °F	Criteria	Criteria Met?
93.0	92.7	± 2°	Yes
32.6	33.1	± 2°	Yes

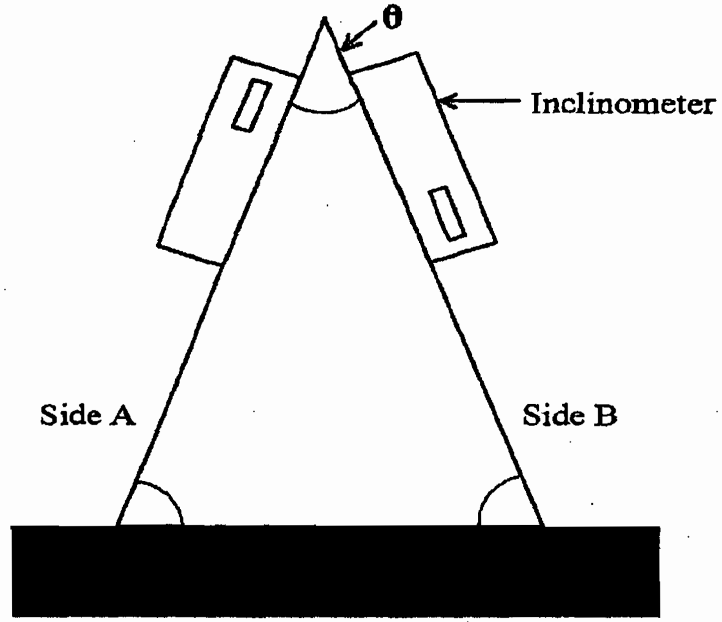
Passes Test? (Yes/No): ______

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: [signature] 8-10-09 (Project Manager or QA Manager - sign and date)

DIGITAL INCLINOMETER/PROTRACTOR CALIBRATION FORM

Secure the triangular block in a fixed position. Place the inclinometer on one side of the block (side A) to measure the angle of inclination (R1). Repeat this measurement on the adjacent side of the block (side B) using the inclinometer to obtain a second angle reading (R2).
The difference of the sum of the two readings from 180° (i.e.,180°- R1 - R2) shall be within ±2° of the known angle, θ.



Side A (R1) 45

Side B (R2) 45

Known Angle (θ) 90

Measured Angle (θ) 90

Difference 0 Acceptable EPA method 2G tolerance ±2°

Passes Test? (Yes/No) Yes

[1] - If using for 2G, Calibrate digital inclinometers on each day of wind tunnel or field testing (prior to beginning test)
[2] - CFR 40 Part 60 Method 2G 10.3.4

Digital Inclininometer ☐
Protractor/Angle Finder ☐

Serial No. Angle 12-2

Manufacturer: Craftsman

Model No. 939840

TRC

Calibrated By: Richard Hyde [signature]

Date: 7-1-09

Checked By: [signature] 7/2/09 (Project Manager or QA Manager - sign and date)

ALTIMETER TEST RECORD

This unit was tested and inspected IAW FAR Part 43, Appendix E, and is approved for return to service.

DATE: 12/23/2008

WORK ORDER #: 15072

SCALE ERROR

-1000	− 10
0	0
+ 500	− 5
+1000	0
+1500	− 5
+2000	0
+3000	+ 10
+4000	+ 20
+6000	+ 30
+8000	+ 25
+10,000	+ 25
+12,000	+ 20
+14,000	+ 15
+16,000	+ 20
+18,000	+ 10
+20,000	− 10
+22,000	
+25,000	
+30,000	
+35,000	
+40,000	
+45,000	
+50,000	

START PRESSURE 30.23

FINAL PRESSURE 30.20

BAROMETRIC SCALE ERROR TEST

28.10	+15	30.50	−10
28.50	+25	30.90	− 5
29.00	+10	30.99	− 5
29.50	+25		
29.92	0		

FRICTION TEST

1000	30'	20,000	60'
2000	30'	25,000	
3000	30'	30,000	
5000	25'	35,000	
10,000	35'	40,000	
15,000	45'	50,000	

CASE LEAK TEST @ 18,000 0

CASE LEAK TEST @ 1,200 0

HYSTERESIS TEST @ 50% 30'

HYSTERESIS TEST @ 40% 30'

AFTER EFFECT 15'

SERIAL NUMBER J5924

INSPECTOR [illegible]

TRC

THERMOCOUPLE DIGITAL INDICATOR CALIBRATION

Digital Thermometer	Temp Controller	Reference Calibartor	CL23A
Manufacturer	Envirnmental Supply Comp	Manufacturer	Omega
Model	na	Model	CL23A
Serial Number	FL-TRC-2	Serial Number	T-243911
Date	December 9, 2008	Reference Calib. Date	November 24, 2008

Thermometer - Filter

Test Point Number	Calibration Device (°F)	Digital Indicator (°F)	[1] Difference (°F)	[2] Difference (% abs)	Pass / Fail
1	100.0	98.0	NA	-0.54	Pass
2	125.0	123.0	NA	-0.50	Pass
3	150.0	148.0	NA	-0.47	Pass
4	175.0	173.0	NA	-0.45	Pass
5	200.0	198.0	NA	-0.42	Pass
6	225.0	224.0	NA	-0.20	Pass
7	250.0	250.0	NA	0.00	Pass
8	275.0	273.0	NA	-0.36	Pass
9	300.0	298.0	NA	-0.35	Pass
10	325.0	324.0	NA	-0.17	Pass

Thermometer - Probe

Test Point Number	Calibration Device (°F)	Digital Indicator (°F)	[1] Difference (°F)	[2] Difference (% abs)	Pass / Fail
1	100.0	100.0	NA	0.00	Pass
2	125.0	125.0	NA	0.00	Pass
3	150.0	150.0	NA	0.00	Pass
4	175.0	174.0	NA	-0.22	Pass
5	200.0	199.0	NA	-0.21	Pass
6	225.0	224.0	NA	-0.20	Pass
7	250.0	249.0	NA	-0.19	Pass
8	275.0	274.0	NA	-0.18	Pass
9	300.0	300.0	NA	0.00	Pass
10	325.0	326.0	NA	0.17	Pass

1) Acceptable EPA Method 4 tolerance must be within 2 deg F and 1.5% of absolute temperature (Deg R)
2) Acceptable EPA Method 2 tolerance must be within 1.5% of absolute temperature (Deg R)

Calibrated By: Roger Paul Osier

Date: 09 Dec. 2008

TRC

THERMOCOUPLE DIGITAL INDICATOR CALIBRATION

Digital Thermometer	Fluke 51	Reference Calibartor	CL23A
Manufacturer	Fluke	Manufacturer	Omega
Model	Fluke 51	Model	CL23A
Serial Number	4470643	Serial Number	T-243911
Date	December 8, 2008	Reference Calib. Date	November 24, 2008

Thermometer - Low Range (EPA Methods 2 and 4)

Test Point Number	Calibration Device (°F)	Digital Indicator (°F)	[1] Difference (°F)	[2] Difference (% abs)	Pass / Fail
1	0.0	0.0	0.00	0.00	Pass
2	20.0	20.2	-0.20	0.04	Pass
3	40.0	40.8	-0.80	0.16	Pass
4	60.0	60.8	-0.80	0.15	Pass
5	80.0	80.6	-0.60	0.11	Pass
6	100.0	100.0	0.00	0.00	Pass
7	120.0	120.2	-0.20	0.03	Pass
8	140.0	140.0	0.00	0.00	Pass
9	160.0	160.0	0.00	0.00	Pass
10	180.0	180.6	-0.60	0.09	Pass

Thermometer - High Range (EPA Method 2)

Test Point Number	Calibration Device (°F)	Digital Indicator (°F)	[1] Difference (°F)	[2] Difference (% abs)	Pass / Fail
1	0.0	0.0	NA	0.00	Pass
2	200.0	200.6	NA	0.13	Pass
3	400.0	400.0	NA	0.00	Pass
4	600.0	600.6	NA	0.07	Pass
5	800.0	800.0	NA	0.00	Pass
6	1000.0	1000.8	NA	0.06	Pass
7	1200.0	1201.2	NA	0.08	Pass
8	1400.0	1400.6	NA	0.04	Pass
9	1600.0	1599.8	NA	-0.01	Pass
10	1800.0	1801.0	NA	0.05	Pass

1) Acceptable EPA Method 4 tolerance must be within 2 deg F and 1.5% of absolute temperature (Deg R)

2) Acceptable EPA Method 2 tolerance must be within 1.5% of absolute temperature (Deg R)

Calibrated By: Roger Paul O'Brien

Date: 12/8/2008

PreciseCal Services, Inc.

NIST Traceable Calibration Services

CERTIFICATE OF CALIBRATION

Company : TRC Air Measurements - FL
6322 NW 18th Dr. Ste. 170
Gainesville FL 32656

Cert No: 1700- 14012

PO Number N/A

Item:	Thermometer, Glass Precision <0.2°C	Cal Date:	25-Nov-08
Model No:	063C-4	Cal Due Date:	25-Nov-09
Control#	0610001483	Item Found:	Within Tolerance
SN/ Other:	N/A	Item Returned:	Within Tolerance
Manufacturer:	Ertco	Procedure#:	3-SCP-004

Tolerance: ± 0.1°C

Standard:	-7.990	15.976	31.964					°C
Unit:	-8	16.0	32.0					
Final Rdg:								

Tolerance:

Standard:								
Unit:								
Final Rdg:								

Location: Lab Temperature: 74 Humidity: 48

It is hereby certified that the above described instruments meets or exceeds all specifications as stated in the referenced procedure. This calibration is in accordance with the requirements of ANSI/NCSL Z540-1 and MIL STD 45662A, and is traceable to the National Institute of Standards and Technologies (NIST), or to intrinsic standards accepted as such by NIST.

Standard#	Due Date	NIST#	Standard#	Due Date	NIST#
T725	4/10/2009	27625-1			
921	8/19/2009	27603-1			

Created by: J. Costello Technician: J. Geschwender QC'd by QC JAC

PreciseCal Services, Inc.
3044 Scherer Drive North
St. Petersburg, FL 33716
Tel: 727-573-5063 Toll Free 877-450-4CAL
FAX: 727-572-4227
Email: Services@PreciseCal.com

PreciseCal Services, Inc.

NIST Traceable Calibration Services

CERTIFICATE OF CALIBRATION

Company : TRC Air Measurements - FL
6322 NW 18th Dr. Ste. 170
Gainesville FL 32656

Cert No: 1700 - 13832

PO Number: N/A

Item:	Calibrator, Temperature, Electronic	Cal Date:	24-Nov-08
Model No:	CL23A	Cal Due Date:	24-Nov-09
Control#	**T-243911**	Item Found:	Within Tolerance
SN/ Other:	T-243911	Item Returned:	Within Tolerance
Manufacturer:	Omega	Procedure#:	MFR Manual

Tolerance: MFR SPECS

See attached data sheet for test results.

Location	Temperature:	Humidity
Lab	75	42

It is hereby certified that the above described instruments meets or exceeds all specifications as stated in the referenced procedure. This calibration is in accordance with the requirements of ANSI/NCSL Z540-1 and MIL STD 45662A, and is traceable to the National Institute of Standards and Technologies (NIST), or to intrinsic standards accepted as such by NIST.

Standard#	Due Date	NIST#	Standard#	Due Date	NIST#
804	4/17/2009	27078-1			

Created by: J. Costello Technician J. Geschwender QC'd by QC PCS

PreciseCal Services, Inc.

NIST Traceable Calibration Services

CERTIFICATE OF CALIBRATION

Company : TRC Air Measurements - FL
6322 NW 18th Dr. Ste. 170
Gainesville FL 32656

Cert No: 1700- 13833

PO Number N/A

Item:	Thermocouple Probe	Cal Date:	25-Nov-08
Model No:	N/A	Cal Due Date:	25-Nov-09
Control#:	TRC-1004	Item Found:	As Noted
SN/ Other:	N/A	Item Returned:	Charted
Manufacturer:	N/A	Procedure#:	3-SCP-004

Tolerance: Charted

Standard:	0.028	50.006	100.022					°C
Unit	0.0	50.2	100.4					
Final Rdg:								

Tolerance:

Standard:								
Unit								
Final Rdg:								

Location: Lab Temperature: 74 Humidity 48

It is hereby certified that the above described instruments meets or exceeds all specifications as stated in the referenced procedure. This calibration is in accordance with the requirements of ANSI/NCSL Z540-1 and MIL STD 45662A, and is traceable to the National Institute of Standards and Technologies (NIST), or to intrinsic standards accepted as such by NIST.

Standard#	Due Date	NIST#	Standard#	Due Date	NIST#
T725	4/10/2009	27625-1			
921	8/19/2009	27603-1			

Created by: J. Costello Technician: J. Geschwender QC'd by QC JAC

PreciseCal Services, Inc.
3044 Scherer Drive North
St. Petersburg, FL 33716

Tel: 727-573-5063 Toll Free 877-450-4CAL
FAX: 727-572-4227
Email: Services@PreciseCal.com

PreciseCal Services, Inc.

NIST Traceable Calibration Services

CERTIFICATE OF CALIBRATION

Company: TRC Air Measurements - FL
6322 NW 18th Dr. Ste. 170
Gainesville FL 32656

Cert No: 1682 - 13698

PO Number N/A

Item:	Scale, Precision	Cal Date:	21-Nov-08
Model No:	V-1200	Cal Due Date:	21-Nov-09
Control#	43250066	Item Found:	Within Tolerance
SN/ Other:	43250066	Item Returned:	Within Tolerance
Manufacturer:	Acculab	Procedure#:	4-SCP-002

Tolerance: ± 0.2 g

Standard:	20	100	500	1000	1200			grams
Unit:	20.0	100.0	500.0	1000.1	1200.1			
Final Rdg:								

Tolerance:

Standard:								
Unit:								
Final Rdg:								

Location: On-site Temperature: 70 Humidity: 56

It is hereby certified that the above described instruments meets or exceeds all specifications as stated in the referenced procedure. This calibration is in accordance with the requirements of ANSI/NCSL Z540-1 and MIL STD 45662A, and is traceable to the National Institute of Standards and Technologies (NIST), or to intrinsic standards accepted as such by NIST.

Standard#	Due Date	NIST#	Standard#	Due Date	NIST#
025	3/27/2009	27123-62			

This certificate shall not be reproduced, except in full, without the written approval of PreciseCal Services.

Created by: J. Costello Technician: A. Ramos QC'd by QC PCS

PreciseCal Services, Inc.
3044 Scherer Drive North
St. Petersburg, FL 33716
Tel: 727-573-5063 Toll Free 877-450-4CAL
FAX: 727-572-4227
Email: Services@PreciseCal.com

APPENDIX B

UNIT 4

REFERENCE METHOD DATA

TABLE 2-1
Diluent and Flow Relative Accuracy

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
12-Aug-09

Run No.	1	2	3	4	5	6	7	8	9	10	11	12	
Date	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	Averages/
Start Time	08:55	09:45	10:36	13:08	14:48	15:38	16:22	17:02	17:46	18:28	19:12	00:00	Total Count
Stop Time	09:19	10:09	11:00	13:32	15:12	16:02	16:46	17:26	18:10	18:52	19:36	00:21	
RM O2, %	9.87	10.19	10.23	9.98	10.02	10.12	9.98	9.93	10.08	9.77	9.80	0.00	9.99
CEM O2, %	9.98	10.28	10.30	10.03	10.07	10.13	9.98	9.95	10.06	9.78	9.82		10.01
Differences, d bar	Discard	Discard	-0.07	-0.05	-0.05	-0.01	0.00	-0.02	0.02	-0.01	-0.02	Discard	-0.02
Use Run (Y/N)	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
0.5			2.31	0.03	0.02	Pass	1.00						

TABLE 2-2
Oxides of Nitrogen Relative Accuracy

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
12-Aug-09

Run No.	1	2	3	4	5	6	7	8	9	10	11	12	
Date	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	Averages/
Start Time	08:55	09:46	10:36	13:08	14:48	15:38	16:22	17:02	17:46	18:28	19:12	00:00	Total Count
Stop Time	09:19	10:09	11:00	13:32	15:12	16:02	16:46	17:26	18:10	18:52	19:38	00:21	
RM NOx ppm	113.72	73.92	82.12	84.65	84.79	87.53	79.61	80.23	78.67	80.19	83.04	0.00	84.59
CEM NOx ppm	113.20	74.10	82.70	85.10	84.10	88.50	81.00	81.10	79.50	80.70	84.00		84.94
Differences, d bar	0.52	-0.18	-0.58	-0.45	0.69	Discard	Discard	-0.87	-0.83	-0.51	-0.96	Discard	-0.35
Use Run (Y/N)	Y	Y	Y	Y	Y	N	N	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
1.0			2.31	0.59	0.46	Pass	1.00						
RM NOx, lb/hr	60.43	38.17	43.23	45.63	45.00	46.39	42.49	42.04	41.64	41.97	43.17	#DIV/0!	43.51
CEM NOx, lb/hr	72.20	47.50	52.60	45.20	43.20	46.10	42.30	42.40	41.40	42.20	44.00		44.38
Differences, d bar	Discard	Discard	-9.37	0.43	1.80	0.29	0.19	-0.36	0.24	-0.23	-0.83	Discard	-0.87
Use Run (Y/N)	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
7.8	79.8	4.2	2.31	3.27	2.51	Pass	1.00						
RM NOx, @7%O2	143.31	95.94	106.98	107.75	108.33	112.86	101.34	101.66	101.06	100.15	103.99	0.00	108.34
CEM NOx, @7%O2	144.10	97.00	108.40	108.80	107.90	114.20	103.10	102.90	101.90	100.90	105.40		109.23
Differences, d bar	-0.79	-1.06	Discard	-1.05	0.43	-1.34	Discard	-1.24	-0.84	-0.75	-1.41	Discard	-0.90
Use Run (Y/N)	Y	Y	N	Y	Y	Y	N	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
1.2	150	0.9	2.31	0.55	0.42	Pass	1.00						

TABLE 2-3
Sulfur Dioxide Relative Accuracy

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
12-Aug-09

Run No. Date Start Time Stop Time	1 8/12/2009 08:55 09:19	2 8/12/2009 09:45 10:09	3 8/12/2009 10:36 11:00	4 8/12/2009 13:08 13:32	5 8/12/2009 14:48 15:12	6 8/12/2009 15:38 16:02	7 8/12/2009 16:22 16:46	8 8/12/2009 17:02 17:26	9 8/12/2009 17:46 18:10	10 8/12/2009 18:28 18:52	11 8/12/2009 19:12 19:36	12 8/12/2009 00:00 00:21	Averages/ Total Count
RM SO2, lb/hr	0.0	0.0	0.0	0.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	#DIV/0!	0.01
CEM SO2, lb/hr	0.9	0.9	0.9	0.6	4.6	0.7	0.9	0.7	0.7	1.1	1.1		0.82
Differences, d bar	-0.9	-0.9	-0.9	-0.5	Discard	-0.7	-0.9	-0.7	-0.7	Discard	-1.1	Discard	-0.81
Use Run (Y/N)	Y	Y	Y	Y	N	Y	Y	Y	Y	N	Y	N	9
% Relative Accuracy **7217.1**	Em. Limit 19.2	RA em. limit 4.9	T value 2.31	SDEV 0.17	CC 0.13	bias pass/fail Pass	bias factor 1.00						
RM SO2, @7%O2	0.00	0.00	0.00	0.14	4.84	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.55
CEM SO2, @7%O2	1.27	1.31	1.31	1.15	8.21	1.29	1.65	1.27	1.28	1.88	2.01		2.11
Differences, d bar	-1.27	-1.31	-1.31	-1.01	-3.37	-1.29	Discard	-1.27	-1.28	-1.87	Discard	Discard	-1.55
Use Run (Y/N)	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	N	9
% Relative Accuracy **379.8**	Em. Limit 26	RA em. limit 8.1	T value 2.31	SDEV 0.72	CC 0.55	bias pass/fail Pass	bias factor 1.00						

TABLE 2-4
Carbon Monoxide Low Relative Accuracy

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
12-Aug-09

Run No.	1	2	3	4	5	6	7	8	9	10	11	12	
Date	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	Averages/
Start Time	08:55	09:45	10:36	13:08	14:48	15:38	16:22	17:02	17:46	18:28	19:12	00:00	Total Count
Stop Time	09:19	10:09	11:00	13:32	15:12	16:02	16:46	17:26	18:10	18:52	19:36	00:21	
RM CO ppm	20.99	24.41	22.30	27.07	16.84	14.03	17.45	18.38	19.04	17.69	17.13	0.00	19.58
CEM CO ppm	22.40	27.60	23.80	30.50	17.70	15.30	18.80	20.10	20.70	19.30	18.20		21.31
Differences, d bar	-1.41	-3.19	-1.50	-3.43	-0.86	-1.27	-1.35	-1.72	-1.66	-1.61	-1.07	Discard	-1.73
Use Run (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	11
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
11.7			2.23	0.82	0.55	Pass	1.00						
RM CO, lb/hr	6.8	7.7	7.1	8.9	5.4	4.5	5.7	5.9	6.1	5.6	5.4	#DIV/0!	6.04
CEM CO, lb/hr	8.7	10.8	9.2	9.9	5.5	4.8	6.0	6.4	6.6	6.1	5.8		6.64
Differences, d bar	-1.9	Discard	Discard	-1.0	-0.1	-0.3	-0.3	-0.5	-0.5	-0.5	-0.4	Discard	-0.61
Use Run (Y/N)	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
17.1	32.4	3.2	2.31	0.55	0.43	Pass	1.00						
RM CO, @7%O2	26.45	31.68	29.05	34.46	21.51	18.09	22.21	23.29	24.46	22.09	21.45	0.00	23.18
CEM CO, @7%O2	28.51	36.12	31.21	39.00	22.72	19.75	23.93	25.52	26.54	24.13	22.83		25.01
Differences, d bar	-2.06	Discard	-2.16	Discard	-1.20	-1.66	-1.72	-2.23	-2.08	-2.03	-1.38	Discard	-1.84
Use Run (Y/N)	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	N	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor						
9.1	100	2.1	2.31	0.36	0.28	Pass	1.00						

