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Project No. 2753

AOP No. 04AQ-C007
NOC Order No. 00AQCR-1000

SOURCE EVALUATION REPORT

Waste Management Disposal Services of Washington, Inc.

Greater Wenatchee Regional Landfill and Recycling Center
East Wenatchee, Washington

Landfill Gas Collection and Control System
Particulate Matter, Opacity, CO, NO_x, SO_2,
Non-Methane Organic Compounds, Organic TAPs,
H_2S and Other Sulfur Compounds, & HCl

February 8, 2007

Test Site:
Greater Wenatchee Regional Landfill and Recycling Center
191 Webb Road
East Wenatchee, Washington 98802

Air Pollution Emission Testing

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1. CERTIFICATIONS

1.1 Test Team Leader

I hereby certify that the test detailed in this report, to the best of my knowledge, was accomplished in conformance with applicable rules and good practices. The results submitted herein are accurate and true to the best of my knowledge.

Name: Thomas A. Rhodes, EIT

Signature _____ Date 3/5/07

1.2 Report Review

I hereby certify that I have reviewed this report and find it to be true and accurate, and in conformance with applicable rules and good practices, to the best of my knowledge.

Name: David Bagwell, QSTI

Signature _____ Date 3/9/07

1.3 Report Review

I hereby certify that I have reviewed this report and find it to be true and accurate, and in conformance with applicable rules and good practices, to the best of my knowledge.

Name: Michael E. Wallace, P.E.

Signature _____ Date 3/9/07

2. INTRODUCTION

2.1 Client:

Waste Management Disposal Services of Washington, Inc.

2.2 Physical Location:

Greater Wenatchee Regional Landfill and Recycling Center
191 Webb Road
East Wenatchee, WA 98802

2.3 Mailing Address:

P.O. Box 2963
Wenatchee, WA 98807

2.4 Test Log:

Landfill Gas Flare, Outlet: Particulate Matter (PM), Opacity, CO, NO_x & SO_2

Outlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	11:08 – 12:08	EPA M5/202, 9, 10, 7E & 6C
"	2	12:56 – 13:56	"
"	3	14:27 – 15:27	"

Summary: Three valid runs for PM, Opacity, CO, NO_x & SO_2

Landfill Gas Flare, Inlet & Outlet: HCl

Inlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	11:08 – 12:08	EPA M26
"	2	12:59 – 13:59	"
"	3	14:29 – 15:29	"

Outlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	11:10 – 12:10	EPA M26
"	2	13:01 – 14:01	"
"	3	14:31 – 15:31	"

Summary: Six valid runs for HCl

Landfill Gas Flare, Inlet & Outlet: Non-Methane Organic Compounds (NMOC)

Inlet

Test Date	Run No.	Test Time	Test Method
February 8, 2007	1	12:12 – 12:14	EPA M25C
"	2	13:59 – 14:01	"
"	3	15:31 – 15:33	"

Outlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	11:08 – 12:08	EPA M25A w/ TO-3
"	2	12:56 – 13:56	"
"	3	14:27 – 15:27	"

Summary: Six valid runs for NMOC

Landfill Gas Flare, Inlet & Outlet:
Organic Toxic Air Pollutants (TAPs), H_2S and Other Sulfur Compounds

Inlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	12:12 – 12:14	TO-15 and ASTM D5504
"	2	13:59 – 14:01	"
"	3	15:31 – 15:33	"

Outlet

Test Date	Run No.	Test Time	Test Methods
February 8, 2007	1	11:08 – 12:08	TO-15 and ASTM D5504
"	2	12:56 – 13:56	"
"	3	14:27 – 15:27	"

Summary: Six valid runs for TAPs and H_2S and other sulfur compounds

2.5 Test Purpose: Compliance with Air Operating Permit No. 04AQ-C007 First Revision (Final Permit) and Notice of Construction Order No. 00AQCR-1000 Second Revision both issued April 13, 2006 by the Central Regional Air Quality Section, State of Washington Department of Ecology.

2.6 Background Information: None

2.7 Participants:

Horizon Personnel:

Thomas A. Rhodes, Team Leader
Joseph M. Heffernan III, Paul T. Heffernan and Kyle R. Kline, Field Technicians
Michael E. Wallace, P.E., Calculations and QA/QC
David Bagwell, QSTI and David R. Rossman, P.E., Report Review
Margery P. Heffernan, Technical Writer

Test Arranged by:

Ted Woodard, Central Washington District Manager, Waste Management Disposal Services of Washington, Inc.

Observers: None

Test Plan Sent to:

Lynette A. Haller, PE, Central Regional Air Quality Section, State of Washington Department of Ecology

3. SUMMARY OF RESULTS

3.1 Table(s) of Results:

Table 1

Flare Outlet Particulate Matter (PM) and Gaseous Emissions Test Results

Test Date: February 8, 2007	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Start Time		11:08	12:56	14:27	
End Time		12:09	13:56	15:30	
Sampling Time	minutes	60	60	60	
Sampling Results					
Total PM Concentration	gr/dscf	0.0070	0.0083	0.0088	0.0080
Rate	tons/yr	1.95	2.37	2.37	2.23
Opacity	%	0	0	0	0
Sample Volume	dscf	42.3	41.1	40.6	41.4
Sample Weight, Total	mg	19.2	22.0	23.1	21.4
Percent Isokinetic	%	204	197	201	201
O_2	%	11.7	11.7	11.8	11.8
CO_2	%	8.3	8.0	8.4	8.2
CO Concentration	ppmv	1.5	0	0	0.5
Heat Input Basis	lb/MMBTU	0.0023	0	0	0.0008
Permit Limit	lb/MMBTU				0.1
Rate	tons/yr	0.21	0	0	0.07
NO_x Concentration	ppmv	24	24	24	24
Heat Input Basis	lb/MMBTU	0.06	0.06	0.06	0.06
Permit Limit	lb/MMBTU				0.06
Rate	tons/yr	5.5	5.8	5.4	5.6
SO_2 Concentration	ppmv	8	9	9	8
Heat Input Basis	lb/MMBTU	0.027	0.031	0.032	0.030
Permit Limit	lb/MMBTU				0.011
Flow Rate (Actual)	acf/min	31,100	31,900	30,000	31,000
Flow Rate (Standard)	dscf/min	7,410	7,630	7,210	7,420
Temperature	°F	1503	1497	1489	1496
Moisture	%	7.9	7.9	7.9	7.9

Table 2

Destruction Efficiency of NMOC Test Results

Test Date: February 8, 2007	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Inlet					
Start Time		12:12	13:59	15:31	
End Time		12:14	14:10	15:33	
Sampling Time	minutes	2	2	2	
Sampling Results					
NMOC	ppmv-C	1,200	1,200	1,200	1,200
Hexane Basis	ppmv-C_6	200	200	200	200
Rate[1]	lb-C_6/hr	1.6	1.6	1.6	1.6
Outlet					
Start Time		11:08	12:56	14:27	
End Time		12:08	13:56	15:27	
Sampling Time	minutes	60	60	60	
Sampling Results					
TGOC Concentration	ppmv-C	0.93	0.55	0.64	0.71
Methane[2]	ppmv-C_4	0.51	0.54	>0.0	>0.35
NMOC	ppmv-C	0.42	0.013	<0.64	<0.19
Hexane Basis	ppmv-C_6	0.069	0.0022	<0.11	<0.60
Rate[3]	lb-C_6/hr	0.0069	0.0002	<0.010	<0.0058
Destruction Efficiency					
Mass Rate Basis, Hexane	%	99.6	100	>99.3	>99.6
Permit Limit					99

[1] Mass rate calculated using inlet EPA M2 flow rate.
[2] Run 3 was below the laboratory detection limit. The results were calculated without subtracting any methane for that run.
[3] Mass rate calculated using outlet EPA M2 flow rate.

Table 3

Destruction Efficiency of Organic TAPs[4]

Three-Run Averaged Results

Test Date: Feb. 8, 2007	**Inlet**		**Outlet[5]**		**Destruction Efficiency (%)**	
	ppbv	mg/min	ppbv	mg/min	Upper[6]	Lower[7]
Acetone[8]	5,267	209.3	--	--	--	--
Benzene	893	47.7	8.3	5.7	88.1	--
Carbon Disulfide	347	18.1	<2.6	<1.7	100	90.3
1,4-Dichlorobenzene	203	20.5	<1.4	<1.7	100	91.5
1,1-Dichloroethane	217	14.7	<2.0	<1.7	100	88.1
cis-1,2-Dichloroethene	990	65.7	<2.1	<1.7	100	97.3
Ethylbenzene	4,833	351.3	<1.9	<1.7	100	99.5
Metheylene Chloride[8]	433	25.2	--	--	--	--
Methyl Ethyl Ketone	8,233	406.2	<2.8	<1.8	100	99.6
4-Methyl-2-Pentanone	610	41.8	<2.0	<1.7	100	95.8
Styrene	400	28.5	<1.9	<1.8	100	93.9
Tetrachloroethene	907	102.9	<1.2	<1.8	100	98.3
Toluene	15,667	987.5	5.3	4.3	99.6	--
Trichloroethene	570	51.3	<1.5	<1.8	100	96.6
Trichlorofluoromethane	230	21.6	<1.5	<1.8	100	91.9
Vinyl Chloride	930	39.8	<3.2	<1.7	100	95.6
m,p-Xylene	12,000	871.9	5.7	5.3	99.4	--
o-Xylene	3,333	242.2	<2.1	<2.0	99.5	99.2
Total TAPs[9] (mg/min)	High	Low	High	Low	Upper	Lower
	3,883	3,546	82.2	16.5	99.5	97.9

[4] Compounds that were below the laboratory detection limit at the inlet and outlet are not included in this table.

[5] At least one run was below the laboratory detection limit. Less than (<) results were calculated using the Method Reporting Limit (MRL). MRL is the minimum quantity of a target analyte that can be confidently determined by the reference method.

[6] The upper limit destruction efficiency is calculated assuming zero concentration for results below the MRL.

[7] The lower limit destruction efficiency is calculated using the MRL for each analyte.

[8] The acetone and methylene chloride samples were contaminated. See discussion in Section 5.1.3.

[9] Excludes acetone and methylene chloride at outlet.

Table 4

H_2S and other Sulfur Compounds

Three-Run Averaged Results

Test Date: Feb. 8, 2007	**Inlet**		**Outlet**[10]		**Destruction Efficiency (%)**
	ppbv	lb/hr	ppbv	lb/hr	
Hydrogen Sulfide	140,000	0.43	<4.5[11]	<0.00018	100
Carbon Disulfide[12]	367	0.0025	6.8	0.00061	54.4
Carbonyl Sulfide	360	0.0020	<5.5[13]	<0.00038	80.5
tert-Butyl Mercaptan	320	0.0026	ND	ND	100
Dimethyl Sulfide	3,333	0.019	ND	ND	100
Ethyl Mercaptan	207	0.0012	ND	ND	100
Isobutyl Mercaptan	53	0.00043	ND	ND	100
Isopropyl Mercaptan	770	0.0053	ND	ND	100
Methyl Mercaptan	2,100	0.0091	ND	ND	100
Thiphene	950	0.0072	ND	ND	100
	ppbv-S	lb-SO_2/hr	ppbv-S	lb-SO_2/hr	
Total Sulfur[14]	149,000	0.86	24	0.0018	99.8

[10] Compounds reported as Not Detected (ND) were below the laboratory detection limit for all thee runs.

[11] Run 1 was below the MRL, an estimate reported by the lab was used to calculate results. Run 3 was below the laboratory detection limit, the MRL was used to calculate the results.

[12] The three runs of carbon disulfide by ASTM D5504 were inconsistent with each other, where as the TO-15 results were very consistent and showed a destruction efficiency of at least 90%.

[13] Run 1 was below the laboratory detection limit, the MRL was used to calculate results.

[14] Sulfur compounds detected by ASTM D5504 as presented in this table.

Table 5

Hydrogen Chloride (HCl) Test Results

Test Date: February 8, 2007	**Units**	**Run 1**	**Run 2**	**Run 3**	**Average**
Inlet					
Start Time		11:08	12:59	14:29	
End Time		12:08	13:59	15:29	
Sampling Time	minutes	60	60	60	
Sampling Results					
Hydrogen Chloride (HCl)					
Concentration[5]	ppmv	<0.025	<0.025	<0.028	<0.026
Rate	lb/hr	<0.00008	<0.00008	<0.00009	<0.00009
Sample Volume	dscf	5.4	5.3	5.6	5.4
Sample Weight, (HCl)	mg	<0.0058	<0.0058	<0.0068	<0.0061
Flow Rate (Standard)[15]	dscf/min	583	584	577	581
Temperature	°F	57	57	57	57
Moisture[16]	%	1.7	1.7	1.7	1.7
Outlet					
Start Time		11:10	13:01	14:31	
End Time		12:10	14:01	15:31	
Sampling Time	minutes	60	60	60	
Sampling Results					
Hydrogen Chloride (HCl)					
Concentration	ppmv	2.1	3.1	2.5	2.5
Rate	lb/hr	0.087	0.13	0.10	0.11
Sample Volume	dscf	4.9	5.0	4.9	4.9
Sample Weight, (HCl)	mg	0.43	0.64	0.50	0.52
Flow Rate (Standard)[12]	dscf/min	7,410	7,630	7,210	7,420
Temperature	°F	1503	1497	1489	1496
Moisture[17]	%	7.9	7.9	7.9	7.9

[15] Inlet and outlet flow rates were determined by EPA M2.
[16] Inlet moisture was determined by ODEQ M4.
[17] Outlet moisture was determined by EPA M4.

3.2 Description of EPA M5/202 Collected Samples:

Particulate Matter Filters: White

Impinger Contents: Clear

3.3 Discussion of Errors and Quality Assurance Procedures: This table is taken from a paper entitled "Significance of Errors in Stack Sampling Measurements", by R.T. Shigahara, W.F. Todd and W.S. Smith. It summarizes the maximum error expressed in percent, which may be introduced into the test procedures by equipment or instrument limitations.

Measurement	% Max Error
Stack Temperature Ts	1.4
Meter Temperature Tm	1.0
Stack Gauge Pressure Ps	0.42
Meter Gauge Pressure Pm	0.42
Atmospheric Pressure Patm	0.21
Dry Molecular Weight Md	0.42
Moisture Content Bws (Absolute)	1.1
Differential Pressure Head ΔP	10.0
Orifice Pressure Differential ΔH	5.0
Pitot Tube Coefficient Cp	2.4
Orifice Meter Coefficient Km	1.5
Diameter of Probe Nozzle Dn	0.80

3.3.1 Manual Methods: QA procedures outlined in the test methods were followed, including equipment specifications and operation, calibrations, sample recovery and handling, calculations and performance tolerances.

On-site quality control procedures include pre- and post-test leak checks on trains and pitot systems. The systems are leak-checked before traverses begin, and after runs are completed (before any component disassembly). If pre-test checks indicate problems, the system is fixed and rechecked before the start of testing. If post-test leak checks are not acceptable, the test run is voided and the run is repeated. The results of the quantifiable QA checks for the test runs are on the Field Data sheets.

Horizon does semi-annual calibrations on pitots, thermocouples, and nozzles. Pitots are examined before and after each use to confirm that they are still aligned. Prior to use, thermocouple systems are checked for ambient temperature before heaters are started or readings are taken. Problems with connections or polarity are obvious from these and readings as temperatures rise.

3.3.2 Continuous Analyzer Gas Sampling: Analyzer system checks are noted on the Calibration Field Record sheet, with procedures documented in the QA/QC section in the Appendix. All calibration standards used in the testing were EPA Protocol. Certificates for the gases are in the Appendix.

3.3.3 Laboratory Analysis: QA results are in the Columbia Analytical Services (CAS) laboratory reports. The analyses for BTU content and fixed gases (ASTM D3588-98), NMOC (EPA M25C), methane (EPA TO-3), organic TAPs (EPA TO-15) and H_2S and other sulfur compounds (ASTM D5504) were done by CAS in Simi Valley, CA. The analysis for HCl was done by CAS in Kelso, WA. Field blanks, method blanks, duplicate analysis, matrix spikes and laboratory control samples were within acceptable limits.

4. SOURCE DESCRIPTION AND OPERATION

4.1 Process and Control Device Description and Operation:

The Greater Wenatchee Landfill is a 69-acre municipal solid waste landfill that serves primarily Douglas, Kittitas, and Chelan counties for disposal. In addition to municipal solid waste, the landfill also accepts asbestos, construction demolition and land clearing debris, industrial non-hazardous wastes, petroleum contaminated soil, sewage sludge, and wood waste. The landfill is somewhat unique in the amount of un-salable orchard fruit that is brought there.

Trench 1 and the northeast half of North Berm were closed and capped during the summer of 2000. A landfill gas collection system is in place and the landfill gas is currently routed to an enclosed flare for control.

The flare is a Parnel design rated for an input of 2000 scf/min and 60.5 MMBtu/hr. Landfill gas is prevented from entering the combustion chamber until the temperature of the chamber reaches ≥1500°F. During the testing the flare temperature averaged 1628°F.

4.2 Test Ports: Port and traverse point locations are described and diagrammed on the Field Data sheets.

4.2.1 Test Duct Characteristics:

Flare Outlet:	Flare Inlet:
Construction: Steel	Construction: Steel
Shape: Circular	Shape: Circular
Size: 102 inches inside diameter	Size: 12.25 inches inside diameter
Orientation: Vertical	Orientation: Horizontal
Flow straighteners: None	Flow straighteners: None
Extension: None	Extension: None
Cyclonic Flow: None expected	Cyclonic Flow: None expected
Meets EPA M-1 Criteria: Yes	Meets EPA M-1 Criteria: Yes

4.3 Operating Parameters: See Production/Process Data section of Appendix.

4.4 Process Startups/Shutdowns or Other Operational Changes During Tests: Process was continuous during testing.

4.5 On-Site Photographs:

Figure 1

Sampling Location and Setup – Flare Outlet

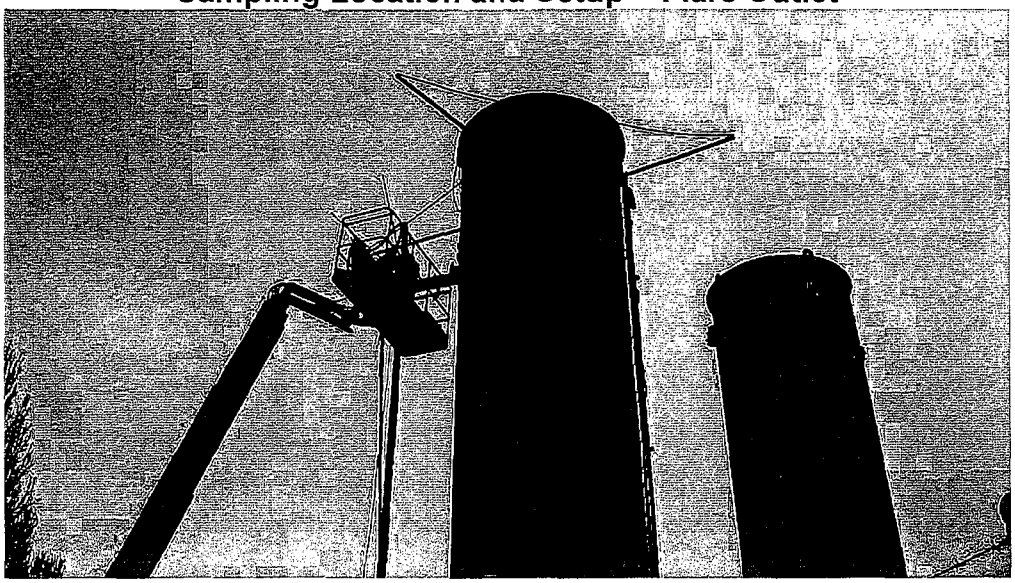
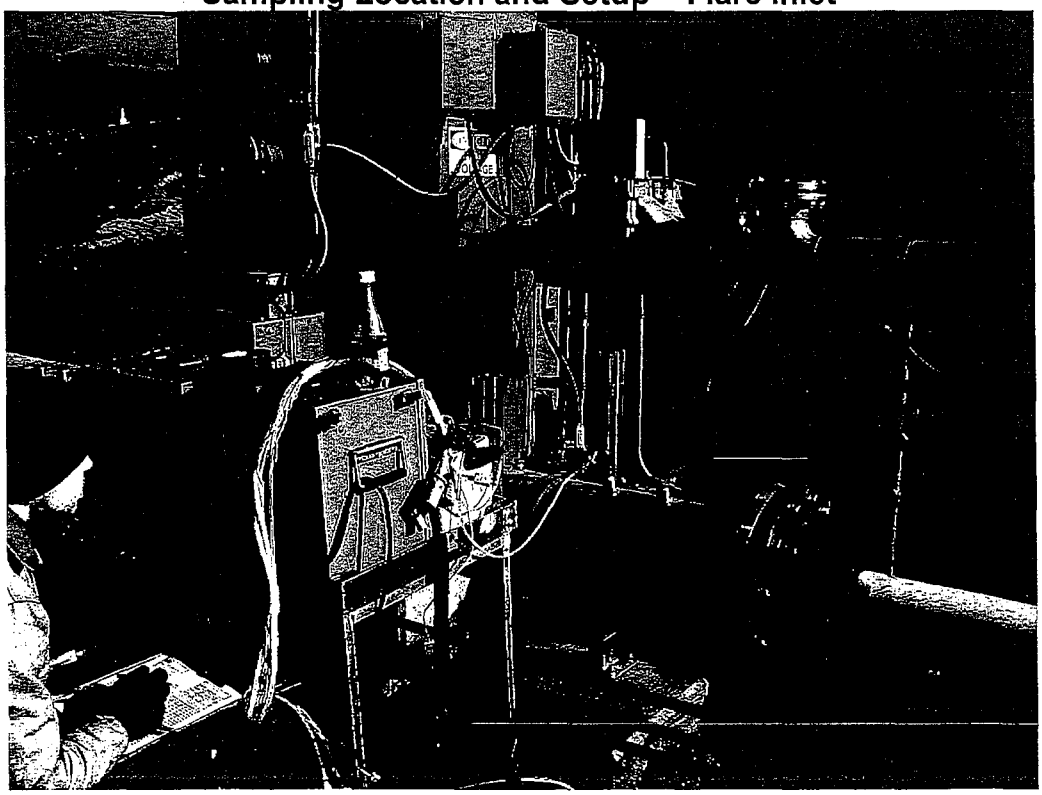


Figure 2

Sampling Location and Setup – Flare Inlet



5. SAMPLING AND ANALYTICAL PROCEDURES

5.1 Sampling Procedures:

5.1.1 Sampling and Analytical Methods: Testing was in accordance with EPA Methods in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Appendix A, July 1, 2006 and Oregon Department of Environmental Quality (ODEQ) methods in Source Sampling Manual Volume 1, January 1992.

Flare Inlet

Flow Rate:	EPA Methods 1 and 2 (S-type pitot traverse)
Moisture:	ODEQ Method 4 (wet/dry bulb temperatures)
Gas Analysis:	ASTM D3588-98 (Tedlar Bag samples)
NMOC:	EPA Method 25C (GC/FID/TCA, Tedlar bag samples)
Organic TAPs:	EPA Method TO-15M (GC/MS, Tedlar bag samples)
HCl:	EPA Method 26 (midget impingers)
Sulfur cmpds:	ASTM D5504 (GC/SCD, Tedlar bag samples)

Flare Outlet

Flow Rate:	EPA Methods 1 and 2 (S-type pitot traverse)
O_2 and CO_2:	EPA Method 3A (paramagnetic analyzers and NDIR)
Moisture:	EPA Method 4 (included with M-5/202 train)
Particulate:	EPA Methods 5/202 (front and back halves)
SO_2:	EPA Method 6C (nondispersive ultraviolet analyzer)
NO_X:	EPA Method 7E (chemiluminescent analyzer)
CO:	EPA Method 10 (gas filter correlation analyzer)
TGOC:	EPA Method 25A (heated sample line and analyzer)
Methane:	EPA Method TO-3M (Tedlar bag samples)
Organic TAPs:	EPA Method TO-15M (GC/MS, Tedlar bag samples)
HCl:	EPA Method 26 (midget impingers)
Sulfur cmpds:	ASTM D5504 (GC/SCD, Tedlar bag samples)
Opacity:	DOE Method 9A/EPA Method 9 (six minutes per run)
Emission Rates:	EPA Method 19 (F-factor methodology)

5.1.2 Allowed Variances to Methods:

The EPA M5/202 sampling was not done isokinetically. The request for this variation was made on the day of testing, when it was realized that a probe with the appropriate nozzle size was not available. David Bagwell received verbal approval for this variance from Jared Mathey of the Washington Department of Ecology.

The low velocity of the exhaust would have required a very large nozzle that is not commonly available for standard EPA Method 5 sampling. Isokinetic sampling is a technique in which the gas sample is withdrawn from the stack in such a manner that the velocity of the sample gas in the EPA Method 5 nozzle tip equals the velocity of the stack gas approaching the nozzle. Isokinetic sampling helps obtain a representative sample of particles that have varying sizes and densities. The particulate sampling was done at a single point and at a rate that was approximately double the isokinetic rate. Isokinetic sampling is important when "large" particles (about 10 microns and larger) are present. Smaller particles behave more like a gas and are unaffected by sampling rates. This source should almost exclusively have small particles.