TABLE 2-5
Carbon Monoxide High Relative Accuracy

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
12-Aug-09

Run No. Date Start Time Stop Time	1 8/12/2009 08:55 09:19	2 8/12/2009 09:45 10:09	3 8/12/2009 10:36 11:00	4 8/12/2009 13:08 13:32	5 8/12/2009 14:48 15:12	6 8/12/2009 15:38 16:02	7 8/12/2009 16:22 16:46	8 8/12/2009 17:02 17:26	9 8/12/2009 17:46 18:10	10 8/12/2009 18:28 18:52	11 8/12/2009 19:12 19:36	12 8/12/2009 00:00 00:21	Averages/ Total Count
RM CO ppm	20.99	24.41	22.30	27.07	16.84	14.03	17.45	18.38	19.04	17.69	17.13	0.00	19.58
CEM CO ppm	18.40	23.10	19.60	25.70	14.10	12.00	14.90	16.20	16.80	15.60	14.70		17.37
Differences, d bar	2.59	1.31	2.70	1.37	2.74	2.03	2.55	2.18	2.24	2.09	2.43	Discard	2.20
Use Run (Y/N)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	11
% Relative Accuracy 12.9	Em. Limit	RA em. limit	T value 2.23	SDEV 0.49	CC 0.33	bias pass/fail Fail	bias factor 1.13						
RM CO, @7%O2	26.45	31.68	29.05	34.46	21.51	18.09	22.21	23.29	24.46	22.09	21.45	0.00	24.91
CEM CO, @7%O2	23.40	30.20	25.70	32.90	18.10	15.50	19.00	20.60	21.50	19.50	18.40		22.33
Differences, d bar	3.05	1.48	Discard	1.56	Discard	2.59	3.21	2.69	2.96	2.59	3.05	Discard	2.58
Use Run (Y/N)	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	N	9
% Relative Accuracy 12.3	Em. Limit 100	RA em. limit 3.1	T value 2.31	SDEV 0.64	CC 0.49	bias pass/fail Fail	bias factor 1.12						

TABLE 2-6
Summary of Reference Method Data

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
08/12/09

Run No.	1	2	3	4	5	6	7	8	9	10	11	
Date	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	08/12/09	
Start Time	08:55	09:45	10:36	13:08	14:48	15:38	16:22	17:02	17:46	18:28	19:12	Permit
Stop Time	09:19	10:09	11:00	13:32	15:12	16:02	16:46	17:26	18:10	18:52	19:36	Limits
Moisture (%)	19.4	19.4	19.4	19.3	19.3	19.3	19.2	19.2	19.2	20.7	20.7	
F Factor	9570	9570	9570	9570	9570	9570	9570	9570	9570	9570	9570	
O2 %	9.870	10.190	10.230	9.980	10.020	10.120	9.980	9.930	10.080	9.770	9.800	
CO2 %	9.89	9.70	9.49	9.79	9.66	9.68	9.75	9.80	9.73	10.11	10.00	
Stack Flowrate, dry scfm	74321	72213	73633	75386	74228	74124	74653	73295	74026	73201	72706	
Stack Flowrate, scfm	92164	89550	91311	93412	91978	91848	92344	90664	91569	92358	91733	
GASEOUS EMISSIONS												
NOx PPM	113.72	73.92	82.12	84.65	84.79	67.53	79.61	80.23	78.87	80.19	83.04	
NOx LB/HR	60.43	38.17	43.23	45.63	45.00	46.39	42.49	42.04	41.64	41.97	43.17	79.8
NOx @ 7% O2	143.3	95.9	107.0	107.8	108.3	112.9	101.3	101.7	101.1	100.1	104.0	150
SO2 PPM	0.00	0.00	0.00	0.11	3.79	0.00	0.04	0.00	0.00	0.00	0.00	
SO2 LB/HR	0.00	0.00	0.00	0.08	2.80	0.00	0.03	0.00	0.00	0.00	0.00	19.2
SO2 @ 7% O2	0.0	0.0	0.0	0.1	4.8	0.0	0.1	0.0	0.0	0.0	0.0	26
CO PPM	20.99	24.41	22.30	27.07	16.84	14.03	17.45	18.38	19.04	17.69	17.13	
CO LB/HR	6.79	7.67	7.14	8.88	5.44	4.53	5.67	5.86	6.13	5.63	5.42	32.4
CO @ 7% O2	26.5	31.7	29.1	34.5	21.5	18.1	22.2	23.3	24.5	22.1	21.5	100

TABLE 2-7
Summary of CEM Method Data

Covanta of Hillsborough
Unit 4 Outlet
Tampa, Florida
08/12/09

Run No. Date Start Time Stop Time	1 08/12/09 8:55 9:19	2 08/12/09 9:45 10:09	3 08/12/09 10:36 11:00	4 08/12/09 13:08 13:32	5 08/12/09 14:48 15:12	6 08/12/09 15:38 16:02	7 08/12/09 16:22 16:46	8 08/12/09 17:02 17:26	9 08/12/09 17:46 18:10	10 08/12/09 18:28 18:52	11 08/12/09 19:12 19:36	Permit Limits
O2 %	9.980	10.280	10.300	10.030	10.070	10.130	9.980	9.950	10.060	9.780	9.820	
GASEOUS EMISSIONS												
NOx PPM	113.20	74.10	82.70	85.10	84.10	88.50	81.00	81.10	79.50	80.70	84.00	
NOx LB/HR	72.20	47.50	52.60	45.20	43.20	46.10	42.30	42.40	41.40	42.20	44.00	79.8
NOx @ 7% O2	144.1	97.0	108.4	108.8	107.9	114.2	103.1	102.9	101.9	100.9	105.4	150
SO2 PPM	1.00	1.00	1.00	0.90	6.40	1.00	1.30	1.00	1.00	1.50	1.60	
SO2 LB/HR	0.90	0.90	0.90	0.60	4.60	0.70	0.90	0.70	0.70	1.10	1.10	19.2
SO2 @ 7% O2	1.3	1.3	1.3	1.2	8.2	1.3	1.7	1.3	1.3	1.9	2.0	26
CO PPM (LOW)	22.40	27.60	23.80	30.50	17.70	15.30	18.80	20.10	20.70	19.30	18.20	
CO LB/HR (LOW)	8.70	10.80	9.20	9.90	5.50	4.80	6.00	6.40	6.60	6.10	5.80	32.4
CO @ 7% O2 (LOW)	28.5	36.1	31.2	39.0	22.7	19.7	23.9	25.5	26.5	24.1	22.8	100
CO PPM (HIGH)	18.40	23.10	19.60	30.50	14.10	12.00	14.90	16.20	16.80	15.60	14.70	
CO LB/HR (HIGH)	8.70	10.80	9.20	9.90	5.50	4.80	6.00	6.40	6.60	6.10	5.80	32.4
CO @ 7% O2 (HIGH)	23.4	30.2	25.7	39.0	18.1	15.5	19.0	20.6	21.5	19.5	18.4	100

TABLE 2-8
Diluent and Flow Relative Accuracy

Covanta Tampa
Unit 4 Inlet
Tampa, FL
12-Aug-09

Run No. Date Start Time Stop Time	1 8/12/2009 08:55 09:19	2 8/12/2009 09:45 10:09	3 8/12/2009 10:36 11:00	4 8/12/2009 13:08 13:32	5 8/12/2009 14:48 15:12	6 8/12/2009 15:38 16:02	7 8/12/2009 16:22 16:46	8 8/12/2009 17:03 17:27	9 8/12/2009 17:46 18:10	10 8/12/2009 18:27 18:51	11 8/12/2009 19:12 19:36	Averages/ Total Count
RM O2, %	9.70	9.79	9.80	9.67	9.54	9.69	9.58	9.52	9.65	9.34	9.45	9.60
CEM O2, %	9.37	9.70	9.73	9.48	9.47	9.52	9.35	9.27	0.00	9.19	9.21	9.44
Differences, d bar	Discard	0.09	0.07	0.19	0.07	0.17	0.23	0.25	Discard	0.15	0.24	0.16
Use Run (Y/N)	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor					
2.3			2.31	0.07	0.06	Fail	1.02					

TABLE 2-9
Sulfur Dioxide Relative Accuracy

Covanta Tampa
Unit 4 Inlet
Tampa, FL
12-Aug-09

Run No.	1	2	3	4	5	6	7	8	9	10	11	Averages/ Total Count
Date	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	
Start Time	08:55	09:45	10:36	13:08	14:48	15:38	16:22	17:03	17:46	18:27	19:12	
Stop Time	09:19	10:09	11:00	13:32	15:12	16:02	16:46	17:27	18:10	18:51	19:36	
RM SO2 ppm	38.45	43.59	43.31	30.71	66.62	33.30	45.24	33.75	31.24	42.18	41.96	41.72
CEM SO2 ppm	35.50	31.80	36.00	27.20	84.00	28.40	45.00	35.70	30.10	43.60	43.00	42.04
Differences, d bar	2.95	Discard	7.31	3.51	-17.38	4.90	0.24	-1.95	Discard	-1.42	-1.04	-0.32
Use Run (Y/N)	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor					
13.9			2.31	7.13	5.48	Pass	1.00					
RM SO2, @7%O2	47.72	54.54	54.24	38.01	81.52	41.29	55.55	41.22	38.60	50.72	50.94	51.24
CEM SO2, @7%O2	42.80	39.50	44.80	33.10	102.20	34.70	54.20	42.70	20.00	51.80	51.10	50.82
Differences, d bar	4.92	Discard	9.44	4.91	-20.68	6.59	1.35	-1.48	Discard	-1.08	-0.16	0.42
Use Run (Y/N)	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	9
% Relative Accuracy	Em. Limit	RA em. limit	T value	SDEV	CC	bias pass/fail	bias factor					
13.9			2.31	8.75	6.72	Pass	1.00					

TABLE 2-10
Summary of Reference Method Data

Covanta Tampa
Unit 4 Inlet
Tampa, FL
08/12/09

Run No. Date Start Time Stop Time	1 08/12/09 08:55 09:19	2 08/12/09 09:45 10:09	3 08/12/09 10:36 11:00	4 08/12/09 13:08 13:32	5 08/12/09 14:48 15:12	6 08/12/09 15:38 16:02	7 08/12/09 16:22 16:46	8 08/12/09 17:03 17:27	9 08/12/09 17:46 18:10	10 08/12/09 18:27 18:51	11 08/12/09 19:12 19:36	Permit Limits
Moisture (%)												
F Factor												
O2 %	9.700	9.790	9.800	9.670	9.540	9.690	9.580	9.520	9.650	9.340	9.450	
CO2 %	10.06	10.11	10.04	10.12	10.24	10.08	10.12	10.20	10.08	10.33	10.27	
Stack Flowrate, dry scfm												
Stack Flowrate, scfm												
GASEOUS EMISSIONS												
SO2 PPM	38.45	43.59	43.31	30.71	66.62	33.30	45.24	33.75	31.24	42.18	41.96	
SO2 @15% O2	20.3	23.1	23.0	16.1	34.6	17.5	23.6	17.5	16.4	21.5	21.6	
SO2 @ 7% O2	47.7	54.5	54.2	38.0	81.5	41.3	55.6	41.2	38.6	50.7	50.9	

TABLE 2-11
Summary of CEM Method Data

Covanta Tampa
Unit 4 Inlet
Tampa, FL
08/12/09

Run No. Date Start Time Stop Time	1 08/12/09 8:55 9:19	2 08/12/09 9:45 10:09	3 08/12/09 10:36 11:00	4 08/12/09 13:08 13:32	5 08/12/09 14:48 15:12	6 08/12/09 15:38 16:02	7 08/12/09 16:22 16:46	8 08/12/09 17:03 17:27	9 08/12/09 17:46 18:10	10 08/12/09 18:27 18:51	11 08/12/09 19:12 19:36	Permit Limits
O2 %	9.370	9.700	9.730	9.480	9.470	9.520	9.350	9.270	0.000	9.190	9.210	
Stack Flowrate, dry scfm												
Stack Flowrate, scfm												
GASEOUS EMISSIONS												
SO2 PPM	35.50	31.80	36.00	27.20	84.00	28.40	45.00	35.70	30.10	43.60	43.00	
SO2 @ 7% O2	42.8	39.5	44.8	33.1	102.2	34.7	54.2	42.7	20.0	51.8	51.1	

Summary of Moisture and Flow Results

Company: Covanta
Location: Tampa
Source: Unit 4

Date: 8/12/2009
Fuel: MSW

		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Date		8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009	8/12/2009
Start Time (24 hour)													
Stop Time (24 hour)													
Barometric Pressure ("Hg)	Pb	29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92	29.92	
Static Pressure, ("H2O)	Ps	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.1	-9.2	-9.2	-9.2	-9.2	0
Actual Meter Volume, (ft3)	Vm	50.709	50.709	50.709	54.836	54.836	54.836	51.665	51.665	51.665	32.035	32.035	
Avg Orifice Press.	@Havg	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
Tot liquid imp. & S.G. (ml/g)	Vi + Vsg	250.70	250.70	250.70	268.50	268.50	268.50	250.00	250.00	250.00	171.40	171.40	
Meter Cal Factor	Y	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706	0.9706
Meter Temp., (F)	Tm	70.67	70.67	70.67	73.67	73.67	73.67	75.17	75.17	75.17	74.50	74.50	
Stack CO2 by volume	% CO2dry	9.9	9.7	9.5	9.8	9.7	9.7	9.8	9.8	9.7	10.1	10.0	
Stack O2 by volume	% O2dry	9.9	10.2	10.2	10.0	10.0	10.1	10.0	9.9	10.1	9.8	9.8	
Stack CO by volume	% COdry	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Standard Meter Volume, (ft3)	VSTD	49.151	49.151	49.151	52.853	52.853	52.853	49.657	49.657	49.657	30.828	30.828	0.000
Moisture Content	% H2O	19.36	19.36	19.36	19.30	19.30	19.30	19.16	19.16	19.16	20.74	20.74	#DIV/0!
Molecular Weight, dry	MWdry	29.98	29.96	29.93	29.97	29.95	29.95	29.96	29.97	29.96	30.01	29.99	28.00
Molecular Weight, wet	MW wet	27.66	27.64	27.62	27.66	27.64	27.65	27.67	27.67	27.67	27.52	27.50	#DIV/0!
Avg sq root vel head, ("H2O)	P½avg	0.5878	0.5710	0.5820	0.5959	0.5875	0.5862	0.5896	0.5790	0.5847	0.5882	0.5840	0.0000
Stack Temp, (F)	Ts	301	302	302	302	304	303	303	303	303	303	303	#DIV/0!
Pitot Coefficient	Cp	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Area of Stack, (ft2)	As	55.333	55.333	55.333	55.333	55.333	55.333	55.333	55.333	55.333	55.333	55.333	55.333
Stack Velocity, (ft/sec)	Vs	40.9	39.8	40.6	41.5	41.0	40.9	41.1	40.4	40.8	41.1	40.8	#DIV/0!
Actual Vol Flowrate, (acfm)	Qa	135941	132128	134727	137883	136200	135742	136486	134047	135351	136552	135605	#DIV/0!
Std Vol Flowrate, (dscfm)	Qstd	74321	72213	73633	75386	74228	74124	74653	73295	74026	73201	72706	#DIV/0!
Std Vol Flowrate, (scfm)	Qstd	92164	89550	91311	93412	91978	91848	92344	90664	91569	92358	91733	#DIV/0!
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12

TRC

CYCLONIC FLOW DETERMINATION, VELOCITY, and MOISTURE (40 CFR 60 Methods 2 and 4)

Project No. 170497.0000.0000	Pitot ID	Date 8-12-09
Client Covanta	PTCF / Cp 0.84	Operator EB
Facility Hillsborough, FL	Internal Dimensions (in.)	Measurement Device Sensitivity 0-10"
Source Unit 4	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location outlet	Meter Box ID E	Meter Box Y 0.9706
Condition normal	Meter ID	Meter Box Δ H@ 1.549

Cyclonic Flow / Velocity Traverse Data

Run No.	1		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O) -9.1	
Run Time (24-hr)	Start	Stop	
Traverse Point No.	Yaw Angle include + or - (deg.)	Flue Gas Temp. (°F)	Δ P (in H_2O)
1		303	.52
2		303	.51
3		303	.45
4		303	.42
1		299	.36
2		302	.36
3		302	.41
4		303	.51
1		301	.26
2		302	.27
3		302	.30
4		300	.31
1		298	.20
2		301	.20
3		302	.19
4		298	.30
AVERAGE			

Moisture Sample Data

Test Time Clock (24-hr)	Elapsed (min)	DGM Reading (ft³)	DGM Temp. (°F) Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
					Run No. 1		
	0	12.577	67	66	1.5	4	66
	12	20.712	71	69	1.5	4	60
	24	28.904	72	70	1.5	4	61
	36	37.134	73	70	1.5	4	62
	48	45.2	74	71	1.5	4	61
	60	53.3	74	71	1.5	4	60
	72	63.286				4	60

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent	H_2O	H_2O		Empty	SG
Final Weight (g)	867.2	657.6		589.0	833.6
Initial Weight (g)	646.4	646.5		585.0	818.8
Net Moisture Weight Gain (g)	220.8	11.1		4.0	14.8
				Total Moisture (g)	250.7 ✓

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)	15	6
Rate (cfm)	0.001	0.001
Pitot Tube	Pre-Test	Post-Test
	+ ✓	+ ____
	- ✓	- ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

TRC

CYCLONIC FLOW DETERMINATION, VELOCITY, and MOISTURE (40 CFR 60 Methods 2 and 4)

Project No.	170497	Pitot ID		Date	8-12-09
Client	Covanta	PTCF / Cp	0.84	Operator	EB
Facility	Hillsborough, FL	Internal Dimensions (in.)		Measurement Device Sensitivity	0-10"
Source	Unit 4	Barometric Pressure (in. Hg)		Thermocouple ID	
Sampling Location	outlet	Meter Box ID	E	Meter Box Y	0.9706
Condition	normal	Meter ID		Meter Box ΔH@	1.549

Cyclonic Flow / Velocity Traverse Data

Run No. 2			
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)	
Run Time (24-hr)	Start	Stop	
Traverse Point No.	Yaw Angle include + or - (deg.)	Flue Gas Temp. (°F)	ΔP (in H_2O)
1		302	.20
2		302	.20
3		302	.19
4		300	.24
1		301	.31
2		302	.32
3		303	.31
4		301	.30
1		302	.32
2		302	.31
3		302	.32
4		301	.41
1		300	.39
2		302	.40
3		302	.40
4		302	.51
AVERAGE			

Moisture Sample Data

Test Time Clock (24-hr)	Test Time Elapsed (min)	DGM Reading (ft³)	DGM Temp. (°F) Inlet	DGM Temp. (°F) Outlet	ΔH (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
					Run No.		

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
				Total Moisture (g)	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	+ ____ - ____	+ ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

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TRC

CYCLONIC FLOW DETERMINATION, VELOCITY, and MOISTURE (40 CFR 60 Methods 2 and 4)

Project No. 170497	Pitot ID	Date 8-12-09
Client Covanta	PTCF / Cp 0.84	Operator CB
Facility Hillsborough, FL	Internal Dimensions (in.)	Measurement Device Sensitivity 0-10"
Source unit 4	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location outlet	Meter Box ID E	Meter Box Y
Condition normal	Meter ID	Meter Box Δ H@

Cyclonic Flow / Velocity Traverse Data

Run No. 3			
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)	
Run Time (24-hr)	Start	Stop	
Traverse Point No.	Yaw Angle include + or - (deg.)	Flue Gas Temp. (°F)	Δ P (in H_2O)
1		302	.41
2		302	.46
3		302	.44
4		302	.51
1		302	.35
2		302	.30
3		302	.41
4		302	.44
1		301	.31
2		302	.33
3		302	.32
4		301	.40
1		301	.22
2		301	.22
3		301	.20
4		301	.21
AVERAGE			

Moisture Sample Data

Test Time		DGM Reading (ft³)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
				Total Moisture (g)	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test + ____ - ____	Post-Test + ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ____________________ (Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 – VELOCITY and MOISTURE

Project No.	Pitot ID	Date 8-12-09
Client Covanta	PTCF / Cp 0.84	Operator GB
Facility Hillsborough FL	Internal Dimensions (in.)	Gauge Sensitivity 0 - 10"
Source Unit 4	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location outlet	Meter Box ID	Meter Box Y 0.9706
Condition normal	Meter ID	Meter Box Δ H@ 1.549

Velocity Traverse Data

Run No. 4		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start 1308	Stop 1332
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	302	.20
2	302	.20
3	302	.24
4	302	.26
1	301	.31
2	302	.31
3	303	.35
4	302	.31
1	302	.40
2	302	.41
3	302	.36
4	301	.44
1	302	.50
2	302	.52
3	302	.50
4	302	.50
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft³)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
1308	0	63.480	74	72	1.5	4	66
	12	71.6	75	72	1.5	4	63
1332/1448	24	82.141	74	73	1.5	4	67
	36	90.86	75	73	1.5	4	68
1512/1538	48	100.179	75	73	1.5	4	58
	60	109.2	75	73	1.5	4	58
1602	72	118.316	—	—	—	—	—

Moisture Analysis Results 73.7

	#1	#2	#3	#4	Silica Gel
Reagent	H_2O	H_2O	–		SG
Final Weight (g)	825.7	610.9	586.2		806.9
Initial Weight (g)	580.5	600.0	583.6		797.1
Net Moisture Weight Gain (g)	245.2	10.9	2.6		9.8
				Total Moisture (g)	268.5

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)	15	6
Rate (cfm)	0.001	0.001
Pitot Tube	Pre-Test	Post-Test
	+____	+____
	-____	-____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
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40 CFR 60 Methods 2 and 4 – VELOCITY and MOISTURE

Project No.	Pitot ID	Date 8-17-09
Client Covanta	PTCF / Cp 0.84	Operator EB
Facility Hillsborough FL	Internal Dimensions (in.)	Gauge Sensitivity 0-10"
Source Unit 4	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location outlet	Meter Box ID	Meter Box Y 0.9706
Condition normal	Meter ID	Meter Box Δ H@ 1.549

Velocity Traverse Data

Run No. 5		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start 1448	Stop 1512
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	305	.41
2	305	.43
3	305	.45
4	305	.55
1	302	.40
2	305	.41
3	305	.38
4	305	.40
1	305	.36
2	305	.36
3	305	.34
4	305	.32
1	303	.22
2	303	.20
3	303	.21
4	304	.20
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft³)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
			Total Moisture (g)		

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	**Pre-Test**	**Post-Test**
	+ ____	+ ____
	- ____	- ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
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40 CFR 60 Methods 2 and 4 – VELOCITY and MOISTURE

Project No.		Pitot ID		Date	8-12-09
Client	Covanta	PTCF / Cp	0.84	Operator	EB
Facility	Hillsborough	Internal Dimensions (in.)		Gauge Sensitivity	0-10"
Source	Unit 4	Barometric Pressure (in. Hg)		Thermocouple ID	
Sampling Location	outlet	Meter Box ID		Meter Box Y	0.9706
Condition	normal	Meter ID		Meter Box Δ H@	1.549

Velocity Traverse Data

Run No.	6	
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start 1538	Stop 1602
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.19
2	303	.20
3	303	.21
4	303	.21
1	301	.29
2	303	.28
3	303	.32
4	303	.35
1	303	.36
2	303	.39
3	303	.38
4	303	.46
1	303	.50
2	303	.51
3	303	.50
4	303	.50
AVERAGE		

Moisture Sample Data

Run No.

Test Time Clock (24-hr)	Elapsed (min)	DGM Reading (ft^3)	DGM Temp. (°F) Inlet	DGM Temp. (°F) Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					

Total Moisture (g)

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	+ ____ - ____	+ ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
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40 CFR 60 Methods 2 and 4 – VELOCITY and MOISTURE

Project No.		Pitot ID		Date	8-12-09
Client	Covanta	PTCF / Cp	0.84	Operator	EB
Facility	Hillsborough	Internal Dimensions (in.)		Gauge Sensitivity	0.10"
Source	unit 4	Barometric Pressure (in. Hg)		Thermocouple ID	
Sampling Location	outlet	Meter Box ID		Meter Box Y	0.9706
Condition	normal	Meter ID		Meter Box Δ H@	1.549

Velocity Traverse Data

Run No. 7		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O) -9.2
Run Time (24-hr)	Start 1622	Stop 1646
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.51
2	303	.50
3	303	.50
4	303	.51
1	303	.42
2	303	.40
3	303	.39
4	303	.44
1	303	.31
2	303	.34
3	303	.34
4	303	.31
1	302	.19
2	303	.19
3	303	.20
4	303	.18
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft^3)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
1622	0	118,646	75	74	1,5	4	65
	12	127.2	76	75	1.5	4	60
1646/1703	24	135.795	76	74	1.5	4	62
	36	144.02	77	74	1.5	4	55
1727/17[illegible]	48	153.125	77	74	1.5	4	63
	60	161.576	76	74	1.5		
	72	170.311	—	—	—	—	

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)	897.1	662.5	589.0		853.5
Initial Weight (g)	674.3	656.1	588.7		833.0
Net Moisture Weight Gain (g)	222.8	6.4	0.3		20.5
				Total Moisture (g)	250

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)	15	6
Rate (cfm)	0.001	0.001
Pitot Tube	Pre-Test	Post-Test
	+____	+____
	-____	-____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By:____________________(Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 -- VELOCITY and MOISTURE

Project No.		Pitot ID		Date	8-12-09
Client	Covanta	PTCF / Cp	0.84	Operator	EB
Facility	Hillsborough	Internal Dimensions (in.)		Gauge Sensitivity	0-10"
Source	Unit 4	Barometric Pressure (in. Hg)	29.92	Thermocouple ID	
Sampling Location	outlet	Meter Box ID	E	Meter Box Y	0.9706
Condition	normal	Meter ID		Meter Box Δ H@	1.549

Velocity Traverse Data

Run No. 8

Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
		-9.2

Run Time (24-hr) Start 1703 Stop 1727

Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.21
2	303	.22
3	303	.20
4	303	.19
1	303	.31
2	303	.30
3	303	.32
4	303	.34
1	303	.38
2	303	.35
3	303	.33
4	303	.34
1	303	.49
2	303	.51
3	303	.52
4	303	.49
AVERAGE		

Moisture Sample Data

Run No.

Test Time: Clock (24-hr)	Elapsed (min)	DGM Reading (ft^3)	DGM Temp. (°F) Inlet	DGM Temp. (°F) Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					

Total Moisture (g)

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	+ ____ - ____	+ ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 -- VELOCITY and MOISTURE

Project No.		Pitot ID		Date	8-12-09
Client	Covanta	PTCF / Cp	0.84	Operator	GB
Facility	Hillsborough	Internal Dimensions (in.)		Gauge Sensitivity	0-10"
Source	Unit 4	Barometric Pressure (in. Hg)		Thermocouple ID	
Sampling Location	outlet	Meter Box ID		Meter Box Y	0.9706
Condition	normal	Meter ID		Meter Box Δ H@	1.549

Velocity Traverse Data

Run No. 4		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
		-9.2
Run Time (24-hr)	Start 1746	Stop
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.51
2	303	.50
3	303	.48
4	303	.49
1	303	.36
2	303	.35
3	303	.35
4	303	.41
1	303	.28
2	303	.29
3	303	.32
4	303	.37
1	303	.22
2	302	.22
3	302	.21
4	302	.23
AVERAGE		

Moisture Sample Data

Test Time: Clock (24-hr)	Test Time: Elapsed (min)	DGM Reading (ft^3)	DGM Temp. (°F): Inlet	DGM Temp. (°F): Outlet	Run No.: Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	12						
	24						
	36						
	48						
	60						
	72						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
				Total Moisture (g)	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test + ____ - ____	Post-Test + ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 -- VELOCITY and MOISTURE

Project No.	Pitot ID	Date 8-12-09
Client Covanta	PTCF / Cp 0.84	Operator EB
Facility Hillsborough	Internal Dimensions (in.)	Gauge Sensitivity 0-10"
Source Unit 4	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location outlet	Meter Box ID E	Meter Box Y 0.9706
Condition normal	Meter ID	Meter Box Δ H@ 1.549

Velocity Traverse Data

Run No. 10		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start 1828	Stop 1852
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.21
2	303	.22
3	303	.22
4	303	.20
1	303	.31
2	303	.34
3	303	.38
4	303	.36
1	303	.40
2	303	.40
3	303	.35
4	303	.30
1	303	.49
2	303	.48
3	303	.50
4	303	.50
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft^3)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
1828	0	170.516	75	74	1.5	4	66
	102	180.23	75	74	1.5	4	58
1857/1912	204	189.456					
	306	198.1					
	408	202.551					
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)	763.9	616.2	588.9		820.6
Initial Weight (g)	614.5	611.3	586.0		806.4
Net Moisture Weight Gain (g)	149.4	4.9	2.9		14.4
				Total Moisture (g)	171.4

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	+ ____ - ____	+ ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

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40 CFR 60 Methods 2 and 4 -- VELOCITY and MOISTURE

Project No.	Pitot ID	Date
Client	PTCF / Cp	Operator
Facility	Internal Dimensions (in.)	Gauge Sensitivity
Source	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location	Meter Box ID	Meter Box Y
Condition	Meter ID	Meter Box Δ H@

Velocity Traverse Data

Run No. 11		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start 1912	Stop
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
1	303	.49
2	303	.49
3	303	.50
4	303	.48
1	303	.39
2	303	.37
3	302	.35
4	302	.33
1	303	.31
2	303	.31
3	303	.39
4	303	.36
1	303	.20
2	303	.22
3	303	.25
4	303	.18
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft^3)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
				Total Moisture (g)	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test + ____ - ____	Post-Test + ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________ (Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 -- VELOCITY and MOISTURE

Project No.	Pitot ID	Date
Client	PTCF / Cp	Operator
Facility	Internal Dimensions (in.)	Gauge Sensitivity
Source	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location	Meter Box ID	Meter Box Y
Condition	Meter ID	Meter Box Δ H@

Velocity Traverse Data

Run No.		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start	Stop
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft^3)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
Total Moisture (g)					

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test	Post-Test
	+ ____	+ ____
	- ____	- ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

40 CFR 60 Methods 2 and 4 – VELOCITY and MOISTURE

Project No.	Pitot ID	Date
Client	PTCF / Cp	Operator
Facility	Internal Dimensions (in.)	Gauge Sensitivity
Source	Barometric Pressure (in. Hg)	Thermocouple ID
Sampling Location	Meter Box ID	Meter Box Y
Condition	Meter ID	Meter Box Δ H@

Velocity Traverse Data

Run No.		
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)
Run Time (24-hr)	Start	Stop
Traverse Point No.	Flue Gas Temp. (°F)	Δ P (in H_2O)
AVERAGE		

Moisture Sample Data

Test Time		DGM Reading (ft^3)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
	0						
	10						
	20						
	30						
	40						
	50						
	60						

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent					
Final Weight (g)					
Initial Weight (g)					
Net Moisture Weight Gain (g)					
				Total Moisture (g)	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test + ____ - ____	Post-Test + ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________________ (Project Manager or QA Manager - sign and date)

TRC

CYCLONIC FLOW DETERMINATION, VELOCITY, and MOISTURE (40 CFR 60 Methods 2 and 4)

Project No. 170497	Pitot ID	Date 8-11-09
Client Covanta	PTCF / Cp 0.84	Operator GB
Facility Hillsborough	Internal Dimensions (in.)	Measurement Device Sensitivity 0-10"
Source Unit 4	Barometric Pressure (in. Hg) 29.91	Thermocouple ID
Sampling Location Outlet	Meter Box ID	Meter Box Y
Condition normal	Meter ID	Meter Box Δ H@

Cyclonic Flow / Velocity Traverse Data

Run No.			
Stack CO_2 (%)	Stack O_2 (%)	P Static (in. H_2O)	
Run Time (24-hr)	Start 1708	Stop	
Traverse Point No.	Yaw Angle include + or - (deg.)	Flue Gas Temp. (°F)	Δ P (in H_2O)
A 1	2	267	.16
2	1	299	.17
3	2		.14
4	4		.16
B 1	3	264	.21
2	2		.24
3	0		.22
4	3		.23
C 1	10	261	.27
2	2		.29
3	5		.25
4	7		.25
D 1	2	260	.32
2	3		.33
3	0		.30
4	2		.30
AVERAGE			

Moisture Sample Data

Test Time		DGM Reading (ft³)	DGM Temp. (°F)		Run No.		
Clock (24-hr)	Elapsed (min)		Inlet	Outlet	Δ H (in. H_2O)	Vacuum (in. Hg)	Imp. Exit Temp. (°F)
1820	0	991.544	75	75	1.5	4	65
	12		75	75	1.5	4	65
1844	24	1012.236	75	75	1.5	4	65
52 min							

Moisture Analysis Results

	#1	#2	#3	#4	Silica Gel
Reagent	DI	DI	Empty		
Final Weight (g)	734.1	600.6	583.9		792.1
Initial Weight (g)	643.3	609.5	581.9		784.3
Net Moisture Weight Gain (g)	90.8	-8.9	2.0		7.8
			Total Moisture (g)	91.7	

Leak Check Data

Meterbox	Pre-Test	Post-Test
Vacuum (in Hg)		
Rate (cfm)		
Pitot Tube	Pre-Test + ____ - ____	Post-Test + ____ - ____

O_2 / CO_2 Data

	Fyrite	Orsat	CEM
O_2 %			
CO_2 %			

Test Location Schematic

1. Include distances to disturbances and note what they are.
2. Show and label all ports. Note which was used for each test type.
3. Indicate the flow direction.

NA = Not Applicable
Rev. 1 (5/2005)

Checked By: ______________________(Project Manager or QA Manager - sign and date)

APPENDIX C

UNIT 4 – COVANTA
CEM & PROCESS DATA

Unit #4 Rata Report Run # 1

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 08:56

End of Report: 08/12/2009 09:19

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 08:56	10.0	20	17	1	117	87	10.3	32
08/12/2009 08:57	11.0	26	21	1	110	91	10.2	27
08/12/2009 08:58	10.2	31	26	1	109	89	9.3	36
08/12/2009 08:59	10.1	25	20	1	114	86	9.2	34
08/12/2009 09:00	10.0	24	20	1	113	85	10.0	30
08/12/2009 09:01	11.0	32	27	1	107	90	10.4	26
08/12/2009 09:02	9.6	37	31	1	102	90	8.3	38
08/12/2009 09:03	9.4	23	19	1	103	85	8.9	38
08/12/2009 09:04	9.7	25	21	1	105	86	9.3	36
08/12/2009 09:05	10.0	26	22	1	102	88	9.3	35
08/12/2009 09:06	9.3	24	19	1	115	88	8.2	37
08/12/2009 09:07	9.4	16	12	1	136	86	9.2	35
08/12/2009 09:08	9.8	18	15	1	137	89	8.6	35
08/12/2009 09:09	8.6	21	17	1	132	86	7.7	43
08/12/2009 09:10	9.3	13	10	1	124	87	9.7	37
08/12/2009 09:11	9.8	17	14	1	117	88	9.2	38
08/12/2009 09:12	10.4	16	12	1	117	87	10.2	33
08/12/2009 09:13	10.5	19	16	1	108	89	10.1	33
08/12/2009 09:14	10.7	23	19	1	103	90		
08/12/2009 09:15	10.3	24	20	1	108	90		
08/12/2009 09:16	10.0	24	20	1	111	87		
08/12/2009 09:17	9.5	17	14	1	114	86	9.6	44
08/12/2009 09:18	10.5	14	11	1	104	88	10.1	39
08/12/2009 09:19	10.3	23	19	1	108	88	9.0	40
Period Average =	**9.98**	22.4	18.4	1.0	113.2	**87.75**	**9.37**	35.5
Period 7% Corr =		**28.5**	**23.4**	**1.3**	**144.1**			**42.8**

Data Summary Report

COVANTA ENERGY
Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups
Report Name: U-4 RATA LBS
Start of Report: 08/12/2009 08:56
End of Report: 08/12/2009 09:19
Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 08:56	7.7	74.0	0.9
08/12/2009 08:57	10.5	72.8	0.9
08/12/2009 08:58	12.2	70.6	0.9
08/12/2009 08:59	9.5	71.3	0.9
08/12/2009 09:00	9.0	69.9	0.9
08/12/2009 09:01	12.8	70.1	0.9
08/12/2009 09:02	14.7	66.8	0.9
08/12/2009 09:03	8.7	63.7	0.9
08/12/2009 09:04	9.5	65.7	0.9
08/12/2009 09:05	10.1	65.3	0.9
08/12/2009 09:06	9.4	73.6	0.9
08/12/2009 09:07	6.1	85.1	0.9
08/12/2009 09:08	7.1	88.7	0.9
08/12/2009 09:09	8.0	82.6	0.9
08/12/2009 09:10	5.0	78.5	0.9
08/12/2009 09:11	6.6	74.9	0.9
08/12/2009 09:12	6.2	74.0	0.9
08/12/2009 09:13	7.5	69.9	0.9
08/12/2009 09:14	9.2	67.4	0.9
08/12/2009 09:15	9.6	70.7	0.9
08/12/2009 09:16	9.2	70.2	0.9
08/12/2009 09:17	6.5	71.3	0.9
08/12/2009 09:18	5.5	66.6	0.9
08/12/2009 09:19	9.0	69.1	0.9
Period Average =	8.7	72.2	0.9
Period Max Value =	14.7	88.7	0.9
Period Min Value =	5.0	63.7	0.9
Period Totals =	2.0960E+2	1.7328E+3	2.1600E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 15:47

Unit #4 Rata Report Run # 2

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 09:46

End of Report: 08/12/2009 10:09

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 09:46							9.8	45
08/12/2009 09:47	10.1	28	24	1	71		9.6	45
08/12/2009 09:48	9.9	24	20	1	76	87	9.3	46
08/12/2009 09:49	10.4	22	18	1	72	87	9.9	42
08/12/2009 09:50	10.6	26	21	1	63	89	9.9	40
08/12/2009 09:51	10.1	28	24	1	69	88	9.5	41
08/12/2009 09:52	10.6	26	22	1	76	89	10.5	34
08/12/2009 09:53	10.5	32	27	1	72	89	9.6	36
08/12/2009 09:54	10.1	26	21	1	81	89	8.3	38
08/12/2009 09:55	8.2	19	16	1	90	86	7.2	35
08/12/2009 09:56	9.2	12	9	1	101	85	10.2	22
08/12/2009 09:57	10.7	17	13	1	83	87	10.0	18
08/12/2009 09:58	10.9	25	21	1	76	87	10.7	22
08/12/2009 09:59	11.4	29	25	1	64	90	10.8	21
08/12/2009 10:00	10.6	35	30	1	70	89	8.5	26
08/12/2009 10:01	9.1	24	20	1	85	87	9.0	33
08/12/2009 10:02	9.8	20	16	1	80	88	9.4	32
08/12/2009 10:03	9.7	27	22	1	72	87	9.1	32
08/12/2009 10:04	10.7	24	20	1	67	86	10.8	25
08/12/2009 10:05	11.0	34	29	1	58	90	10.8	25
08/12/2009 10:06	11.3	42	36	1	59	91	10.7	21
08/12/2009 10:07	10.8	50	44	1	70	88	9.6	27
08/12/2009 10:08	10.1	34	29	1	78	88	10.1	29
08/12/2009 10:09	10.7	30	25	1	72	89	9.6	28
Period Average =	**10.28**	27.6	23.1	1.0	74.1	**88.00**	**9.70**	31.8
Period 7% Corr =		**36.1**	**30.2**	**1.3**	**97.0**			**39.5**

Data Summary Report

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA LBS
Start of Report:	08/12/2009 09:46
End of Report:	08/12/2009 10:09

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 09:48	9.2	48.1	0.9
08/12/2009 09:49	8.5	45.6	0.9
08/12/2009 09:50	10.2	40.8	0.9
08/12/2009 09:51	10.9	44.2	0.9
08/12/2009 09:52	10.2	49.2	0.9
08/12/2009 09:53	12.6	46.6	0.9
08/12/2009 09:54	10.2	52.4	0.9
08/12/2009 09:55	7.2	56.3	0.9
08/12/2009 09:56	4.5	62.4	0.9
08/12/2009 09:57	6.5	52.5	0.9
08/12/2009 09:58	9.6	48.1	0.9
08/12/2009 09:59	11.6	41.9	0.9
08/12/2009 10:00	13.8	45.3	0.9
08/12/2009 10:01	9.2	53.8	0.9
08/12/2009 10:02	7.8	51.2	0.9
08/12/2009 10:03	10.4	45.6	0.9
08/12/2009 10:04	9.1	41.9	0.9
08/12/2009 10:05	13.6	38.0	0.9
08/12/2009 10:06	16.9	39.1	0.9
08/12/2009 10:07	19.5	44.8	0.9
08/12/2009 10:08	13.2	49.9	0.9
08/12/2009 10:09	11.8	46.6	0.9
Period Average =	10.8	47.5	0.9
Period Max Value =	19.5	62.4	0.9
Period Min Value =	4.5	38.0	0.9
Period Totals =	2.3650E+2	1.0443E+3	1.9800E+1
Period % Recovery =	95.7	95.7	95.7

Date/Time Printed: 08/12/2009 15:42

Unit #4 Rata Report Run # 3

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA
Start of Report:	08/12/2009 10:37
End of Report:	08/12/2009 11:00

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 10:37	10.2	25	20	1	89	88	10.4	40
08/12/2009 10:38	10.6	29	24	1	85	88	9.6	37
08/12/2009 10:39	10.6	27	23	1	85	89	10.5	33
08/12/2009 10:40	10.6	28	24	1	80	88	9.7	34
08/12/2009 10:41	10.7	24	20	1	80	88	10.0	30
08/12/2009 10:42	10.0	26	21	1	78	87	8.3	40
08/12/2009 10:43	9.5	19	15	1	92	86	10.2	33
08/12/2009 10:44	10.9	20	16	1	81	87	9.7	32
08/12/2009 10:45	10.3	25	21	1	83	89	10.2	31
08/12/2009 10:46	10.4	27	22	1	86	88	9.5	31
08/12/2009 10:47	10.2	24	20	1	87	87	9.7	31
08/12/2009 10:48	10.2	29	25	1	84	87	9.8	30
08/12/2009 10:49	10.1	26	22	1	79	88	9.1	33
08/12/2009 10:50	10.2	22	18	1	79	87	9.3	34
08/12/2009 10:51	10.2	24	20	1	75	86	9.5	39
08/12/2009 10:52	10.6	21	17	1	75	87	10.3	35
08/12/2009 10:53	10.5	23	19	1	73	89	9.9	38
08/12/2009 10:54	10.3	23	18	1	79	87	9.2	41
08/12/2009 10:55	10.0	18	14	1	85	87	10.3	40
08/12/2009 10:56	11.0	22	18	1	76	90	10.2	37
08/12/2009 10:57	9.9	28	23	1	82	88	7.9	51
08/12/2009 10:58	9.0	19	15	1	97	85	9.4	46
08/12/2009 10:59	10.5	16	12	1	91	86	10.6	36
08/12/2009 11:00	10.8	27	23	1	83	89	10.1	32
Period Average =	**10.30**	23.8	19.6	1.0	82.7	**87.54**	**9.73**	36.0
Period 7% Corr =		**31.2**	**25.7**	**1.3**	**108.4**			**44.8**

Data Summary Report

3

COVANTA ENERGY — Hillsborough County Resource Recovery Facility

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA LBS
Start of Report:	08/12/2009 10:37
End of Report:	08/12/2009 11:00

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 10:37	9.7	57.0	0.9
08/12/2009 10:38	11.3	54.4	0.9
08/12/2009 10:39	10.6	55.0	0.9
08/12/2009 10:40	10.9	51.2	0.9
08/12/2009 10:41	9.4	51.2	0.9
08/12/2009 10:42	10.0	49.4	0.9
08/12/2009 10:43	7.2	57.6	0.9
08/12/2009 10:44	7.7	51.3	0.9
08/12/2009 10:45	9.9	53.7	0.9
08/12/2009 10:46	10.5	55.1	0.9
08/12/2009 10:47	9.2	55.1	0.9
08/12/2009 10:48	11.2	53.2	0.9
08/12/2009 10:49	10.1	50.6	0.9
08/12/2009 10:50	8.5	50.0	0.9
08/12/2009 10:51	9.1	46.9	0.9
08/12/2009 10:52	8.1	47.5	0.9
08/12/2009 10:53	9.1	47.3	0.9
08/12/2009 10:54	8.9	50.0	0.9
08/12/2009 10:55	6.9	53.8	0.9
08/12/2009 10:56	8.8	49.8	0.9
08/12/2009 10:57	10.9	52.5	0.9
08/12/2009 10:58	7.2	60.0	0.9
08/12/2009 10:59	6.1	56.9	0.9
08/12/2009 11:00	10.6	53.7	0.9
Period Average =	9.2	52.6	0.9
Period Max Value =	11.3	60.0	0.9
Period Min Value =	6.1	46.9	0.9
Period Totals =	2.2190E+2	1.2632E+3	2.1600E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 15:39