5.1.3 Sampling Notes:

When this testing was done in 2002, the concentration of acetone and methylene chloride (DCM) detected in the outlet bags seemed abnormally high. At the time, it was suspected that the samples were contaminated with the fumes from the acetone and DCM used in the truck to recover the particulate sampling trains. Again with this testing, the levels of acetone and DCM detected in the outlet bags show a destruction efficiency of only 34% and 64%, respectively. A leak in the sampling system is unlikely because very snug fitting Tygon tubing was used to connect the Teflon line to the sample "lung". However, it is also unlikely that the flare is not adequately combusting these two compounds. Of the possibilities, a very small leak is more probable.

5.1.4 Laboratory Analysis:

Analyte	Laboratory
Particulate Matter	Antech, Corbett, OR
Gas Analysis, NMOC, Methane, TAPs, Sulfur Compounds	Columbia Analytical Services, Simi Valley, CA
HCl	Columbia Analytical Services, Kelso, WA

5.2 Sampling Train Diagrams:

Figure 3
EPA Method 5/202 Particulate Sample Train Diagram

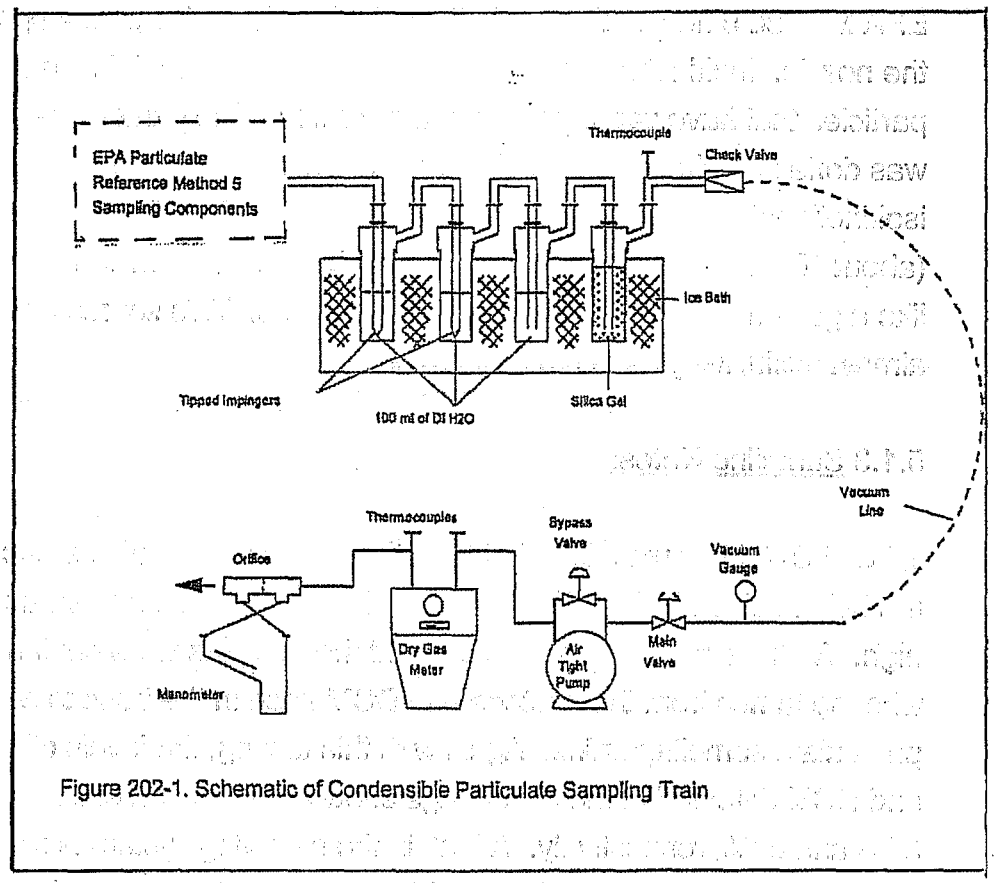


Figure 202-1. Schematic of Condensible Particulate Sampling Train

Figure 4
EPA Methods 3A, 6C, 7E, & 10 Analyzer Sample System Diagram

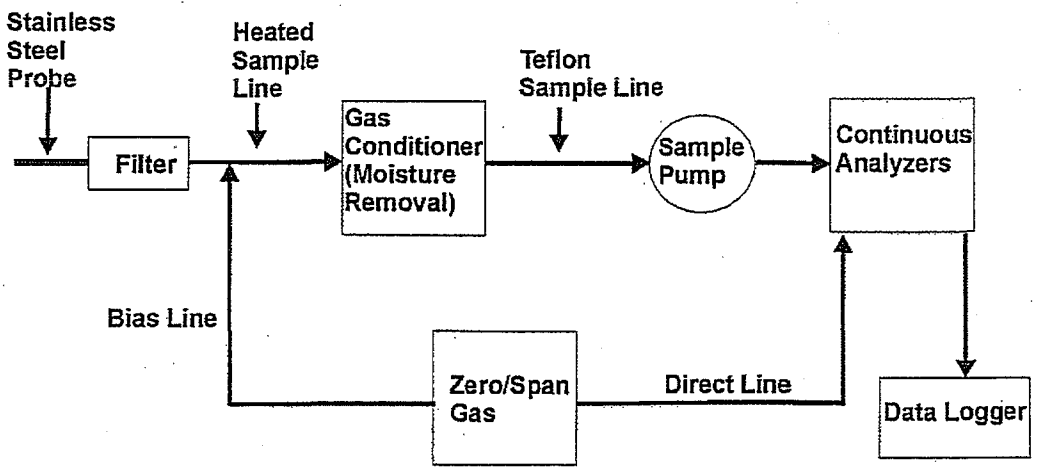


Figure 5
EPA Method 25A Analyzer Sample System Diagram

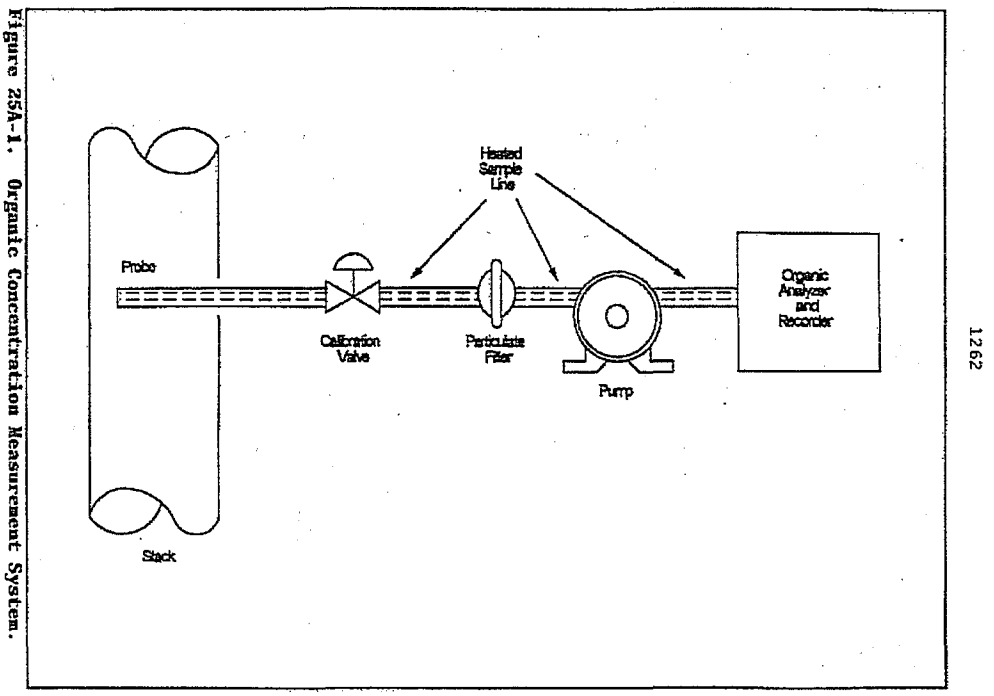


Figure 6
EPA Method 26 HCl Sample Train Diagram

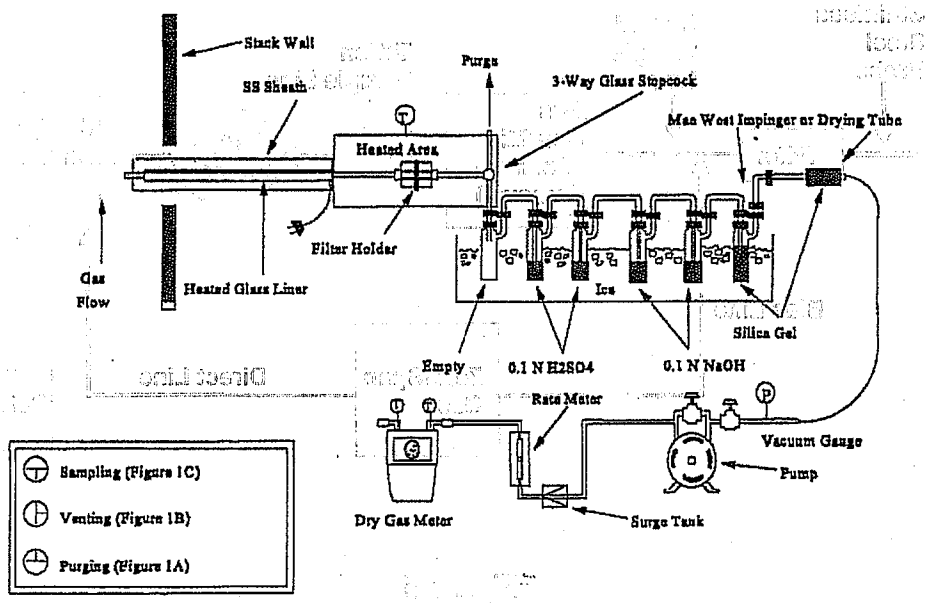


Figure 26-1. Sampling train.

5.3 Horizon Test Equipment:

5.3.1 Manual Methods:

Equipment Name	Identification
Isokinetic Meter Box	Graseby Model 2010A, Horizon No. 7
Inclined Liquid Manometers	Incorporated with meter box
Non-Isokinetic Meters	CAE Express, Horizon Nos. 15 and 17
Probe Liner(s)	Quartz (PM), Teflon (HCl)
Pitots	HT-4, 8S-1
Shortridge® Micromanometers	SR 1, SR 2
Quartz Nozzles	Incorporated with quartz probes
Relative Humidity	Kestrel Meter
Barometer	Test Van III

5.3.2 Continuous Emissions Monitors and Methods:

Gas	Brand	Model	Cal. Span	Analyzer	Method
O_2	Servomex	1400	20.95%	Paramagnetic	3A
CO_2	Servomex	1400	21.83%	Chopperless NDIR	3A
CO	Thermo Env	48	459 ppm	Gas Filter Correlation	10
NO_x	Thermo Env	42C	88.5 ppm	Chemiluminescent	7E
SO_2	West. Resch	721M	26.61ppm	Non Disp. Ultra-violet	6C
TGOC	J.U.M.	VE-7	85.3 ppm C_3H_8	Flame Ionization	25A

5.3.3 Continuous Emissions Monitors Sampling Setup:

O_2, CO_2, CO, NO_x, SO_2 Sampling:

Sample Location:	Fixed point near the centroid of the exhaust
Probe:	Stainless Steel
Conditioning:	Refrigerated MAK 6 cooler
Sample Line(s):	Teflon (heated to sample conditioner & unheated to pump)
Pump:	Teflon lined
Data Logger:	Keithley (PC based) with Test Point software

TGOC Sampling:

Probe:	Stainless steel
Conditioning:	None
Sample Line(s):	Teflon, heated
Pump:	Heated, internal to analyzer
Data Logger:	Keithley (PC based) with Test Point software

5.3.4 Bag Sampling Setup:

Inlet

Probe:	New Teflon
Sample Line:	New Teflon
Pump:	None (positive pressure of gas stream)

Outlet

Probe:	Stainless steel
Sample Line:	Heated Teflon (line to TGOC analyzer)
Bag Sampler:	5-Liter lung evacuated by pump
Pump:	Diaphragm pump

6. DISCUSSION

The quality assurance checks including leak checks, instrument checks, and calibrations, were within method-allowable tolerances. As mentioned, the particulate sampling was twice isokinetic but there should be no effect on the results because the particulate matter is very small.

It is possible that the acetone and methylene chloride results were contaminated as a result of sample recovery operations in the test van. Both of these compounds should have been easily combusted by the flare. The TO-15 results confirm that most organic compounds were not detected at the outlet.

APPENDIX

Nomenclature & Drift Correction Documentation

Nomenclature

Constants	Value	Units	Definition	Ref
Pstd(1)	29.92126	inHg	Standard Pressure	CRC
Pstd(2)	2116.22	lbf / ft²		CRC
Tstd	527.67	°R	Standard Temperature	CRC
R	1545.33	ft lbf / lbmol °R	Ideal Gas Constant	CRC
MWatm	28.965	lbm / lbmole	Atmospheric (20.946 %O2, 0.033% CO2, Balance N2+Ar)	
MWc	12.011	lbm / lbmole	Carbon	CRC
MWco	28.010	lbm / lbmole	Carbon Monoxide	CRC
MWco2	44.010	lbm / lbmole	Carbon Dioxide	CRC
MWh2o	18.015	lbm / lbmole	Water	CRC
MWno2	46.006	lbm / lbmole	Nitrogen Dioxide	CRC
MWo2	31.999	lbm / lbmole	Oxygen	CRC
MWso2	64.063	lbm / lbmole	Sulfur Dioxide	CRC
MWn2+ar	28.154	lbm / lbmole (Balance with 98.82% N2 & 1.18% Ar)	Emission balance	
C1	385.3211	ft³ / lbmol	Ideal Gas Constant @ Standard Conditions	
C2	816.5455	inHg in³/ °R ft³	Isokentics units correction constant	
Kp	5129.4	ft / min [(inHg lbm/mole) / (°R inH2O)]^½	Pitot tube constant	Ref 2.5.1

Symbol	Units	Definition	Calculating Equation or Source of Data	EPA
As	in²	Area, Stack		
An	in²	Area, Nozzle		
Bws	%	Moisture, % Stack gas	[100 Vw(std) / [Vw(std)+Vm(std)]]	Eq. 5-3
C	ppmv-C	Carbon (General Reporting Basis for Organics)		
C1	ft3/lbmol	Gas Constant @ Standard Conditions	[R Tstd / Pstd(2)]	
C2	inHg in³/ °R ft³		[14,400 Pstd / Tstd]	
Cd	lbm-GAS / MMdscf	Mass of gas per unit volume	[Cgas MWgas / C1]	
cg	gr/dscf	Grain Loading, Actual	[15.432 mn / Vm(std) 1,000]	Eq. 5-6
cg @ X%CO2	gr/dscf	Grain Loading Corrected to X% Carbon Dioxide	[X% / CO2%]	
cg @ X%O2	gr/dscf	Grain Loading Corrected to X% Oxygen	[(20.946-X) / (20.946-O2)]	
Cgas	ppmv, %	Gas Concentration, (Corrected)		
Cgas @ X%CO2	ppmv	Gas Concentration Correction to X% Carbon Dioxide	[X% / CO2%]	
Cgas @ X%O2	ppmv	Gas Concentration Correction to X% Oxygen	[(20.946-X%) / (20.946-O2%)]	
Cgas	ppmv		Mgas (lbm/hr) * 1,000,000*385.3211/60*Qsd*mw	
CO	ppmv	Carbon Monoxide		
Co	ft	Outer Circumference of Circular Stack		
Ci	ft	Inner Circumference of Circular Stack		
CO2	%	Carbon Dioxide		
Cp		Pitot tube coefficient		
Ct	lb/hr	Particulate Mass Emissions	[60 cg Qsd/ 7,000]	
dH	in H2O	Pressure differential across orifice		
Dn	in	Diameter, Nozzle		
dp^½		Average square root of velocity pressure		
Ds	in	Diameter, Stack		
E	lb / MMBtu	Pollutant Emission Rate	Cgas Fd MWgas (20.946 / (20.946-O2)) / (1,000,000 C1)	
Fd	dscf / MMBtu	F Factor for Various Fuels		Table 19-1
I	%	Percent Isokinetic	[C2 Ts(abs) Vm(std) / (vs Ps mfg An Ø)]	Eq. 5-8*
Md	lbm / lbmole	Molecular weight, Dry Stack Gas	[(1-%O2-%CO2)(MWn2+ar)+(%O2 MWo2)+(%CO2 MWco2)]	Eq. 3-1*
mfg		Mole fraction of dry stack gas	[1-Bws/100]	
Mgas	lbm/hr	Gaseous Mass Emisisons	[60 Cgas(ppmv) MW Pstd(2) Qsd / 1,000,000 R Tstd]	
mn	mg	Particulate lab sample weight		
Ms	lbm / lbmole	Molecular weight, Wet Stack	[Md mfg +MWh2o (1-mfg)]	Eq. 2-5
MW	lbm / lbmole	Molecular Weight		
NO2	ppmv-NO2	Nitrogen Dioxide (General Reporting Basis for NOx)		
NOx	ppmv-NO2	Nitrogen Oxides (Reported as NO2)		
O2	%	Oxygen		
OPC	%	Opacity		
Pbar	in Hg	Pressure, Barometric		
Pg	in H2O	Pressure, Static Stack		
Po	in Hg	Pressure, Absolute across Orifice	[Pbar + dH / 13.5951]	
Ps	in Hg	Pressure, Absolute Stack	[Pbar + Pg / 13.5951]	Eq. 2-6*
Qa	acf/min	Volumetric Flowrate, Actual	[As vs / 144]	
Qsd	dscf/min	Volumetric Flowrate, Dry Standard	[Qa Tstd mfg Ps] / [Pstd(1) Ts(abs)]	Eq 2-10*
Rf	MMBtu/hr		1,000,000 Mgas (20.946-O2)] / [Cd Fd 20.946]	
SO2	ppmv-SO2	Sulfur Dioxide		
t	in	Wall thickness of a stack or duct		
TGOC	ppmv-C	Total Gaseous Organic Concentration (Reported as C)		
Tm	°F	Temperature, Dry gas meter		
Tm(abs)	°R	Temperature, Absolute Dry Meter	[Tm + 459.67]	
Ts	°F	Temperature, Stack gas		
Ts(abs)	°R	Temperature, Absolute Stack gas	[Ts + 459.67]	
Vlc	ml	Volume of condensed water		
Vm	dcf	Volume, Gas sample		
Vm(std)	dscf	Volume, Dry standard gas sample	[Y Vm Tstd Po]/ [Pstd(1) Tm(abs)]	Eq. 5-1
vs	fpm	Velocity, Stack gas	Kp Cp dp^½ [Ts(abs) / (Ps Ms)]^ ½	Eq. 2-9*
Vw(std)	scf	Volume, Water Vapor	0.04707 Vlc	Eq. 5-2
Y		Dry gas meter calibration factor		Fig. 5.6
Ø	min	Time, Total sample		

* Based on equation.

HORIZON ENGINEERING INC
13565 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
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DRIFT CORRECTION DOCUMENTATION

EPA Drift Equations:

- Method 3A: Oxygen and Carbon Dioxide

$$C_{gas} = \frac{(C_{ma} - C_{oa})(C - C_m) + C_{ma}}{(C_m - C_o)} \qquad \text{(Eq. 3A-1)}$$

- Method 6C: Sulfur Dioxide

$$C_{gas} = \frac{C_{ma}(C - C_o)}{(C_m - C_o)} \quad \text{where } C_{oa} = 0 \qquad \text{(Eq. 6C-1)}$$

- Method 7E: Nitrogen Oxides, Section 8 of Method 7E states: "Follow Section 8 of Method 6C (Eq. 6C-1)"
- Method 10: Carbon Monoxide, the EPA does not currently address Gas Filter Correlation instruments, therefore there are no current standards.
- Method 25A: Total Gaseous Organic Concentration (TGOC), this method does not mention correcting for drift although there are established limits.

Horizon Engineering Drift Correction Equations:

$$C_{gas} = \frac{(C_{id} - Z_x)(C_{ma} - C_{oa})}{(S_x - Z_x)} \qquad S_x = \frac{(C_{mf} - C_{mi})(T_x - T_{ci})}{(T_{cf} - T_{ci})} + C_{mi}$$

$$Z_x = \frac{(C_{of} - C_{oi})(T_x - T_{ci})}{(T_{cf} - T_{ci})} + C_{oi} \qquad T_x = \frac{(T_{te} - T_{ts})}{2} + T_{ts}$$

EPA	Definition	Horizon
C_{gas}	Effluent gas concentration, dry basis	C_{gas}
C_{ma}	Actual upscale calibration gas concentration	C_{ma}
C_{oa}	Actual zero/low calibration gas concentration	C_{oa}
C_m	Average of initial and final system upscale calibration bias responses	
	Initial system upscale calibration bias response	C_{mi}
	Final system upscale calibration bias response	C_{mf}
C_o	Average of initial and final system zero/low calibration bias responses	
	Initial system zero/low calibration bias response	C_{oi}
	Final system zero/low calibration bias response	C_{of}
C	Average gas concentration indicated by gas analyzer, dry basis	C_{id}
	Starting test time	T_{ts}
	Ending test time	T_{te}
	Initial system bias calibration response time	T_{ci}
	Final system bias calibration response time	T_{cf}
	Mid-point of test time or gas sampling interval to be analyzed	T_x
	Approximate upscale response at mid-point test time	S_x
	Approximate zero/low response at mid-point test time	Z_x
	Carbon count of TGOC calibration gas. (CH_4=1, C_3H_8=3...)	K
	Carbon response factor basis on a state basis (example Propane carbon basis)	R

Notes or exceptions:
TGOC is first recorded on a wet basis, then corrected to a dry basis
The TGOC instruments used by Horizon have some historic data on instrument response to different hydrocarbons.
04/08/04

Laboratory Report and Chain of Custody
Columbia Analytical Services, Simi Valley, CA
Field Data (Tedlar Bag Sampling Times)
Columbia Analytical Services, Kelso, WA

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

Columbia Analytical Services
An Employee - Owned C

February 27, 2007

3-05-07

Ms. Laurel Peterson
Horizon Engineering
13585 Northeast Whitaker Way
Portland, OR 97230

RE: P2700335
Greater Wenatchee Regional Landfill/2758

Dear Ms. Peterson:

Enclosed are the results of the sample(s) submitted to our laboratory on February 9, 2007. For your reference, these analyses have been assigned our service request number P2700335.

All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply only to the samples analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Your report contains 31 pages.

Columbia Analytical Services is certified by the California Department of Health Services, Certificate No. 2380; Arizona Department of Health Services, Certificate No. AZ0694; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661. Please contact me for specific method(s) and analyte(s) corresponding to a particular certification.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

Columbia Analytical Services, Inc.

Kate Aguilera
Project Manager

2655 Park Center Drive, Suite A Simi Valley, California 93065 (805) 526-7161 (805) 526-7270 fax

LABORATORY REPORT

Client:	HORIZON ENGINEERING	Date of Report:	02/27/07
Address:	13585 Northeast Whitaker Way	Date Received:	02/09/07
	Portland, OR 97230	CAS Project No:	P2700335
Contact:	Ms. Laurel Peterson	Purchase Order:	2758

Client Project ID: Greater Wenatchee Regional Landfill/2758

Six (6) Tedlar Bag Samples labeled: "Run #1 Inlet" "Run #2 Inlet" "Run #3 Inlet" "Run #1 Outlet" "Run #2 Outlet" "Run #3 Outlet"

The samples were received at the laboratory under chain of custody on February 09, 2007. The samples were received intact. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time that they were received at the laboratory.

Methane Analysis

The samples identified as "Run #1 Outlet", "Run #2 Outlet" and "Run #3 Outlet" were analyzed for methane per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID).

Total Gaseous Non-Methane Organics as Methane Analysis

The samples "Run #1 Inlet", "Run #2 Inlet" and "Run #3 Inlet" were analyzed for total gaseous non-methane organics as methane according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis.

Reviewed and Approved:

Zheng Wang
Analytical Chemist
Air Quality Laboratory

Reviewed and Approved:

Chris Parnell
GCMS-VOA Team Leader
Air Quality Laboratory

CAS Project No: P2700335

Sulfur Analysis

All samples were also analyzed for twenty sulfur compounds per ASTM D 5504-01 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

BTU and CHONS Analysis

The results for BTU and CHONS were generated according to ASTM D 3588-98. The following analyses were performed and used to calculate the BTU and CHONS results.

The samples "Run #1 Inlet", "Run #2 Inlet" and "Run #3 Inlet" were also analyzed according to modified EPA Method TO-3 for C_2 through $>C_6$ hydrocarbons using a gas chromatograph equipped with a flame ionization detector (FID).

The samples were also analyzed for fixed gases (hydrogen, oxygen/argon, nitrogen, carbon monoxide, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD).

The samples were also analyzed for hydrogen sulfide per ASTM D 5504-01 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD).

Volatile Organic Compound Analysis

All of the samples were also analyzed by combined gas chromatography/mass spectrometry (GC/MS) for volatile organic compounds. The analyses were performed according to the methodology outlined in EPA Method TO-15. However, the method was modified to include the use of Tedlar bags. The analyses were performed by gas chromatography/mass spectrometry, utilizing a direct cryogenic trapping technique. The analytical system used was comprised of a Hewlett Packard Model 5972 GC/MS/DS interfaced to a Tekmar AutoCan Elite whole air inlet system/cryogenic concentrator. A 100% Dimethylpolysiloxane capillary column (RT_x-1, Restek Corporation, Bellefonte, PA) was used to achieve chromatographic separation.