Unit #4 Rata Report Run # 4

COVANTA ENERGY — Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups
Report Name: U-4 RATA
Start of Report: 08/12/2009 13:09
End of Report: 08/12/2009 13:32

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 13:09	9.8	23	19	1	97	71	9.3	29
08/12/2009 13:10	10.1	24	20	1	95	72	9.4	28
08/12/2009 13:11	10.3	32	27	1	91	70	10.3	23
08/12/2009 13:12	10.5	37	32	1	86	73	8.8	27
08/12/2009 13:13	8.9	30	25	1	95	72	8.4	35
08/12/2009 13:14	9.7	19	15	1	90	71	9.7	30
08/12/2009 13:15	10.0	26	22	1	81	73		
08/12/2009 13:16	9.7	25	21	1	90	71		
08/12/2009 13:17	10.3	22	18	1	84	73	10.0	25
08/12/2009 13:18	10.5	30	25	1	81	74	10.0	23
08/12/2009 13:19	10.6	35	30	1	75	73	9.8	24
08/12/2009 13:20	10.3	32	27	1	79	72	9.9	25
08/12/2009 13:21	10.3	29	24	0	81	73	9.3	25
08/12/2009 13:22	10.0	28	24	1	82	71	9.8	24
08/12/2009 13:23	10.4	28	23	1	77	73	9.6	22
08/12/2009 13:24	9.9	30	25	1	80	73	9.3	25
08/12/2009 13:25	9.8	26	22	0	85	71	8.9	28
08/12/2009 13:26	9.6	25	20	1	81	72	9.2	28
08/12/2009 13:27	9.9	31	26	1	78	75	9.1	29
08/12/2009 13:28	9.5	36	31	1	89	75	9.3	33
08/12/2009 13:29	10.2	36	31	1	88	77	9.4	32
08/12/2009 13:30	10.1	41	35	1	91	76	10.0	30
08/12/2009 13:31	10.3	44	38	1	83	76	9.3	26
08/12/2009 13:32	10.0	43	37	0	83	76	9.8	28
Period Average =	**10.03**	30.5	25.7	0.9	85.1	**73.04**	**9.48**	27.2
Period 7% Corr =		**39.0**	**32.9**	**1.2**	**108.8**			**33.1**

Date/Time Printed: 08/12/2009 15:35

Data Summary Report

4

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA LBS
Start of Report:	08/12/2009 13:09
End of Report:	08/12/2009 13:32

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 13:09	7.2	50.1	0.7
08/12/2009 13:10	7.7	49.8	0.7
08/12/2009 13:11	9.9	46.3	0.7
08/12/2009 13:12	12.0	45.7	0.7
08/12/2009 13:13	9.6	49.8	0.7
08/12/2009 13:14	6.0	46.5	0.7
08/12/2009 13:15	8.4	43.0	0.7
08/12/2009 13:16	7.9	46.5	0.7
08/12/2009 13:17	7.1	44.6	0.7
08/12/2009 13:18	9.8	43.6	0.7
08/12/2009 13:19	11.3	39.8	0.7
08/12/2009 13:20	10.2	41.4	0.7
08/12/2009 13:21	9.4	43.0	0.0
08/12/2009 13:22	8.8	42.4	0.7
08/12/2009 13:23	9.1	40.9	0.7
08/12/2009 13:24	9.7	42.5	0.7
08/12/2009 13:25	8.2	43.9	0.0
08/12/2009 13:26	8.0	42.4	0.7
08/12/2009 13:27	10.3	42.6	0.8
08/12/2009 13:28	12.0	48.6	0.8
08/12/2009 13:29	12.3	49.3	0.8
08/12/2009 13:30	13.8	50.3	0.8
08/12/2009 13:31	14.8	45.9	0.8
08/12/2009 13:32	14.5	45.9	0.0
Period Average =	9.9	45.2	0.6
Period Max Value =	14.8	50.3	0.8
Period Min Value =	6.0	39.8	0.0
Period Totals =	2.3800E+2	1.0848E+3	1.5200E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 15:36

Unit #4 Rata Report Run # 5

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 14:49

End of Report: 08/12/2009 15:12

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 14:49	9.4	15	11	1	111	64	8.6	100
08/12/2009 14:50	9.6	14	11	2	108	67	9.4	110
08/12/2009 14:51	9.8	21	17	3	100	68	9.1	130
08/12/2009 14:52	10.2	19	15	5	95	68	10.3	135
08/12/2009 14:53	10.9	22	18	9	84	71	10.3	187
08/12/2009 14:54	10.6	25	21	17	84	70	9.4	198
08/12/2009 14:55	10.1	21	17	24	89	71	9.5	169
08/12/2009 14:56	10.3	20	16	19	89	73	9.8	119
08/12/2009 14:57	9.9	23	19	13	90	72	8.5	109
08/12/2009 14:58	9.7	17	13	10	102	70	9.8	77
08/12/2009 14:59	10.3	17	14	7	87	70	9.4	73
08/12/2009 15:00	10.0	19	15	6	87	70	9.3	65
08/12/2009 15:01	10.3	18	14	5	82	73	10.0	58
08/12/2009 15:02	10.6	18	15	5	73	73	9.8	51
08/12/2009 15:03	10.3	18	14	4	77	72	9.4	51
08/12/2009 15:04	9.6	16	13	4	75	72	8.8	56
08/12/2009 15:05	10.1	13	10	3	63	72	9.9	48
08/12/2009 15:06	10.1	18	15	3	60	71	8.9	47
08/12/2009 15:07	9.9	17	13	3	70	72	9.8	40
08/12/2009 15:08	10.3	16	13	3	65	73	9.4	37
08/12/2009 15:09	9.9	16	12	2	76	73	9.3	36
08/12/2009 15:10	10.0	13	10	2	82	72	9.7	38
08/12/2009 15:11	10.1	13	10	2	80	72	9.5	39
08/12/2009 15:12	9.7	15	12	2	89	72	9.3	44
Period Average =	**10.07**	17.7	14.1	6.4	84.1	**70.88**	**9.47**	84.0
Period 7% Corr =		**22.7**	**18.1**	**8.2**	**107.9**			**102.2**

Data Summary Report

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

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COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Data Group: All Data Groups
Report Name: U-4 RATA LBS
Start of Report: 08/12/2009 14:49
End of Report: 08/12/2009 15:12

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 14:49	4.3	51.7	0.6
08/12/2009 14:50	4.2	52.6	1.4
08/12/2009 14:51	6.3	49.5	2.1
08/12/2009 14:52	5.7	47.0	3.4
08/12/2009 14:53	6.9	43.4	6.5
08/12/2009 14:54	7.7	42.8	12.1
08/12/2009 14:55	6.6	46.0	17.3
08/12/2009 14:56	6.5	47.3	14.0
08/12/2009 14:57	7.3	47.1	9.5
08/12/2009 14:58	5.3	51.9	7.1
08/12/2009 14:59	5.3	44.3	5.0
08/12/2009 15:00	5.9	44.3	4.3
08/12/2009 15:01	5.8	43.5	3.7
08/12/2009 15:02	5.8	38.8	3.7
08/12/2009 15:03	5.7	40.3	2.9
08/12/2009 15:04	5.1	39.3	2.9
08/12/2009 15:05	4.1	33.0	2.2
08/12/2009 15:06	5.7	31.0	2.2
08/12/2009 15:07	5.4	36.7	2.2
08/12/2009 15:08	5.2	34.5	2.2
08/12/2009 15:09	5.2	40.4	1.5
08/12/2009 15:10	4.1	42.9	1.5
08/12/2009 15:11	4.1	41.9	1.5
08/12/2009 15:12	4.8	46.6	1.5
Period Average =	5.5	43.2	4.6
Period Max Value =	7.7	52.6	17.3
Period Min Value =	4.1	31.0	0.6
Period Totals =	1.3300E+2	1.0368E+3	1.1130E+2
Period % Recovery =	100.0	100.0	100.0

Unit #4 Rata Report Run # 6

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA
Start of Report:	08/12/2009 15:39
End of Report:	08/12/2009 16:02

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 15:39	10.4	23	19	1	82	72	10.1	21
08/12/2009 15:40	10.6	20	16	1	76	70	10.0	22
08/12/2009 15:41	10.8	19	16	1	74	71	10.6	21
08/12/2009 15:42	10.5	25	21	1	68	71	9.4	23
08/12/2009 15:43	10.3	21	17	1	74	70	9.3	23
08/12/2009 15:44	10.1	17	13	1	84	68	9.7	25
08/12/2009 15:45	10.2	16	12	1	85	71	9.4	27
08/12/2009 15:46	10.0	16	12	1	100	69	9.6	30
08/12/2009 15:47	10.0	14	11	1	98	70	9.4	31
08/12/2009 15:48	10.1	14	11	1	101	71	9.5	30
08/12/2009 15:49	9.9	13	10	1	109	71	8.8	32
08/12/2009 15:50	9.7	10	7	1	106	71	9.4	33
08/12/2009 15:51	10.2	11	8	1	94	73	9.7	33
08/12/2009 15:52	9.6	15	12	1	99	72	8.7	34
08/12/2009 15:53	9.9	10	7	1	107	71	9.7	33
08/12/2009 15:54	9.9	12	9	1	86	72	8.9	32
08/12/2009 15:55	9.7	12	9	1	94	73	9.6	30
08/12/2009 15:56	10.2	11	8	1	87	72	9.7	30
08/12/2009 15:57	10.2	14	11	1	89	73		29
08/12/2009 15:58	10.2	13	10	1	89	72	9.4	30
08/12/2009 15:59	9.9	13	10	1	87	73	9.6	30
08/12/2009 16:00	10.5	15	12	1	76	74	9.8	27
08/12/2009 16:01	10.1	17	14	1	77	75	9.5	28
08/12/2009 16:02	10.1	15	12	1	81	74	9.2	28
Period Average =	**10.13**	15.3	12.0	1.0	88.5	**71.63**	**9.52**	28.4
Period 7% Corr =		**19.7**	**15.5**	**1.3**	**114.2**			**34.7**

Date/Time Printed: 08/12/2009 16:20

Data Summary Report

COVANTA ENERGY — Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups
Report Name: U-4 RATA LBS
Start of Report: 08/12/2009 15:39
End of Report: 08/12/2009 16:02
Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 15:39	7.3	42.9	0.7
08/12/2009 15:40	6.2	38.7	0.7
08/12/2009 15:41	6.0	38.2	0.7
08/12/2009 15:42	7.9	35.1	0.7
08/12/2009 15:43	6.5	37.7	0.7
08/12/2009 15:44	5.1	41.6	0.7
08/12/2009 15:45	5.0	43.9	0.7
08/12/2009 15:46	4.9	50.2	0.7
08/12/2009 15:47	4.3	49.9	0.7
08/12/2009 15:48	4.4	52.2	0.7
08/12/2009 15:49	4.1	56.3	0.7
08/12/2009 15:50	3.1	54.7	0.7
08/12/2009 15:51	3.6	49.9	0.7
08/12/2009 15:52	4.8	51.9	0.7
08/12/2009 15:53	3.1	55.3	0.7
08/12/2009 15:54	3.8	45.0	0.7
08/12/2009 15:55	3.9	49.9	0.7
08/12/2009 15:56	3.5	45.6	0.7
08/12/2009 15:57	4.5	47.3	0.7
08/12/2009 15:58	4.1	46.6	0.7
08/12/2009 15:59	4.2	46.2	0.7
08/12/2009 16:00	4.9	40.9	0.7
08/12/2009 16:01	5.6	42.0	0.8
08/12/2009 16:02	4.9	43.6	0.7
Period Average =	4.8	46.1	0.7
Period Max Value =	7.9	56.3	0.8
Period Min Value =	3.1	35.1	0.7
Period Totals =	1.1570E+2	1.1056E+3	1.6900E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 16:19

Unit #4 Rata Report Run # 7

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 16:23

End of Report: 08/12/2009 16:46

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 16:23	11.0	19	16	1	62	72	10.8	28
08/12/2009 16:24	11.2	28	23	1	58	73	10.7	31
08/12/2009 16:25	11.4	30	26	1	56	75	10.6	33
08/12/2009 16:26	10.5	29	23	1	65	75	9.3	37
08/12/2009 16:27	10.0	17	12	1	79	73	9.3	40
08/12/2009 16:28	9.4	15	12	1	83	70	8.6	48
08/12/2009 16:29	9.5	13	10	1	88	70	9.2	53
08/12/2009 16:30	10.2	14	11	1	90	73	9.9	53
08/12/2009 16:31	10.3	20	17	1	83	70	9.3	58
08/12/2009 16:32	9.6	21	17	1	89	71	8.9	64
08/12/2009 16:33	9.7	16	12	1	87	71	9.1	61
08/12/2009 16:34	9.5	17	13	1	86	70	9.1	55
08/12/2009 16:35	9.8	17	13	2	85	73	9.0	53
08/12/2009 16:36	9.9	17	14	2	90	72	9.4	49
08/12/2009 16:37	9.5	20	16	1	92	72	8.6	52
08/12/2009 16:38	9.8	16	12	2	90	70	9.8	43
08/12/2009 16:39	10.4	18	15	2	79	73		47
08/12/2009 16:40	9.4	21	16	2	85	72	8.8	40
08/12/2009 16:41	9.6	19	15	2	85	72	9.2	39
08/12/2009 16:42	9.8	17	14	1	77	73	9.1	40
08/12/2009 16:43	9.9	18	14	1	79	71	9.4	38
08/12/2009 16:44	10.0	18	14	1	78	72	9.4	34
08/12/2009 16:45	9.6	17	13	1	87	71	8.8	41
08/12/2009 16:46	9.4	13	10	1	92	69	8.8	43
Period Average =	**9.98**	18.8	14.9	1.3	81.0	**71.79**	**9.35**	45.0
Period 7% Corr =		**23.9**	**19.0**	**1.7**	**103.1**			**54.2**

Date/Time Printed: 08/12/2009 16:49

Data Summary Report

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA LBS
Start of Report:	08/12/2009 16:23
End of Report:	08/12/2009 16:46

Hillsborough County Resource Recovery Facility

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 16:23	6.1	32.5	0.7
08/12/2009 16:24	9.1	30.8	0.7
08/12/2009 16:25	10.0	30.6	0.8
08/12/2009 16:26	9.6	35.5	0.8
08/12/2009 16:27	5.5	42.0	0.7
08/12/2009 16:28	4.6	42.3	0.7
08/12/2009 16:29	4.0	44.8	0.7
08/12/2009 16:30	4.5	47.8	0.7
08/12/2009 16:31	6.2	42.3	0.7
08/12/2009 16:32	6.6	46.0	0.7
08/12/2009 16:33	5.0	44.9	0.7
08/12/2009 16:34	5.3	43.8	0.7
08/12/2009 16:35	5.5	45.1	1.5
08/12/2009 16:36	5.4	47.1	1.5
08/12/2009 16:37	6.4	48.2	0.7
08/12/2009 16:38	5.0	45.8	1.4
08/12/2009 16:39	5.8	42.0	1.5
08/12/2009 16:40	6.7	44.5	1.5
08/12/2009 16:41	6.1	44.5	1.5
08/12/2009 16:42	5.5	40.9	0.7
08/12/2009 16:43	5.7	40.8	0.7
08/12/2009 16:44	5.7	40.9	0.7
08/12/2009 16:45	5.3	44.9	0.7
08/12/2009 16:46	4.0	46.2	0.7
Period Average =	6.0	42.3	0.9
Period Max Value =	10.0	48.2	1.5
Period Min Value =	4.0	30.6	0.7
Period Totals =	1.4360E+2	1.0142E+3	2.1700E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 16:48

Unit #4 Rata Report Run # 8

COVANTA ENERGY — Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 17:03

End of Report: 08/12/2009 17:26

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 17:03	9.5	14	10	1	88	71	9.1	42
08/12/2009 17:04	9.6	17	14	1	83	71	9.1	43
08/12/2009 17:05	9.8	19	15	1	84	71	9.2	48
08/12/2009 17:06	9.6	19	15	1	82	71	9.1	45
08/12/2009 17:07	9.9	16	12	1	82	70	9.6	36
08/12/2009 17:08	10.2	16	12	1	73	72	9.5	37
08/12/2009 17:09	10.3	19	15	1	72	71	9.4	37
08/12/2009 17:10	10.0	22	18	1	76	73	9.4	40
08/12/2009 17:11	10.3	20	16	1	77	73	9.3	36
08/12/2009 17:12	9.3	20	16	1	92	70	8.6	43
08/12/2009 17:13	10.1	12	9	1	94	72		37
08/12/2009 17:14	10.0	19	15	1	89	73		
08/12/2009 17:15	10.3	21	17	1	86	72		
08/12/2009 17:16	10.4	24	19	1	87	73		
08/12/2009 17:17	10.0	28	23	1	84	74	8.8	34
08/12/2009 17:18	9.6	18	15	1	90	71	8.5	36
08/12/2009 17:19	9.7	18	14	1	88	72	10.0	30
08/12/2009 17:20	10.2	21	17	1	71	72	8.9	33
08/12/2009 17:21	10.0	20	16	1	80	70	10.4	27
08/12/2009 17:22	11.0	23	19	1	65	71	10.7	24
08/12/2009 17:23	10.8	32	27	1	60	74	8.9	29
08/12/2009 17:24	8.9	27	23	1	77	71	8.7	33
08/12/2009 17:25	10.0	18	15	1	81	73	9.1	28
08/12/2009 17:26	9.3	20	16	1	86	74	9.1	32
Period Average =	**9.95**	20.1	16.2	1.0	81.1	**71.88**	**9.27**	35.7
Period 7% Corr =		**25.5**	**20.6**	**1.3**	**102.9**			**42.7**

Data Summary Report

Hillsborough County
Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA LBS

Start of Report: 08/12/2009 17:03

End of Report: 08/12/2009 17:26

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 17:03	4.4	45.4	0.7
08/12/2009 17:04	5.3	42.9	0.7
08/12/2009 17:05	6.0	43.4	0.7
08/12/2009 17:06	6.0	42.4	0.7
08/12/2009 17:07	5.0	41.8	0.7
08/12/2009 17:08	5.1	38.2	0.7
08/12/2009 17:09	6.0	37.2	0.7
08/12/2009 17:10	7.1	40.4	0.7
08/12/2009 17:11	6.5	40.9	0.7
08/12/2009 17:12	6.2	46.8	0.7
08/12/2009 17:13	3.8	49.2	0.7
08/12/2009 17:14	6.1	47.3	0.7
08/12/2009 17:15	6.7	45.0	0.7
08/12/2009 17:16	7.8	46.2	0.7
08/12/2009 17:17	9.2	45.2	0.7
08/12/2009 17:18	5.7	46.5	0.7
08/12/2009 17:19	5.7	46.1	0.7
08/12/2009 17:20	6.7	37.2	0.7
08/12/2009 17:21	6.2	40.7	0.7
08/12/2009 17:22	7.2	33.6	0.7
08/12/2009 17:23	10.5	32.3	0.7
08/12/2009 17:24	8.5	39.8	0.7
08/12/2009 17:25	5.8	43.0	0.7
08/12/2009 17:26	6.6	46.3	0.7
Period Average =	6.4	42.4	0.7
Period Max Value =	10.5	49.2	0.7
Period Min Value =	3.8	32.3	0.7
Period Totals =	1.5410E+2	1.0178E+3	1.6800E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 17:47

Unit #4 Rata Report Run # 9

COVANTA ENERGY

Hillsborough County
Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 17:47

End of Report: 08/12/2009 18:10

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 17:47	9.9	18	15	1	86			33
08/12/2009 17:48	10.1	20	16	1	79	72		30
08/12/2009 17:49	9.7	20	16	1	89	73		33
08/12/2009 17:50	9.6	17	13	1	84	70		36
08/12/2009 17:51	9.4	17	13	1	88	71		35
08/12/2009 17:52	10.1	16	13	1	78	72		32
08/12/2009 17:53	10.2	20	16	1	74	74		31
08/12/2009 17:54	10.0	22	18	1	73	73		32
08/12/2009 17:55	10.1	19	15	1	68	73		31
08/12/2009 17:56	9.7	21	17	1	77	73		29
08/12/2009 17:57	9.6	19	15	1	81	71		29
08/12/2009 17:58	10.4	16	13	1	76	72		26
08/12/2009 17:59	10.0	22	18	1	75	72		31
08/12/2009 18:00	9.9	20	16	1	82	70		30
08/12/2009 18:01	10.1	17	13	1	85	71		26
08/12/2009 18:02	10.2	19	15	1	84	70		28
08/12/2009 18:03	10.5	21	18	1	75	71		26
08/12/2009 18:04	9.8	23	19	1	81	70		30
08/12/2009 18:05	10.1	19	15	1	83	71		28
08/12/2009 18:06	10.2	25	21	1	77	72		29
08/12/2009 18:07	10.2	24	20	1	80	71		26
08/12/2009 18:08	10.9	28	24	1	68	72		27
08/12/2009 18:09	10.8	27	22	1	76	74		27
08/12/2009 18:10	9.9	27	22	1	88	74		37
Period Average =	**10.06**	20.7	16.8	1.0	79.5	**71.83**	**0.00**	30.1
Period 7% Corr =		**26.5**	**21.5**	**1.3**	**101.9**			**20.0**

3

Data Summary Report

9

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA LBS
Start of Report:	08/12/2009 17:47
End of Report:	08/12/2009 18:10

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 17:48	6.4	41.4	0.7
08/12/2009 17:49	6.5	47.3	0.7
08/12/2009 17:50	5.3	42.8	0.7
08/12/2009 17:51	5.3	45.4	0.7
08/12/2009 17:52	5.1	40.9	0.7
08/12/2009 17:53	6.6	39.8	0.7
08/12/2009 17:54	7.1	38.8	0.7
08/12/2009 17:55	6.1	36.1	0.7
08/12/2009 17:56	6.8	40.9	0.7
08/12/2009 17:57	6.0	41.8	0.7
08/12/2009 17:58	5.1	39.8	0.7
08/12/2009 17:59	7.0	39.3	0.7
08/12/2009 18:00	6.2	41.8	0.7
08/12/2009 18:01	5.3	43.9	0.7
08/12/2009 18:02	5.9	42.8	0.7
08/12/2009 18:03	6.6	38.7	0.7
08/12/2009 18:04	7.1	41.2	0.7
08/12/2009 18:05	6.0	42.9	0.7
08/12/2009 18:06	8.0	40.3	0.7
08/12/2009 18:07	7.5	41.3	0.7
08/12/2009 18:08	8.9	35.6	0.7
08/12/2009 18:09	8.8	40.9	0.7
08/12/2009 18:10	8.8	47.4	0.7
Period Average =	6.6	41.4	0.7
Period Max Value =	8.9	47.4	0.7
Period Min Value =	5.1	35.6	0.7
Period Totals =	1.5240E+2	9.5110E+2	1.6100E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 19:02