The results of analyses are given on the attached data sheets. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for utilization of less than the complete report.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Project ID: P2700335

Methane

Test Code: EPA TO-3 Modified
Instrument ID: HP5890II/GC7/FID
Analyst: Wade Henton
Sampling Media: Tedlar Bag(s)
Test Notes:

Date(s) Collected: 2/8/07
Date Received: 2/9/07
Date Analyzed: 2/9/07
Volume(s) Analyzed: 1.0 ml

Client Sample ID	CAS Sample ID	D.F.	Methane Concentration in ppmV		Data Qualifier
			Result	MRL	
Run #1 Outlet	P2700335-004	1.00	**0.51**	0.50	
Run #2 Outlet	P2700335-005	1.00	**0.54**	0.50	
Run #3 Outlet	P2700335-006	1.00	ND	0.50	
Method Blank	P070209-MB	1.00	ND	0.50	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: Horizon Engineering
Client Project ID: Greater Wenatchee Regional Landfill/2758 CAS Project ID: P2700335

Total Gaseous Nonmethane Organics (TGNMO) as Methane

Test Code: EPA Method 25C Modified
Instrument ID: HP5890II/GC1/FID/TCA
Analyst: Wade Henton
Sampling Media: Tedlar Bag(s)
Test Notes:

Date(s) Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.50 ml

Client Sample ID	CAS Sample ID	D.F.	Total Gaseous Nonmethane Organics (TGNMO) as Methane Concentration in ppmV		Data Qualifier
			Result	MRL	
Run #1 Inlet	P2700335-001	1.00	1,200	1.0	
Run #2 Inlet	P2700335-002	1.00	1,200	1.0	
Run #3 Inlet	P2700335-003	1.00	1,200	1.0	
Method Blank	P070209-MB	1.00	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: MW Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 12:13
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 11:48
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**200,000**	140	**140,000**	100	
[illegible]-58-1	Carbonyl Sulfide	**890**	250	**360**	100	
74-93-1	Methyl Mercaptan	**4,000**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**460**	250	**180**	100	
75-18-3	Dimethyl Sulfide	**8,500**	250	**3,300**	100	
75-15-0	Carbon Disulfide	**2,300**	160	**750**	50	
75-33-2	Isopropyl Mercaptan	**2,400**	310	**780**	100	
75-66-1	tert-Butyl Mercaptan	**1,200**	370	**310**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,300**	340	**970**	100	
513-44-0	Isobutyl Mercaptan	**260**	370	**71**	100	**W , J**
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.
W = Result quantified but corresponding peak was detected outside of generated retention time window.

Verified By: KJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 14:00
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 12:31
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**190,000**	140	**140,000**	100	
463-58-1	Carbonyl Sulfide	**850**	250	**350**	100	
74-93-1	Methyl Mercaptan	**4,100**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**590**	250	**230**	100	
75-18-3	Dimethyl Sulfide	**8,400**	250	**3,300**	100	
75-15-0	Carbon Disulfide	**520**	160	**170**	50	
75-33-2	Isopropyl Mercaptan	**2,400**	310	**780**	100	
75-66-1	tert-Butyl Mercaptan	**1,200**	370	**340**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,300**	340	**940**	100	
513-44-0	Isobutyl Mercaptan	**320**	370	**87**	100	**W , J**
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.
W = Result quantified but corresponding peak was detected outside of generated retention time window.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 15:32
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 13:15
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**190,000**	140	**140,000**	100	
-58-1	Carbonyl Sulfide	**920**	250	**370**	100	
74-93-1	Methyl Mercaptan	**4,200**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**540**	250	**210**	100	
75-18-3	Dimethyl Sulfide	**8,700**	250	**3,400**	100	
75-15-0	Carbon Disulfide	**570**	160	**180**	50	
75-33-2	Isopropyl Mercaptan	**2,300**	310	**750**	100	
75-66-1	tert-Butyl Mercaptan	**1,100**	370	**310**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,100**	340	**910**	100	
513-44-0	Isobutyl Mercaptan	ND	370	ND	100	
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: W Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Outlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 11:30
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 11:26
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**4.7**	7.0	**3.4**	5.0	**J**
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**9.4**	7.8	**3.0**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

Verified By: HJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 13:30
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 12:09
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**7.2**	7.0	**5.2**	5.0	
[illegible]-58-1	Carbonyl Sulfide	**15**	12	**6.1**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	**44**	7.8	**14**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: [illegible] Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Outlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 14:57
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 13:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	**13**	12	**5.4**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	11	7.8	**3.5**	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P070209-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 2/09/07
Time Analyzed: 09:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
3-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: HU Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-001

Test Code: ASTM D3588-98
Analyst: Zheng Wang/Wade Henton Date Collected: 2/8/07
Sampling Media: Tedlar Bag Date Received: 2/9/07
Test Notes:

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.06	0.01	
Oxygen + Argon	2.76	3.18	
Nitrogen	15.06	15.16	
Carbon Monoxide	< 0.01	< 0.01	
Methane	48.07	27.71	
Carbon Dioxide	33.97	53.72	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	< 0.01	
Pentanes	0.01	0.02	
Hexanes	0.01	0.02	
> Hexanes	0.04	0.15	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	21.71	35.56	
Hydrogen	50.97	7.00	
Oxygen / Argon	19.37	42.25	
Nitrogen	7.94	15.17	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9607	
Specific Volume	ft3/lb	13.64	
Gross Heating Value	BTU/ft3	490.0	**
Net Heating Value	BTU/ft3	441.3	**
Gross Heating Value	BTU/ft3	480.3	*
Net Heating Value	BTU/ft3	432.5	*
Gross Heating Value	BTU/lb	6683.6	**
Net Heating Value	BTU/lb	6018.7	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9974	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

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Verified By: MJ Date: 2/22/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-002

Test Code: ASTM D3588-98
Analyst: Zheng Wang/Wade Henton Date Collected: 2/8/07
Sampling Media: Tedlar Bag Date Received: 2/9/07
Test Notes:

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.06	0.01	
Oxygen + Argon	2.29	2.63	
Nitrogen	13.46	13.55	
Carbon Monoxide	< 0.01	< 0.01	
Methane	49.24	28.40	
Carbon Dioxide	34.86	55.15	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	0.01	
Pentanes	0.01	0.02	
Hexanes	0.01	0.02	
> Hexanes	0.05	0.19	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	22.01	36.50	
Hydrogen	51.62	7.18	
Oxygen / Argon	19.35	42.75	
Nitrogen	7.01	13.56	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9604	
Specific Volume	ft3/lb	13.64	
Gross Heating Value	BTU/ft3	502.6	**
Net Heating Value	BTU/ft3	452.6	**
Gross Heating Value	BTU/ft3	492.5	*
Net Heating Value	BTU/ft3	443.5	*
Gross Heating Value	BTU/lb	6857.0	**
Net Heating Value	BTU/lb	6175.1	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9974	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

Verified By: HJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-003

Test Code: ASTM D3588-98
Analyst: Zheng Wang/Wade Henton Date Collected: 2/8/07
Sampling Media: Tedlar Bag Date Received: 2/9/07
Test Notes:

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.07	0.01	
Oxygen + Argon	2.17	2.49	
Nitrogen	13.04	13.14	
Carbon Monoxide	< 0.01	< 0.01	
Methane	49.59	28.62	
Carbon Dioxide	35.06	55.51	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	< 0.01	
Pentanes	0.01	0.01	
Hexanes	0.01	0.02	
> Hexanes	0.04	0.16	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	22.08	36.74	
Hydrogen	51.81	7.23	
Oxygen / Argon	19.34	42.87	
Nitrogen	6.77	13.15	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9596	
Specific Volume	ft3/lb	13.65	
Gross Heating Value	BTU/ft3	505.6	**
Net Heating Value	BTU/ft3	455.3	**
Gross Heating Value	BTU/ft3	495.5	*
Net Heating Value	BTU/ft3	446.2	*
Gross Heating Value	BTU/lb	6903.9	**
Net Heating Value	BTU/lb	6217.1	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9973	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	**2,300**	800	**920**	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
[illegible]-64-1	Acetone	**12,000**	4,000	**5,100**	1,700	M
75-69-4	Trichlorofluoromethane	**1,300**	800	**240**	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	**1,500**	800	**430**	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	**970**	800	**310**	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	**850**	800	**210**	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	**23,000**	800	**7,900**	270	
156-59-2	cis-1,2-Dichloroethene	**3,900**	800	**970**	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	**2,800**	800	**860**	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	**3,000**	800	**550**	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
108-10-1	4-Methyl-2-pentanone	**2,500**	800	**600**	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	**58,000**	800	**15,000**	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	**6,000**	800	**890**	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	**20,000**	800	**4,700**	180	
179601-23-1	*m,p*-Xylenes	**50,000**	800	**12,000**	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	**1,700**	800	**390**	190	
95-47-6	o-Xylene	**14,000**	800	**3,200**	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	**1,200**	800	**200**	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	**2,400**	800	**930**	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
67-64-1	Acetone	**13,000**	4,000	**5,300**	1,700	M
75-69-4	Trichlorofluoromethane	**1,300**	800	**230**	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	**1,500**	800	**440**	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	**1,100**	800	**360**	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	**880**	800	**220**	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	**25,000**	800	**8,300**	270	
156-59-2	cis-1,2-Dichloroethene	**4,000**	800	**1,000**	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	**2,900**	800	**910**	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	**3,100**	800	**580**	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
8-10-1	4-Methyl-2-pentanone	**2,500**	800	**610**	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	**61,000**	800	**16,000**	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	**6,200**	800	**920**	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	**21,000**	800	**4,900**	180	
179601-23-1	*m,p* -Xylenes	**53,000**	800	**12,000**	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	**1,800**	800	**410**	190	
95-47-6	o-Xylene	**15,000**	800	**3,400**	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	**1,300**	800	**210**	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	**2,400**	800	**940**	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
67-64-1	Acetone	**13,000**	4,000	**5,400**	1,700	M
75-69-4	Trichlorofluoromethane	**1,200**	800	**220**	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	**1,500**	800	**430**	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	**1,100**	800	**370**	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	**880**	800	**220**	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	**25,000**	800	**8,500**	270	
156-59-2	cis-1,2-Dichloroethene	**4,000**	800	**1,000**	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	**2,900**	800	**910**	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	**3,100**	800	**580**	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
108-10-1	4-Methyl-2-pentanone	**2,600**	800	**620**	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	**60,000**	800	**16,000**	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	**6,200**	800	**910**	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	**21,000**	800	**4,900**	180	
179601-23-1	*m,p*-Xylenes	**52,000**	800	**12,000**	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	**1,700**	800	**400**	190	
95-47-6	o-Xylene	**15,000**	800	**3,400**	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	**1,200**	800	**200**	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	8.0	ND	3.9	
75-01-4	Vinyl Chloride	ND	8.0	ND	3.1	
74-83-9	Bromomethane	ND	8.0	ND	2.1	
75-00-3	Chloroethane	ND	8.0	ND	3.0	
67-64-1	Acetone	**540**	40	**230**	17	
75-69-4	Trichlorofluoromethane	ND	8.0	ND	1.4	
75-35-4	1,1-Dichloroethene	ND	8.0	ND	2.0	
75-09-2	Methylene chloride	**28**	8.0	**8.2**	2.3	
76-13-1	Trichlorotrifluoroethane	ND	8.0	ND	1.0	
75-15-0	Carbon Disulfide	ND	8.0	ND	2.6	
156-60-5	trans-1,2-Dichloroethene	ND	8.0	ND	2.0	
75-34-3	1,1-Dichloroethane	ND	8.0	ND	2.0	
1634-04-4	Methyl tert-Butyl Ether	ND	8.0	ND	2.2	
108-05-4	Vinyl Acetate	ND	8.0	ND	2.3	
78-93-3	2-Butanone (MEK)	ND	8.0	ND	2.7	
156-59-2	cis-1,2-Dichloroethene	ND	8.0	ND	2.0	
67-66-3	Chloroform	ND	8.0	ND	1.6	
107-06-2	1,2-Dichloroethane	ND	8.0	ND	2.0	
71-55-6	1,1,1-Trichloroethane	ND	8.0	ND	1.5	
71-43-2	Benzene	**39**	8.0	**12**	2.5	
56-23-5	Carbon Tetrachloride	ND	8.0	ND	1.3	
78-87-5	1,2-Dichloropropane	ND	8.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	8.0	ND	1.2	
79-01-6	Trichloroethene	ND	8.0	ND	1.5	
10061-01-5	cis-1,3-Dichloropropene	ND	8.0	ND	1.8	
8-10-1	4-Methyl-2-pentanone	ND	8.0	ND	2.0	
10061-02-6	trans-1,3-Dichloropropene	ND	8.0	ND	1.8	
79-00-5	1,1,2-Trichloroethane	ND	8.0	ND	1.5	
108-88-3	Toluene	**25**	8.0	**6.6**	2.1	
591-78-6	2-Hexanone	ND	8.0	ND	2.0	
124-48-1	Dibromochloromethane	ND	8.0	ND	0.94	
106-93-4	1,2-Dibromoethane	ND	8.0	ND	1.0	
127-18-4	Tetrachloroethene	ND	8.0	ND	1.2	
108-90-7	Chlorobenzene	ND	8.0	ND	1.7	
100-41-4	Ethylbenzene	ND	8.0	ND	1.8	
179601-23-1	*m,p* -Xylenes	**28**	8.0	**6.4**	1.8	
75-25-2	Bromoform	ND	8.0	ND	0.77	
100-42-5	Styrene	ND	8.0	ND	1.9	
95-47-6	o-Xylene	**8.9**	8.0	**2.0**	1.8	
79-34-5	1,1,2,2-Tetrachloroethane	ND	8.0	ND	1.2	
541-73-1	1,3-Dichlorobenzene	ND	8.0	ND	1.3	
106-46-7	1,4-Dichlorobenzene	ND	8.0	ND	1.3	
95-50-1	1,2-Dichlorobenzene	ND	8.0	ND	1.3	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.15 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	6.7	ND	3.2	
75-01-4	Vinyl Chloride	ND	6.7	ND	2.6	
74-83-9	Bromomethane	ND	6.7	ND	1.7	
75-00-3	Chloroethane	ND	6.7	ND	2.5	
67-64-1	Acetone	**570**	33	**240**	14	
75-69-4	Trichlorofluoromethane	ND	6.7	ND	1.2	
75-35-4	1,1-Dichloroethene	ND	6.7	ND	1.7	
75-09-2	Methylene chloride	**43**	6.7	**12**	1.9	
76-13-1	Trichlorotrifluoroethane	ND	6.7	ND	0.87	
75-15-0	Carbon Disulfide	ND	6.7	ND	2.1	
156-60-5	trans-1,2-Dichloroethene	ND	6.7	ND	1.7	
75-34-3	1,1-Dichloroethane	ND	6.7	ND	1.6	
1634-04-4	Methyl tert-Butyl Ether	ND	6.7	ND	1.8	
108-05-4	Vinyl Acetate	ND	6.7	ND	1.9	
78-93-3	2-Butanone (MEK)	ND	6.7	ND	2.3	
156-59-2	cis-1,2-Dichloroethene	ND	6.7	ND	1.7	
67-66-3	Chloroform	ND	6.7	ND	1.4	
107-06-2	1,2-Dichloroethane	ND	6.7	ND	1.6	
71-55-6	1,1,1-Trichloroethane	ND	6.7	ND	1.2	
71-43-2	Benzene	**23**	6.7	**7.2**	2.1	
56-23-5	Carbon Tetrachloride	ND	6.7	ND	1.1	
78-87-5	1,2-Dichloropropane	ND	6.7	ND	1.4	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.15 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	6.7	ND	1.0	
79-01-6	Trichloroethene	ND	6.7	ND	1.2	
10061-01-5	cis-1,3-Dichloropropene	ND	6.7	ND	1.5	
8-10-1	4-Methyl-2-pentanone	ND	6.7	ND	1.6	
10061-02-6	trans-1,3-Dichloropropene	ND	6.7	ND	1.5	
79-00-5	1,1,2-Trichloroethane	ND	6.7	ND	1.2	
108-88-3	Toluene	**19**	6.7	**4.9**	1.8	
591-78-6	2-Hexanone	ND	6.7	ND	1.6	
124-48-1	Dibromochloromethane	ND	6.7	ND	0.78	
106-93-4	1,2-Dibromoethane	ND	6.7	ND	0.87	
127-18-4	Tetrachloroethene	ND	6.7	ND	0.98	
108-90-7	Chlorobenzene	ND	6.7	ND	1.4	
100-41-4	Ethylbenzene	ND	6.7	ND	1.5	
179601-23-1	*m,p* -Xylenes	**28**	6.7	**6.4**	1.5	
75-25-2	Bromoform	ND	6.7	ND	0.65	
100-42-5	Styrene	ND	6.7	ND	1.6	
95-47-6	o-Xylene	**9.0**	6.7	**2.1**	1.5	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.7	ND	0.97	
541-73-1	1,3-Dichlorobenzene	ND	6.7	ND	1.1	
106-46-7	1,4-Dichlorobenzene	ND	6.7	ND	1.1	
95-50-1	1,2-Dichlorobenzene	ND	6.7	ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: KJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	10	ND	4.8	
75-01-4	Vinyl Chloride	ND	10	ND	3.9	
74-83-9	Bromomethane	ND	10	ND	2.6	
75-00-3	Chloroethane	ND	10	ND	3.8	
67-64-1	Acetone	**840**	50	**350**	21	
75-69-4	Trichlorofluoromethane	ND	10	ND	1.8	
75-35-4	1,1-Dichloroethene	ND	10	ND	2.5	
75-09-2	Methylene chloride	**58**	10	**17**	2.9	
76-13-1	Trichlorotrifluoroethane	ND	10	ND	1.3	
75-15-0	Carbon Disulfide	ND	10	ND	3.2	
156-60-5	trans-1,2-Dichloroethene	ND	10	ND	2.5	
75-34-3	1,1-Dichloroethane	ND	10	ND	2.5	
1634-04-4	Methyl tert-Butyl Ether	ND	10	ND	2.8	
108-05-4	Vinyl Acetate	ND	10	ND	2.8	
78-93-3	2-Butanone (MEK)	ND	10	ND	3.4	
156-59-2	cis-1,2-Dichloroethene	ND	10	ND	2.5	
67-66-3	Chloroform	ND	10	ND	2.0	
107-06-2	1,2-Dichloroethane	ND	10	ND	2.5	
71-55-6	1,1,1-Trichloroethane	ND	10	ND	1.8	
71-43-2	Benzene	**19**	10	**5.8**	3.1	
56-23-5	Carbon Tetrachloride	ND	10	ND	1.6	
78-87-5	1,2-Dichloropropane	ND	10	ND	2.2	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	10	ND	1.5	
79-01-6	Trichloroethene	ND	10	ND	1.9	
10061-01-5	cis-1,3-Dichloropropene	ND	10	ND	2.2	
3-10-1	4-Methyl-2-pentanone	ND	10	ND	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	10	ND	2.2	
79-00-5	1,1,2-Trichloroethane	ND	10	ND	1.8	
108-88-3	Toluene	16	10	4.4	2.7	
591-78-6	2-Hexanone	ND	10	ND	2.4	
124-48-1	Dibromochloromethane	ND	10	ND	1.2	
106-93-4	1,2-Dibromoethane	ND	10	ND	1.3	
127-18-4	Tetrachloroethene	ND	10	ND	1.5	
108-90-7	Chlorobenzene	ND	10	ND	2.2	
100-41-4	Ethylbenzene	ND	10	ND	2.3	
179601-23-1	*m,p* -Xylenes	18	10	4.2	2.3	
75-25-2	Bromoform	ND	10	ND	0.97	
100-42-5	Styrene	ND	10	ND	2.3	
95-47-6	o-Xylene	ND	10	ND	2.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ND	1.5	
541-73-1	1,3-Dichlorobenzene	ND	10	ND	1.7	
106-46-7	1,4-Dichlorobenzene	ND	10	ND	1.7	
95-50-1	1,2-Dichlorobenzene	ND	10	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
108-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/23/07

Columbia Analytical Services, Inc.
Sample Acceptance Check Form

Client: Horizon Engineering Work order: P2700335

Project: Greater Wenatchee Regional Landfill/2758

Sample(s) received on: 2/9/07 Date opened: 2/9/07 by: MZ

Note: This form is used for all samples received by CAS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
	Cooler Temperature NA °C			
	Blank Temperature NA °C			
8	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Is pH (acid) **preservation** necessary, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are pH (acid) preserved?	☐	☐	☒
	Were VOA vials checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Required pH (as received, if required)	pH (as received, if required)	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2700335-001			NA	
P2700335-002			NA	
P2700335-003			NA	
P2700335-004			NA	
P2700335-005			NA	
P2700335-006			NA	

Explain any discrepancies: (include lab sample ID numbers):

Air - Chain of Custody Record & Analytical Service Request

Colt Analytical Services Inc.
An Employee - Owned Company
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) (10 Day - Standard)

CAS Project No. P2700335

Company Name & Address (Reporting Information)
Horizon Engineering
13585 Whitaker Way
Portland, OR 97230

Project Name
Greater Wenatchee Regional Landfill

Project Number
#2758

CAS Contact
Kata Aguilera

Project Manager
Laurel Peterson

P.O. # / Billing Information
#2758

Phone 503/255-5050 | Fax 503/255-0505

Email Address for Result Reporting
lpeterson@horizonengineering.com

Sampler (Print & Sign)
Thomas Rhodes

Analysis Method and/or Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	Btu Content/Fixed Gases: ASTM D3588-98 NMOC: EPA M. 25C	Specieated Organic TAPs: EPA TO-15	H2S & Hydrogen Sulfides: ASTM D5504	Methane: TO-3M		Comments e.g. Actual Preservative or specific instructions
Run #1 Inlet	1	2/8	1213	Air				X	X				Please only
Run #2 Inlet	2	2/8	1400					X	X				analyze
Run #3 Inlet	3	2/8	1532					X	X				duplicates
Run #1 Outlet	4	2/8	1130						X		X		if needed.
Run #2 Outlet	5	2/8	1330						X		X		
Run #3 Outlet	6	2/8	1457						X		X		

Report Tier Levels - please select
Tier I - (Results/Default if not specified) ___
Tier II - (Results + QC) X
Tier III - (Data Validation Package) 10% Surcharge ___
Tier V - (client specified) ___
EDD required Yes / No
Type: _____ EDD Units: _____

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 2/9/07	Time: 1601	Received by: (Signature)	Date: 2/9/07	Time: 2020
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank

HORIZON ENGINEERING
13565 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

Tedlar Bag Sampling Data Sheet

Client Grater Wenatchee LLC Name TAR
Job # 2758

Date	Source Name	Time Start	Time End	Comments
2/8/07	Flare Inlet R1	1212	1214	
"	" R2	1359	1401	
"	" R3	1531	1533	
"	Flare Exhaust R1	1108	1208	
"	" R2	1256	1356	
"	" R3	1427	1527	

1317 South 13th Avenue P.O. Box 479 Kelso, Washington 98626 (360) 577-7222 (360) 636-1068 fax

Columbia Analytical Services INC
An Employee - Owned Company

2-28-07

February 27, 2007 Analytical Report for Service Request No: K0701148

Laurel Peterson
Horizon Engineering, LLC
13585 NE Whitaker Way
Portland, OR 97230

RE: Wenatchee/2758

Dear Laurel:

Enclosed are the results of the samples submitted to our laboratory on February 12, 2007. For your reference, these analyses have been assigned our service request number K0701148.