Unit #4 Rata Report Run # 10

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups

Report Name: U-4 RATA

Start of Report: 08/12/2009 18:28

End of Report: 08/12/2009 18:51

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 18:28	9.7	16	13	1	90	71	9.1	37
08/12/2009 18:29	9.6	19	15	1	86	70	9.0	39
08/12/2009 18:30	9.7	19	15	1	80	72	9.4	41
08/12/2009 18:31	9.6	18	14	1	77	72	8.3	48
08/12/2009 18:32	9.3	17	13	2	87	72	9.5	44
08/12/2009 18:33	9.6	19	16	2	80	73	8.4	45
08/12/2009 18:34	9.4	15	12	1	92	71		44
08/12/2009 18:35	9.9	18	14	1	81	74	9.6	45
08/12/2009 18:36	10.3	22	19	1	76	72	9.3	43
08/12/2009 18:37	9.9	24	20	1	86	72	9.8	43
08/12/2009 18:38	10.4	23	19	2	77	72	9.5	45
08/12/2009 18:39	10.0	23	19	2	77	73	9.0	48
08/12/2009 18:40	8.9	21	17	2	83	71	8.3	50
08/12/2009 18:41	10.0	13	10	2	80	71	10.2	42
08/12/2009 18:42	10.3	22	19	2	71	72	9.5	42
08/12/2009 18:43	10.3	19	16	2	75	72	9.7	42
08/12/2009 18:44	10.1	20	16	2	73	72	9.0	47
08/12/2009 18:45	10.2	17	13	2	76	71	10.1	39
08/12/2009 18:46	10.4	21	17	2	70	72	9.3	39
08/12/2009 18:47	9.5	24	19	1	80	71	9.4	40
08/12/2009 18:48	10.4	18	15	1	75	70	10.0	35
08/12/2009 18:49	10.3	22	18	1	77	75	9.5	42
08/12/2009 18:50	8.9	20	16	1	86	75	7.3	54
08/12/2009 18:51	8.1	13	10	2	102	71	8.2	52
Period Average =	**9.78**	19.3	15.6	1.5	80.7	**71.96**	**9.19**	43.6
Period 7% Corr =		**24.1**	**19.5**	**1.9**	**100.9**			**51.8**

Data Summary Report

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

Data Group: All Data Groups
Report Name: U-4 RATA LBS
Start of Report: 08/12/2009 18:28
End of Report: 08/12/2009 18:51
Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 18:28	5.0	46.5	0.7
08/12/2009 18:29	5.9	43.8	0.7
08/12/2009 18:30	6.1	41.9	0.7
08/12/2009 18:31	5.7	40.3	0.7
08/12/2009 18:32	5.4	45.6	1.5
08/12/2009 18:33	6.1	42.5	1.5
08/12/2009 18:34	4.7	47.5	0.7
08/12/2009 18:35	5.9	43.6	0.7
08/12/2009 18:36	7.0	39.8	0.7
08/12/2009 18:37	7.7	45.0	0.7
08/12/2009 18:38	7.3	40.3	1.5
08/12/2009 18:39	7.4	40.9	1.5
08/12/2009 18:40	6.6	42.9	1.4
08/12/2009 18:41	4.1	41.3	1.4
08/12/2009 18:42	7.0	37.2	1.5
08/12/2009 18:43	6.1	39.3	1.5
08/12/2009 18:44	6.4	38.2	1.5
08/12/2009 18:45	5.3	39.3	1.4
08/12/2009 18:46	6.7	36.7	1.5
08/12/2009 18:47	7.5	41.3	0.7
08/12/2009 18:48	5.6	38.2	0.7
08/12/2009 18:49	7.3	42.0	0.8
08/12/2009 18:50	6.6	46.9	0.8
08/12/2009 18:51	4.1	52.7	1.4
Period Average =	6.1	42.2	1.1
Period Max Value =	7.7	52.7	1.5
Period Min Value =	4.1	36.7	0.7
Period Totals =	1.4750E+2	1.0137E+3	2.6200E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 18:59

Unit #4 Rata Report Run # 11

Company:	Covanta of Hillsborough 350 N. Falkenburg Rd. Tampa, FL 33619
Data Group:	All Data Groups
Report Name:	U-4 RATA
Start of Report:	08/12/2009 19:13
End of Report:	08/12/2009 19:36

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Validation: Valid Data Only

	O2s	COLos	COHis	SO2s	NOxs	CO2s	O2e	SO2e
Group#-Channel#	G43-C6	G43-C5	G43-C10	G43-C3	G43-C4	G47-C30	G43-C2	G43-C1
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Stac	U-4E Econ	U-4E Econ
Short Descrip.	O2s	COs-L	COs-H	SO2s	NOXs	FLOWs-dry	O2e	SO2e
Units	%	ppm	ppm	ppm	ppm	kdscfm	%	ppm
Range	0-25	0-500	0-2000	0-200	0-500	0-225	0-25	0-500
08/12/2009 19:13	10.2	14	11	1	82	73	9.8	38
08/12/2009 19:14	10.0	22	19	1	82	74		
08/12/2009 19:15	10.0	20	16	1	82	73		
08/12/2009 19:16	10.2	22	18	1	78	72		
08/12/2009 19:17	10.1	20	16	1	82	72	9.7	42
08/12/2009 19:18	9.6	22	18	1	84	71	8.7	44
08/12/2009 19:19	9.8	16	13	1	84	71	9.8	44
08/12/2009 19:20	10.3	22	18	1	75	73	10.0	44
08/12/2009 19:21	10.2	26	22	1	75	73	9.1	45
08/12/2009 19:22	9.4	21	17	1	91	72	8.7	49
08/12/2009 19:23	9.2	16	12	2	92	73	9.0	51
08/12/2009 19:24	9.7	16	13	2	89	73	9.1	48
08/12/2009 19:25	9.7	18	14	2	90	73	9.1	47
08/12/2009 19:26	9.9	16	13	2	87	70	9.4	41
08/12/2009 19:27	9.9	18	15	2	87	71	9.3	39
08/12/2009 19:28	9.7	19	15	2	90	72	9.0	40
08/12/2009 19:29	9.2	17	13	2	91	70	7.9	44
08/12/2009 19:30	8.9	13	10	2	96	69	9.2	41
08/12/2009 19:31	10.3	12	9	2	86	72	10.1	36
08/12/2009 19:32	10.0	16	13	2	79	72	9.3	41
08/12/2009 19:33	10.2	15	12	2	77	71	9.4	40
08/12/2009 19:34	10.2	19	15	2	76	73	9.5	40
08/12/2009 19:35	9.6	20	16	2	77	73	9.0	43
08/12/2009 19:36	9.4	17	14	2	84		8.4	46
Period Average =	**9.82**	18.2	14.7	1.6	84.0	**72.00**	**9.21**	43.0
Period 7% Corr =		**22.8**	**18.4**	**2.0**	**105.4**			**51.1**

Date/Time Printed: 08/12/2009 19:37

Data Summary Report

COVANTA ENERGY

Hillsborough County Resource Recovery Facility

Company: Covanta of Hillsborough
350 N. Falkenburg Rd.
Tampa, FL 33619

#1

Data Group: All Data Groups
Report Name: U-4 RATA LBS
Start of Report: 08/12/2009 19:13
End of Report: 08/12/2009 19:36

Validation: Valid Data Only

Group#-Channel#	G47-C31	G47-C32	G47-C33
Long Descrip.	U-4E Stac	U-4E Stac	U-4E Stac
Short Descrip.	CO #/Hr	NOX #/Hr	SO2 #/Hr
Units	#/Hr	#/Hr	#/Hr
Range	0-1000	0-1000	0-1000
08/12/2009 19:13	4.5	43.5	0.7
08/12/2009 19:14	7.2	44.1	0.7
08/12/2009 19:15	6.5	43.5	0.7
08/12/2009 19:16	7.0	40.9	0.7
08/12/2009 19:17	6.4	42.9	0.7
08/12/2009 19:18	6.9	43.4	0.7
08/12/2009 19:19	5.0	43.4	0.7
08/12/2009 19:20	7.1	39.8	0.7
08/12/2009 19:21	8.4	39.8	0.7
08/12/2009 19:22	6.7	47.7	0.7
08/12/2009 19:23	5.2	48.9	1.5
08/12/2009 19:24	5.2	47.3	1.5
08/12/2009 19:25	5.8	47.8	1.5
08/12/2009 19:26	5.0	44.3	1.4
08/12/2009 19:27	5.7	44.9	1.4
08/12/2009 19:28	6.1	47.1	1.5
08/12/2009 19:29	5.3	46.3	1.4
08/12/2009 19:30	4.0	48.2	1.4
08/12/2009 19:31	3.8	45.0	1.5
08/12/2009 19:32	5.1	41.4	1.5
08/12/2009 19:33	4.7	39.8	1.4
08/12/2009 19:34	6.1	40.4	1.5
08/12/2009 19:35	6.5	40.9	1.5
08/12/2009 19:36	5.5	44.6	1.5
Period Average =	5.8	44.0	1.1
Period Max Value =	8.4	48.9	1.5
Period Min Value =	3.8	39.8	0.7
Period Totals =	1.3970E+2	1.0559E+3	2.7500E+1
Period % Recovery =	100.0	100.0	100.0

Date/Time Printed: 08/12/2009 19:38

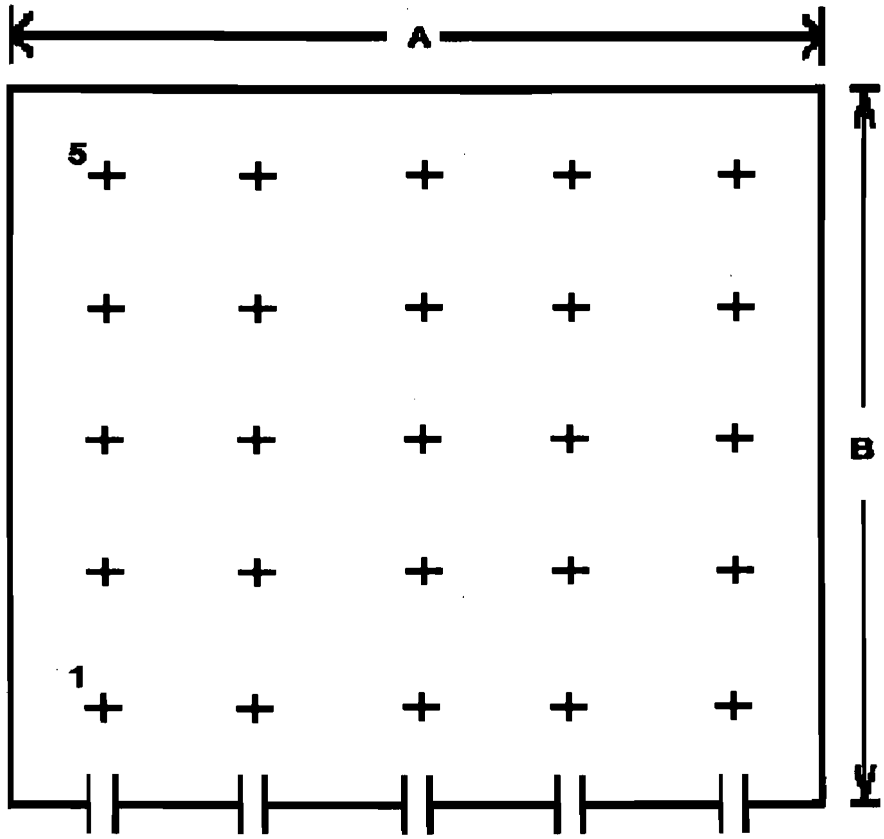
Appendix D

5.4 OUTLET SAMPLING POINT LOCATIONS

The outlet test sampling ports are located in the rectangular ductwork between the baghouse outlet and the induced draft fan inlet. The duct is 83 inches by 96 inches. The distances to the test ports are 2.1 duct diameters (13.3 feet) upstream and 1.7 duct diameters (16.7 feet) downstream from the nearest flow disturbances.

There are two rows of ports. The top row has five sampling test ports, 6 inches in diameter. The bottom has seven sampling test ports, 2 inches in diameter. See Figure 5.2A and Figure 5.2B for drawing of the traverse point locations.

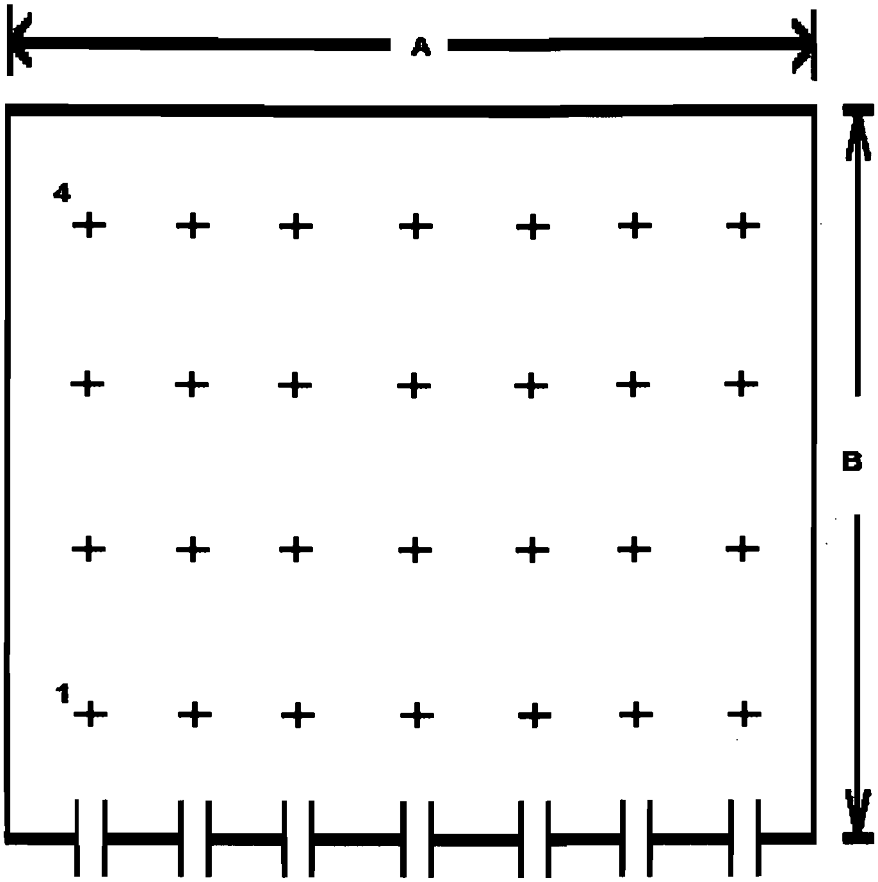
Figure 5-2A: Units 4 Outlet Sampling Point Determination (Top Row)



A = 83 inches **B = 96 inches**

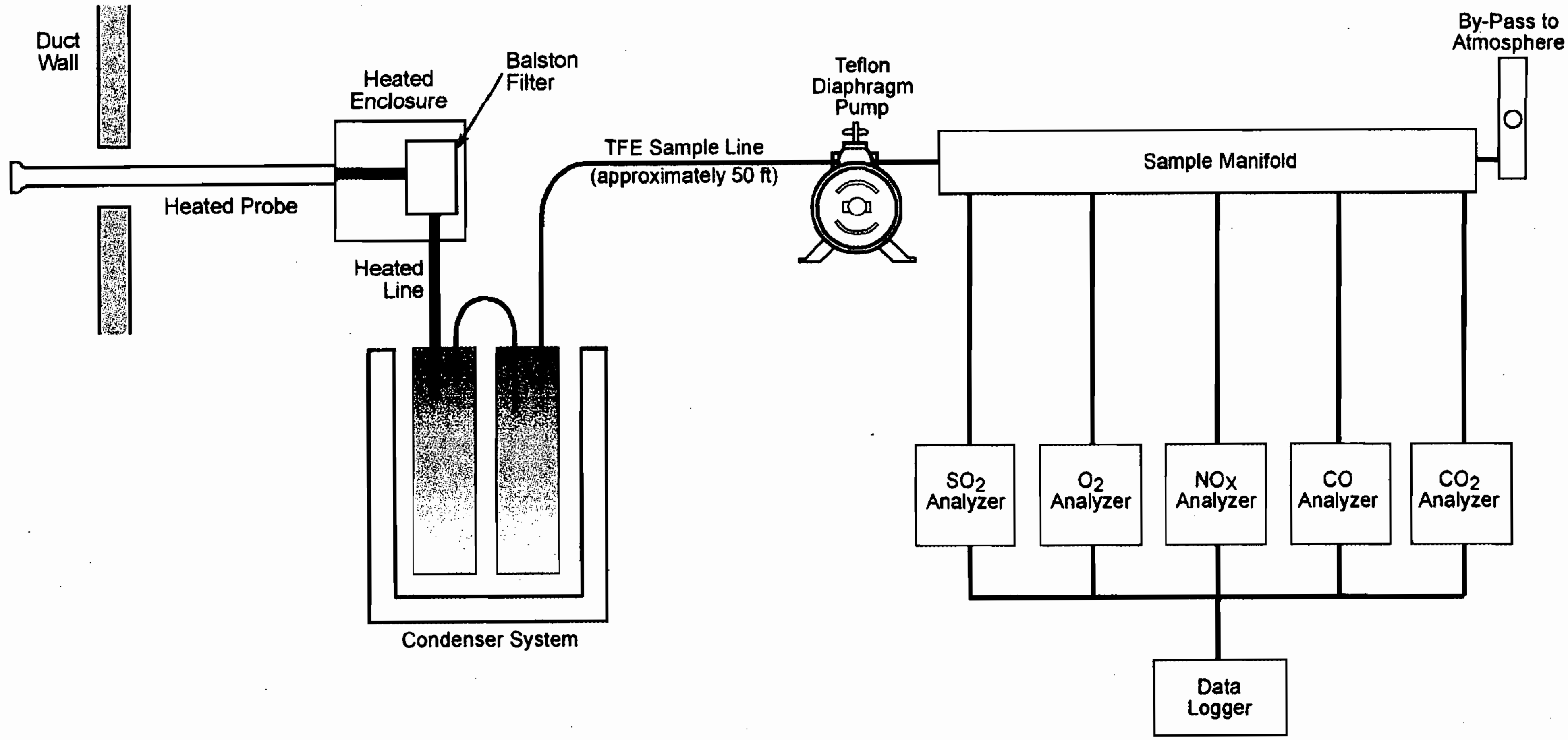
traverse point	percent of distance	distance inches
1	10	9.6
2	30	28.8
3	50	48.0
4	70	67.2
5	90	86.4

Figure 5-2A: Units 4 Outlet Sampling Point Determination (Bottom Row)



A = 83 inches B = 96 inches

traverse point	percent of distance	distance inches
1	12.5	12
2	37.5	36
3	62.5	60
4	87.5	84



TRC
21 Griffin Road North
Windsor, CT 06095
(860) 298-9692

FIGURE 4-5

EPA METHOD 3A, 6C, 7E & 10 CONTINUOUS EMISSION MONITORING SYSTEM

M-3a 7e.FH9

APPENDIX E

REFERENCE METHOD DAS

Covanta - Hillsborough FL

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

Covanta 8/12/09	Outlet					Inlet		
Linearity Check	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppmv or % vol)	253.00	85.00	45.50	21.92	14.43	85.00	21.92	14.43
Analyzer Range (ppmv or % vol)	253.00	85.00	45.50	21.92	14.43	85.00	21.92	14.43
Low Level Certified Value (ppm or % vol)	na	na	na	na	na	na	na	na
Mid Level Certified Value (ppm or % vol)	147.30	49.38	25.10	12.17	14.43	49.38	12.17	14.43
High Level Certified Value (ppm or % vol)	253.00	85.00	45.50	21.92	8.52	85.00	21.92	8.52
Zero Observed (ppm or % vol)	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Low Level Observed (ppm or % vol)	na	na	na	na	na	na	na	na
Mid Level Observed (ppm or % vol)	147.30	48.92	25.05	12.12	8.30	49.40	12.17	8.32
High Level Observed (ppm or % vol)	255.25	85.28	45.35	21.95	14.36	85.54	21.95	14.43
% Difference From Zero to Target	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
% Difference From Low to Target	na	na	na	na	na	na	na	na
% Difference From Mid to Target	0.0	-0.5	-0.1	-0.2	-42.5	0.0	0.0	-42.3
% Difference From High to Target	0.9	0.3	-0.3	0.1	40.5	0.6	0.1	41.0
EPA Allowable % Difference from Target	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span
U4-RA-1	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	45.5	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	25.10	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	25.05	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	0.00	0.20	0.00	-0.04	0.71	0.12	0.03
Calibration Gas (ppmv)	148.15	47.98	24.95	12.07	8.32	49.14	12.09	8.32
Final Bias Reading								
Zero Gas (ppmv)	0.00	0.19	0.00	0.00	-0.02	0.71	0.16	0.04
Calibration Gas (ppmv)	148.43	48.17	25.00	12.07	8.30	49.12	12.10	8.23
Initial Bias Calculation								
Zero Bias ≤5%	0.0	0.0	0.4	0.0	-0.3	0.9	0.5	0.2
Calibration Bias ≤5%	0.3	-1.1	-0.2	-0.2	0.1	-0.3	-0.4	0.0
Final Bias Calculation								
Zero Bias ≤5%	0.0	0.2	0.0	0.0	-0.1	0.9	0.7	0.3
Calibration Bias ≤5%	0.4	-0.9	-0.1	-0.2	0.0	-0.3	-0.3	-0.6
Drift Calculation								
Zero Drift ≤3%	0.0	-0.2	0.4	0.0	-0.1	0.0	-0.2	-0.1
Calibration Drift ≤3%	-0.1	-0.2	-0.1	0.0	0.1	0.0	0.0	0.6
Run Results								
Raw Results (ppmv or % vol)	114.48	-0.15	20.90	9.79	9.65	38.41	9.67	9.76
Corrected Results (ppmv or % vol)	113.72	-0.25	20.99	9.87	9.89	38.45	9.70	10.06