All analyses were performed according to our laboratory's quality assurance program. The test results meet requirements of the NELAC standards. Exceptions are noted in the case narrative report where applicable. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3316. You may also contact me via Email at JChristian@kelso.caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Jeff Christian
Laboratory Director

JC/lmb

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Program	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Colorado DPHE	-
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DHS	WA200001
South Carolina DHEC	61002
Utah DOH	COLU
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

Columbia Analytical Services, Inc.
An Employee-Owned Company

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 x 07 • FAX (360) 636-1068

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

DATE 2/12/07 PAGE 1 OF 1

PROJECT NAME Wenatchee # 2758
PROJECT MANAGER Laurel Peterson
COMPANY/ADDRESS Horizon Engineering
13585 Whitaker
Portland, OR 97230
PHONE: 503/255-5050 FAX: 503/255-0505
SAMPLERS SIGNATURE Thomas Rhodes

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	ANALYSIS REQUESTED: EPA M-26 - HCl	REMARKS
Run #1 Inlet	2/8/07				1	X	
Run #1 Exhaust	"				1	X	
Run #2 Inlet	"				1	X	
Run #2 Exhaust	"				1	X	
Run #3 Inlet	"				1	X	
Run #3 Exhaust	↓				1	X	
Blank H_2SO_4	"				1	X	0.1 N H_2SO_4
Blank H_2O	↓				1	X	

RELINQUISHED BY:
Signature: Laurel Peterson
Printed Name: Laurel Peterson
Firm: HE
Date/Time: 2/12/07 9:30

RECEIVED BY:
Signature: [illegible]
Printed Name: [illegible]
Firm: CAS 2-12-07 11:00
Date/Time

RELINQUISHED BY:
Signature: [illegible]
Printed Name: [illegible]
Firm: CAS 2-12-07 1:30
Date/Time

RECEIVED BY:
Signature: Tracy Black
Printed Name: Black
Firm: CAS 2/12/07 1330
Date/Time

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr. ___ 5 day
X Standard (10-15 working days)
___ Provide Verbal Preliminary Results
X Provide FAX preliminary Results
Requested Report Date ___

REPORT REQUIREMENTS
___ I. Routine Report
X II. Report (includes DUP.MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:
P.O.# ___
Bill To ___

SAMPLE RECEIPT:
Shipping VIA: ___
Shipping #: ___
Condition: ___
Lab No: ___

SPECIAL INSTRUCTIONS/COMMENTS:

DISTRIBUTION: WHITE - return to originator; YELLOW - lab; PINK - retained by originator

LABCOC 11/01

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Horizon Engineering, LLC	**Service Request:**	K0701148
Project:	Wenatchee/2758	**Date Collected:**	2/8/2007
Sample Matrix:	Aqueous liquid	**Date Received:**	2/12/2007
		Date Extracted:	NA

Inorganic Parameters
Units: Total µg

Analyte:	Volume of Bottle	Chloride
EPA Method:	-	26
Method Reporting Limit:	-	-
Date Analyzed:	-	2/26/2007

Sample Name	Lab Code		
Run #1 Inlet	K0701148-001	56	<5.6
Run #1 Exhaust	K0701148-002	70	420
Run #2 Inlet	K0701148-003	56	<5.6
Run #2 Exhaust	K0701148-004	76	640
Run #3 Inlet	K0701148-005	66	<6.6
Run #3 Exhaust	K0701148-006	72	502
Blank H2SO4	K0701148-007	92	<9.2
Blank H2O	K0701148-008	72	<7.2
Method Blank	K0701148-MB	-	<5.6

Approved By: _____ Date: 2/27/07

3ADW/061694

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Horizon Engineering, LLC
Project: Wenatchee/2758
LCS Matrix: Water

Service Request: K0701148
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 02/26/07

Laboratory Control Sample Summary
Chloride
EPA Method 26
Units: mg/L (ppm)

Analyte	EPA Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Chloride	26	7.1	6.6	93	85-115

Approved By: _____ Date: 2/27/07

LCS/102194

Gas Analysis (BTU Content and Fixed Gases)
Energy Rate Determinations
Example Calculation
Combustion and F-factor (Fd) Determinations
Laboratory Results

Energy Rate Determinations

Waste Management Disposal Services of Washington, Inc. 08-Feb-2007
Wenatchee Landfill Flare Inlet mwallace
East Wenatchee, WA

Fuel Heating Value	HV[1]	BTU/ft³ @ 60°F & 14.73 psia	490.0	502.6	505.6
	HV	BTU/ft³ @ 68°F & 1 atm	481.5	493.8	496.8
Mechanical Readings	Beginning	ft³	448,338	519,075	578,960
	Ending	ft³	487,536	558,519	618,553
Volume Displacement	Vg	Mft³	39.198	39.444	39.593
Time	Beginning		11:08	12:56	14:27
	Ending		12:08	13:56	15:27
Time Interval	t	hr	1.00	1.00	1.00
Gas Pressure	Beginning	psig	0.0	0.0	0.0
	Ending	psig	0.0	0.0	0.0
Average Absolute Pressure	Pg	psia	14.73	14.73	14.73
Gas Temperature	Beginning	°F	60.0	60.0	60.0
	Ending	°F	60.0	60.0	60.0
Average Gas Temperature	Tg	°R	519.7	519.7	519.7
Volume Displacement	Vg(std)	Mft³ @ 68°F & 1 Atm	39.89	40.14	40.30
Fuel Rate	Qg(std)	Mft³/hr @ 68°F & 1 Atm	39.89	40.14	40.30
Energy Rate	Qh	MMBtu/hr	19.21	19.82	20.02

Client: Waste Management, WA Date 2/8/07

Source Greater Wenatchee Landfill Flare Project # 2758 Run # 1

Energy Rate and Flow Rate:

Gas Usage = 39.198 **Mft³ @ 60°F, 14.73 PSA (Client Data)**

Heating Value (HV[1]) = 490.0 **Btu/ft³ @ 60°F, 14.73 PSA (by Laboratory Analysis)**

Natural Gas Heating Value (HV) @ 68°F, 1 ATM:

60°F = 459.67°R = 519. 67°R @ 14.73 psia

68°F = 459.67°R = 527. 67°R @ 14.69595 psia (1 ATM)

$$HV = HV[1] \times \frac{519.67^\circ R}{527.67^\circ R} \times \frac{14.69595\,psia}{14.73\,psia}$$

$$HV = \frac{490.0\ Btu}{ft^3} \times \frac{519.67^\circ R}{527.67^\circ R} \times \frac{14.69595\,psia}{14.73\,psia} = \frac{481.46\ Btu}{ft^3}$$

Volume Displacement (Vg(std)):

$$Vg(std) = GasUsage \times \frac{527.67^\circ R}{519.67^\circ R} \times \frac{14.73\,psia}{14.69595\,psia}$$

$$Vg(std) = 39.198\ Mft^3 \times \frac{527.67^\circ R}{519.67^\circ R} \times \frac{14.73\,psia}{14.69595\,psia} = 39.894\ Mft^3$$

Fuel Rate (Qg(std)) @ 68°F, 1 ATM:

Sampling Time Interval = Start (1108) End (1208) = 1 **hrs**

$$Qg(std) = Vg(std) / hrs$$

$$Qg(std) = \frac{39.894\ Mft^3}{1\ hr} = 39.894\ \frac{Mft^3}{hr}$$

Natural Gas Energy Rate (Qh):

$$Qh = (Qg(std) \times HV) \div 1000$$

$$Qh = \left(39.894\ \frac{Mft^3}{hr} \times 481.46\ \frac{Btu}{ft^3}\right) \div 1000 = 19.207\ \frac{MMBtu}{hr}$$

Combustion of Inlet Gas and F Factor Determination

Waste Management Disposal Services of Washington, Inc. — 17-Feb-2007

Wenatchee Landfill Flare Inlet — **RUN 1** — MWALLACE

FUEL DRY		FUEL WET		HEATING VALUE molwt	molWt	BTU	@60/30 *BTU/CUFT	FUEL		
CH4	48.070%	CH4	48.070%	7.71	16.04	487.05	1013.2	[A]	48.0700	CH4
C2H6	0.000%	C2H6	0.000%	0.00	30.07	0.00	1792.0	[B]	0.0000	C2H6
C3H8	0.010%	C3H8	0.010%	0.00	44.10	0.26	2590.0	[C]	0.0100	C3H8
C4H10	0.000%	C4H10	0.000%	0.00	58.12	0.00	3367.5	[D]	0.0000	C4H10
C5H12	0.010%	C5H12	0.010%	0.01	72.15	0.40	4012.0	[E]	0.0100	C5H12
C6H14+	0.050%	C6H14+	0.050%	0.04	86.18	2.38	4762.0	[F]	0.0500	C6H14
CO	0.000%	CO	0.000%	0.00	28.01	0.00	321.8		0.0000	CO
H2	0.060%	H2	0.060%	0.00	2.02	0.20	325.0		0.0600	H2
H2S	0.010%	H2S	0.010%	0.00	34.08	0.06	647.0		0.0100	H2S
N2	15.240%	N2	15.240%	4.27	28.01	0.00	0.0	[G]	15.2400	N2
O2	2.580%	O2	2.580%	0.83	32.00	0.00	0.0		2.5800	O2
H2O		H20	0.000%	0.00	18.02	0.00	0.0		0.0000	H2O
SO2	0.000%	SO2	0.000%	0.00	64.06	0.00	0.0		0.0000	SO2
CO2	33.970%	CO2	33.970%	14.95	44.01	0.00	0.0	[H]	33.9700	CO2
	100.000%		100.000%	Mol wt. 27.82		490.35	Btu/cuft wet fuel		100.0000	

Oxygen Required

CH4 O2 Needed	C2H6 O2 Needed	C3H8 O2 Needed	C4H10 O2 Needed	C5H12 O2 Needed	C6H14 O2 Needed	CO O2 Needed	H2 O2 Needed	H2S O2 Needed
2.00	3.50	5.00	6.50	8.00	9.50	0.50	0.50	1.50
Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles
96.14	0.00	0.05	0.00	0.08	0.48	0.00	0.03	0.02

AIR TOTAL O2 Needed	AIR N2	AIR H2O	AIR CO2	AIR/FUEL MolWt	AIR/FUEL MolWt		
	N2 per O2 (wet) 377.41% In Air	H2O per O2 (wet) 3.462%	CO2 per O2 (wet) 0.16%	27.816	28.871		
[J]	(w/Ar)	0.72%	0.033%	WET Fuel	WET Air	WET Air/Fuel	WET Air/Fuel
Moles	Moles	Moles	Moles	Moles	Moles	Mole/Mole	lbm/lbm
94.21	355.6	3.26	0.148	100.00	453.18	4.532	4.704
154.64	583.6	5.35	0.148		743.79	7.438	7.720
215.08	811.7	7.45	0.148		1034.40	10.344	10.736
275.51	1,039.8	9.54	0.148		1325.01	13.250	13.753
335.95	1,267.9	11.63	0.148		1615.62	16.156	16.769
396.38	1,496.0	13.72	0.148		1906.23	19.062	19.785

CAS ANALYSIS
490.0 BTU/cf @ 60/14.73

HORIZON ENGINEERING
490.3 BTU/cf @ 60/14.73
0.07% Percent Difference

PRODUCTS CO2 [Y]	N2 [Z]	SO2	O2 [K]	H2O [W]	CO2+N2	GROSS HEATING VALUE wet mol wt	WET **GHV Btu/cuft @60/30	WET GHV(2) Btu/cuft @68/1atm 1.018	DRY GHV(2) Btu/cuft @68/1atm
44.01	28.15	64.06	32.00	18.02					
82.57	**370.80**	0.01	0.00	99.92	453.4	28.69	490.35	481.80	**481.80**
82.57	598.88	0.01	60.43	102.01	681.4	28.76			
82.57	**826.96**	0.01	**120.87**	**104.11**	909.5	28.79			
82.57	1055.05	0.01	181.30	106.20	1,137.6	28.81			
82.57	1283.13	0.01	241.74	108.29	1,365.7	28.82			
82.57	1511.21	0.01	302.17	110.38	1,593.8	28.83			

M19 "F" FACTORS Standardized at 68F and 29.92126 inHg Total BTU Fuel	Total Dry cuft Exhaust	Total Wet cuft Exhaust (From 100 lbmols Fuel)	Fw wscf/MMBtu	Fd dscf/MMBtu	Exhaust 64.1% Percent Excess Air	Exhaust %H20 Exhaust Percent H2O	Exhaust %O2 Exhaust Percent O2 Dry	Exhaust %CO2 Exhaust Percent CO2 Dry	Exhaust %SO2 Exhaust Percent SO2 Dry	Exhaust PPMV SO Exhaust PPMV SO2 Dry
18,564,668	174,696	213,197	11,484	**9,410.1**	0.00%	18.06%	0.00%	18.21%	0.00%	22.1
18,564,668	285,867	325,175	17,516	15,398	64.15%	12.09%	8.15%	11.13%	0.00%	13.5
18,564,668	397,039	437,153	23,548	21,387	128.30%	**9.18%**	**11.73%**	**8.01%**	0.00%	9.7
18,564,668	508,211	549,131	29,579	27,375	192.44%	7.45%	13.75%	6.26%	0.00%	7.6
18,564,668	619,382	661,109	35,611	33,363	256.59%	6.31%	15.04%	5.14%	0.00%	6.2
18,564,668	730,554	773,087	41,643	39,352	320.74%	5.50%	15.94%	4.35%	0.00%	5.3

Combustion of Inlet Gas and F Factor Determination

Waste Management Disposal Services of Washington, Inc. — 17-Feb-2007
Wenatchee Landfill Flare Inlet — **RUN 2** — MWALLACE

FUEL DRY		FUEL WET		HEATING VALUE mol.wt	mol.wt	@60/30 BTU	@60/30 BTU/CUF	FUEL		
CH4	49.240%	CH4	49.240%	7.90	16.04	498.90	1013.2	[A]	49.2400	CH4
C2H6	0.000%	C2H6	0.000%	0.00	30.07	0.00	1792.0	[B]	0.0000	C2H6
C3H8	0.010%	C3H8	0.010%	0.00	44.10	0.26	2590.0	[C]	0.0100	C3H8
C4H10	0.000%	C4H10	0.000%	0.00	58.12	0.00	3367.5	[D]	0.0000	C4H10
C5H12	0.010%	C5H12	0.010%	0.01	72.15	0.40	4012.0	[E]	0.0100	C5H12
C6H14+	0.060%	C6H14+	0.060%	0.05	86.18	2.86	4762.0	[F]	0.0600	C6H14
CO	0.000%	CO	0.000%	0.00	28.01	0.00	321.8		0.0000	CO
H2	0.060%	H2	0.060%	0.00	2.02	0.20	325.0		0.0600	H2
H2S	0.010%	H2S	0.010%	0.00	34.08	0.06	647.0		0.0100	H2S
N2	13.620%	N2	13.620%	3.82	28.01	0.00	0.0	[G]	13.6200	N2
O2	2.130%	O2	2.130%	0.68	32.00	0.00	0.0		2.1300	O2
H2O		H2O	0.000%	0.00	18.02	0.00	0.0		0.0000	H2O
SO2	0.000%	SO2	0.000%	0.00	64.06	0.00	0.0		0.0000	SO2
CO2	34.860%	CO2	34.860%	15.34	44.01	0.00	0.0	[H]	34.8600	CO2
	100.000%		100.000%	Mol wt. 27.81		502.68	Btu/cuft wet fuel		100.0000	

Oxygen Required

CH4 O2 Needed	C2H6 O2 Needed	C3H8 O2 Needed	C4H10 O2 Needed	C5H12 O2 Needed	C6H14 O2 Needed	CO O2 Needed	H2 O2 Needed	H2S O2 Needed
2.00	3.50	5.00	6.50	8.00	9.50	0.50	0.50	1.50
Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles
98.48	0.00	0.05	0.00	0.08	0.57	0.00	0.03	0.02

AIR

TOTAL O2 Needed	N2 N2 per O2 (wet) 377.41% In Air	H2O H2O per O2 (wet) 3.462%	CO2 CO2 per O2 (v 0.16%	AIR/FUEL MolWt 27.806 WET Fuel	MolWt 28.871 WET Air	WET Air/Fuel	WET Air/Fuel
[J]	(w/Ar)	0.72%	0.033%				
Moles	Moles	Moles	Moles	Moles	Moles	Mole/Mole	lbm/lbm
97.10	366.4	3.36	0.153	100.00	467.06	4.671	4.849
159.05	600.3	5.51	0.153		764.98	7.650	7.943
221.01	834.1	7.65	0.153		1062.91	10.629	11.036
282.96	1,067.9	9.80	0.153		1360.84	13.608	14.130
344.92	1,301.8	11.94	0.153		1658.77	16.588	17.223
406.87	1,535.6	14.09	0.153		1956.69	19.567	20.316

CAS ANALYSIS
502.6 BTU/cf @ 60/14.73
HORIZON ENGINEERING
502.7 BTU/cf @ 60/14.73
0.02% Percent Difference

PRODUCTS

CO2 [Y]	N2 [Z]	SO2	O2 [K]	H2O [W]	CO2+N2	GROSS HEATING VALUE wet mol wt	WET **GHV Btu/cuft @60/30	WET GHV(2) Btu/cuft @68/1atm 1.018	DRY GHV(2) Btu/cuft @68/1atm
44.01	28.15	64.06	32.00	18.02					
84.69	**380.07**	0.01	0.00	102.43	464.8	28.69	502.68	493.91	**493.91**
84.69	613.89	0.01	61.96	104.58	698.6	28.76			
84.69	**847.72**	0.01	**123.91**	**106.72**	932.4	28.79			
84.69	1081.55	0.01	185.87	108.87	1,166.2	28.81			
84.69	1315.37	0.01	247.82	111.01	1,400.1	28.82			
84.69	1549.20	0.01	309.78	113.16	1,633.9	28.83			

M19 "F" FACTORS

Standardized at 68F and 29.92126 inHg

Total BTU Fuel	Total Dry cuft Exhaust (From 100 lbmols Fuel)	Total Wet cuft Exhaust (From 100 lbmols Fuel)	Fw wscf/MMBtu	Fd dscf/MMBtu	Exhaust 63.8% Percent Excess Air	Exhaust %H20 Exhaust Percent H2O	Exhaust %O2 Exhaust Percent O2 Dry	Exhaust %CO2 Exhaust Percent CO2 Dry	Exhaust %SO2 Exhaust Percent SO2 Dry	Exhaust PPMV SO Exhaust PPMV SO2 Dry
19,031,510	179,085	218,554	11,484	**9,409.9**	0.00%	18.06%	0.00%	18.22%	0.00%	21.5
19,031,510	293,057	333,352	17,516	15,398	63.81%	12.09%	8.15%	11.14%	0.00%	13.1
19,031,510	407,028	448,150	23,548	21,387	127.62%	**9.18%**	**11.73%**	**8.02%**	0.00%	9.5
19,031,510	520,999	562,948	29,580	27,376	191.43%	7.45%	13.75%	6.26%	0.00%	7.4
19,031,510	634,970	677,745	35,612	33,364	255.24%	6.31%	15.04%	5.14%	0.00%	6.1
19,031,510	748,941	792,543	41,644	39,353	319.05%	5.50%	15.94%	4.36%	0.00%	5.1

Combustion of Inlet Gas and F Factor Determination

Waste Management Disposal Services of Washington, Inc. 17-Feb-2007
Wenatchee Landfill Flare Inlet **RUN 3** MWALLACE

FUEL DRY		FUEL WET		HEATING VALUE molwt	molwt	BTU	@60/30 *BTU/CUFT	FUEL		
CH4	49.590%	CH4	49.590%	7.95	16.04	502.40	1013.2	[A]	49.5850	CH4
C2H6	0.000%	C2H6	0.000%	0.00	30.07	0.00	1792.0	[B]	0.0000	C2H6
C3H8	0.010%	C3H8	0.010%	0.00	44.10	0.26	2590.0	[C]	0.0100	C3H8
C4H10	0.000%	C4H10	0.000%	0.00	58.12	0.00	3367.5	[D]	0.0000	C4H10
C5H12	0.010%	C5H12	0.010%	0.01	72.15	0.40	4012.0	[E]	0.0100	C5H12
C6H14+	0.050%	C6H14+	0.050%	0.04	86.18	2.38	4762.0	[F]	0.0500	C6H14
CO	0.000%	CO	0.000%	0.00	28.01	0.00	321.8		0.0000	CO
H2	0.070%	H2	0.070%	0.00	2.02	0.23	325.0		0.0700	H2
H2S	0.010%	H2S	0.010%	0.00	34.08	0.06	647.0		0.0100	H2S
N2	13.200%	N2	13.200%	3.70	28.01	0.00	0.0	[G]	13.1987	N2
O2	2.010%	O2	2.010%	0.64	32.00	0.00	0.0		2.0098	O2
H2O	[redacted]	H2O	0.000%	0.00	18.02	0.00	0.0		0.0000	H2O
SO2	0.000%	SO2	0.000%	0.00	64.06	0.00	0.0		0.0000	SO2
CO2	35.060%	CO2	35.060%	15.43	44.01	0.00	0.0	[H]	35.0565	CO2
				Mol wt.		505.73	Btu/cuft			
	100.010%		100.010%	27.78			wet fuel		100.0000	

Oxygen Required

CH4 O2 Needed	C2H6 O2 Needed	C3H8 O2 Needed	C4H10 O2 Needed	C5H12 O2 Needed	C6H14 O2 Needed	CO O2 Needed	H2 O2 Needed	H2S O2 Needed
2.00	3.50	5.00	6.50	8.00	9.50	0.50	0.50	1.50
Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles	Moles
99.17	0.00	0.05	0.00	0.08	0.47	0.00	0.03	0.01

AIR TOTAL O2 Needed [J] Moles	AIR N2 N2 per O2 (wet) 377.41% In Air (w/Ar) Moles	AIR H2O H2O per O2 (wet) 3.462% 0.72% Moles	AIR CO2 CO2 per O2 (wet) 0.16% 0.033% Moles	AIR/FUEL MolWt 27.783 WET Fuel Moles	AIR/FUEL MolWt 28.871 WET Air Moles	AIR/FUEL WET Air/Fuel Mole/Mole	AIR/FUEL WET Air/Fuel lbm/lbm
97.82	369.2	3.39	0.154	100.00	470.52	4.705	4.889
161.24	608.5	5.58	0.154		775.50	7.755	8.059
224.66	847.9	7.78	0.154		1080.48	10.805	11.228
288.08	1,087.2	9.97	0.154		1385.45	13.855	14.397
351.50	1,326.6	12.17	0.154		1690.43	16.904	17.566
414.92	1,566.0	14.37	0.154		1995.41	19.954	20.735

CAS ANALYSIS
505.6 BTU/cf @ 60/14.73
HORIZON ENGINEERING
505.7 BTU/cf @ 60/14.73
0.03% Percent Difference

PRODUCTS CO2 [Y]	N2 [Z]	SO2	O2 [K]	H2O [W]	CO2+N2	GROSS HEATING VALUE wet mol wt	WET **GHV Btu/cuft @60/30	WET GHV(2) Btu/cuft @68/1atm 1.018	DRY GHV(2) Btu/cuft @68/1atm
44.01	28.15	64.06	32.00	18.02					
85.18	**382.36**	0.01	0.00	103.09	467.5	28.69	505.73	496.91	**496.86**
85.18	621.72	0.01	63.42	105.28	706.9	28.76			
85.18	**861.08**	0.01	**126.84**	**107.48**	946.3	28.79			
85.18	1100.44	0.01	190.27	109.67	1,185.6	28.81			
85.18	1339.80	0.01	253.69	111.87	1,425.0	28.82			
85.18	1579.16	0.01	317.11	114.07	1,664.3	28.83			

M19 "F" FACTORS Standardized at 68F and 29.92126 inHg Total BTU Fuel	Total Dry cuft Exhaust	Total Wet cuft Exhaust (From 100 lbmols Fuel)	Fw wscf/MMBtu	Fd dscf/MMBtu	Exhaust 64.8% Percent Excess Air	Exhaust %H20 Exhaust Percent H2O	Exhaust %O2 Exhaust Percent O2 Dry	Exhaust %CO2 Exhaust Percent CO2 Dry	Exhaust %SO2 Exhaust Percent SO2 Dry	Exhaust PPMV SO Exhaust PPMV SO2 Dry
19,147,057	180,156	219,878	11,484	**9,409.1**	0.00%	18.07%	0.00%	18.22%	0.00%	21.4
19,147,057	296,825	337,392	17,621	15,502	64.84%	12.02%	8.23%	11.06%	0.00%	13.0
19,147,057	413,493	454,906	23,759	21,596	129.68%	**9.10%**	**11.82%**	**7.94%**	0.00%	9.3
147,057	530,161	572,421	29,896	27,689	194.51%	7.38%	13.83%	6.19%	0.00%	7.3
19,147,057	646,829	689,935	36,033	33,782	259.35%	6.25%	15.11%	5.07%	0.00%	6.0
19,147,057	763,497	807,449	42,171	39,875	324.19%	5.44%	16.00%	4.30%	0.00%	5.0

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client:	**Horizon Engineering**		
Client Sample ID:	**Run #1 Inlet**	CAS Project ID: P2700335	
Client Project ID:	**Greater Wenatchee Regional Landfill/2758**	CAS Sample ID: P2700335-001	
Test Code:	ASTM D3588-98		
Analyst:	Zheng Wang/Wade Henton	Date Collected: 2/8/07	
Sampling Media:	Tedlar Bag	Date Received: 2/9/07	
Test Notes:			

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.06	0.01	
Oxygen + Argon	2.76	3.18	
Nitrogen	15.06	15.16	
Carbon Monoxide	< 0.01	< 0.01	
Methane	48.07	27.71	
Carbon Dioxide	33.97	53.72	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	< 0.01	
Pentanes	0.01	0.02	
Hexanes	0.01	0.02	
> Hexanes	0.04	0.15	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	21.71	35.56	
Hydrogen	50.97	7.00	
Oxygen / Argon	19.37	42.25	
Nitrogen	7.94	15.17	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9607	
Specific Volume	ft3/lb	13.64	
Gross Heating Value	BTU/ft3	490.0	**
Net Heating Value	BTU/ft3	441.3	**
Gross Heating Value	BTU/ft3	480.3	*
Net Heating Value	BTU/ft3	432.5	*
Gross Heating Value	BTU/lb	6683.6	**
Net Heating Value	BTU/lb	6018.7	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9974	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

Verified By: MJ Date: 2/22/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-002

Test Code: ASTM D3588-98
Analyst: Zheng Wang/Wade Henton Date Collected: 2/8/07
Sampling Media: Tedlar Bag Date Received: 2/9/07
Test Notes:

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.06	0.01	
Oxygen + Argon	2.29	2.63	
Nitrogen	13.46	13.55	
Carbon Monoxide	< 0.01	< 0.01	
Methane	49.24	28.40	
Carbon Dioxide	34.86	55.15	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	0.01	
Pentanes	0.01	0.02	
Hexanes	0.01	0.02	
> Hexanes	0.05	0.19	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	22.01	36.50	
Hydrogen	51.62	7.18	
Oxygen / Argon	19.35	42.75	
Nitrogen	7.01	13.56	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9604	
Specific Volume	ft3/lb	13.64	
Gross Heating Value	BTU/ft3	502.6	**
Net Heating Value	BTU/ft3	452.6	**
Gross Heating Value	BTU/ft3	492.5	*
Net Heating Value	BTU/ft3	443.5	*
Gross Heating Value	BTU/lb	6857.0	**
Net Heating Value	BTU/lb	6175.1	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9974	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

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Verified By: WJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: Run #3 Inlet — CAS Project ID: P2700335
Client Project ID: Greater Wenatchee Regional Landfill/2758 — CAS Sample ID: P2700335-003

Test Code: ASTM D3588-98
Analyst: Zheng Wang/Wade Henton — Date Collected: 2/8/07
Sampling Media: Tedlar Bag — Date Received: 2/9/07
Test Notes:

Components	Volume %	Weight %	Data Qualifier
Hydrogen	0.07	0.01	
Oxygen + Argon	2.17	2.49	
Nitrogen	13.04	13.14	
Carbon Monoxide	< 0.01	< 0.01	
Methane	49.59	28.62	
Carbon Dioxide	35.06	55.51	
Hydrogen Sulfide	0.01	0.02	
Ethane	< 0.01	< 0.01	
Propane	0.01	0.01	
Butanes	< 0.01	< 0.01	
Pentanes	0.01	0.01	
Hexanes	0.01	0.02	
> Hexanes	0.04	0.16	
TOTALS	99.99	99.99	

Components	Mole %	Weight %	Data Qualifier
Carbon	22.08	36.74	
Hydrogen	51.81	7.23	
Oxygen / Argon	19.34	42.87	
Nitrogen	6.77	13.15	
Sulfur	< 0.10	< 0.10	

Specific Gravity (Air = 1)		0.9596	
Specific Volume	ft3/lb	13.65	
Gross Heating Value	BTU/ft3	505.6	**
Net Heating Value	BTU/ft3	455.3	**
Gross Heating Value	BTU/ft3	495.5	*
Net Heating Value	BTU/ft3	446.2	*
Gross Heating Value	BTU/lb	6903.9	**
Net Heating Value	BTU/lb	6217.1	**
Compressibility Factor "Z" (60 F, 14.696 psia)		0.9973	

* = Water Saturated at 0.25636 psia
** = Dry Gas @ 60 F, 14.696 psia

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Verified By: MJ Date: 2/23/07

Outlet Particulate Matter (PM)
Flow Rate and PM Emissions Determinations
Example Calculation
Field Data
Blank Corrections
Laboratory Results, Worksheets, Tare Records
and Chain of Custody
Sample Recovery Field Data and Worksheets
Traverse Point Locations

Outlet Flow Rate and PM Emissions

Client	Waste Management Disposal Services of Washington, Inc.				08-Feb-2007	Date
Source	Wenatchee Regional Landfill Flare Outlet				mwallace	Analysis/QA
Location	East Wenatchee, WA					
Methods	EPA 1-4, 5, 202					
Definitions	Symbol	Units	Run 1	Run 2	Run 3	Average
Date	3		08-Feb	08-Feb	08-Feb	
Time, Starting			11:09	12:56	14:30	
Time, Ending			12:09	13:56	15:30	
Filter, Front			06-m29-018	06-m29-019	06-m29-020	
Volume, Gas sample	Vm	dcf	43.339	42.644	42.569	42.9
Temperature, Dry gas meter	Tm	°F	56.8	63.0	68.3	62.7
Temperature, Stack gas	Ts	°F	1502.7	1497.0	1489.3	1496.3
Temperature, Stack Dry Bulb	Tdb	°F	na	na	na	
Temperature, Stack Wet Bulb	Twb	°F	na	na	na	
Pressure differential across orifice	dH	in H2O	1.60	1.60	1.60	1.60
Average sqrt velo. press.	dp^½	in H2O^½	0.083	0.085	0.081	
Diameter, Nozzle	Dn	in	0.6972	0.6882	0.6972	
Pitot tube coefficient	Cp		0.8384	0.8384	0.8384	
Dry gas meter calibration factor	Y		0.9882	0.9882	0.9882	
Pressure, Barometric	Pbar	in Hg	28.80	28.80	28.80	
Pressure, Static Stack	Pg	in H2O	-0.06	-0.06	-0.07	
Time, Total sample	Ø	min	60.0	60.0	60.0	60.0
Stack Area	As	in²	8,171	8,171	8,171	
Nozzle Area	An	in²	0.3817	0.3719	0.3817	
Volume of condensed water	Vlc	ml	76.7	74.7	73.7	75.0
Oxygen		% O2	11.73	11.73	11.82	11.76
Carbon Dioxide		% CO2	8.27	8.01	8.39	8.22
Molecular weight, Dry Stack	Md	lbm / lbmole	29.92	29.88	29.94	29.91
Pressure, Absolute Stack	Ps	in Hg	28.80	28.80	28.79	28.80
Pressure, avg arcoss orifice	Po	in Hg	28.92	28.92	28.92	28.92
Volume, Dry standard gas sample	Vm(std)	dscf	42.29	41.11	40.63	41.35
Volume, Water Vapor	Vw(std)	scf	3.61	3.51	3.47	3.53
Moisture, % Stack (EPA 4)	Bws(1)	%	7.86	7.87	7.86	7.87
Moisture, % Stack (Psychometry-Sat)	Bws(2)	%	na	na	na	
Moisture, % Stack (Theoretical)	Bws(3)	%	na	na	na	
Moisture, % Stack (Psychometry)	Bws(4)	%	na	na	na	
Moisture, % Stack (Predicted)	Bws(5)	%	na	na	na	
Mole Fraction dry Gas	mfg		92.1%	92.1%	92.1%	92.1%
Molecular weight, Wet Stack	Ms	lbm / lbmole	28.98	28.94	29.00	28.97
Velocity, Stack gas (flow)	vs	fpm	547.5	562.4	529.4	546.5
Volumetric Flowrate, Actual	Qa	acf/min	31,068	31,914	30,043	31,008
Volumetric Flowrate, Dry Standard	Qsd	dscf/min	7,408	7,630	7,212	7,417
Energy Rate	Qh	MMBtu/hr	19.21	19.82	20.02	19.68
Total Particulate						
Particulate sample weight-Total	mn	mg	19.19	22.00	23.07	21.42
Grain Loading, Actual	cg	gr / dscf	0.0070	0.0083	0.0088	0.0080
		mg / dscm	16.0	18.9	20.1	18.3
Particulate Mass Emissions	Ct	lbm / hr	0.44	0.54	0.54	0.51
		gm / hr	202	245	246	231
		tons/yr	1.95	2.37	2.37	2.23
		lbm/MMBtu	0.0231	0.0272	0.0271	0.0258
Front Half						
Particulate sample weight	mn	mg	2.10	0.70	3.90	2.23
Grain Loading, Actual	cg	gr / dscf	0.0008	0.0003	0.0015	0.0008
		mg / dscm	1.8	0.6	3.4	1.9
Particulate Mass Emissions	Ct	lbm / hr	0.05	0.02	0.09	0.05
		gm / hr	22	8	42	24
Back Half						
Particulate sample weight	mn	mg	17.09	21.30	19.17	19.19
Grain Loading, Actual	cg	gr / dscf	0.0062	0.0080	0.0073	0.0072
		mg / dscm	14.3	18.3	16.7	16.4
Particulate Mass Emissions	Ct	lbm / hr	0.40	0.52	0.45	0.46
		gm / hr	180	237	204	207

Client: Waste Management, WA Date 2/8/07

Source Greater Wenatchee Landfill Flare Project # 2758 Run # 1

Molecular Weights (lb/lbmol):

CO_2=44.01	O_2=31.999	N_2+Ar=28.154	H_2O=18.015	atm=28.965

Constants:

Pstd(1)=29.92129 in Hg	Tstd=527.67 °R	Kp=5129.4	C2=816.5455inHg $in^2/°R\ ft^2$

Pressure, Absolute Stack (Ps):

$$Ps, inHg = P_{Barometric} + \frac{P_{static}}{13.6} = \underline{28.8}\ inHg + \frac{\underline{-0.06}\ in\ H2O}{13.6} = \underline{28.796}\ inHg$$

Volume, Dry Standard Gas Sample (Vm[std]): $Tm = \underline{56.792}\ ^\circ F + 459.67 = \underline{516.46}\ ^\circ R$

$$Orifice\ Press = Pb\ \underline{28.8}\ inHg + \frac{\underline{1.6}\ \Delta H in H_2O}{13.6} = \underline{28.918}\ inHg$$

$$Vm(std)\ ft^3 = \frac{Y \times MeterVol \times Tstd \times Orifice\ Pres(Po)}{Pstd(1) \times Tm \circ R}$$

$$= \frac{\underline{0.98822} \times \underline{43.339}\ ft^3 \times 527.67 \circ R \times (Po\ \underline{28.918}\ inHg)}{29.9213 inHg \times \underline{516.45} \circ R} = \underline{42.292}\ dscf$$

Moisture, % Stack Gas (bws): $V_{wstd} = 0.04707 \times Cond.H2O, ml = 0.04707 \times \underline{76.7}\ ml = \underline{3.6103}\ scf$

$$bws = 100 \times \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = \frac{\underline{3.6103}\ scf}{\underline{3.6103}\ scf + \underline{42.292}\ dscf} = \underline{7.8652}\ \%$$

Mole Fraction Gas (mfg):

$$1 - \frac{bws}{100} = 1 - \frac{\underline{7.8652\%}}{100} = \underline{0.92135}$$

Molecular Weight, Dry, Stack (Md):

$$Md\ \frac{lb}{lbmol} = \left[(1 - \frac{O_2}{100} - \frac{CO_2}{100}) \times MolWtN2Ar\right] + \left[\frac{O_2}{100} \times MolWtO2\right] + \left[\frac{CO_2}{100} \times MolWtCO2\right]$$

$$= \left[(1 - \frac{\underline{11.73}\ \%O_2}{100} - \frac{\underline{8.27}\ \%CO_2}{100}) \times 28.154\ \frac{lb}{lbmol}\right] + \left[\frac{\underline{11.73}\ \%O_2}{100} \times 31.999\ \frac{lb}{lbmol}\right] +$$

$$\left[\frac{\underline{8.27}\ \%CO_2}{100} \times 44.010\ \frac{lb}{lbmol}\right]$$

$$= \underline{29.916}\ \frac{lb}{lbmol}$$

Molecular Weight, Wet, Stack (Ms):

$$Ms\ \frac{lb}{lbmol} = (Md \times mfg) + (MolWtH_2O \times (1 - mfg)) = \left(\underline{29.916}\ \frac{lb}{lbmol} \times \underline{.92135}\right) + (18.015 \times (1 - \underline{.92135}))$$

$$= \underline{28.980}\ \frac{lb}{lbmol}$$

Client: Waste Management, WA Date 2/8/07

Stack gas (vs): $Ts = 1502.7^\circ F + 459.\overset{6.7}{7} = 1961.7^\circ R$

$$= vs\frac{feet}{min} = Kp \times Cp \times dp\sqrt{inH_2O} \times \sqrt{\frac{Ts^\circ R}{Ps \times Ms}}$$

$$= 5129.4\,ft/\min \ldots \times 0.8384 \times .083024\, dp\sqrt{inH_2O} \times \sqrt{\frac{1961.7^\circ R}{28.796\,inHg \times 28.98\frac{lb}{lbmol}}} = 547.42\frac{ft}{\min}$$

Flow Rate, Actual (Qa): Stack Ø = 102.0"

$$Qa\frac{actualCubicFeet.}{\min} = \frac{AreaStack \times vs}{144} = \frac{817.3\ in^2 \times 547.42\frac{ft}{\min}}{144} = 3{,}063\ acfm$$

Flow Rate, Dry Standard (Qsd):

$$Qsd\frac{dryStdFt^3}{\min} = \frac{Qa \times Tstd \times mfg \times Ps}{Pstd(1) \times Ts^\circ R} = \frac{3{,}063\ acfm \times 527.67^\circ R \times 0.92135 \times 28.796\ inHg}{29.9213 inHg \times 1961.7^\circ R}$$

$$= 7408.8\frac{dscf}{\min}$$

Percent Isokinetic (I): Nozzle Ø = 0.6972

$$I\% = \frac{C_2 \times Ts^\circ R \times Vm(std)}{vs \times Ps \times mfg \times An \times \theta}$$

$$= \frac{816.5455 inHg \cdot in^2/^\circ R \cdot ft^2 \times 1961.7^\circ R \times 42.292\ dscf}{547.42\ fpm \times 28.796\ inHg \times 0.92135 \times 0.3817\ in^2 \times 60\ \min}$$

$$= 203.67\ \%$$

Grain Loading, actual (cg): TOTAL PM

$$cg\frac{gr}{dscf} = \frac{15.432gr}{g} \times \frac{1g}{1000mg} \times \frac{mgSample}{Vm(std)} = \frac{15.432gr}{g} \times \frac{1g}{1000mg} \times \frac{19.19\ mg}{42.292\ dscf}$$

$$= 0.00700227\frac{gr}{dscf}$$

Mass Emissions (Ct):

$$Ct\frac{lb}{hr} = \frac{60 \times cg \times Qsd}{7000 grains/lb} = \frac{60 \times 0.00700177\frac{gr}{dscf} \times 7408.8\ dscf/\min}{7000 gr/lb} = 0.44470\frac{lb}{hr}$$

Heat input based Emissions

Energy rate = 19.21 MMBTU/hr

$$\frac{0.4447\ lb\text{-}PM/hr}{} \times \frac{hr}{19.21\ MM\ BTU} = 0.023149\ lb\text{-}PM/MM\ BTU$$

Field Data Sheet

13585 NE Whitaker Way
Portland, OR 97230
Phone (503) 255-5050
Fax (503) 255-0505

USED SR#2
for flows
w/ pitot
8s-1: cp = 0.8384

Client: GWRL
Plant: Wenatchee, WA
Location: Outlet
Sample Location: Exhaust

Date 2/8/07
Test Method M5/202
Concurrent Testing 26 Gases
Run # 1
Operator KRK Support TAR
Temperature, Amb (Ta) ~45
Moisture 8 % Tdb — Twb —
Press., Static (Pstat) -0.06 Press., Bar (Pb) 28.88
Cyclonic Flow Expected ? N If yes, avg. null angle — degrees

Probe Quartz Cp — Heat Set — °F
Post-Test Pitot Inspection NC (NC=no change, D=damaged)
Pitot Lk Rate in H2O@in H2O: Pre: Hi — @ — Post 0 @11; Lo —@— 0 @5
Nozzle .6972 Quartz Sample Box 187
Filter 06 m29 018 Heat Set 250 °F
Meter Box 7 dH@ 1.62874Y .98822
Meter Leak Check: Pretest: 0.006 cfm 14 inHg; Post: 0.004 cfm 6 inHg

.6970
.6970
.6975

Stack Diagram

Traverse Point Number	Sampling Time min (dt)	Clock Time (24 hr)	Dry Gas Meter Reading cuft (Vm)	Velocity Head in H2) (dPs)	Orifice Pressure in H2O DESIRED	Orifice Pressure H2O ACTUAL (dH)	STACK °F (Ts) Amb:	PROBE °F (Tp) Amb:	OVEN Filter °F (To) Amb:	IMPINGER Outlet °F (Ti) Amb:	METER Inlet/Avg. °F (Tm-in) Amb:	METER Outlet °F (Tm-out) Amb:	Pump Vacuum inHg. (Pv)
		1109	499.701										
1	5		503.19	0.0203		1.6	1524		259	52	56	54	4
2	10		506.73	0.0042			1505		260	53	56	55	4
3	15		510.40	0.0079			1500		261	54	55	55	4
4	20		514.01	0.0073			1498		262	55	55	55	4
5	25		517.61	0.0057			1508		262	55	55	55	4
6	30		521.24	0.0056			1501		261	56	57	55	4
7	35		524.89	0.0074			1497		261	49	58	56	4
8	40		528.50	0.0119			1505		262	47	58	57	4
9	45		532.11	0.0128			1495		263	45	59	57	4
10	50		535.76	0.0127			1502		260	45	60	58	4
11	55		539.39	0.0133			1498		261	46	60	58	4
12	60	1209	543.040	0.0072		↓	1499		261	46	61	58	4
13				0.0040									
14				0.0054									
15				0.0037									
16				0.0021									
17				0.0038									
18				0.0007									
19				0.0035									
20				0.0020									
21				0.0065									
22				0.0093									
23				0.0095									
24				0.0168									

Notes:

Field Data Sheet

HORIZON ENGINEERING
13585 NE Whitaker Way
Portland, OR 97230
Phone (503) 255-5050
Fax (503) 255-0505

Same flow situation as run #1

Client: GWRL
Plant: Wenatchee, WA
Location: Outlet
Sample Location: Exhaust

Date 2/8/07
Test Method 5/202
Concurrent Testing 26, Gases
Run # 2
Operator KRK Support TAR
Temperature, Amb (Ta) ~45
Moisture 8 % Tdb — Twb —
Press., Static (Pstat) -0.06 Press., Bar (Pb) 28.8
Cyclonic Flow Expected ? N If yes, avg. null angle — degrees

Probe Quartz Cp — Heat Set — °F
Post-Test Pitot Inspection NC (NC=no change, D=damaged)
Pitot Lk Rate Pre: Hi — @ — Post 0 @ 10
in H2O@in H2O Lo — @ — 0 @ 13
Nozzle 0.6882 quartz Sample Box 172
Filter Qz m29 019 Heat Set 250 °F
Meter Box 7 dH@ 1.62874 Y .9882
Meter Pretest: 0.005 cfm 11 inHg
Leak Check Post: 0.005 cfm 6 inHg

Stack Diagram

.6890
.6880
.6875

Traverse Point Number	Sampling Time min (dt)	Clock Time (24 hr)	Dry Gas Meter Reading cuft (Vm)	Velocity Head in H2O (dPs)	Orifice Pressure in H2O DESIRED	Orifice Pressure H2O ACTUAL (dH)	STACK °F (Ts) Amb:	PROBE °F (Tp) Amb:	OVEN Filter °F (To) Amb:	IMPINGER Outlet °F (Ti) Amb:	METER Inlet/Avg. °F (Tm-in) Amb:	METER Outlet °F (Tm-out) Amb:	Pump Vacuum inHg (Pv)
		1256	543.600										
1 /	5		547.13	0.0035		1.6	1483		226	41	63	61	4
2 /	10		550.65	0.0034			1488		231	41	62	61	4
3 /	15		554.22	0.0053			1496		234	44	61	61	4
4 /	20		557.76	0.0052			1497		234	46	61	61	4
5 /	25		561.32	0.0027			1503		239	46	62	61	4
6 /	30		564.89	0.0156			1498		237	45	63	62	4
7 /	35		568.44	0.0102			1516		234	44	63	62	4
8 /	40		572.01	0.0107			1493		236	44	65	63	4
9 /	45		575.57	0.0123			1504		241	44	65	63	4
10 /	50		579.14	0.0121			1498		239	44	66	64	4
11 /	55		582.71	0.0135			1493		237	44	66	65	4
12 /	60	1356	586.244	0.0104			1495		237	45	67	65	4
13				0.0082									
14				0.0070									
15				0.0093									
16				0.0105									
17				0.0038									
18				0.0067									
19				0.0078									
20				0.0020									
21				0.0037									
22				0.0036									
23				0.0061									
24				0.0137									
25													

Notes:

Field Data Sheet

13585 NE Whitaker Way
Portland, OR 97230
Phone (503) 255-5050
Fax (503) 255-0505

Client: GWRL
Plant: Wenatchee, WA
Location: Outlet
Sample Location: Exhaust

Date 2/8/07
Test Method 5/202
Concurrent Testing 26, Gases
Run # 3
Operator KEK Support TAR
Temperature, Amb (Ta) ~ 45
Moisture 8% Tdb — Twb —
Press., Static (Pstat) -0.07 Press., Bar (Pb) 28.8
Cyclonic Flow Expected ? N If yes, avg. null angle — degrees

Stack Diagram

Probe Quartz Cp — Heat Set — °F
Post-Test Pitot Inspection NC (NC=no change, D=damaged)
Pitot Lk Rate in H2O@in H2O: Pre: Hi — @ — Post 0 @ 7; Lo — @ — 0 @ 10
Nozzle .6972 quartz Sample Box 187
Filter 06 m20020 Heat Set 250 °F
Meter Box 7 dH@1.62874 Y .98822
Meter Leak Check: Pretest: .008 cfm 11 inHg; Post: 0.005 cfm 8 inHg

Traverse Point Number	Sampling Time min (dt)	Clock Time (24 hr)	Dry Gas Meter Reading cuft (Vm)	Velocity Head in H2) (dPs)	Orifice Pressure in H2O DESIRED	Orifice Pressure H2O ACTUAL (dH)	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	IMPINGER Outlet °F (Ti)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		1430	586.700				Amb:	Amb:	Amb:	Amb:	Amb:	Amb:	
1	5		590.200	0.0042		1.6	1493		256	45	69	68	4
2	10		593.72	0.0035			1478		257	40	68	68	4
3	15		597.26	0.0067			1498		257	41	68	68	4
4	20		600.78	0.0060			1483		260	40	68	68	4
5	25		604.32	0.0072			1490		259	40	68	68	4
6	30		607.90	0.0043			1489		258	40	68	68	4
7	35		611.45	0.0073			1486		258	40	68	68	4
8	40		615.01	0.0092			1497		257	41	69	68	4
9	45		618.56	0.0118			1478		257	41	69	68	4
10	50		622.12	0.0143			1492		258	41	69	68	4
11	55		625.70	0.0097			1496		257	41	69	69	4
12	60	1530	629.269	0.0111		↓	1492		259	42	69	69	4
13				0.0058									
14				0.0084									
15				0.0052									
16				0.0097									
17				0.0053									
18				0.0078									
19				0.0029									
20				0.0011									
21				0.0027									
22				0.0096									
				0.0072									
24				0.0043									
25													

Notes:

Blank Corrections

Waste Management Disposal Services of Washington, Inc.
Wenatchee Regional Landfill Flare Outlet
East Wenatchee, WA

Feb, 08 2007
mwallace

FILTERABLE							
BLANKS							
Acetone	123	ml	0		gm	0.00	mg/100ml
Acetone Limit						0.80	mg/100ml
Filter-Front	06-M29-021	ID	0.0018		gm		
	06-M29-023		0.0007				
	06-M29-022		0.0012				
RUNS	AVERAGE		0.0012				
			Run 1	Run 2	Run 3		
ACETONE-Front	Volume	ml	54	68	53		
	Weight	mg	1.70	0.70	3.70		
	Blank	mg/100ml	0.00	0.00	0.00		
	Correction	mg	0.00	0.00	0.00		
	Net	mg	1.70	0.70	3.70		
FILTER-Front	ID		06-m29-018	06-m29-019	06-m29-020		
	Weight	mg	0.4	0.0	0.2		
TOTAL FILTERABLE		mg	2.1	0.7	3.9		

CONDENSABLE							
BLANKS							
H2O, Residue (Inorganic)	278	ml	0.0030	gm		1.08	mg/100ml
H2O (extract) (By calculation)(Organic)	165	ml	0.0000	gm		0.00	mg/100ml
H2O Combined Blank Correction						1.08	mg/100ml
H2O Combined Limit						1.00	mg/100ml
H2O, Residue (Inorganic)	Applicable					1.00	mg/100ml
H2O (extract) (By calculation)(Organic)	Applicable					0.00	mg/100ml
DCM(B) - HE	165	ml	0.0001	gm		0.06	mg/100ml
DCM - Lab	150	ml	0.0000	gm		0.00	mg/100ml
DCM(A) H2O Extract with DCM rinse (DCM Rinse)	152	ml					
(Lab DCM)	150	ml					
Total sample weight			0.0000	gm			
Lab DCM weight			0.0000	gm			
Correction using subtraction to determine HE DCM blank							
Smallest calculated correction							
HE DCM rinse weight			0.0001	gm			
Resulting sample weight from H2O extract			-0.0001	gm			
DCM Limit						1.335	mg/100ml

Impinger Water-Residue (Inorganic)					
Initial Impinger contents, rinse	Volume	ml	351.09	370.12	353.09
Sample Volume Recieved by Lab	(Vic-Vb)	ml	250.00	250.00	250.00
IC Sulfate Aliquot	Vb	ml	0	0	0
Total PM Sample Volume	Vic	ml	416.74	431.76	417.74
Impinger water residue	mr	mg	19.8	22.9	21.4
Aliquot Corrected		mg	0.00	0.00	0.00
	Blank	mg/100ml	1.00	1.00	1.00
	Correction	mg	-3.51	-3.70	-3.53
Net Weight (mr Vic/(Vic-Vb))		mg	16.29	19.20	17.87
Optional Sulfate Analysis	IC Results	ug	0.0	0.0	0.0
	Cso4	mg/ml	0.0000	0.0000	0.0000
	mc	mg	0.00	0.00	0.00
Mass of Inorganic CPM	mi	mg	0.00	0.00	0.00
Impinger Water-Residue (Organic)					
Extraction	Weight	mg	0.8	2.1	1.3
DCM Lab	Volume	ml	150	150	150
	Blank	mg/100ml			
	Correction	mg			
DCM-Field Rinse	Volume	ml	100	100	100
	Blank	mg/100ml			
	Correction	mg			
H2O Extracted	Volume	ml	351.09	370.12	353.09
	Blank	mg/100ml			
	Correction	mg			
Total	Correction	mg	0.00	0.00	0.00
	Net	mg	0.80	2.10	1.30
TOTAL CONDENSABLE		mg	17.09	21.30	19.17
TOTAL PARTICULATE	mn	mg	19.19	22.00	23.07