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

U4-RA-2		NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %		253.0	85.0	45.5	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)		147.30	49.38	25.10	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero		0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias		147.30	48.92	25.05	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading									
Zero Gas (ppmv)		0.00	0.19	0.00	0.00	-0.02	0.71	0.16	0.04
Calibration Gas (ppmv)		148.43	48.17	25.00	12.07	8.30	49.12	12.10	8.23
Final Bias Reading									
Zero Gas (ppmv)		0.00	0.00	0.00	-0.03	-0.02	0.72	0.15	0.03
Calibration Gas (ppmv)		146.74	47.88	25.00	12.05	8.32	49.22	12.13	8.27
Initial Bias Calculation									
Zero Bias	≤5%	0.0	0.2	0.0	0.0	-0.1	0.9	0.7	0.3
Calibration Bias	≤5%	0.4	-0.9	-0.1	-0.2	0.0	-0.3	-0.3	-0.6
Final Bias Calculation									
Zero Bias	≤5%	0.0	0.0	0.0	-0.1	-0.1	0.9	0.7	0.2
Calibration Bias	≤5%	-0.2	-1.2	-0.1	-0.3	0.1	-0.2	-0.2	-0.3
Drift Calculation									
Zero Drift	≤3%	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.1
Calibration Drift	≤3%	0.7	0.3	0.0	0.1	-0.1	-0.1	-0.1	-0.3
Run Results									
Raw Results (ppmv or % vol)		74.06	-0.31	24.31	10.10	9.46	43.49	9.78	9.78
Corrected Results (ppmv or % vol)		73.92	-0.42	24.41	10.19	9.70	43.59	9.79	10.11
U4-RA-3		**NO_X-B**	**SO2-A**	**CO-A**	**O_2-A**	**CO_2-A**	**SO2-B**	**O_2-B**	**CO_2-B**
Gas Range (ppm), O2 & CO2 in %		253.0	85.0	45.5	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)		147.30	49.38	25.10	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero		0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias		147.30	48.92	25.05	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading									
Zero Gas (ppmv)		0.00	0.00	0.00	-0.03	-0.02	0.72	0.15	0.03
Calibration Gas (ppmv)		146.74	47.88	25.00	12.05	8.32	49.22	12.13	8.27
Final Bias Reading									
Zero Gas (ppmv)		0.00	-0.47	0.00	0.00	0.06	2.63	0.18	0.03
Calibration Gas (ppmv)		147.02	47.79	24.90	12.03	8.58	48.04	12.00	8.23
Initial Bias Calculation									
Zero Bias	≤5%	0.0	0.0	0.0	-0.1	-0.1	0.9	0.7	0.2
Calibration Bias	≤5%	-0.2	-1.2	-0.1	-0.3	0.1	-0.2	-0.2	-0.3
Final Bias Calculation									
Zero Bias	≤5%	0.0	-0.6	0.0	0.0	0.4	3.2	0.8	0.2
Calibration Bias	≤5%	-0.1	-1.3	-0.3	-0.4	1.9	-1.6	-0.8	-0.6
Drift Calculation									
Zero Drift	≤3%	0.0	0.6	0.0	-0.1	-0.6	-2.2	-0.1	0.0
Calibration Drift	≤3%	-0.1	0.1	0.2	0.1	-1.8	1.4	0.6	0.3
Run Results									
Raw Results (ppmv or % vol)		81.89	-0.56	22.17	10.12	9.41	42.86	9.75	9.72
Corrected Results (ppmv or % vol)		82.12	-0.33	22.30	10.23	9.49	43.31	9.80	10.04

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

Linearity Check	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B	
Gas Range (ppmv or % vol)	253.00	85.00	45.50	21.92	14.43	85.00	21.92	14.43	
Analyzer Range (ppmv or % vol)	253.00	85.00	45.50	21.92	14.43	85.00	21.92	14.43	Redo SO2A Lin
Low Level Certified Value (ppm or % vol)	na	na	na	na	na	na	na	na	
Mid Level Certified Value (ppm or % vol)	147.30	49.38	25.10	12.17	14.43	49.38	12.17	14.43	
High Level Certified Value (ppm or % vol)	253.00	85.00	45.50	21.92	8.52	85.00	21.92	8.52	
Zero Observed (ppm or % vol)	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	
Low Level Observed (ppm or % vol)	na	na	na	na	na	na	na	na	
Mid Level Observed (ppm or % vol)	147.30	49.21	25.05	12.12	8.30	49.40	12.17	8.32	
High Level Observed (ppm or % vol)	255.25	85.19	45.35	21.95	14.36	85.54	21.95	14.43	
% Difference From Zero to Target	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	
% Difference From Low to Target	na	na	na	na	na	na	na	na	
% Difference From Mid to Target	0.0	-0.2	-0.1	-0.2	-42.5	0.0	0.0	-42.3	
% Difference From High to Target	0.9	0.2	-0.3	0.1	40.5	0.6	0.1	41.0	
EPA Allowable % Difference from Target	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	
U4-RA-4	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B	
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	45.5	21.92	14.4	85.0	21.92	14.4	Redo Bias on outlet
Calibration Gas Certified Value (ppm or %)	147.30	49.38	25.10	12.17	8.52	49.38	12.17	8.52	Redo SO2A Bias
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00	
Direct Cal Bias	147.30	49.21	25.05	12.12	8.30	49.40	12.17	8.32	
Initial Bias Reading									
Zero Gas (ppmv)	0.00	0.00	0.00	0.00	0.06	1.43	0.06	0.04	
Calibration Gas (ppmv)	147.02	47.51	24.90	12.03	8.58	49.63	12.13	8.22	
Final Bias Reading									
Zero Gas (ppmv)	0.00	-0.19	0.00	0.00	0.06	1.28	0.14	0.04	
Calibration Gas (ppmv)	144.70	47.51	24.85	12.03	8.56	48.68	12.04	8.22	
Initial Bias Calculation									
Zero Bias ≤5%	0.0	0.0	0.0	0.0	0.4	1.7	0.3	0.3	
Calibration Bias ≤5%	-0.1	-2.0	-0.3	-0.4	1.9	0.3	-0.2	-0.7	
Final Bias Calculation									
Zero Bias ≤5%	0.0	-0.2	0.0	0.0	0.4	1.6	0.6	0.3	
Calibration Bias ≤5%	-1.0	-2.0	-0.4	-0.4	1.8	-0.8	-0.6	-0.7	
Drift Calculation									
Zero Drift ≤3%	0.0	0.2	0.0	0.0	0.0	0.2	-0.4	0.0	
Calibration Drift ≤3%	0.9	0.0	0.1	0.0	0.1	1.1	0.4	0.0	
Run Results									
Raw Results (ppmv or % vol)	83.82	0.01	26.83	9.87	9.84	31.08	9.62	9.76	
Corrected Results (ppmv or % vol)	84.65	0.11	27.07	9.98	9.79	30.71	9.67	10.12	

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

Linearity Check	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppmv or % vol)	253.00	85.00	81.40	21.92	14.43	85.00	21.92	14.43
Analyzer Range (ppmv or % vol)	253.00	85.00	81.40	21.92	14.43	85.00	21.92	14.43
Low Level Certified Value (ppm or % vol)	na	na	na	na	na	na	na	na
Mid Level Certified Value (ppm or % vol)	147.30	49.38	45.50	12.17	14.43	49.38	12.17	14.43
High Level Certified Value (ppm or % vol)	253.00	85.00	81.40	21.92	8.52	85.00	21.92	8.52
Zero Observed (ppm or % vol)	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Low Level Observed (ppm or % vol)	na	na	na	na	na	na	na	na
Mid Level Observed (ppm or % vol)	147.30	49.21	45.42	12.12	8.30	49.40	12.17	8.32
High Level Observed (ppm or % vol)	255.25	85.19	82.10	21.95	14.36	85.54	21.95	14.43
% Difference From Zero to Target	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0
% Difference From Low to Target	na	na	na	na	na	na	na	na
% Difference From Mid to Target	0.0	-0.2	-0.2	-0.2	-42.5	0.0	0.0	-42.3
% Difference From High to Target	0.9	0.2	1.5	0.1	40.5	0.6	0.1	41.0
EPA Allowable % Difference from Target	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span	±2% Span
U4-RA-5	**NO_X-B**	**SO2-A**	**CO-A**	**O_2-A**	**CO_2-A**	**SO2-B**	**O_2-B**	**CO_2-B**
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	-0.19	0.00	0.00	0.06	1.28	0.14	0.04
Calibration Gas (ppmv)	144.70	47.51	45.52	12.03	8.56	48.68	12.04	8.22
Final Bias Reading								
Zero Gas (ppmv)	0.00	0.00	0.00	0.00	0.00	1.46	0.13	0.04
Calibration Gas (ppmv)	144.77	47.60	45.52	12.00	8.28	48.73	12.07	8.22
Initial Bias Calculation								
Zero Bias ≤5%	0.0	-0.2	0.0	0.0	0.4	1.6	0.6	0.3
Calibration Bias ≤5%	-1.0	-1.7	0.1	-0.4	1.8	-0.8	-0.6	-0.7
Final Bias Calculation								
Zero Bias ≤5%	0.0	0.0	0.0	0.0	0.0	1.8	0.6	0.3
Calibration Bias ≤5%	-1.0	-1.6	0.1	-0.5	-0.1	-0.8	-0.5	-0.7
Drift Calculation								
Zero Drift ≤3%	0.0	-0.2	0.0	0.0	0.4	-0.2	0.0	0.0
Calibration Drift ≤3%	0.0	-0.1	0.0	0.1	1.9	-0.1	-0.1	0.0
Run Results								
Raw Results (ppmv or % vol)	83.31	3.56	16.85	9.89	9.54	65.23	9.48	9.87
Corrected Results (ppmv or % vol)	84.79	3.79	16.84	10.02	9.66	66.62	9.54	10.24

Rerange CO

inlet SO2 went over range on Run 5
(Bad Run for Inlet Only)

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

U4-RA-6	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	0.00	0.00	0.00	0.00	1.46	0.13	0.04
Calibration Gas (ppmv)	144.77	47.60	45.52	12.00	8.28	48.73	12.07	8.22
Final Bias Reading								
Zero Gas (ppmv)	0.00	-0.19	0.10	0.00	0.00	1.46	0.09	0.05
Calibration Gas (ppmv)	146.46	47.51	45.52	12.00	8.28	48.96	12.07	8.21
Initial Bias Calculation								
Zero Bias ≤5%	0.0	0.0	0.0	0.0	0.0	1.8	0.6	0.3
Calibration Bias ≤5%	-1.0	-1.6	0.1	-0.5	-0.1	-0.8	-0.5	-0.7
Final Bias Calculation								
Zero Bias ≤5%	0.0	-0.2	0.1	0.0	0.0	1.8	0.4	0.3
Calibration Bias ≤5%	-0.3	-1.7	0.1	-0.5	-0.1	-0.5	-0.5	-0.8
Drift Calculation								
Zero Drift ≤3%	0.0	0.2	-0.1	0.0	0.0	0.0	0.2	-0.1
Calibration Drift ≤3%	-0.7	0.1	0.0	0.0	0.0	-0.3	0.0	0.1
Run Results								
Raw Results (ppmv or % vol)	86.53	-0.11	14.07	9.98	9.41	33.41	9.63	9.71
Corrected Results (ppmv or % vol)	87.53	-0.02	14.03	10.12	9.68	33.30	9.69	10.08

U4-RA-7	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	-0.19	0.10	0.00	0.00	1.46	0.09	0.05
Calibration Gas (ppmv)	146.46	47.51	45.52	12.00	8.28	48.96	12.07	8.21
Final Bias Reading								
Zero Gas (ppmv)	0.00	-0.19	0.00	0.00	0.00	1.49	0.09	0.07
Calibration Gas (ppmv)	145.90	47.51	45.52	12.00	8.28	48.96	12.07	8.22
Initial Bias Calculation								
Zero Bias ≤5%	0.0	-0.2	0.1	0.0	0.0	1.8	0.4	0.3
Calibration Bias ≤5%	-0.3	-1.7	0.1	-0.5	-0.1	-0.5	-0.5	-0.8
Final Bias Calculation								
Zero Bias ≤5%	0.0	-0.2	0.0	0.0	0.0	1.8	0.4	0.5
Calibration Bias ≤5%	-0.6	-1.7	0.1	-0.5	-0.1	-0.5	-0.5	-0.7
Drift Calculation								
Zero Drift ≤3%	0.0	0.0	0.1	0.0	0.0	0.0	0.0	-0.1
Calibration Drift ≤3%	0.2	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
Run Results								
Raw Results (ppmv or % vol)	79.00	-0.15	17.49	9.84	9.48	44.98	9.52	9.75
Corrected Results (ppmv or % vol)	79.61	0.04	17.45	9.98	9.75	45.24	9.58	10.12

Tested by TRC - Air Measurments, Gainesville Office

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

U4-RA-8		NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %		253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)		147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero		0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias		147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading									
Zero Gas (ppmv)		0.00	-0.19	0.00	0.00	0.00	1.49	0.09	0.07
Calibration Gas (ppmv)		145.90	47.51	45.52	12.00	8.28	48.96	12.07	8.22
Final Bias Reading									
Zero Gas (ppmv)		0.00	-0.19	0.00	0.00	0.06	1.44	0.08	0.06
Calibration Gas (ppmv)		146.18	47.51	45.42	11.97	8.48	48.88	12.05	8.22
Initial Bias Calculation									
Zero Bias	≤5%	0.0	-0.2	0.0	0.0	0.0	1.8	0.4	0.5
Calibration Bias	≤5%	-0.6	-1.7	0.1	-0.5	-0.1	-0.5	-0.5	-0.7
Final Bias Calculation									
Zero Bias	≤5%	0.0	-0.2	0.0	0.0	0.4	1.8	0.4	0.4
Calibration Bias	≤5%	-0.4	-1.7	0.0	-0.7	1.2	-0.6	-0.5	-0.7
Drift Calculation									
Zero Drift	≤3%	0.0	0.0	0.0	0.0	-0.4	0.1	0.0	0.1
Calibration Drift	≤3%	-0.1	0.0	0.1	0.1	-1.4	0.1	0.1	0.0
Run Results									
Raw Results (ppmv or % vol)		79.54	-0.41	18.37	9.78	9.63	33.90	9.45	9.83
Corrected Results (ppmv or % vol)		80.23	-0.23	18.38	9.93	9.80	33.75	9.52	10.20

U4-RA-9		NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %		253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)		147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero		0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias		147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading									
Zero Gas (ppmv)		0.00	-0.19	0.00	0.00	0.06	1.44	0.08	0.06
Calibration Gas (ppmv)		146.18	47.51	45.42	11.97	8.48	48.88	12.05	8.22
Final Bias Reading									
Zero Gas (ppmv)		0.00	-0.19	0.00	0.00	0.06	1.35	0.07	0.07
Calibration Gas (ppmv)		144.77	47.51	45.42	12.00	8.50	48.96	12.04	8.22
Initial Bias Calculation									
Zero Bias	≤5%	0.0	-0.2	0.0	0.0	0.4	1.8	0.4	0.4
Calibration Bias	≤5%	-0.4	-1.7	0.0	-0.7	1.2	-0.6	-0.5	-0.7
Final Bias Calculation									
Zero Bias	≤5%	0.0	-0.2	0.0	0.0	0.4	1.6	0.3	0.5
Calibration Bias	≤5%	-1.0	-1.7	0.0	-0.5	1.4	-0.5	-0.6	-0.7
Drift Calculation									
Zero Drift	≤3%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	-0.1
Calibration Drift	≤3%	0.6	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.0
Run Results									
Raw Results (ppmv or % vol)		77.70	-0.62	19.01	9.93	9.69	31.46	9.57	9.71
Corrected Results (ppmv or % vol)		78.67	-0.45	19.04	10.08	9.73	31.24	9.65	10.08

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

U4-RA-10	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	-0.19	0.00	0.00	0.06	1.35	0.07	0.07
Calibration Gas (ppmv)	144.77	47.51	45.42	12.00	8.50	48.96	12.04	8.22
Final Bias Reading								
Zero Gas (ppmv)	0.00	-0.28	-0.10	0.00	0.08	1.03	0.04	0.06
Calibration Gas (ppmv)	145.62	47.32	45.52	12.00	8.28	48.90	12.06	8.24
Initial Bias Calculation								
Zero Bias ≤5%	0.0	-0.2	0.0	0.0	0.4	1.6	0.3	0.5
Calibration Bias ≤5%	-1.0	-1.7	0.0	-0.5	1.4	-0.5	-0.6	-0.7
Final Bias Calculation								
Zero Bias ≤5%	0.0	-0.3	-0.1	0.0	0.6	1.3	0.2	0.4
Calibration Bias ≤5%	-0.7	-1.9	0.1	-0.5	-0.1	-0.6	-0.5	-0.6
Drift Calculation								
Zero Drift ≤3%	0.0	0.1	0.1	0.0	-0.1	0.4	0.1	0.1
Calibration Drift ≤3%	-0.3	0.2	-0.1	0.0	1.5	0.1	-0.1	-0.1
Run Results								
Raw Results (ppmv or % vol)	79.04	-0.67	17.65	9.63	9.94	41.97	9.26	9.96
Corrected Results (ppmv or % vol)	80.19	-0.45	17.69	9.77	10.11	42.18	9.34	10.33

U4-RA-11	NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %	253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)	147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero	0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias	147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading								
Zero Gas (ppmv)	0.00	-0.28	-0.10	0.00	0.08	1.03	0.04	0.06
Calibration Gas (ppmv)	145.62	47.32	45.52	12.00	8.28	48.90	12.06	8.24
Final Bias Reading								
Zero Gas (ppmv)	0.00	-0.76	0.00	0.00	0.00	0.97	0.04	0.06
Calibration Gas (ppmv)	146.74	47.03	45.52	12.00	8.28	48.86	12.04	8.22
Initial Bias Calculation								
Zero Bias ≤5%	0.0	-0.3	-0.1	0.0	0.6	1.3	0.2	0.4
Calibration Bias ≤5%	-0.7	-1.9	0.1	-0.5	-0.1	-0.6	-0.5	-0.6
Final Bias Calculation								
Zero Bias ≤5%	0.0	-0.9	0.0	0.0	0.0	1.2	0.2	0.4
Calibration Bias ≤5%	-0.2	-2.2	0.1	-0.5	-0.1	-0.6	-0.6	-0.7
Drift Calculation								
Zero Drift ≤3%	0.0	0.6	-0.1	0.0	0.6	0.1	0.0	0.0
Calibration Drift ≤3%	-0.4	0.3	0.0	0.0	0.0	0.0	0.1	0.1
Run Results								
Raw Results (ppmv or % vol)	82.41	-0.82	17.11	9.66	9.71	41.69	9.37	9.91
Corrected Results (ppmv or % vol)	83.04	-0.31	17.13	9.80	10.00	41.96	9.45	10.27

Quality Assurance Activities
Calibration Error, Bias, and Drift Checks

U4-RA-12		NO_X-B	SO2-A	CO-A	O_2-A	CO_2-A	SO2-B	O_2-B	CO_2-B
Gas Range (ppm), O2 & CO2 in %		253.0	85.0	81.4	21.92	14.4	85.0	21.92	14.4
Calibration Gas Certified Value (ppm or %)		147.30	49.38	45.50	12.17	8.52	49.38	12.17	8.52
Direct Cal Zero		0.00	0.00	0.00	0.00	0.00	-0.05	0.00	0.00
Direct Cal Bias		147.30	48.92	45.42	12.12	8.30	49.40	12.17	8.32
Initial Bias Reading									
Zero Gas (ppmv)		0.00	-0.76	0.00	0.00	0.00	0.97	0.04	0.06
Calibration Gas (ppmv)		146.74	47.03	45.52	12.00	8.28	48.86	12.04	8.22
Final Bias Reading									
Zero Gas (ppmv)									
Calibration Gas (ppmv)									
Initial Bias Calculation									
Zero Bias	≤5%	0.0	-0.9	0.0	0.0	0.0	1.2	0.2	0.4
Calibration Bias	≤5%	-0.2	-2.2	0.1	-0.5	-0.1	-0.6	-0.6	-0.7
Final Bias Calculation									
Zero Bias	≤5%	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Calibration Bias	≤5%	-58.2	-57.6	-55.8	-55.3	-57.5	-58.1	-55.5	-57.7
Drift Calculation									
Zero Drift	≤3%	0.0	-0.9	0.0	0.0	0.0	1.1	0.2	0.4
Calibration Drift	≤3%	58.0	55.3	55.9	54.7	57.4	57.5	54.9	57.0
Run Results									
Raw Results (ppmv or % vol)									
Corrected Results (ppmv or % vol)		0.00	0.79	0.00	0.00	0.00	-1.00	-0.04	-0.06

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-1	8/12/2009	8:55:01 AM	117.50	-0.19	19.30	9.80	9.66	35.60	10.00	9.43
Run U4-RA-1	8/12/2009	8:56:01 AM	116.27	-0.11	20.53	9.66	9.78	38.17	9.63	9.76
Run U4-RA-1	8/12/2009	8:57:01 AM	116.56	-0.11	20.07	9.89	9.58	35.63	10.24	9.22
Run U4-RA-1	8/12/2009	8:58:01 AM	114.51	-0.09	21.35	10.17	9.33	34.05	10.20	9.30
Run U4-RA-1	8/12/2009	8:59:01 AM	113.86	-0.09	22.86	10.10	9.39	34.96	10.11	9.36
Run U4-RA-1	8/12/2009	9:00:01 AM	114.19	-0.09	23.06	10.03	9.45	35.33	9.99	9.48
Run U4-RA-1	8/12/2009	9:01:01 AM	114.00	-0.10	23.08	10.03	9.46	34.82	10.08	9.38
Run U4-RA-1	8/12/2009	9:02:01 AM	112.86	-0.10	23.99	10.14	9.36	34.24	10.05	9.44
Run U4-RA-1	8/12/2009	9:03:01 AM	111.55	-0.11	25.04	10.02	9.46	34.93	9.95	9.52
Run U4-RA-1	8/12/2009	9:04:01 AM	110.92	-0.11	24.90	9.93	9.53	35.52	9.90	9.56
Run U4-RA-1	8/12/2009	9:05:01 AM	110.42	-0.12	24.77	9.90	9.56	35.82	9.89	9.56
Run U4-RA-1	8/12/2009	9:06:01 AM	109.82	-0.12	24.75	9.89	9.57	35.96	9.83	9.63
Run U4-RA-1	8/12/2009	9:07:01 AM	110.65	-0.12	24.52	9.81	9.63	36.35	9.75	9.70
Run U4-RA-1	8/12/2009	9:08:01 AM	112.85	-0.13	23.89	9.78	9.66	36.53	9.73	9.71
Run U4-RA-1	8/12/2009	9:09:01 AM	114.50	-0.13	23.42	9.75	9.69	36.79	9.64	9.81
Run U4-RA-1	8/12/2009	9:10:01 AM	115.81	-0.14	23.10	9.66	9.77	37.38	9.58	9.85
Run U4-RA-1	8/12/2009	9:11:01 AM	116.32	-0.14	22.50	9.65	9.78	37.54	9.59	9.84
Run U4-RA-1	8/12/2009	9:12:01 AM	116.50	-0.14	22.08	9.65	9.78	37.68	9.61	9.82
Run U4-RA-1	8/12/2009	9:13:01 AM	116.43	-0.15	21.70	9.69	9.74	37.63	9.64	9.80
Run U4-RA-1	8/12/2009	9:14:01 AM	115.99	-0.15	21.48	9.73	9.71	37.57	9.68	9.76
Run U4-RA-1	8/12/2009	9:15:01 AM	115.35	-0.15	21.45	9.76	9.68	37.62	9.68	9.76
Run U4-RA-1	8/12/2009	9:16:01 AM	115.08	-0.15	21.46	9.78	9.67	37.71	9.68	9.76
Run U4-RA-1	8/12/2009	9:17:01 AM	115.02	-0.15	21.44	9.77	9.67	38.07	9.63	9.80
Run U4-RA-1	8/12/2009	9:18:01 AM	114.95	-0.15	21.21	9.76	9.68	38.36	9.65	9.78
END Run U4-RA-1	8/12/2009	9:19:01 AM	**114.48**	**-0.15**	**20.90**	**9.79**	**9.65**	**38.41**	**9.67**	**9.76**
START Run U4-RA-2	8/12/2009	9:45:03 AM	81.52	-0.28	20.50	9.00	10.40	55.71	9.34	9.99
Run U4-RA-2	8/12/2009	9:46:03 AM	85.84	-0.31	18.00	9.41	10.05	52.98	9.98	9.47
Run U4-RA-2	8/12/2009	9:47:03 AM	80.72	-0.31	17.62	9.77	9.73	51.32	9.81	9.70
Run U4-RA-2	8/12/2009	9:48:03 AM	78.13	-0.31	19.66	9.84	9.67	51.36	9.71	9.82
Run U4-RA-2	8/12/2009	9:49:03 AM	77.61	-0.31	20.35	9.82	9.69	51.18	9.76	9.76
Run U4-RA-2	8/12/2009	9:50:03 AM	75.72	-0.31	20.45	9.91	9.61	50.21	9.82	9.71
Run U4-RA-2	8/12/2009	9:51:03 AM	73.38	-0.29	20.94	9.99	9.54	49.23	9.79	9.75
Run U4-RA-2	8/12/2009	9:52:03 AM	73.15	-0.27	21.55	9.99	9.55	48.48	9.83	9.69
Run U4-RA-2	8/12/2009	9:53:03 AM	73.11	-0.25	21.93	10.07	9.48	47.31	9.91	9.64
Run U4-RA-2	8/12/2009	9:54:03 AM	73.25	-0.24	22.61	10.09	9.47	47.28	9.91	9.65
Run U4-RA-2	8/12/2009	9:55:03 AM	74.05	-0.22	22.73	10.04	9.51	47.57	9.67	9.90
Run U4-RA-2	8/12/2009	9:56:03 AM	75.76	-0.22	22.29	9.85	9.68	47.91	9.51	10.01
Run U4-RA-2	8/12/2009	9:57:03 AM	77.57	-0.21	21.45	9.84	9.69	46.65	9.60	9.94
Run U4-RA-2	8/12/2009	9:58:03 AM	77.67	-0.21	21.01	9.89	9.64	45.44	9.64	9.90
Run U4-RA-2	8/12/2009	9:59:03 AM	77.21	-0.22	21.08	9.96	9.58	44.60	9.73	9.81
Run U4-RA-2	8/12/2009	10:00:03 AM	76.31	-0.22	21.45	10.04	9.51	43.78	9.79	9.77
Run U4-RA-2	8/12/2009	10:01:03 AM	76.08	-0.23	22.01	10.03	9.52	43.70	9.69	9.88
Run U4-RA-2	8/12/2009	10:02:03 AM	76.66	-0.25	22.02	9.98	9.57	43.94	9.67	9.89
Run U4-RA-2	8/12/2009	10:03:03 AM	76.62	-0.25	21.88	9.96	9.58	44.12	9.65	9.91
Run U4-RA-2	8/12/2009	10:04:03 AM	76.31	-0.26	21.95	9.95	9.60	44.31	9.66	9.89
Run U4-RA-2	8/12/2009	10:05:03 AM	75.56	-0.28	22.01	9.99	9.56	44.12	9.69	9.85
Run U4-RA-2	8/12/2009	10:06:03 AM	74.70	-0.28	22.38	10.04	9.52	43.93	9.75	9.81
Run U4-RA-2	8/12/2009	10:07:03 AM	74.00	-0.29	23.08	10.09	9.48	43.53	9.78	9.78
Run U4-RA-2	8/12/2009	10:08:03 AM	73.95	-0.30	23.97	10.10	9.46	43.54	9.76	9.80

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
END Run U4-RA-2	8/12/2009	10:09:03 AM	**74.06**	**-0.31**	**24.31**	**10.10**	**9.46**	**43.49**	**9.78**	**9.78**

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-3	8/12/2009	10:36:01 AM	81.52	-0.47	21.90	10.25	9.24	49.34	9.95	9.74
Run U4-RA-3	8/12/2009	10:37:01 AM	82.56	-0.51	21.50	10.07	9.38	52.94	9.29	10.11
Run U4-RA-3	8/12/2009	10:38:01 AM	85.51	-0.50	22.15	10.18	9.31	48.96	9.89	9.61
Run U4-RA-3	8/12/2009	10:39:01 AM	85.47	-0.49	23.58	10.21	9.28	46.85	9.83	9.64
Run U4-RA-3	8/12/2009	10:40:01 AM	84.69	-0.48	24.13	10.31	9.20	45.19	9.95	9.56
Run U4-RA-3	8/12/2009	10:41:01 AM	83.68	-0.48	24.50	10.31	9.21	43.99	9.98	9.52
Run U4-RA-3	8/12/2009	10:42:01 AM	82.53	-0.48	24.29	10.35	9.19	42.68	10.00	9.53
Run U4-RA-3	8/12/2009	10:43:01 AM	81.97	-0.48	24.23	10.22	9.30	43.04	9.79	9.73
Run U4-RA-3	8/12/2009	10:44:01 AM	83.35	-0.47	23.56	10.16	9.36	42.38	9.91	9.60
Run U4-RA-3	8/12/2009	10:45:01 AM	82.68	-0.47	23.09	10.21	9.32	41.83	9.89	9.63
Run U4-RA-3	8/12/2009	10:46:01 AM	82.77	-0.47	23.10	10.22	9.32	41.14	9.94	9.59
Run U4-RA-3	8/12/2009	10:47:01 AM	83.05	-0.47	23.25	10.21	9.33	40.89	9.91	9.62
Run U4-RA-3	8/12/2009	10:48:01 AM	83.24	-0.48	23.27	10.20	9.34	40.77	9.90	9.63
Run U4-RA-3	8/12/2009	10:49:01 AM	83.10	-0.49	23.55	10.19	9.35	40.70	9.89	9.65
Run U4-RA-3	8/12/2009	10:50:01 AM	82.78	-0.49	23.62	10.16	9.38	40.98	9.84	9.68
Run U4-RA-3	8/12/2009	10:51:01 AM	82.52	-0.51	23.47	10.14	9.40	41.26	9.82	9.70
Run U4-RA-3	8/12/2009	10:52:01 AM	82.06	-0.51	23.39	10.13	9.41	41.69	9.81	9.70
Run U4-RA-3	8/12/2009	10:53:01 AM	81.56	-0.52	23.20	10.15	9.39	41.79	9.83	9.68
Run U4-RA-3	8/12/2009	10:54:01 AM	81.07	-0.53	23.09	10.16	9.38	41.98	9.83	9.68
Run U4-RA-3	8/12/2009	10:55:01 AM	80.95	-0.53	22.98	10.15	9.39	42.49	9.79	9.71
Run U4-RA-3	8/12/2009	10:56:01 AM	81.10	-0.54	22.69	10.15	9.39	42.56	9.83	9.67
Run U4-RA-3	8/12/2009	10:57:01 AM	80.78	-0.55	22.57	10.18	9.36	42.28	9.83	9.66
Run U4-RA-3	8/12/2009	10:58:01 AM	80.98	-0.55	22.66	10.14	9.39	42.74	9.73	9.75
Run U4-RA-3	8/12/2009	10:59:01 AM	81.64	-0.55	22.46	10.09	9.43	43.03	9.73	9.74
END Run U4-RA-3	8/12/2009	11:00:00 AM	**81.89**	**-0.56**	**22.17**	**10.12**	**9.41**	**42.87**	**9.75**	**9.72**
Run U4-RA-4	8/12/2009	1:08:00 PM	98.95	0.47	21.95	8.60	10.90	39.99	9.55	9.71
START Run U4-RA-4	8/12/2009	1:08:01 PM	98.95	0.47	21.95	8.60	10.90	39.85	9.56	9.69
Run U4-RA-4	8/12/2009	1:09:01 PM	100.51	0.33	18.24	9.32	10.29	34.88	9.57	9.91
Run U4-RA-4	8/12/2009	1:10:01 PM	98.20	0.23	19.51	9.51	10.14	34.23	9.58	9.80
Run U4-RA-4	8/12/2009	1:11:01 PM	95.97	0.16	20.42	9.66	10.02	33.52	9.60	9.77
Run U4-RA-4	8/12/2009	1:12:01 PM	93.95	0.12	22.39	9.83	9.88	31.61	9.81	9.60
Run U4-RA-4	8/12/2009	1:13:01 PM	91.97	0.10	24.47	9.85	9.87	31.91	9.57	9.86
Run U4-RA-4	8/12/2009	1:14:01 PM	92.23	0.07	25.00	9.67	10.02	32.67	9.56	9.83
Run U4-RA-4	8/12/2009	1:15:01 PM	91.40	0.06	24.20	9.69	10.01	32.37	9.64	9.77
Run U4-RA-4	8/12/2009	1:16:01 PM	90.05	0.06	24.12	9.69	10.01	32.10	9.58	9.82
Run U4-RA-4	8/12/2009	1:17:01 PM	89.77	0.05	23.90	9.70	10.00	31.68	9.62	9.78
Run U4-RA-4	8/12/2009	1:18:01 PM	88.97	0.05	23.49	9.75	9.96	31.27	9.68	9.72
Run U4-RA-4	8/12/2009	1:19:01 PM	87.90	0.05	23.75	9.81	9.91	30.77	9.74	9.67
Run U4-RA-4	8/12/2009	1:20:01 PM	86.56	0.05	24.37	9.86	9.87	30.45	9.75	9.66
Run U4-RA-4	8/12/2009	1:21:01 PM	85.98	0.05	24.74	9.88	9.85	30.19	9.76	9.66
Run U4-RA-4	8/12/2009	1:22:01 PM	85.60	0.05	24.92	9.89	9.84	30.10	9.73	9.68
Run U4-RA-4	8/12/2009	1:23:01 PM	85.20	0.04	24.99	9.90	9.84	29.87	9.75	9.65
Run U4-RA-4	8/12/2009	1:24:01 PM	84.50	0.04	25.04	9.92	9.82	29.69	9.74	9.66
Run U4-RA-4	8/12/2009	1:25:01 PM	84.17	0.04	25.16	9.91	9.83	29.66	9.72	9.69
Run U4-RA-4	8/12/2009	1:26:01 PM	84.07	0.04	25.10	9.89	9.84	29.87	9.67	9.73
Run U4-RA-4	8/12/2009	1:27:01 PM	83.76	0.03	24.99	9.87	9.86	30.00	9.66	9.73
Run U4-RA-4	8/12/2009	1:28:01 PM	83.48	0.03	25.12	9.86	9.86	30.26	9.62	9.77
Run U4-RA-4	8/12/2009	1:29:00 PM	83.75	0.03	25.42	9.84	9.88	30.55	9.63	9.76
Run U4-RA-4	8/12/2009	1:30:00 PM	83.81	0.02	25.77	9.85	9.86	30.86	9.62	9.76

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
Run U4-RA-4	8/12/2009	1:31:00 PM	83.98	0.02	26.25	9.86	9.85	30.97	9.64	9.75
END Run U4-RA-4	8/12/2009	1:32:00 PM	**83.82**	**0.01**	**26.82**	**9.87**	**9.84**	**31.08**	**9.62**	**9.76**

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-5	8/12/2009	2:48:01 PM	116.66	0.00	13.87	9.33	10.06	50.44	8.52	11.00
Run U4-RA-5	8/12/2009	2:49:01 PM	113.52	0.00	14.03	9.27	10.12	59.12	8.80	10.60
Run U4-RA-5	8/12/2009	2:50:01 PM	111.92	0.04	14.29	9.23	10.16	71.61	8.86	10.48
Run U4-RA-5	8/12/2009	2:51:01 PM	108.74	0.14	14.46	9.38	10.03	78.94	8.92	10.44
Run U4-RA-5	8/12/2009	2:52:01 PM	106.12	0.38	15.63	9.44	9.98	83.03	9.12	10.22
Run U4-RA-5	8/12/2009	2:53:01 PM	102.66	0.77	16.16	9.64	9.79	85.48	9.40	9.97
Run U4-RA-5	8/12/2009	2:54:01 PM	98.80	1.55	17.08	9.82	9.63	87.12	9.50	9.90
Run U4-RA-5	8/12/2009	2:55:01 PM	96.75	2.88	17.93	9.86	9.59	88.29	9.47	9.91
Run U4-RA-5	8/12/2009	2:56:01 PM	95.77	4.45	18.18	9.87	9.57	89.17	9.47	9.90
Run U4-RA-5	8/12/2009	2:57:01 PM	94.89	5.41	18.32	9.90	9.54	89.83	9.50	9.89
Run U4-RA-5	8/12/2009	2:58:01 PM	94.37	5.80	18.66	9.86	9.58	89.74	9.41	9.97
Run U4-RA-5	8/12/2009	2:59:01 PM	94.82	5.86	18.54	9.85	9.59	87.35	9.46	9.92
Run U4-RA-5	8/12/2009	3:00:01 PM	93.92	5.73	18.38	9.87	9.57	85.33	9.46	9.92
Run U4-RA-5	8/12/2009	3:01:01 PM	93.23	5.53	18.34	9.87	9.58	83.16	9.44	9.93
Run U4-RA-5	8/12/2009	3:02:01 PM	92.24	5.32	18.25	9.89	9.56	80.87	9.47	9.90
Run U4-RA-5	8/12/2009	3:03:01 PM	90.99	5.10	18.20	9.91	9.53	78.62	9.49	9.88
Run U4-RA-5	8/12/2009	3:04:01 PM	90.03	4.89	18.11	9.92	9.52	76.76	9.46	9.91
Run U4-RA-5	8/12/2009	3:05:01 PM	89.00	4.69	17.93	9.89	9.55	75.39	9.44	9.91
Run U4-RA-5	8/12/2009	3:06:01 PM	87.40	4.50	17.66	9.90	9.54	73.76	9.45	9.90
Run U4-RA-5	8/12/2009	3:07:01 PM	85.93	4.32	17.59	9.89	9.54	72.33	9.43	9.92
Run U4-RA-5	8/12/2009	3:08:01 PM	85.01	4.15	17.50	9.89	9.54	70.61	9.46	9.88
Run U4-RA-5	8/12/2009	3:09:01 PM	84.04	3.99	17.37	9.90	9.53	68.97	9.46	9.89
Run U4-RA-5	8/12/2009	3:10:01 PM	83.71	3.84	17.25	9.89	9.54	67.52	9.46	9.89
Run U4-RA-5	8/12/2009	3:11:01 PM	83.54	3.69	17.05	9.89	9.54	66.30	9.48	9.87
End Run U4-RA-5	8/12/2009	3:12:01 PM	**83.31**	**3.56**	**16.85**	**9.89**	**9.54**	**65.23**	**9.48**	**9.87**
START Run U4-RA-6	8/12/2009	3:38:01 PM	77.87	0.00	17.18	10.35	9.12	29.55	10.54	9.02
Run U4-RA-6	8/12/2009	3:39:01 PM	76.57	-0.06	17.74	10.51	8.98	28.19	9.78	9.68
Run U4-RA-6	8/12/2009	3:40:01 PM	78.50	-0.09	18.93	10.41	9.08	27.79	9.97	9.48
Run U4-RA-6	8/12/2009	3:41:01 PM	77.19	-0.09	18.75	10.41	9.07	27.95	10.01	9.41
Run U4-RA-6	8/12/2009	3:42:01 PM	75.56	-0.09	18.52	10.48	9.01	27.64	10.08	9.39
Run U4-RA-6	8/12/2009	3:43:01 PM	73.88	-0.10	19.12	10.42	9.06	27.85	9.99	9.44
Run U4-RA-6	8/12/2009	3:44:01 PM	73.56	-0.11	19.16	10.36	9.12	28.25	9.87	9.54
Run U4-RA-6	8/12/2009	3:45:01 PM	74.63	-0.10	18.70	10.30	9.17	28.60	9.84	9.57
Run U4-RA-6	8/12/2009	3:46:01 PM	75.91	-0.10	18.17	10.26	9.20	29.37	9.77	9.62
Run U4-RA-6	8/12/2009	3:47:01 PM	78.52	-0.10	17.71	10.21	9.24	30.22	9.74	9.66
Run U4-RA-6	8/12/2009	3:48:01 PM	80.40	-0.10	17.21	10.17	9.27	30.78	9.71	9.67
Run U4-RA-6	8/12/2009	3:49:01 PM	82.18	-0.10	16.80	10.15	9.29	31.04	9.72	9.67
Run U4-RA-6	8/12/2009	3:50:01 PM	84.26	-0.10	16.40	10.10	9.33	31.42	9.66	9.70
Run U4-RA-6	8/12/2009	3:51:01 PM	85.59	-0.10	15.89	10.07	9.36	31.86	9.68	9.68
Run U4-RA-6	8/12/2009	3:52:01 PM	85.95	-0.10	15.48	10.06	9.36	32.20	9.66	9.70
Run U4-RA-6	8/12/2009	3:53:01 PM	87.01	-0.10	15.31	10.01	9.40	32.62	9.62	9.73
Run U4-RA-6	8/12/2009	3:54:01 PM	88.01	-0.10	14.97	10.00	9.41	32.92	9.62	9.74
Run U4-RA-6	8/12/2009	3:55:01 PM	87.83	-0.10	14.73	9.98	9.43	33.16	9.58	9.76
Run U4-RA-6	8/12/2009	3:56:01 PM	88.03	-0.10	14.52	9.96	9.44	33.19	9.60	9.75
Run U4-RA-6	8/12/2009	3:57:01 PM	87.80	-0.10	14.29	9.96	9.43	33.25	9.62	9.73
Run U4-RA-6	8/12/2009	3:58:01 PM	87.71	-0.10	14.18	9.97	9.43	33.28	9.62	9.72
Run U4-RA-6	8/12/2009	3:59:01 PM	87.68	-0.11	14.08	9.97	9.42	33.41	9.61	9.73
Run U4-RA-6	8/12/2009	4:00:01 PM	87.61	-0.11	14.00	9.96	9.43	33.47	9.63	9.71
Run U4-RA-6	8/12/2009	4:01:01 PM	86.96	-0.11	14.00	9.98	9.41	33.40	9.63	9.71

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
END Run U4-RA-6	8/12/2009	4:02:01 PM	**86.53**	**-0.11**	**14.07**	**9.98**	**9.41**	**33.41**	**9.63**	**9.71**

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-7	8/12/2009	4:22:01 PM	88.55	0.00	15.68	9.33	9.88	36.24	10.32	8.81
Run U4-RA-7	8/12/2009	4:23:01 PM	80.66	-0.04	13.69	10.01	9.30	33.96	10.54	8.79
Run U4-RA-7	8/12/2009	4:24:01 PM	70.27	-0.06	15.61	10.46	8.90	32.01	10.70	8.69
Run U4-RA-7	8/12/2009	4:25:01 PM	65.83	-0.07	18.74	10.66	8.72	32.20	10.76	8.63
Run U4-RA-7	8/12/2009	4:26:01 PM	63.05	-0.08	21.05	10.78	8.60	32.77	10.64	8.75
Run U4-RA-7	8/12/2009	4:27:01 PM	63.44	-0.10	22.11	10.65	8.71	34.05	10.44	8.90
Run U4-RA-7	8/12/2009	4:28:01 PM	65.71	-0.11	21.34	10.51	8.83	35.40	10.25	9.08
Run U4-RA-7	8/12/2009	4:29:01 PM	67.99	-0.11	20.41	10.32	8.99	37.22	10.08	9.21
Run U4-RA-7	8/12/2009	4:30:01 PM	70.24	-0.12	19.50	10.21	9.09	39.02	10.03	9.24
Run U4-RA-7	8/12/2009	4:31:01 PM	72.28	-0.12	18.87	10.20	9.10	40.44	10.04	9.24
Run U4-RA-7	8/12/2009	4:32:01 PM	73.26	-0.13	18.81	10.18	9.12	41.88	9.96	9.31
Run U4-RA-7	8/12/2009	4:33:01 PM	74.58	-0.13	18.85	10.11	9.18	43.50	9.90	9.36
Run U4-RA-7	8/12/2009	4:34:01 PM	75.37	-0.13	18.60	10.06	9.23	44.67	9.83	9.43
Run U4-RA-7	8/12/2009	4:35:01 PM	76.02	-0.13	18.38	10.01	9.27	45.35	9.79	9.46
Run U4-RA-7	8/12/2009	4:36:01 PM	76.50	-0.12	18.20	9.98	9.31	45.76	9.75	9.49
Run U4-RA-7	8/12/2009	4:37:01 PM	77.36	-0.12	18.07	9.96	9.32	46.05	9.71	9.54
Run U4-RA-7	8/12/2009	4:38:01 PM	78.24	-0.12	18.05	9.92	9.36	46.44	9.66	9.58
Run U4-RA-7	8/12/2009	4:39:01 PM	78.74	-0.12	17.89	9.92	9.37	46.30	9.68	9.57
Run U4-RA-7	8/12/2009	4:40:01 PM	78.63	-0.12	17.82	9.93	9.37	46.29	9.62	9.63
Run U4-RA-7	8/12/2009	4:41:01 PM	78.84	-0.12	17.85	9.89	9.40	46.18	9.58	9.67
Run U4-RA-7	8/12/2009	4:42:01 PM	78.99	-0.12	17.83	9.87	9.42	45.93	9.57	9.69
Run U4-RA-7	8/12/2009	4:43:01 PM	78.83	-0.13	17.75	9.86	9.44	45.68	9.56	9.70
Run U4-RA-7	8/12/2009	4:44:01 PM	78.78	-0.13	17.67	9.86	9.45	45.41	9.56	9.70
Run U4-RA-7	8/12/2009	4:45:01 PM	78.70	-0.14	17.59	9.86	9.46	45.04	9.54	9.72
END Run U4-RA-7	8/12/2009	4:46:01 PM	**79.00**	**-0.15**	**17.49**	**9.84**	**9.48**	**44.98**	**9.52**	**9.75**
START Run U4-RA-8	8/12/2009	5:03:01 PM	90.52	0.09	14.67	9.05	10.18	40.65	9.23	9.94
Run U4-RA-8	8/12/2009	5:04:01 PM	85.15	-0.01	13.52	9.40	9.88	40.37	9.08	10.17
Run U4-RA-8	8/12/2009	5:05:01 PM	83.37	-0.08	14.24	9.42	9.86	40.87	9.20	10.04
Run U4-RA-8	8/12/2009	5:06:01 PM	82.65	-0.15	15.16	9.48	9.80	41.74	9.18	10.08
Run U4-RA-8	8/12/2009	5:07:01 PM	82.08	-0.20	15.62	9.47	9.81	41.84	9.22	10.02
Run U4-RA-8	8/12/2009	5:08:01 PM	81.63	-0.23	15.48	9.54	9.75	40.50	9.30	9.93
Run U4-RA-8	8/12/2009	5:09:01 PM	80.04	-0.25	15.39	9.62	9.68	39.63	9.36	9.87
Run U4-RA-8	8/12/2009	5:10:01 PM	78.73	-0.27	15.66	9.68	9.64	39.16	9.34	9.90
Run U4-RA-8	8/12/2009	5:11:01 PM	78.34	-0.29	16.10	9.69	9.63	38.99	9.38	9.86
Run U4-RA-8	8/12/2009	5:12:01 PM	78.02	-0.31	16.39	9.73	9.60	38.70	9.32	9.93
Run U4-RA-8	8/12/2009	5:13:01 PM	79.32	-0.32	16.52	9.67	9.66	38.84	9.32	9.92
Run U4-RA-8	8/12/2009	5:14:01 PM	80.25	-0.33	16.18	9.70	9.63	38.44	9.36	9.90
Run U4-RA-8	8/12/2009	5:15:01 PM	80.97	-0.34	16.16	9.72	9.62	37.97	9.40	9.85
Run U4-RA-8	8/12/2009	5:16:01 PM	81.25	-0.35	16.36	9.74	9.60	37.52	9.42	9.84
Run U4-RA-8	8/12/2009	5:17:01 PM	81.48	-0.36	16.73	9.79	9.57	36.82	9.46	9.81
Run U4-RA-8	8/12/2009	5:18:01 PM	81.70	-0.36	17.28	9.77	9.58	36.51	9.43	9.84
Run U4-RA-8	8/12/2009	5:19:01 PM	82.08	-0.37	17.34	9.74	9.61	36.35	9.38	9.88
Run U4-RA-8	8/12/2009	5:20:01 PM	82.22	-0.37	17.28	9.74	9.61	35.94	9.42	9.85
Run U4-RA-8	8/12/2009	5:21:01 PM	81.55	-0.38	17.35	9.75	9.61	35.66	9.40	9.86
Run U4-RA-8	8/12/2009	5:22:01 PM	81.41	-0.38	17.41	9.77	9.60	35.17	9.47	9.80
Run U4-RA-8	8/12/2009	5:23:01 PM	80.48	-0.39	17.59	9.82	9.55	34.61	9.53	9.75
Run U4-RA-8	8/12/2009	5:24:01 PM	79.48	-0.40	18.08	9.84	9.54	34.33	9.48	9.80
Run U4-RA-8	8/12/2009	5:25:01 PM	79.37	-0.40	18.39	9.80	9.59	34.21	9.48	9.79
Run U4-RA-8	8/12/2009	5:26:01 PM	79.33	-0.41	18.39	9.80	9.60	33.96	9.45	9.83

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
END Run U4-RA-8	8/12/2009	5:27:00 PM	**79.54**	**-0.41**	**18.37**	**9.77**	**9.63**	**33.91**	**9.45**	**9.83**

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-9	8/12/2009	5:46:01 PM	88.83	0.00	15.48	9.70	9.86	36.79	9.64	9.50
Run U4-RA-9	8/12/2009	5:47:01 PM	86.87	-0.04	15.87	9.81	9.79	35.24	9.45	9.84
Run U4-RA-9	8/12/2009	5:48:01 PM	86.43	-0.11	16.68	9.79	9.81	34.59	9.63	9.65
Run U4-RA-9	8/12/2009	5:49:01 PM	83.30	-0.22	17.49	9.83	9.79	34.11	9.47	9.83
Run U4-RA-9	8/12/2009	5:50:01 PM	84.08	-0.29	17.77	9.78	9.85	34.34	9.44	9.86
Run U4-RA-9	8/12/2009	5:51:01 PM	83.60	-0.34	17.65	9.68	9.93	35.15	9.20	10.08
Run U4-RA-9	8/12/2009	5:52:01 PM	83.82	-0.38	17.42	9.64	9.97	35.35	9.24	10.04
Run U4-RA-9	8/12/2009	5:53:01 PM	82.79	-0.41	17.20	9.69	9.93	35.04	9.30	9.98
Run U4-RA-9	8/12/2009	5:54:01 PM	81.49	-0.43	17.37	9.74	9.89	34.71	9.34	9.95
Run U4-RA-9	8/12/2009	5:55:01 PM	80.34	-0.44	17.69	9.74	9.89	34.50	9.36	9.93
Run U4-RA-9	8/12/2009	5:56:01 PM	78.84	-0.46	17.81	9.75	9.87	34.32	9.33	9.95
Run U4-RA-9	8/12/2009	5:57:01 PM	78.45	-0.47	17.94	9.75	9.88	33.98	9.35	9.95
Run U4-RA-9	8/12/2009	5:58:01 PM	78.50	-0.48	17.94	9.73	9.89	33.64	9.40	9.89
Run U4-RA-9	8/12/2009	5:59:01 PM	78.13	-0.50	17.81	9.78	9.85	33.24	9.42	9.88
Run U4-RA-9	8/12/2009	6:00:02 PM	77.94	-0.51	17.95	9.78	9.85	33.17	9.42	9.87
Run U4-RA-9	8/12/2009	6:01:02 PM	78.13	-0.52	17.99	9.77	9.85	33.08	9.40	9.87
Run U4-RA-9	8/12/2009	6:02:02 PM	78.42	-0.54	17.88	9.79	9.83	32.78	9.43	9.84
Run U4-RA-9	8/12/2009	6:03:02 PM	78.63	-0.55	17.82	9.81	9.81	32.50	9.48	9.80
Run U4-RA-9	8/12/2009	6:04:02 PM	78.26	-0.55	17.92	9.83	9.78	32.23	9.47	9.81
Run U4-RA-9	8/12/2009	6:05:02 PM	78.39	-0.57	18.08	9.82	9.79	32.16	9.46	9.81
Run U4-RA-9	8/12/2009	6:06:02 PM	78.53	-0.58	18.09	9.84	9.78	32.06	9.47	9.80
Run U4-RA-9	8/12/2009	6:07:02 PM	78.44	-0.59	18.28	9.84	9.78	31.98	9.47	9.79
Run U4-RA-9	8/12/2009	6:08:02 PM	78.35	-0.60	18.46	9.86	9.75	31.75	9.52	9.75
Run U4-RA-9	8/12/2009	6:09:02 PM	77.83	-0.61	18.76	9.90	9.72	31.58	9.55	9.72
END Run U4-RA-9	8/12/2009	6:10:02 PM	**77.70**	**-0.62**	**19.01**	**9.93**	**9.69**	**31.46**	**9.57**	**9.71**
START Run U4-RA-10	8/12/2009	6:28:01 PM	89.96	0.00	14.77	9.45	10.00	37.29	9.55	9.53
Run U4-RA-10	8/12/2009	6:29:01 PM	86.94	-0.12	15.51	9.52	9.98	36.85	9.25	9.93
Run U4-RA-10	8/12/2009	6:30:01 PM	85.02	-0.19	16.36	9.50	10.02	37.59	9.25	9.94
Run U4-RA-10	8/12/2009	6:31:01 PM	82.80	-0.28	16.56	9.54	9.99	38.17	9.32	9.89
Run U4-RA-10	8/12/2009	6:32:01 PM	81.24	-0.37	16.59	9.47	10.05	40.06	9.08	10.10
Run U4-RA-10	8/12/2009	6:33:01 PM	81.77	-0.44	16.31	9.46	10.06	40.37	9.17	10.02
Run U4-RA-10	8/12/2009	6:34:01 PM	81.39	-0.49	16.44	9.43	10.09	40.92	9.06	10.12
Run U4-RA-10	8/12/2009	6:35:01 PM	82.46	-0.52	16.15	9.43	10.08	41.33	9.08	10.10
Run U4-RA-10	8/12/2009	6:36:01 PM	81.91	-0.55	16.12	9.48	10.04	41.44	9.18	10.00
Run U4-RA-10	8/12/2009	6:37:01 PM	81.08	-0.57	16.57	9.54	9.99	41.53	9.17	10.01
Run U4-RA-10	8/12/2009	6:38:01 PM	81.46	-0.59	17.05	9.58	9.97	41.62	9.25	9.94
Run U4-RA-10	8/12/2009	6:39:01 PM	80.84	-0.60	17.42	9.63	9.92	41.86	9.27	9.93
Run U4-RA-10	8/12/2009	6:40:01 PM	80.39	-0.60	17.71	9.63	9.92	42.27	9.20	10.01
Run U4-RA-10	8/12/2009	6:41:01 PM	80.48	-0.60	17.75	9.57	9.98	42.63	9.18	10.01
Run U4-RA-10	8/12/2009	6:42:01 PM	80.12	-0.60	17.44	9.60	9.95	42.40	9.24	9.96
Run U4-RA-10	8/12/2009	6:43:01 PM	79.47	-0.60	17.55	9.63	9.92	42.21	9.27	9.94
Run U4-RA-10	8/12/2009	6:44:01 PM	79.10	-0.61	17.57	9.67	9.90	42.01	9.30	9.91
Run U4-RA-10	8/12/2009	6:45:01 PM	78.73	-0.62	17.59	9.67	9.89	42.02	9.30	9.92
Run U4-RA-10	8/12/2009	6:46:01 PM	78.46	-0.62	17.49	9.70	9.87	41.80	9.33	9.88
Run U4-RA-10	8/12/2009	6:47:01 PM	77.93	-0.63	17.60	9.72	9.86	41.62	9.32	9.90
Run U4-RA-10	8/12/2009	6:48:01 PM	77.96	-0.64	17.74	9.71	9.87	41.42	9.36	9.87
Run U4-RA-10	8/12/2009	6:49:01 PM	77.68	-0.65	17.74	9.73	9.85	41.12	9.38	9.85
Run U4-RA-10	8/12/2009	6:50:01 PM	77.68	-0.66	17.83	9.75	9.84	41.21	9.36	9.87
Run U4-RA-10	8/12/2009	6:51:01 PM	78.11	-0.67	17.85	9.69	9.89	41.75	9.27	9.96

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
END Run U4-RA-10	8/12/2009	6:52:01 PM	**79.04**	**-0.67**	**17.65**	**9.63**	**9.94**	**41.97**	**9.26**	**9.96**

Covanta Hillsborough, Unit 4, Logged Data Records

Run Number	Date	Time	AVE NOx-B (ppmv)	AVE SO2-A (ppmv)	AVE CO-A (ppmv)	AVE O2-A (% vol)	AVE CO2-A (% vol)	AVE SO2-B (ppmv)	AVE O2-B (% vol)	AVE CO2-B (% vol)
START Run U4-RA-11	8/12/2009	7:12:01 PM	73.93	-0.47	20.10	9.75	9.54	37.61	9.21	9.79
Run U4-RA-11	8/12/2009	7:13:01 PM	80.21	-0.55	18.02	9.79	9.52	40.25	9.47	9.68
Run U4-RA-11	8/12/2009	7:14:01 PM	79.52	-0.63	16.54	9.93	9.41	39.60	9.53	9.70
Run U4-RA-11	8/12/2009	7:15:01 PM	80.18	-0.68	17.63	9.88	9.46	39.97	9.41	9.80
Run U4-RA-11	8/12/2009	7:16:01 PM	80.17	-0.72	18.04	9.88	9.47	40.61	9.48	9.75
Run U4-RA-11	8/12/2009	7:17:01 PM	79.55	-0.75	18.53	9.90	9.46	41.04	9.50	9.73
Run U4-RA-11	8/12/2009	7:18:01 PM	79.66	-0.77	18.69	9.90	9.47	41.45	9.49	9.77
Run U4-RA-11	8/12/2009	7:19:01 PM	80.13	-0.77	18.90	9.81	9.55	41.97	9.45	9.80
Run U4-RA-11	8/12/2009	7:20:01 PM	80.23	-0.78	18.59	9.80	9.56	42.03	9.54	9.73
Run U4-RA-11	8/12/2009	7:21:01 PM	79.36	-0.80	18.71	9.84	9.53	41.94	9.60	9.68
Run U4-RA-11	8/12/2009	7:22:01 PM	79.00	-0.81	19.24	9.84	9.54	42.09	9.55	9.74
Run U4-RA-11	8/12/2009	7:23:01 PM	80.06	-0.82	19.32	9.78	9.60	42.52	9.48	9.81
Run U4-RA-11	8/12/2009	7:24:01 PM	80.92	-0.82	19.00	9.73	9.64	42.92	9.48	9.81
Run U4-RA-11	8/12/2009	7:25:01 PM	81.42	-0.82	18.71	9.71	9.66	43.10	9.47	9.82
Run U4-RA-11	8/12/2009	7:26:01 PM	81.82	-0.82	18.56	9.69	9.68	43.11	9.46	9.83
Run U4-RA-11	8/12/2009	7:27:01 PM	82.05	-0.81	18.36	9.69	9.68	42.89	9.46	9.83
Run U4-RA-11	8/12/2009	7:28:01 PM	82.32	-0.81	18.25	9.69	9.68	42.61	9.45	9.84
Run U4-RA-11	8/12/2009	7:29:01 PM	82.77	-0.80	18.17	9.68	9.69	42.43	9.43	9.86
Run U4-RA-11	8/12/2009	7:30:01 PM	83.16	-0.81	18.02	9.64	9.73	42.48	9.35	9.93
Run U4-RA-11	8/12/2009	7:31:01 PM	83.74	-0.81	17.71	9.61	9.75	42.31	9.37	9.91
Run U4-RA-11	8/12/2009	7:32:01 PM	83.66	-0.81	17.39	9.64	9.73	42.03	9.38	9.90
Run U4-RA-11	8/12/2009	7:33:01 PM	83.38	-0.81	17.23	9.64	9.72	41.90	9.40	9.88
Run U4-RA-11	8/12/2009	7:34:01 PM	83.06	-0.82	17.09	9.66	9.71	41.80	9.40	9.88
Run U4-RA-11	8/12/2009	7:35:01 PM	82.66	-0.82	17.08	9.67	9.70	41.71	9.39	9.90
END Run U4-RA-11	8/12/2009	7:36:01 PM	**82.41**	**-0.82**	**17.11**	**9.66**	**9.71**	**41.69**	**9.37**	**9.91**

Instrumental Analyses
Quality Assurance Data
SECI Midulla Generating Station - Unit CT4

Dates:	**August 11th, 2009**
Company:	**Covanta**
Facility:	**Hillsbourgho**
Source ID:	**Unit 4**
Location:	**Tampa FL.**
Technicians:	**EB, LJB, RPO, RAH**

System B NO_X Converter Efficiency Test

Criteria: *"At least 90% conversion efficiency" (EMC ALT-013)*

Test Date: 08/11/09 Technician: RAH

NO_2 / N_2 Balance	Results
Certified Value	52.4 ppmv
Observed Value	51.80 ppmv
Converter Temperature	624.0 °C
Observation Time	5 minutes
Converter Efficiency	98.9%

Instrumental Sample System Leak Checks

Date	Run Number	Vacuum (inches Hg)	Leak Rate (inches Hg/min)	Status (Pass/Fail)
System A - Unit 4				
08/12/09	pre U4 RA-1	24.0	0.2	Pass
08/12/09	post U$ RA-	24.0	0.2	Pass
System B - Unit 4				
08/12/09	pre U4 RA-1	24.0	0.8	Pass
08/12/09	post U$ RA-	24.0	0.8	Pass
Leak check criteria less than 1.0" Hg Vacuum/minute decline at start of greater than 15.0" Hg				

NOx Converter Efficiency Test
SECI Midulla Generating Station

Run Number	Date	Time	NOx-B	AVE NOx-B
			(ppmv)	(ppmv)
START NOx Converter, 52.4	8/11/2009	4:51:17 PM	49.75	49.75
NOx Converter, 52.4	8/11/2009	4:52:17 PM	51.06	50.41
NOx Converter, 52.4	8/11/2009	4:53:17 PM	51.56	50.79
NOx Converter, 52.4	8/11/2009	4:54:17 PM	52.05	51.10
NOx Converter, 52.4	8/11/2009	4:55:17 PM	53.19	51.52
END NOx Converter, 52.4	8/11/2009	4:56:16 PM	53.19	**51.80**

Quality Assurance Report
EPA Methods 7E, 6C, 10, and 3A: NO_X, SO2, CO, O_2 and CO_2 Response Time
Covanta Hillsborough Inc.

Date August 11th and 12th, 2008
Technician: LJB
Lab Unit #: Trailer 13

Test Instrumentation				
Analyzer	**Make**	**Model**	**Serial Number**	**Detection Method**
SO_2-B Analyzer	AMTEK	721M	96-721M-8427-364	UV Absorption Detector
O2-B Analyzer	Servomex	1440	01440C1ST0/2868	Paramagnetic Cell Detector
CO2-B Analyzer	Servomex	1440	01415C/1240	IR Absorption/Solid State Detector

HRSG Stack Test Conditions	
Sample Line Vacuum	12.0 " Hg
Sample Manifold Pressure	5 psig
Analyzer Flow Meter Setting	1.0 lpm
Gas Standard Pressure	16 psig
Sample System Configuration:	120 ft. Heat Trace + Condenser
	+ 100-ft Sample Line

Response Time Test Results					
Parameter	**SO_2-B**	**O_2-B**	**CO_2-B**		
Zero Gas Concentration	0.00	0.00	0.00		
Span Gas Concentration	49.38	12.17	8.52		
Analyzer Full Scale Range	85.00	21.92	14.43		
Upscale Reponse Time Testing					
Starting Value	0.48	0.27	0.01		
Final Average Response	47.73	12.10	8.08		
Calculated 95% Response	45.37	11.51	7.67		
Actual Response (≥95%)	45.68	12.08	7.93		
Upscale Response Time (sec)	80	60	40		
Downscale Reponse Time Testing					
Starting Value	47.82	12.11	8.08		
Final Response	0.13	0.32	0.02		
Calculated 95% Response	2.52	0.91	0.42		
Actual Response (≥95%)	2.51	0.54	0.11		
Downscale Response Time (sec)	80	40	40		
System A Maximum System Response Time (seconds)				**80**	**seconds**
System A Minmum Sampling Time Each Sample Point				**160**	**seconds**
System A Sample Time Selected For Each Sample Point				**420**	**seconds**

Testing conducted by TRC Environmental Corporation - Gainesville, Florida

Quality Assurance Report
EPA Methods 7E, 6C, 10, and 3A: NO_X, SO2, CO, O_2 and CO_2 Response Time
Covanta Hillsborough Inc.

Date August 11th and 12th, 2008
Technician: LJB
Lab Unit #: Trailer 13

System A Test Instrumentation (OUTLET)				
Analyzer	**Make**	**Model**	**Serial Number**	**Detection Method**
NO_X-B Analyzer	TECO	42C	42CHL-69796-364	Photodetection (of a chemi-luminescent reaction of nitric oxide and ozone
SO_2-A Analyzer	AMTEK	921W	VV-921W-8800-1	UV Absorption Detector
CO-A Analyzer	TECO	48	48-35635-250	IR Absorption/GFC Detector
O_2-A Analyzer	Servomex	1440	1420C/2647	Paramagnetic Cell Detector
CO_2-A Analyzer	Servomex	1440	01415/2537	IR Absorption/Solid State Detector

System A Stack Test Conditions	
Sample Line Vacuum	10 " Hg
Sample Manifold Pressure	5 psig
Analyzer Flow Meter Setting	1.0 lpm
Gas Standard Pressure	16 psig
Sample System Configuration:	120 ft. Heat Trace + Condenser

System A Response Time Test Results					
Parameter	**NO_X-A**	**SO_2-A**	**CO-A**	**O_2-A**	**CO_2-A**
Zero Gas Concentration	0.00	0.00	0.00	0.00	0.00
Span Gas Concentration	147.30	49.38	25.10	12.17	8.52
Analyzer Full Scale Range	253.00	85.00	45.50	21.92	14.43
Upscale Reponse Time Testing					
Starting Value	0.16	1.23	0.10	-0.03	0.00
Final Average Response	145.99	49.11	24.85	12.05	8.28
Calculated 95% Response	138.70	46.72	23.61	11.45	7.87
Actual Response (≥95%)	145.66	47.22	24.60	12.03	8.03
Upscale Response Time (sec)	80	120	80	40	40
Downscale Reponse Time Testing					
Starting Value	147.46	49.58	24.75	12.00	8.26
Final Response	0.33	2.17	0.10	-0.03	0.00
Calculated 95% Response	7.68	4.54	1.33	0.58	0.41
Actual Response (≥95%)	5.07	4.34	0.75	0.00	0.04
Downscale Response Time (sec)	60	120	60	40	40
System A Maximum System Response Time (seconds)				**120**	**seconds**
System A Minmum Sampling Time Each Sample Point				**240**	**seconds**
System A Sample Time Selected For Each Sample Point				**420**	**seconds**