3-06-07

ANTECH

Analysis/Technology

Mr. David Rossman
HORIZON ENGINEERING
13585 NE Whitaker
Portland OR 97230

February 25, 2007 Identification : Wenatchee (Horizon #2758)
Job# 0704200-03 Received: 2/11/07
Method: EPA5/202

Sample #	04200	04201	04202
Identification	LF FL exh Run 1	LF FL exh Run 2	LF FL exh Run 3
Front Acetone:			
Volume (mls)	54	68	53
Residue (g)	0.0017	0.0007	0.0037
Impinger water:			
Volume(mls)	415	430	419
Residue(g):	0.0198	0.0229	0.0214
Dichloromethane:			
Horizon vol (mls):	115	140	108
AntechVol(mls)	150	150	150
Residue (g):	0.0008	0.0199*	0.0013
		0.0021**	
Filters:			
Number:	06-M29-018	06-M29-019	06-M29-020
Residue:	00.0004	-0.0007	0.0002

*contains flake of material approx. 7 mm x 6 mm x 0.5 mm, matte white on one side, shiny gray on the other.
** residue weight with above material removed

Respectfully submitted:
ANTECH
Diana Tracy
Diana Tracy, president

501 N.E. THOMPSON MILL ROAD
CORBETT, OREGON 97019
503/695-2135
FAX: 503/695-2139
E-mail: antech@cascadeaccess.com

ANTECH
Analysis/Technology

Mr. David Rossman
HORIZON ENGINEERING
13585 NE Whitaker
Portland OR 97230

February 25, 2007
Job# 0704200-03
Method: EPA5/202

Identification: Wenatchee (Horizon #2758)
Received: 2/11/07

Sample #	04203		
Identification	LF flare exh all blanks		
Acetone:			
Volume (mls)	123		
Residue (g)	-0.0001		
Water:			
Volume (mls)	278		
Residue (g)	0.0030		
Dichloromethane:	A	B	House
Volume(mls)	150		150
	152	165	
Residue (g):	-0.0001	0.0001	-0.0009
Filters:	(04203)	(04700)	(04701)
Number:	06-M29-021	06-M29-023	06-M29-022
Residue:	0.0018*	0.0007	0.0012

* filter has yellow residue around edges

Respectfully submitted:
ANTECH
Diana Tracy
Diana Tracy, president

501 N.E. THOMPSON MILL ROAD
CORBETT, OREGON 97019
503/695-2135
FAX: 503/695-2139
E-mail: antech@cascadeaccess.com

ANTECH
SAMPLE DATA: EPA RESIDUES (page 3)

COPY

FILTERS:

Sample #	04200	04201	04202
Sample ID	LFE R1	LFE R2	LFE R3
Filter #	06-M29-018	06-M29-019	06-M29-020
Date/time	2-11 11A	2-11 11A	2-11 10A
In dessicator			

		Date/time		Date/time		Date/time
GWt1(g)	.4424	2-14 8A	.9387	2-14 8A	.4471	2-14 8A
GWt2(g)	.4425	2-15 10A	.4389	2-15 10A	.4472	2-15 10A
GWt3(g)						
GWt4(g)						
Average	.4425		.4388		.4472	
Tare (g)	.4421	6-16-06	.4395	6-16-06	.4470	6-16-06
Net (g)	0.0004		-0.0007		0.0002	

FILTERS:

Sample #			
Sample ID			
Filter #			
Date/time			
In dessicator			

		Date/time		Date/time		Date/time
GWt1(g)						
GWt2(g)						
GWt3(g)						
GWt4(g)						
Average						
Tare (g)						
Net (g)						

QC DATA:

Date/time	2-11	2-14	2-15	2-16	
Balance calibrated	✓	✓	✓	✓	
(NTIS cert wts)	✓	✓	✓	✓	
Date/time	11A	8A	10A	8A	
Temp/temp	69	68	69	70	
Relative humidity (%)	33	34	35	34	

ANTECH
SAMPLE DATA: EPA RESIDUES
Analyst: [illegible] reviewer:
Job# 0704200-03 Identification: Wenatchee 2758

FRONT ACETONE:

Sample #	04200		04201		04202	
Sample ID	LFE R1		LFE R2		LFE R3	
vol mark	✓		✓		✓	
Date/time	2-12 10A		2-12 10A		2-12 10A	
Into dessicator						
Vol(mls)	54	date/time weighed	68	date/time weighed	53	date/time weighed
GWt1(g)	103.2604	2-14 8A	112.7486	2-14 8A	117.2876	2-14 8A
GWt2(g)	103.2602	2-15 10A	112.7482	2-15 10A	117.2871	2-15 10A
GWt3(g)						
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average	103.2603		112.7489		117.2874	
*Tare (g)	103.2586	2-11 12N	112.7477	2-11 12N	117.2837	2-11 12N
Net (g)	0.0017		0.0007		0.0037	

BACK ACETONE:

Sample #						
Sample ID						
vol mark						
Date/time						
Into dessicator						
Vol(mls)		date/time weighed		date/time weighed		date/time weighed
GWt1(g)						
GWt2(g)						
GWt3(g)						
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average						
*Tare (g)						
Net (g)						

*Beaker tare note: This is original data. Beakers are dried at 105degC and held in dessicator before weighing

COPY

ANTECH
SAMPLE DATA: EPA RESIDUE (PAGE 2)
IMPINGER WATER:

Sample #	04200		04201		04202	
Sample ID	LFE R1		LFE R2		LFE R3	
vol mark	✓		✓		✓	
Date/time	2-12 10A		2-12 10A		2-12 ~~10A~~ 11A	
Into dessicator						
Vol(mls)	415	date/time Weighed	430	date/time weighed	419	date/time weighed
GWt1(g)	168.3028	2-14 8A	128.8595	2-14 8A	144.5319	2-14 8A
GWt2(g)	168.3029	2-15 10A	128.8589	2-15 10A	144.5310	2-15 10A
GWt3(g)			128.8584	2-16 8A	144.5315	2-16 8A
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average	168.3029		128.8589		144.5313	
*Tare (g)	168.2831	2-11 12N	128.8355	2-11 12N	144.5099	2-11 12N
Net (g)	0.0198		0.0229		0.0214	

DICHLOROMETHANE:

Sample #	04206		04201		04202	
Sample ID	LFE R1		LFE R2		LFE R3	
vol mark	✓		✓		✓	
Date/time	2-12 10A		2-12 10A		2-12 10A	
Into dessicator						
Vol(mls)	115 +(150)	date/time Weighed	140 +(150)	date/time weighed	108 +(150)	date/time weighed
GWt1(g)	110.2499	2-14 8A	122.2375	2-14 8A	114.9864	2-14 8A
GWt2(g)	110.2498	2-15 10A	122.2367	2-15 10A	114.9855	2-15 10A
GWt3(g)			122.2369	2-16 8A	114.9856	2-16 8A
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average	110.2499		122.2368		114.9856	
*Tare (g)	110.2491	2-11 12N	122.2169	2-11 12N	114.9843	2-11 12N
Net (g)	0.0008		0.0199 *		0.0013	

*Beaker tare note: This is original data. Beakers are dried at 105degC and held in dessicator before weighing.

contains ~~clumps~~ flakes of material 7mm x 6mm x 1mm (approx)

Wenatchee

2758

ANTECH
SAMPLE DATA: EPA RESIDUE (PAGE 2)
IMPINGER WATER:

Sample #								
Sample ID								
vol mark								
Date/time								
Into dessicator								
Vol(mls)		date/time Weighed		date/time weighed		date/time weighed		
GWt1(g)								
GWt2(g)								
GWt3(g)								
GWt4(g)								
GWt5(g)								
GWt6(g)								
Average								
*Tare (g)								
Net (g)								

DICHLOROMETHANE:

Sample #			04201 *					
Sample ID			LFE R2					
vol mark			~					
Date/time			2-12 10A					
Into dessicator								
Vol(mls)		date/time Weighed	140	date/time weighed		date/time weighed		
GWt1(g)			122.2887	2-16 9A				
GWt2(g)			122.2191	2-19 7A				
GWt3(g)								
GWt4(g)								
GWt5(g)								
GWt6(g)								
Average			122.2190					
*Tare (g)			122.2169	2-11 12D				
Net (g)			0.0021					

*Beaker tare note: This is original data. Beakers are dried at 105degC and held in dessicator before weighing.

* wts without "chunk"

ANTECH
SAMPLE DATA: EPA RESIDUES

Analyst: [illegible] reviewer:
Job# 070200-03 Identification: Fernalchee 2758

BLANKS:

ACETONE:			IMPINGER WATER:		DCM: A	
Sample #	04203		04203		04203	
Sample ID	LFE Bl		LFE Bl		LFE Bl	
vol mark	✓		✓		✓	
Date/time	2-12 10A		2-12 10A		2-12 11A	
Into dessicator						
Vol(mls)	123	date/time weighed	278	date/time weighed	152 +(150)	date/time weighed
GWt1(g)	107.8917	2-14 8A	128.4744	2-14 8A	116.7625	2-14 8A
GWt2(g)	107.8910	2-15 10A	128.4736	2-15 10A	116.7621	2-15 10A
GWt3(g)			128.4736	2-16 8A		
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average	107.8912		128.4736		116.7623	
*Tare (g)	107.8918	2-11 12N	128.4706	2-11 12N	116.7624	2-11 12N
Net (g)	-0.0001		0.0030		-0.0001	

COPY

FILTER:			FILTER:		DCM B	
Sample #	04203				04203	
Sample ID	LFE Bl				LFE Bl	
Filter #	06-M29-021					
Date/time	2-11 11A				2-12 10A	
Into dessicator						
Vol(mls)		date/time weighed		date/time weighed	165	date/time weighed
GWt1(g)	.4379	2-14 8A			117.7648	2-14 8A
GWt2(g)	.4397	2-15 10A			117.7645	2-15 10A
GWt3(g)						
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average	.4388				117.7647	
*Tare (g)	.4380	6-16-06			117.7646	2-11 12N
Net (g)	0.0018 *				0.0001	

*Beaker tare note: This is original data. Beakers are dried at 105degC and held in dessicator before weighing.

* This filter has yellow residue around the edges.

ANTECH
SAMPLE DATA: EPA RESIDUES
Analyst: MJ reviewer:
Job# 070420D-03 Identification: Firestone 2758

HOUSE BLANKS:

ACETONE:			IMPINGER WATER:		DCM:	
Sample #						Blank for second (w/o cont) DCM wt
Sample ID						
vol mark						
Date/time						
Into dessicator						
Vol(mls)		date/time weighed		date/time weighed		weighed
GWt1(g)						
GWt2(g)						
GWt3(g)						
GWt4(g)						
GWt5(g)						
GWt6(g)						
Average						
*Tare (g)						
Net (g)						

FILTER:			FILTER:		EMPTY:	
Sample #					042	
Sample ID					lab blank	
Filter #						
Date/time					2-12 10A	
Into dessicator						
Vol(mls)		date/time weighed		date/time weighed	empty	date/time weighed
GWt1(g)					100.2290	2-14 8A
GWt2(g)					100.2289	2-15 10A
GWt3(g)					100.2288	2-16 8A
GWt4(g)					100.2290	2-19 7A
GWt5(g)						
GWt6(g)						
Average					100.2289	
*Tare (g)					100.2288	2-11 12D
Net (g)					0.0001	

Beaker tare note: This is original data. Beakers are dried at 105degC and held in dessicator before weighing.

Wenatchee

Report on separate sheets

ANTECH
SAMPLE DATA: EPA RESIDUES (page 3)

FILTERS:						
Sample #	04700		04701			
Sample ID	LFE BL		LFE BL			
Filter #	06-M09023		06-M29-022			
Date/time	2-16 7P		2-16 7P			
In dessicator						
		Date/time		Date/time		Date/time
GWt1(g)	.4603	2-18-7A	.4624	2-18 9A		
GWt2(g)	.4621	2-19 7A	.4638	2-19 7A		
GWt3(g)	.4617	2-20 11A	4633	2-20 11A		
GWt4(g)						
Average	.4619		.4636			
Tare (g)	.4612	6-16-06	.4624	6-16-06		
Net (g)	0.0007		0.0012			

COPY

FILTERS:						
Sample #						
Sample ID						
Filter #						
Date/time						
In dessicator						
		Date/time		Date/time		Date/time
GWt1(g)						
GWt2(g)						
GWt3(g)						
GWt4(g)						
Average						
Tare (g)						
Net (g)						

QC DATA:					
Date/time	2-19	2-20			
Balance calibrated	✓	✓			
(NTIS cert wts)	✓	✓			
Date/time	11A	11A			
Temp/temp	68	68			
Relative humidity (%)	33	33			

ANALYTICAL BALANCE CALIBRATION FORM

Balance name Sartorius Number

Classification of standard weights

Date	~~0.500~~ g	1.0000 g	10.0000 g	50.0000 g	100.0000 g	Analyst
12-8-06	0.1000g	1.0001g			100.0000g	
12-11-06	0.1000g	1.0001g			100.0001g	
12-12-06	0.1000g	1.0001g			100.0001g	
12-13-06	0.1001g	1.0000g			100.0001g	
12-18-06	0.1000g	1.0001g			100.0001g	
12-21-06	0.1000g	1.0001g			100.0000g	
12-22-06	0.1000g	1.0000g			100.0001g	
12-27-06	0.1000g	1.0001g			100.0001g	
12-28-06	0.1000g	1.0000g			100.0001g	
12-29-06	0.1000g	1.0001g			100.0001g	
12-31-06	0.1000g	1.0001g			100.0001g	
1-1-07	0.1000g	1.0001g			100.0001g	
1-2-07	0.1000g	1.0001g			100.0001g	
1-3-07	0.0999g	1.0001g			100.0000g	
1-9-07	0.1000g	1.0001g			100.0001g	
1-12-07	0.1000g	1.0000g			100.0001g	
1-15-07	0.1000g	1.0001g			100.0001g	
1-16-07	0.1000g	1.0001g			100.0001g	
1-23-07	0.1000g	1.0001g			100.0001g	
1-26-07	0.1000g	1.0001g			100.0001g	
1-28-07	0.1001g	1.0001g			100.0000g	
1-29-07	0.1000g	1.0001g			100.0000g	
1-30-07	0.1000g	1.0001g			100.0001g	
2.2.07	0.1000g	1.0001g			100.0000g	
2-6-07	0.1001g	1.0001g			100.0001g	
2-8-07	0.1000g	1.0000g			100.0001g	
2-9-07	0.1000g	1.0001g			100.0001g	
2-11-07	0.1000g	1.0001g			100.0001g	
2-12-07	0.1000g	1.0000g			100.0001g	
2-13-07	0.1000g	1.0001g			100.0001g	
2-14-07	0.1000g	1.0001g			100.0001g	
2-15-07	0.1000g	1.0001g			100.0001g	
2-16-07	0.0999g	1.0001g			100.0000g	
2-18-07	0.1000g	1.0000g			100.0001g	
2-19-07	0.0999g	1.0000g			100.0001g	
2-20-07	0.1000g	1.0001g			100.0001g	

Oregon Lakes

These filters were dried @ 160° C for 2hr, then cooled in desiccator @ RT overnight

06-M29-013	.4568
014	.4284
015	.4567
016	.4474
017	.4406
06-M29-018	.4421
019	.4375
020	.4470
021	.4380
022	.4624
06-M29-023	.4612

COPY

Established 1974

QUALITY CONTROL SERVICES

LABORATORY AND METROLOGY EQUIPMENT: SALES AND SERVICE
2340 S.E. 11th Avenue • Portland, Oregon 97214
P.O. Box 14831 • Portland, Oregon 97293 • (503) 236-2712 • FAX: (503) 235-2535

ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

Antech Lab
501 N.E. Thompson Mill Rd.
Corbett, OR. 97019
Diane Tracy

Report Number: ANTLA50505744060317

A2LA ACCREDITED

CERTIFICATE OF CALIBRATION AND TEST RECORD

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	BP210S	50505744	N/A	Lab

Units	Readability	SOP Used	Cal. Date	Last Cal.	Cal. Due
Grams	0.0001	QC012	03/17/2006	03/01/2005	03/2007

FUNCTIONAL CHECKS

ECCENTRICITY:
Test Wt: 100 Tol: 0.0003
AS FOUND: Pass: ☑ Fail: ☐
AS LEFT: Pass: ☑ Fail: ☐

LINEARITY:
Test Wt: 50x4 Tol: 0.0002
AS FOUND: Pass: ☑ Fail: ☐
AS LEFT: Pass: ☑ Fail: ☐

SPAN:
Test Wt: 200
Tol: 0.0004
1: 199.9999
2: 199.9999
3: 200.0000
Results 199.99995

STANDARD DEVIATION:
Test Wt: 100 Tol: 0.0001
1: 100.0001 4: 100.0003
2: 100.0001 5: 100.0001
3: 100.0003 6: 100.0002
Results: 0.00007

ENVIRONMENTAL CONDITIONS:
☐ Good ☑ Fair ☐ Poor
Temperature: 21.2°C

CALIBRATION CHECKPOINTS AND DATA

Standard	As Found	As Left	Expanded Uncertainty
200	199.9999	199.9999	0.00014
150	150.0000	150.0000	0.00014
100	100.0001	100.0001	0.00014
50	50.0001	50.0001	0.00014
20	20.0000	20.0000	0.00014
10	10.0000	10.0000	0.00014

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal. Date	Cal. Due	Traceable ID#
Weight Set	Rice Lake	20 kg to 1mg	2831W	08/24/2005	08/2006	822/272027-5

Comments / Info Concerning This Calibration:

Permanent Information Concerning This Instrument:

REPORT PREPARED/REVIEWED BY: Mary Murray DATE: 3-27-06 Technician: D. Thompson

Signature: DT

92

THE UNCERTAINTY IS CALCULATED ACCORDING TO THE ISO GUIDE TO THE EXPRESSION OF UNCERTAINTY IN MEASUREMENT (ANSI/NCSL Z540-2-1997) AND INCLUDES THE UNCERTAINTY OF STANDARDS USED COMBINED WITH THE OBSERVED STANDARD DEVIATION OF THE UNIT UNDER TEST. THE UNCERTAINTY IS EXPANDED WITH A K FACTOR OF 2 FOR AN APPROXIMATE 95% LEVEL OF CONFIDENCE. INSTRUMENTS LISTED ABOVE WERE CALIBRATED USING STANDARDS TRACEABLE TO THE NATIONAL INSTITUTE OF

Particulate Matter Chain of Custody

HORIZON ENGINEERING LLC
13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

Date Sent to Lab: _____

Page: 1 of 1

Client: Wenatchee

Laboratory: Antech
501 N.E. Thompson Mill Road
Corbett, Oregon 97019

Horizon Job No. 2758

Antech Job No. _____

Field Personnel Thomas Rhodes

Office Personnel Kate Krisor

Sample Type		Front Acetone Rinse	Back DCM Rinse	Impinger H2O	Filter - Front	Filter - Back		
* One Source Per Chain of Custody *								
Source:								
Flare Exhaust	Run 1	✓	✓	✓	✓			04207
" "	Run 2	✓	✓	✓	✓			01
" "	Run 3	✓	✓	✓	✓			02
	Run							
	Run							
	Run							
Blanks:		✓	✓✓	✓	✓			03

Return Samples to Horizon ASAP for Further Analysis? ____

RUSH ____
Normal X

Requlished by: Margaret Heffernan Date/Time 2/9/07 4:30

Requlished by: _____ Date/Time _____

Received by: [signature] Date/Time 2-9-07 4:15P

Received by: _____ Date/Time _____

0704700-01

Particulate Matter Chain of Custody

HORIZON ENGINEERING LLC
13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

Date Sent to Lab: 2/16/07

Page: 1 of 1

Client: Wenatchee

Laboratory: Antech
501 N.E. Thompson Mill Road
Corbett, Oregon 97019

Horizon Job No. 2758

Antech Job No. _____

Field Personnel Thomas Rhodes

Office Personnel Margie Heffernan

Sample Type		Front Rinse	Back Rinse	Impinger H2O	Filter - Front	Filter - Back		
* One Source Per Chain of Custody *								
Source: Flare Exhaust								
	Run							
	Run							
	Run							
	Run							
	Run							
	Run							
Blanks: (2)					✓ ✓			

Return Samples to Horizon ASAP for Further Analysis? ___ RUSH X
Normal _____

Requlished by: _____ Date/Time 2/16/07 13:30

Requlished by: _____ Date/Time _____

Received by: _____ Date/Time 2-16-07 13:30

Received by: _____ Date/Time _____

Air Pollution Emission Testing

HORIZON ENGINEERING LLC
13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

Sample Recovery Worksheet

Client: Wenatchee Landfill Source: Flare Outlet Initials: TAR Test Date: 2/8/07

Balance Calibration (1000, 500, 200 g)
Need one per each 3-run test: 1000 / 500 / 200

	RUN 1	RUN 2	RUN 3
IMPINGER CONTENTS			
Container, condensate & rinse, grams	700	716	704
Container & condensate, grams	649	646	651
Empty container, grams	284	285	287
Initial volume, ml	300	"	"
Initial contents	H_2O	"	"
Initial concentration	100%	"	"
Net water gain, ml			
Condensate appearance	Clear	Clear	Clear
Level marked on container	Yes	Yes	Yes
pH of condensate	5	5	5
Rinsed with	H_2O / DCM	"	"
Solvent Name and Lot No.			
Solvent Name and Lot No.			
SILICA GEL (w/impinger, top off)			
Final weight, grams	531	633	529
Initial weight, grams	520	620 ~~520~~	520
Net gain, grams	11	13	9
TOTAL MOISTURE GAIN			
Impingers and silica gel, grams			
FILTERS			
Front filter number	06-M29-018	06-M29-019	06-M29-020
Front filter appearance	White	White	White
Back filter number	—	—	—

Sample Recovery

Waste Management Disposal Services of Washington, Inc. — 08-Feb-2007
Wenatchee Regional Landfill Flare Outlet — mwallace
East Wenatchee, WA
EPA 4

			Run 1	Run 2	Run 3
Impinger Contents					
	Impinger, Contents & Condensate & Rinse	g	700.0	716.0	704.0
spg	Impinger, Contents & Condensate	g	649.0	646.0	651.0
g/ml	Impinger	g	284.0	285.0	287.0
0.998	H2O	ml	300.0	300.0	300.0
	Condensate	g	65.5	61.5	64.5
Silica Gel Impinger	Final weight	g	531.0	633.0	529.0
	Initial weight	g	520.0	620.0	520.0
	Gain	g	11.0	13.0	9.0
Total Moisture Gain	Condensate + Silica Gel gain	g	76.5	74.5	73.5
Vlc	Net Moisture Gain	ml	76.7	74.7	73.7
	Water Correction Volume	mls	351.1	370.1	353.1
	Rinse Water + Initial +Condensate Sent to Lab	mls	416.7	431.8	417.7
	Sample Recieved by Lab	mls	415.0	430.0	419.0
	Diff	%	-0.4%	-0.4%	0.3%
General Remarks	Sample Appearance		Clr	Clr	Clr
	Container Marked		Yes	Yes	Yes
	pH of Condensate		5.0	5.0	5.0
Filter ID & Remarks	Front		06-m29-018	06-m29-019	06-m29-020
	Appearance		White	White	White

HORIZON ENGINEERING LLC
13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

TRAVERSE POINT LOCATIONS WORKSHEET

Client & Source Wenatchee Landfill Date 2/7/2007
Sampling location FLARE EXHAUST Initials PTH

Traverse Point Number	Traverse Point Location (inches)
1	12 1/2
2	16 7/8
3	22
4	28 1/8
5	35 1/2
6	46 1/4
7	
8	
9	
10	
11	
12	

Duct Dimensions and Port Locations

Inside of far wall to outside of nipple, F 112"
Inside of near wall to outside of nipple, N 10"
Nearest downstream disturbance, A ~60"
Nearest upstream disturbance, B at least 30'
Circular: Inside Diameter, F-N 102"
Rectangular: Width — " Depth — "
Number of Ports: 4

Circle duct characteristics:

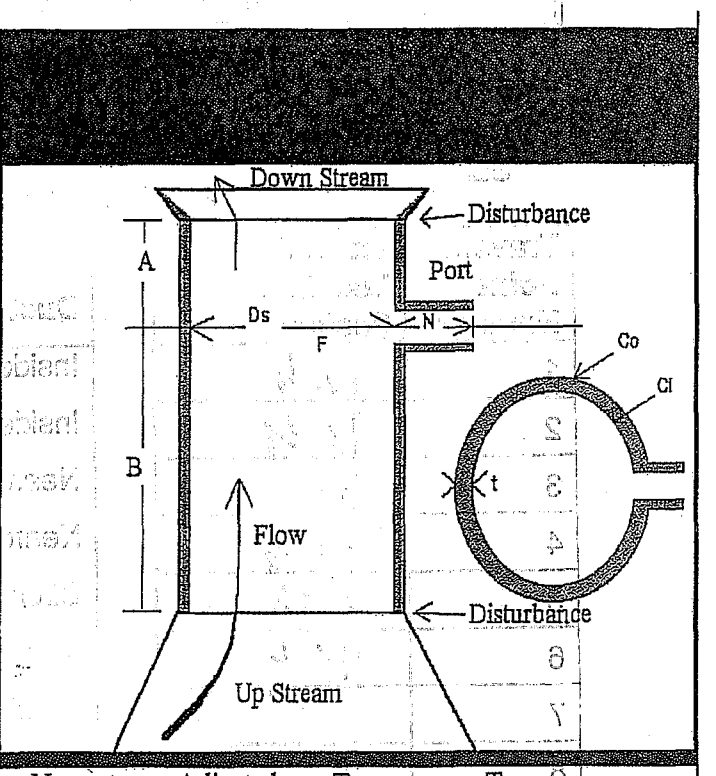
Construction: (Steel), PVC, Fiberglas, Other _____
Shape: (Circular), Rectangular
Orientation: (Vertical) Horizontal
Flow straighteners: Yes (No)
Extension: Yes (No)
Cyclonic Flow Expected: Yes (No)
Cyclonic Flow Measured Yes (No)
Average Null Angle <20° Yes No
Meets EPA M-1 Criteria (Yes) No

Test port sketch or comments

Outlet Traverse Point Locations

Waste Management Disposal Services of Washington, Inc. — 08-Feb-2007
Wenatchee Regional Landfill Flare Outlet — mwallace
East Wenatchee, WA
EPA 1

Outer Circumference	Co	in	
Wall thickness	t	in	
INSIDE of FAR WALL to OUTSIDE of Nipple	F	in	112.00
INSIDE of NEAR WALL to OUTSIDE of Nipple	N	in	10.00
STACK WALL to to OUTSIDE of Nipple	N-t	in	
DOWNstream Disturb	A	in	60.0
UPstream Disturb	B	in	*360.0*
Inner Diameter	Ds	in	102.00
Area	As	sqin	8,171.3
DOWNstream Ratio	A/Ds		0.59
UPstream Ratio	B/Ds		3.53



Traverse (Particulate)	24
Recommended #Pts/Diameter	12
Traverse (NON-Particulate)	16
Recommended #Pts/Diameter	8
Actual Points per Diameter	12

Trav Pt #No	Fract Stk ID (f)	Stack ID (Ds)	Actual Points (Dsxf)	Nearest 8ths (TP)	Adjusted Points (TP)	Traverse Points (TP + N)	Traverse Points (TP + N)
1	2.13%	102.0	2.2	2.125	2.125	12.125	12 1 / 8
2	6.70%	102.0	6.8	6.875	6.875	16.875	16 7 / 8
3	11.81%	102.0	12.0	12.000	12.000	22.000	22
4	17.73%	102.0	18.1	18.125	18.125	28.125	28 1 / 8
5	25.00%	102.0	25.5	25.500	25.500	35.500	35 1 / 2
6	35.57%	102.0	36.3	36.250	36.250	46.250	46 1 / 4
7	64.43%	102.0	65.7	65.750	65.750	75.750	75 3 / 4
8	75.00%	102.0	76.5	76.500	76.500	86.500	86 1 / 2
9	82.27%	102.0	83.9	83.875	83.875	93.875	93 7 / 8
10	88.19%	102.0	90.0	90.000	90.000	100.000	100
11	93.30%	102.0	95.2	95.125	95.125	105.125	105 1 / 8
12	97.87%	102.0	99.8	99.875	99.875	109.875	109 7 / 8

Outlet Visible Emissions
Field Data
Certifications

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VISIBLE EMISSION OBSERVATION FORM

SOURCE INFORMATION
Company Name: Greater Wenatchee Land Fill
Address:
E. Wenatchee, WA
Phone #

OBSERVATION RECORD		
DATE 2/8/07	TIME: Start 1154 pst	End 1200

Source Description: Flare	ID #: 2
Operating Mode/Output Rate: Normal	
Control Equipment: —	Operating Mode: —

PLUME INFORMATION	@ Start	@ End.
Emission Point Description	Metal Stack	
Height Above Ground	~ 50'	—
Height Relative to Observer	~ 45'	—
Distance from Observer	~ 150'	—
Direction from Observer	N	—
Plume Type: Continuous	Yes	—
Intermittent	No	—
Fugitive	No	—
Plume Color	Clear	—
Water Droplets Present?	No	—
Attached Plume?	Yes	—
Detached Plume?	No	
Point in the Plume at Which Opacity was Observed	Stack Exit	
Description of Background	Sky	—
Color of Background	Gray	—
Condition of Sky	Cloudy	—
Wind Speed (mph)	0-5	—
Wind Direction (from)	SE	—
Ambient Temperature (°F)	45	—
Relative Humidity(Pb)	50%	—

MIN	Seconds 0	15	30	45	Time / Comments
1	0	0	0	0	Run 1
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					
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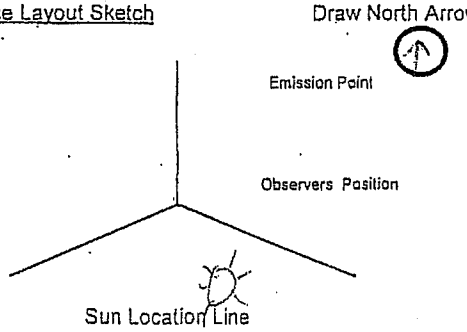
35					

Source Layout Sketch



Comments

Observer's Name (print): Paul Heffernan	Certification No.: SS-506-27
Organization: Horizon Engineering, Portland, Oregon (503) 255-5050	

Certified By: Smoke School Inc	Date: 9/21/06
Observer's Signature:	Date: 2/8/2007

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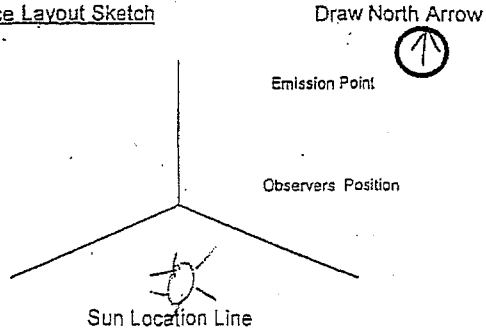
Run 2

SOURCE INFORMATION
Company Name: Greater Wenatchee
Address: Landfill
E. Wenatchee, WA
Phone #

Source Description: Landfill Flare	ID #: 2
Operating Mode/Output Rate: Normal	
Control Equipment: n/a	Operating Mode: n/a

PLUME INFORMATION	@ Start	@ End
Emission Point Description	Metal Stack	
Height Above Ground	~50'	—
Height Relative to Observer	~75'	—
Distance from Observer	~150'	—
Direction from Observer	North	—
Plume Type: Continuous	✓	—
Intermittent		
Fugitive		
Plume Color	Clear	—
Water Droplets Present?	NO	—
Attached Plume?	✓	—
Detached Plume?		
Point in the Plume at Which Opacity was Observed	Stack Exit	
Description of Background	Sky	—
Color of Background	Gray	
Condition of Sky	Cloudy	—
Wind Speed (mph)	0-5	—
Wind Direction (from)	ESE	—
Ambient Temperature (°F)	48	—
Relative Humidity(Pb)	~50%	—

Source Layout Sketch



Comments

VISIBLE EMISSION OBSERVATION FORM

OBSERVATION RECORD

DATE 2/8/2007 | TIME: Start 1305 pst | End 1311

MIN	Seconds 0	15	30	45	Time / 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					
8					
9					
10					
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34					
35					

Observer's Name (print): Paul Hefferman | Certification No.: SS-506-27

Organization: Horizon Engineering, Portland, Oregon (503) 255-5050

Certified By: Smoke School Inc | Date: 9/21/06

Observer's Signature: | Date: 2/8/2007

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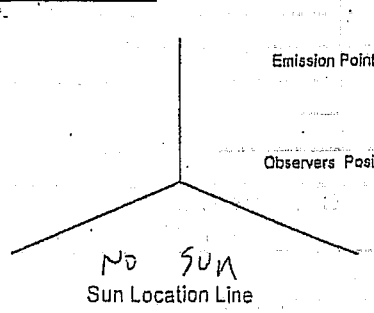
Run 3

SOURCE INFORMATION	
Company Name:	Greater Wenatchee Landfill
Address:	E. Wenatchee, WA
Phone #	

Source Description: Landfill Flare	ID # 2
Operating Mode/Output Rate: Normal	
Control Equipment	Operating Mode

PLUME INFORMATION	@ Start	@ End.
Emission Point Description	Metal	Stack
Height Above Ground	~50'	—
Height Relative to Observer	~45'	—
Distance from Observer	~150'	—
Direction from Observer	NNE	—
Plume Type: Continuous	✓	—
Intermittent		
Fugitive		
Plume Color	Clear	—
Water Droplets Present?	NO	—
Attached Plume?	Yes	—
Detached Plume?		
Point in the Plume at Which Opacity was Observed	Stack Exit	
Description of Background	Sky	—
Color of Background	Gray	—
Condition of Sky	Cloudy	—
Wind Speed (mph)	0-5	-
Wind Direction (from)	E	-
Ambient Temperature (°F)	43	-
Relative Humidity(Pb)	60%	-

Source Layout Sketch — Draw North Arrow



Comments

VISIBLE EMISSION OBSERVATION FORM

OBSERVATION RECORD

DATE 2/8/2007 TIME: Start 1452 pst End 1458

MIN	Seconds 0	15	30	45	Time / 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	
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Observer's Name (print)	Certification No.
Paul Heffeman	SS-506-27
Organization: Horizon Engineering, Portland, Oregon (503) 255-5050	

Certified By:	Date
Smoke School Inc	9/21/06
Observer's Signature:	Date 2/8/2007

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Smoke School Inc.

EPA Reference Method 9 Certification Card

Paul Heffernan

Cert. No. SS-S06-27 Exp. Date 2007-03-27

Certified Reader's Signature

Smoke School Inc. President

Outlet Gases

CO, NO_x and SO_2 Emissions Determinations

Molecular Weight Determinations

Analyzer Calibration Data and QA Checks

Data Logger Gas Charts & Printouts

CO, NOx and SO2 Emissions

Waste Management Disposal Services of Washington, Inc.						08-Feb-2007
Wenatchee Regional Landfill Flare Outlet						mwallace
East Wenatchee, WA						
Carbon Monoxide (CO) Nitrogen Oxides (NOx) Sulfur Dioxide (SO2) EPA 10, 7E, 6C						
Number of Completed Runs			Run 1	Run 2	Run 3	Average
Date Tested			08-Feb	08-Feb	08-Feb	
System Calibration Time - Initial		Tci	10:43	12:24	14:15	
Test Time-Starting		Tts	11:08	12:56	14:27	
Test Time-Ending		Tte	12:08	13:56	15:27	
System Calibration Time - Final		Tcf	12:24	14:15	15:45	
Test Mid-point Time		Tx	11:38	13:26	14:57	
Volumetric Flowrate, Dry Standard	dscf/min	Qsd	7,408	7,630	7,212	
F Factor for Fuel (Calculated)	dscf / MMBtu	Fd	9,410	9,410	9,409	
Oxygen	%	O2	11.73	11.73	11.82	
Carbon Dioxide	%	CO2	8.27	8.01	8.39	
Carbon Monoxide	CO	Span	500	500	500	
Indicated average - Dry	ppmv	Cid	1.55	-0.40	-0.82	0.11
Cylinder Value - High Range calibration gas	ppmv	Cma	284.00	284.00	284.00	
Cylinder Value - Low Range (Zero) calibration gas	ppmv	Coa	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	ppmv	Cmi	289.99	285.12	286.09	
System Calibration Response - Low Range gas - Initial	ppmv	Coi	0.39	-0.28	-0.30	
System Calibration Response - Low Range gas - Final	ppmv	Cof	-0.28	-0.30	-0.82	
System Calibration Response - High Range gas - Final	ppmv	Cmf	285.12	286.09	279.55	
Actual average - Dry (Corrected for Drift)	ppmv-CO	Cgas	1.50	*0.00*	*0.00*	0.50
Mass Emissions	lbm / hr	Mgas	0.049	*0.000*	*0.000*	0.016
	lbm-CO / MMBtu	E	0.0023	*0.0000*	*0.0000*	0.0008
	tons/yr		0.21	*0.00*	*0.00*	0.07
Nitrogen Oxides	NOx	Span	100	100	100	
Indicated average-Dry	ppmv	Cid	23.14	23.45	23.26	23.28
Cylinder Value - High Range calibration gas	ppmv	Cma	51.30	51.30	51.30	
Cylinder Value - Low Range (Zero) calibration gas	ppmv	Coa	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	ppmv	Cmi	50.60	50.10	50.00	
System Calibration Response - Low Range gas - Initial	ppmv	Coi	-0.06	-0.16	-0.16	
System Calibration Response - Low Range gas - Final	ppmv	Cof	-0.16	-0.16	-0.07	
System Calibration Response - High Range gas - Final	ppmv	Cmf	50.10	50.00	49.70	
Actual average - Dry (Corrected for Drift)	ppmv-NO2	Cgas	23.65	24.13	24.00	23.92
Mass Emissions	lbm-NO2 / hr	Mgas	1.255	1.319	1.240	1.271
	lbm-NO2 / MMBtu	E	0.0604	0.0616	0.0619	0.0613
	tons/yr		5.50	5.78	5.43	5.57
Sulfur Dioxide	SO2	Span	30	30	30	
Indicated average-Dry	ppmv	Cid	7.80	8.08	7.70	7.86
Cylinder Value - High Range calibration gas	ppmv	Cma	14.85	14.85	14.85	
Cylinder Value - Low Range (Zero) calibration gas	ppmv	Coa	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	ppmv	Cmi	15.37	14.04	13.45	
System Calibration Response - Low Range gas - Initial	ppmv	Coi	0.73	0.49	-0.39	
System Calibration Response - Low Range gas - Final	ppmv	Cof	0.49	-0.39	-1.27	
System Calibration Response - High Range gas - Final	ppmv	Cmf	14.04	13.45	13.42	
Actual average - Dry (Corrected for Drift)	ppmv-SO2	Cgas	7.61	8.75	8.87	8.41
Mass Emissions	lbm-SO2 / hr	Mgas	0.562	0.666	0.638	0.622
	lbm-SO2 / MMBtu	E	0.0271	0.0311	0.0318	0.0300
	tons/yr		2.46	2.92	2.79	2.72

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horizone@teleport.com

Example Calculations- Gaseous Emission rate, lb/hr

Client: Waste Management, WA Source Greater Wenatchee Land Fill Flare
Date 2/8/07 Project # 2758 Run # 1

Equation:

$$E\frac{lb}{hr} = \frac{60\frac{\min}{hr} \times GasMeasured(ppmv) \times GasMolWt\frac{lb}{lbmol} \times 2116.22\frac{lbf}{ft^2} \times Flow\frac{dscf}{\min}}{10^6 \times 1545.33\frac{ftlbf}{lbmol \circ R} \times 527.7 \circ Rstd}$$

=

where Molecular Weights (lb/lbmol):

CO=28	SO_2=64
NO_x=46	TGOC as C=12

Calculations:

$FlowRate =$ 7408.8 $\frac{dscf}{\min}$

$GasName =$ NOx $MeasuredConcentration =$ 23.65 $ppmv$

$$E\frac{lb}{hr} = \frac{60\frac{\min}{hr} \times 23.65\,ppmv \times \frac{46}{lbmol}\frac{lb}{} \times 2116.22\frac{lbf}{ft^2} \times 7408.8\frac{dscf}{\min}}{10^6 \times 1545.33\frac{ftlbf}{lbmol \circ R} \times 527.7 \circ Rstd}$$

= 1.2550 lb-NOx/hr

On heat input Basis

Fd = 9,410 O_2 = 11.73

$$lb\text{-}NO_x/MMBtu = \frac{\left(23.65\,ppmv \times 9410\,dscf/MMBtu \times 46\,lb/mol\right) \times \left(\frac{20.946}{20.946-11.73}\right)}{10^6 \times 1545.33\frac{ft\,lbf}{lbmol\,^\circ R} \times \frac{527.67\,^\circ R\,std}{2116.22\,lbf/ft^2}}$$

= 0.060383 lb-NOx/MMBtu

Molecular Weight

Waste Management Disposal Services of Washington, Inc.						08-Feb-2007
Wenatchee Regional Landfill Flare Outlet						mwallace
East Wenatchee, WA						
O2 & CO2-EPA 3A						
Number of Completed Runs			Run 1	Run 2	Run 3	Average
Date Tested			08-Feb	08-Feb	08-Feb	
System Calibration Time - Initial		Tci	10:43	12:24	14:15	
Test Time-Starting		Tts	11:08	12:56	14:27	
Test Time-Ending		Tte	12:08	13:56	15:27	
System Calibration Time - Final		Tcf	12:24	14:15	15:45	
Test Mid-point Time		Tx	11:38	13:26	14:57	
Molecular weight, Dry Stack	lbm/lb-mole	Md	29.92	29.88	29.94	
Oxygen	O2	Span	25			
Indicated average - Dry	%	Cid	11.82	11.82	11.90	11.85
Cylinder Value - High Range calibration gas	%	Cma	11.34	11.34	11.34	
Cylinder Value - Low Range (Zero) calibration gas	%	Coa	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	%	Cmi	11.34	11.49	11.37	
System Calibration Response - Low Range gas - Initial	%	Coi	0.04	0.04	0.01	
System Calibration Response - Low Range gas - Final	%	Cof	0.04	0.01	0.01	
System Calibration Response - High Range gas - Final	%	Cmf	11.49	11.37	11.47	
Actual average - Dry (Corrected for Drift)	%	Cgas	11.73	11.73	11.82	11.76
Carbon Dioxide	CO2	Span	25			
Indicated average - Dry	%	Cid	8.17	7.94	8.27	8.13
Cylinder Value - High Range calibration gas	%	Cma	12.50	12.50	12.50	
Cylinder Value - Low Range (Zero) calibration gas	%	Coa	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	%	Cmi	12.26	12.38	12.34	
System Calibration Response - Low Range gas - Initial	%	Coi	0.05	0.05	0.04	
System Calibration Response - Low Range gas - Final	%	Cof	0.05	0.04	0.05	
System Calibration Response - High Range gas - Final	%	Cmf	12.38	12.34	12.26	
Actual average - Dry (Corrected for Drift)	%	Cgas	8.27	8.01	8.39	8.22

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Calibration Field Record

Client: Greater Wenatchee LF
Test Date: 2/8/07
Source: Flare

Tester(s): TH/ATH/JMH/KK
Observer:
Datalogger: Testpoint
Conditioner: M4K

Leak Checks: Pre-OK ✓ Post-OK ✓ Probe placement 4'	Cylinder #	Gas	Cylinder Value (Cv)	Analyzer Calibration Response (Cdir)	Resp. Time (secs)	Start Run 1 / Start Run 1 System Calibration Response (Cs)	End Run 1 / Start Run 2 System Calibration Response (Cs)	End Run 2 / Start Run 3 System Calibration Response (Cs)	End Run 2 System Calibration Response (Cs)	
Times				1020		1030	1225	1410	1540	
O2% ch 1	Air	O2	20.95	20.97						
Range/CS 25 12.65	0-10	O2	11.34	11.48		11.34	11.44	11.37	11.47	
Analyzer Model 1460	15	N2	0.11	-0.01		0.04	0.04	0.01	0.01	
Analyzer SN: 113										
CO2 % ch 2	32	CO2	21.83	21.87						
Range/CS 25 17.83	21	CO2	12.5	12.37		12.26	12.38	12.34	12.26	
Analyzer Model 1460	0-10	N2	0.11	0.10		0.05	0.05	0.04	0.05	
Analyzer SN: 166										
CO ppm ch 3	21	CO	459	458.77						
Range/CS 500 145.9	15	CO	284	293.42		289.99	285.12	286.09	279.55	
Analyzer Model 48	0-10	N2	0.0	-0.09		0.39	-0.28	-0.30	-0.32	
Analyzer SN: 10										
NOx ppm ch 4	21	NO	825	88.49						
Range/CS 100 12.25	15	NO	51.3	51.3		50.60	50.10	50.00	49.70	
Analyzer Model 42C	0-10	N2	0.0	0.06		-0.06	-0.16	-0.16	-0.07	
Analyzer SN: 196										
TGOC ppm ch 6	P 23	C_3H_8	85.3			85.70	89.24/85.35	86.26	84.29	
Out Range 100	P 27	"	49.2			50.69	48.01/49.84	49.80	49.14	
Analyzer Model VE7	P 21	"	28.83			28.56	26.91/28.95	27.82	28.83	
Analyzer SN: 89	A-2	Air	0.0			0.0	-1.60/0.02	-0.39	-0.14	
SO_2 ch 7	S-9	SO_2	26.61	26.80						
Range/CS 30 12.6	S-4	"	14.85	14.82		15.37	14.04	13.45	13.42	
Analyzer Model 721M	C-10	N_2	0.0	0.00		0.73	0.49	-0.34	-1.27	
Analyzer SN: 131										

Performance Specs: (3A, 6C, 7E, 10, 20) Note: CS=High Gas Conc.			Performance Specs: (25A)		Test Times	Run 1	Run 2	Run 3
Cal Error*	2%	|Cdir-Cv| / CS	5%	(Cs-Cv) / Cv	Start Time	1108	1256	1427
Bias* (SB)	5%	|Cs-Cdir| / CS	5%	(Cs-Cv) / Range	End Time	1208	1356	1527
Drift*	3%	|SBf-SBi|	3%	(Csl-Csf) / Range				

*Alternate specification: 0.5 ppmv absolute difference

Test Notes:

Hot Line Temp 282
Hot Line Temp ~~—~~ 106

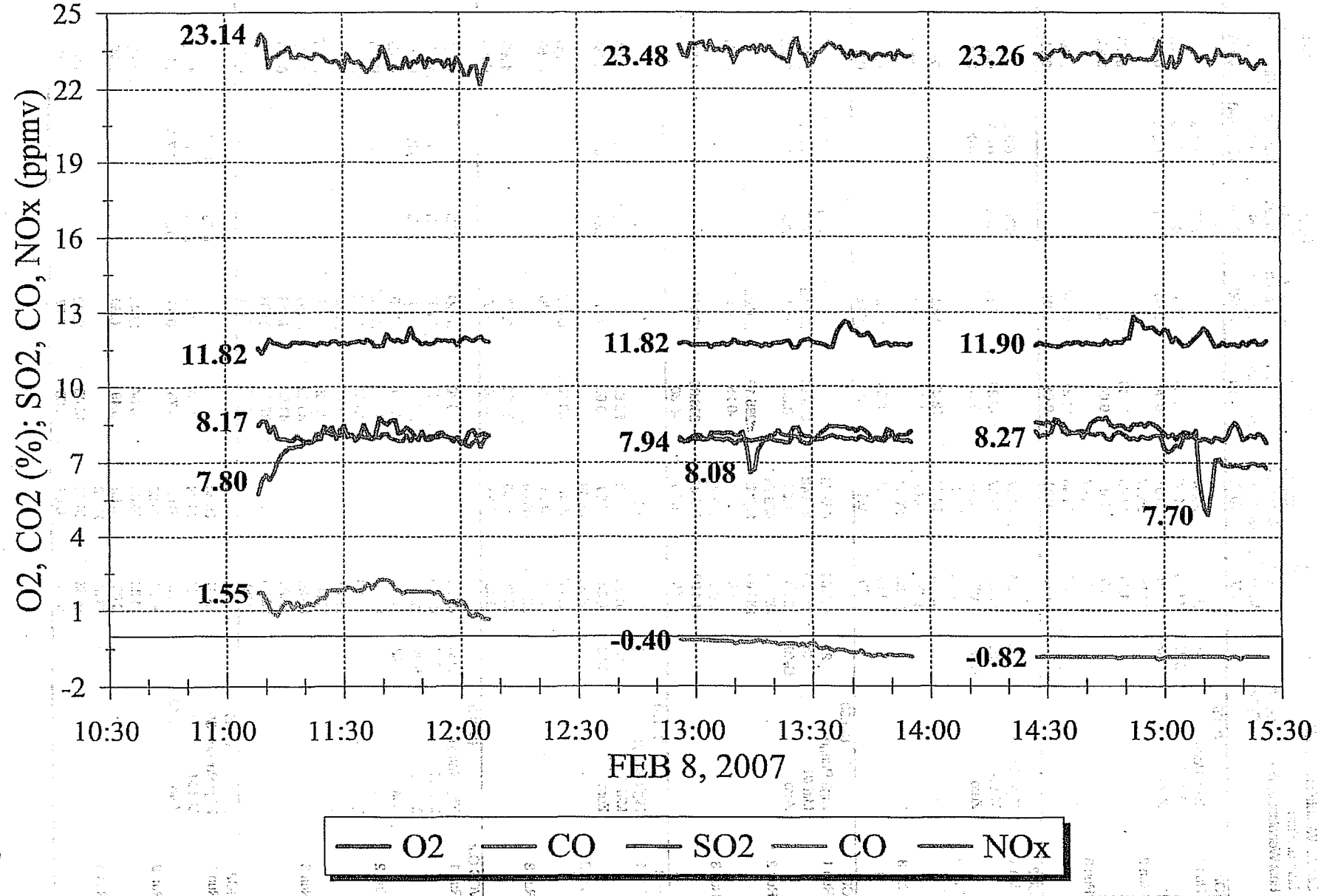
Analyzer QA Checks

Greater Wenatchee Landfill
Landfill Flare
East Wenatchee, WA

		Cyl. ID & Span		Cylinder Value CV	Analyzer Calibration Response ACR	Initial System Calibration Response SCRi	Final System Calibration Response SCRf	Cylinder Value Percent of Span	Cal Error <2% (<5 % 25A)	Initial System Calibration Bias < 5%	Final System Calibration Bias < 5%	Drift < 3%
O2	0- 25											
Run 1	High Range		Air	20.95	20.97			84%	0.1%			
	Mid-#1		O-10	11.34	11.48	11.34	11.49	45%	0.6%	0.6%	0.0%	0.6%
	Zero		15	0.00	-0.01	0.04	0.04	0%	0.0%	0.2%	0.2%	0.0%
Run 2				20.95	20.97							
				11.34	11.48	11.49	11.37			0.0%	0.4%	0.5%
				0.00	-0.01	0.04	0.01			0.2%	0.1%	0.1%
Run 3				20.95	20.97							
				11.34	11.48	11.37	11.47			0.4%	0.0%	0.4%
				0.00	-0.01	0.01	0.01			0.1%	0.1%	0.0%
CO2	0- 25											
Run 1	High Range		32	21.83	21.87			87%	0.2%			
	Mid-#1		21	12.50	12.37	12.26	12.38	50%	0.5%	0.4%	0.0%	0.5%
	Zero		O-10	0.00	0.10	0.05	0.05	0%	0.4%	0.2%	0.2%	0.0%
Run 2				21.83	21.87							
				12.50	12.37	12.38	12.34			0.0%	0.1%	0.2%
				0.00	0.10	0.05	0.04			0.2%	0.2%	0.0%
Run 3				21.83	21.87							
				12.50	12.37	12.34	12.26			0.1%	0.4%	0.3%
				0.00	0.10	0.04	0.05			0.2%	0.2%	0.0%
CO	0- 500											
Run 1	High Range		21	459.00	458.78			92%	0.0%			
	Mid-#1		15	284.00	293.42	289.99	285.12	57%	1.9%	0.7%	1.7%	1.0%
	Zero		O-10	0.00	-0.09	0.39	-0.28	0%	0.0%	0.1%	0.0%	0.1%
Run 2				459.00	458.78							
				284.00	293.42	285.12	286.09			1.7%	1.5%	0.2%
				0.00	-0.09	-0.28	-0.30			0.0%	0.0%	0.0%
Run 3				459.00	458.78							
				284.00	293.42	286.09	279.55			1.5%	2.8%	1.3%
				0.00	-0.09	-0.30	-0.82			0.0%	0.1%	0.1%
NOx	0- 100											
Run 1	High Range		21	88.50	88.49			89%	0.0%			
	Mid-#1		15	51.30	51.30	50.60	50.10	51%	0.0%	0.7%	1.2%	0.5%
	Zero		O-10	0.00	0.06	-0.06	-0.16	0%	0.1%	0.1%	0.2%	0.1%
Run 2				88.50	88.49							
				51.30	51.30	50.10	50.00			1.2%	1.3%	0.1%
				0.00	0.06	-0.16	-0.16			0.2%	0.2%	0.0%
Run 3				88.50	88.49							
				51.30	51.30	50.00	49.70			1.3%	1.6%	0.3%
				0.00	0.06	-0.16	-0.07			0.2%	0.1%	0.1%
VOC Out	0- 100											
Run 1	High Range		P23	85.30		85.70	83.24	85%		0.4%	2.1%	2.5%
	Mid-#1		P27	49.20		50.69	48.01	49%	3%	1.5%	1.2%	2.7%
	Mid-#2		P21	28.83		28.56	26.91	29%	-1%	0.3%	1.9%	1.7%
	Zero		A2	0.00		0.00	-1.60	0%		0.0%	1.6%	1.6%
Run 2				85.30		85.35	86.26			0.0%	1.0%	0.9%
				49.20		49.84	49.80			0.6%	0.6%	0.0%
				28.83		28.95	27.88			0.1%	0.9%	1.1%
				0.00		0.02	-0.39			0.0%	0.4%	0.4%
Run 3				85.30		86.26	84.29			1.0%	1.0%	2.0%
				49.20		49.80	49.14			0.6%	0.1%	0.7%
				28.83		27.88	28.33			0.9%	0.5%	0.4%
				0.00		-0.39	-0.14			0.4%	0.1%	0.3%
SO2	0- 30											
Run 1	High Range	S9		26.61	26.80			89%	0.6%			
	Mid-#1	S4		14.88	14.88	15.37	14.04	50%	0.0%	1.6%	2.8%	4.4%
	Zero	O-10		0.00	-0.52	0.73	0.49	0%	1.7%	4.2%	3.4%	0.8%
Run 2				26.61	26.80							
				14.88	14.88	14.04	13.45			2.8%	4.8%	2.0%
				0.00	-0.52	0.49	-0.39			3.4%	0.4%	2.9%
Run 3				26.61	26.80							
				14.88	14.88	13.45	13.42			4.8%	4.9%	0.1%
				0.00	-0.52	-0.39	-1.27			0.4%	2.5%	2.9%

Wenatchee Regional Landfill

Flare Outlet



Inlet Flow Rate
Flow Rate Determinations
Field Data
Traverse Point Locations

Inlet Flow Rate

Waste Management Disposal Services of Washington, Inc	Client	Sampling	Run #1	Run #2	Run #3
Wenatchee Landfill Flare Inlet	Source	Point			
East Wenatchee, WA	Location	1	0.0389	0.0370	0.0412
08-Feb-2007	Date	2	0.0519	0.0463	0.0504
mwallace	Analysis/QA	3	0.0510	0.0457	0.0418
		4	0.0496	0.0483	0.0541
		5	0.0442	0.0447	0.0505
		6	0.0441	0.0420	0.0499
		7	0.0290	0.0440	0.0474
		8	0.0733	0.0500	0.0427
		9	0.0364	0.0403	0.0293
		10	0.0441	0.0487	0.0404
		11	0.0472	0.0509	0.0468
		12	0.0361	0.0447	0.0403
		13	0.0531	0.0457	0.0472
		14	0.0493	0.0440	0.0441
		15	0.0459	0.0655	0.0462
		16	0.0435	0.0389	0.0465
		SQRT(dP)	0.2136	0.2141	0.2115

Definitions, Units	Method/Notes	Symbol	Run #1	Run #2	Run #3	Average
Time, Flow Traverse			12:58	13:02	15:39	
Duct diameter	in	Ds	12.25	12.25	12.25	
Cross Section	in²	As	117.9	117.9	117.9	
Pitot Coef.		Cp	0.834	0.834	0.834	
Temperature, Stack Dry Bulb	Tdb	°F	57.0	57.0	57.0	57.0
Temperature, Stack Wet Bulb	Twb	°F	57.0	57.0	57.0	57.0
Duct temperature	Ts	°F	57.0	57.0	57.0	57.0
Duct temperature	Ts	°R	516.7	516.7	516.7	516.7
Barometric Pressure	in Hg	Pbar	28.80	28.80	28.80	
Static Pressure	in H2O	Pg	1.139	1.120	1.020	1.093
Duct Pressure	in Hg	Ps	28.88	28.88	28.88	28.88
Average square root velocity pressure	in H2O^½	dp^½	0.2136	0.2141	0.2115	
Moisture, % Stack	Saturation	Bws	1.66	1.66	1.66	1.66
Mole fraction dry gas		mfg	98.3%	98.3%	98.3%	98.3%
Molecular weight Dry		Md	27.84	27.83	27.80	27.82
Molecular weight Wet		Ms	27.67	27.66	27.64	27.66
Velocity stack	fpm	vs	734.4	736.3	727.7	732.8
Flowrate actual	acf/min	Qa	601.1	602.6	595.6	599.8
Flowrate @std	dscf/min	Qsd	582.8	584.2	577.2	581.4

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VOLUME FLOWRATE MEASUREMENT

Cyclonic Flow? Y___ N X Avg Null Angle ___
Po = Barometric Pressure 28.8 in Hg
Cp = Pitot Coefficient .8336
Pitot I.D. #T-4
Post-Test Pitot Inspection (NC=no change, D=damaged)

Date 2/8/07
Plant GWRL
Sampling Location Inlet
Test Conditions Normal
Duct Dimentions (See Traverse Sheet)
Gauge I.D. SP# 1 By KRK

Run #	1	2	3						
Time	1258	1302	1539						
ΔP 1	.0389	0.0370	0.0412						
2	.0519	.0463	.0504						
3	.0510	.0457	.0418						
4	.0496	.0483	.0541						
5	.0442	.0447	.0505						
6	.0441	.0420	.0499						
7	.0290	.0440	.0474						
8	.0733	.0500	.0427						
1	.0364	.0403	.0293						
2	.0441	.0487	.0404						
3	.0472	.0509	.0468						
4	.0361	.0447	.0403						
5	.0531	.0457	.0472						
6	.0493	.0440	.0441						
7	.0459	.0655	.0462						
8	.0435	.0389	.0465						
Avg √Δ P									

Symbol	Definition, Units	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
Tdb	Dry bulb temp., F	57	57	57			
Twb	Wet bulb temp., F	—	—	—			
Pstat	Static press., in H2O	+1.139	+1.12	+1.02			
Leak Check in 15sec. (Pos)		0 "H2O @ 10 "H2O	0 "H2O @ 13 "H2O	0 "H2O @ 12 "H2O	__ "H2O @ __ "H2O	__ "H2O @ __ "H2O	__ "H2O @ __ "H2O
Leak Check in 15sec. (Neg)		0 "H2O @ 8 "H2O	0 "H2O @ 11 "H2O	0 "H2O @ 14 "H2O	__ "H2O @ __ "H2O	__ "H2O @ __ "H2O	__ "H2O @ __ "H2O

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TRAVERSE POINT LOCATIONS WORKSHEET

Client & Source Greater Wenatchee Landfill Date 2/7/07
Sampling location Flare Inlet Initials KRK

Traverse Point Number	Traverse Point Location (inches)
1	2"
2	2 3/4
3	3 7/8
4	5 1/2
5	9 3/4
6	11 3/8
7	12 1/2
8	13 1/4
9	
10	
11	
12	

Duct Dimensions and Port Locations

Inside of far wall to outside of nipple, F 13.75"
Inside of near wall to outside of nipple, N 1.5"
Nearest downstream disturbance, A ~5'
Nearest upstream disturbance, B ~8'
Circular: Inside Diameter, F-N 12.25
Rectangular: Width ——" Depth ——"
Number of Ports: 2

Circle duct characteristics:

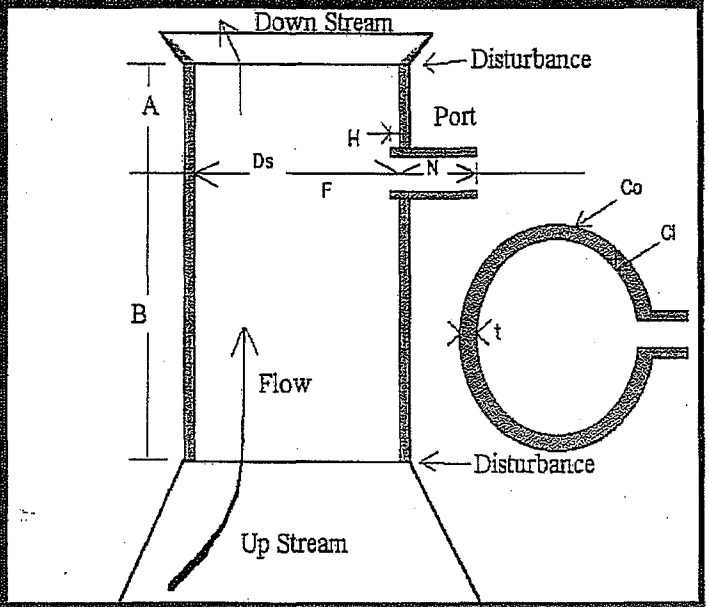
Construction: (Steel), PVC, Fiberglas, Other ——
Shape: (Circular), Rectangular
Orientation: Vertical, (Horizontal)
Flow straighteners: Yes (No)
Extension: Yes (No)
Cyclonic Flow Expected: Yes (No)
Cyclonic Flow Measured Yes (No)
Average Null Angle <20° Yes No (NA)
Meets EPA M-1 Criteria (Yes) No

Test port sketch or comments

Waste Management Disposal Services of Washington, Inc.
Wenatchee Landfill Flare Inlet
East Wenatchee, WA

08-Feb-2007
mwallace

Outer Circumference	Co	in	
Wall thickness	t	in	
INSIDE of FAR WALL to OUTSIDE of Nipple	F	in	13.75
INSIDE of NEAR WALL to OUTSIDE of Nipple	N	in	1.50
Nipple over hang into stack	H	in	0.0
STACK WALL to to OUTSIDE of Nipple	N-t	in	
*DOWNstream Disturb	A	in	60
*UPstream Disturb	B	in	96
Inner Diameter (F-N+H=Ds)	Ds	in	12.25
Area Total	As	sqin	
DOWNstream Ratio	A/Ds		4.9
UPstream Ratio	B/Ds		7.8



Traverse (Particulate)	12
Recommended #Pts/Diameter	6
Traverse (NON-Particulate)	12
Recommended #Pts/Diameter	6
Actual Points per Diameter	8

Trav Pt #No	Fract Stk ID (f)	Stack ID (Ds)	Actual Points (Dsxf)	Nearest 8ths (TP)	Adjusted Points (TP)	Traverse Points (TP + N)	Traverse Points (TP + N)
1	3.23%	12.25	0.4	0.375	0.500	2.000	2
2	10.47%	12.25	1.3	1.250	1.250	2.750	2 3 / 4
3	19.38%	12.25	2.4	2.375	2.375	3.875	3 7 / 8
4	32.32%	12.25	4.0	4.000	4.000	5.500	5 1 / 2
5	67.68%	12.25	8.3	8.250	8.250	9.750	9 3 / 4
6	80.62%	12.25	9.9	9.875	9.875	11.375	11 3 / 8
7	89.53%	12.25	11.0	11.000	11.000	12.500	12 1 / 2
8	96.77%	12.25	11.9	11.875	11.750	13.250	13 1 / 4

Inlet and Outlet NMOC
Inlet and Destruction Efficiency Determinations
Emissions Determinations
Data Logger Printout
Laboratory Results

Inlet NMOC and Destruction Efficiency of NMOC

Waste Management Disposal Services of Washington, Inc. Wenatchee Landfill Flare East Wenatchee, WA				08-Feb-2007 mwallace	
Number of Completed Runs		Run 1	Run 2	Run 3	Average
INLET FLOW RATE (EPA M2)	dscf/min	582.8	584.2	577.2	581.4
OUTLET FLOW RATE (EPA M2)	dscf/min	7,408	7,630	7,212	7,417
NMOC					
INLET					
NMOC as Methane	ppmv-CH4	1,200	1,200	1,200	1,200
NMOC as Hexane	ppmv-C6H14	200.0	200.0	200.0	200.0
Inlet Rate, NMOC as Hexane	**lbm-C6H14/hr**	**1.564**	**1.568**	**1.549**	**1.560**
	mg/min	11,824	11,853	11,712	11,796
	ug/dscm	716,531	716,531	716,531	716,531
	tons/yr-C6H14	6.85	6.87	6.79	6.83
OUTLET					
TGOC as Propane	ppmv-C3H8	0.31	0.18	0.21	0.24
TGOC as Carbon	ppmv-C	0.93	0.55	0.64	0.71
TGOC as Hexane	ppmv-C6	0.15	0.09	0.11	0.12
Methane	ppmv-CH4	0.51	0.54	> 0.0	>0.35
NMOC as Carbon	ppmv-C	0.42	0.013	0.64	0.19
NMOC as Hexane	ppmv-C6	0.0692	0.0022	0.1074	0.0596
Outlet Rate, NMOC as Hexane	**lbm-C6H14 / hr**	0.0069	0.0002	0.0104	0.0058
	DESTRUCTION	**99.56%**	**99.99%**	**99.33%**	**99.62%**

TGOC and NMOC Emissions

Waste Management Disposal Services of Washington, Inc.						08-Feb-2007
Wenatchee Regional Landfill Flare Outlet						mwallace
East Wenatchee, WA						
TGOC-EPA 25A, Methane-TO-3						
Number of Completed Runs			Run 1	Run 2	Run 3	Average
Date Tested			08-Feb	08-Feb	08-Feb	
System Calibration Time - Initial		Tci	10:43	12:24	14:15	
Test Time-Starting		Tts	11:08	12:56	14:27	
Test Time-Ending		Tte	12:08	13:56	15:27	
System Calibration Time - Final		Tcf	12:24	14:15	15:45	
Test Mid-point Time		Tx	11:38	13:26	14:57	
Volumetric Flowrate, Dry Standard	dscf/min	Qsd	7,408	7,630	7,212	
F Factor for Fuel (EST)	dscf / MMBtu	Fd	9,410	9,410	9,409	
Oxygen	%	O2	11.73	11.73	11.82	
Carbon Dioxide	%	CO2	8.27	8.01	8.39	
Moisture, Mole Fraction dry Gas		mfg	92.14%	92.13%	92.14%	
Total Gaseous Organic Concentration	**(TGOC)**	Span	100	100	100	
Span Gas- Instrument Response Factor	JUM Factor	C3H8	1.00	1.00	1.00	
Span Gas- Carbon Count Equivalent		K	3			
Cylinder Value - High Range calibration gas	ppmv		28.83	28.83	28.83	
Cylinder Value - Low Range (Zero) calibration gas	ppmv	Coa	0.00	0.00	0.00	
Indicated average- Wet	ppmv-C3H8	Ciw	-0.58	-0.04	-0.08	-0.23
Span Gas Concentration- Equivalent	ppmv	Sc	28.83	28.83	28.83	
Zero Gas Concentration- Equivalent	ppmv	Zc	0.00	0.00	0.00	
System Calibration Response - High Range gas - Initial	ppmv	Ss	28.56	28.95	27.88	
System Calibration Response - Low Range gas - Initial	ppmv	Zs	0.00	0.02	-0.39	
System Calibration Response - Low Range gas - Final	ppmv	Ze	-1.60	-0.39	-0.14	
System Calibration Response - High Range gas - Final	ppmv	Se	26.91	27.88	28.33	
Actual average - Wet (Corrected for Drift & Response)	ppmv-C3H8	Cgas	0.28	0.17	0.20	0.22
Actual average - Dry (Corrected for Drift & Response)	ppmv-C3H8	Cgas	0.31	0.18	0.21	0.24
Mass Emissions	lbm-C3H8 / hr		0.0043	0.0026	0.0029	0.0033
Actual average - Dry, Carbon Basis	ppmv-C	Cgas	**0.93**	**0.55**	**0.64**	**0.71**
Mass Emissions	lbm-C / hr		0.0128	0.0079	0.0087	0.0098
Actual average - Dry, Hexane Basis	ppmv-C6	Cgas	0.15	0.09	0.11	0.12
Mass Emissions	lbm-C6H14 / hr		0.0153	0.0094	0.0104	0.0117
Methane (TO-3)	ppmv-CH4		**0.51**	**0.54**	**> 0.0**	**>0.35**
NMOC (TGOC-Methane)	ppmv-C		**0.42**	**0.013**	**0.64**	**0.36**
	lbm-C / hr		0.0058	0.0002	0.0087	0.0049
	ppmv-C6		0.0692	0.0022	0.1074	0.0596
	lbm-C6H14 / hr		0.0069	0.0002	0.0104	0.0058
	tons-C6H14 / yr		0.0301	0.0010	0.0455	0.0256

Wenatchee Regional Landfill

Flare Outlet

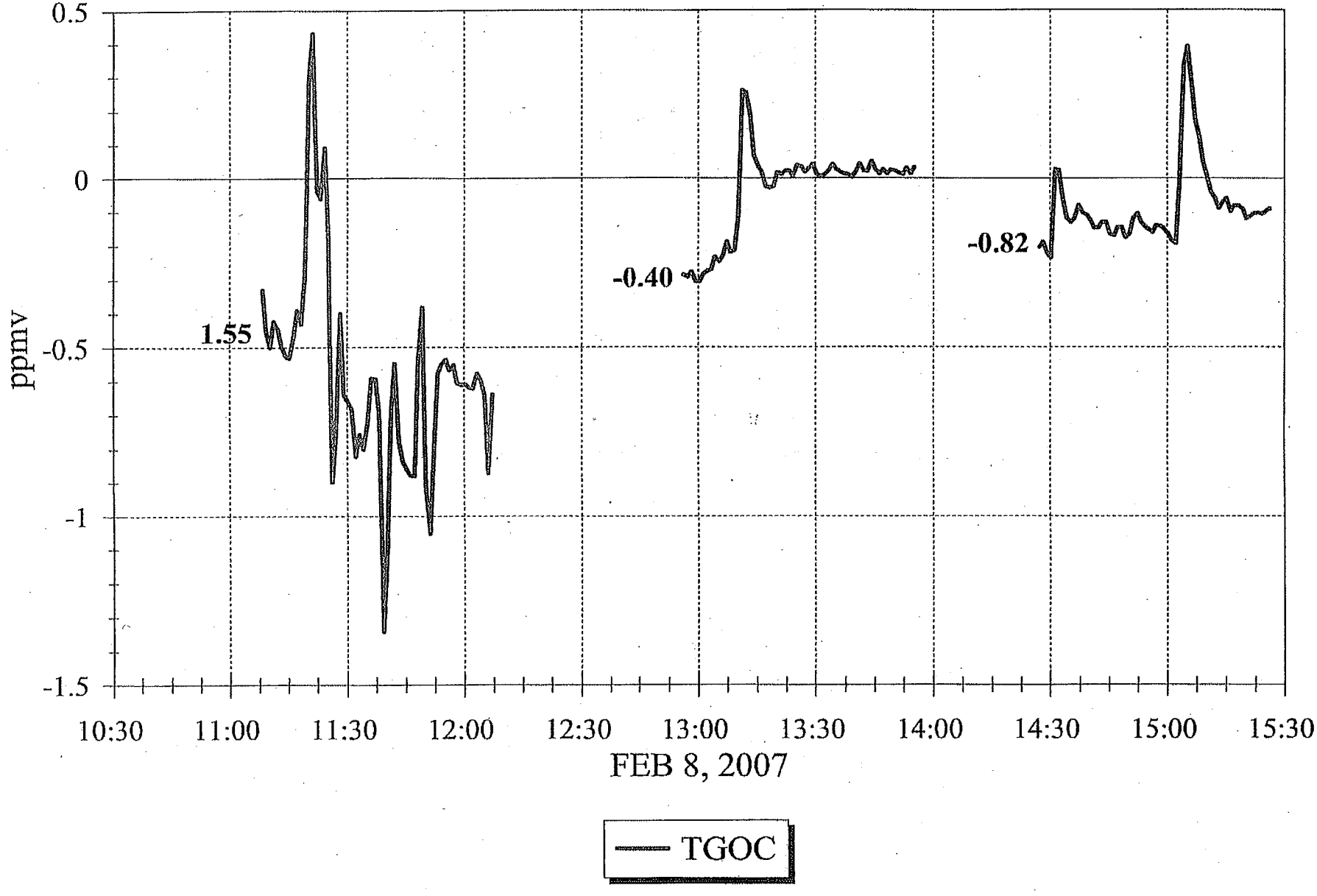


Fig 5

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Project ID: P2700335

Methane

Test Code: EPA TO-3 Modified
Instrument ID: HP5890II/GC7/FID
Analyst: Wade Henton
Sampling Media: Tedlar Bag(s)
Test Notes:

Date(s) Collected: 2/8/07
Date Received: 2/9/07
Date Analyzed: 2/9/07
Volume(s) Analyzed: 1.0 ml

Client Sample ID	CAS Sample ID	D.F.	Methane Concentration in ppmV		Data Qualifier
			Result	MRL	
Run #1 Outlet	P2700335-004	1.00	**0.51**	0.50	
Run #2 Outlet	P2700335-005	1.00	**0.54**	0.50	
Run #3 Outlet	P2700335-006	1.00	ND	0.50	
Method Blank	P070209-MB	1.00	ND	0.50	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

1.16

Verified By: W Date: 2/23/07

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COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Project ID: P2700335

Total Gaseous Nonmethane Organics (TGNMO) as Methane

Test Code: EPA Method 25C Modified
Instrument ID: HP5890II/GC1/FID/TCA
Analyst: Wade Henton
Sampling Media: Tedlar Bag(s)
Test Notes:

Date(s) Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.50 ml

Client Sample ID	CAS Sample ID	D.F.	Total Gaseous Nonmethane Organics (TGNMO) as Methane Concentration in ppmV		Data Qualifier
			Result	MRL	
Run #1 Inlet	P2700335-001	1.00	**1,200**	1.0	
Run #2 Inlet	P2700335-002	1.00	**1,200**	1.0	
Run #3 Inlet	P2700335-003	1.00	**1,200**	1.0	
Method Blank	P070209-MB	1.00	ND	1.0	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: MJ Date: 2/23/07

5

Inlet and Outlet Organic TAPs
Destruction Efficiency Determinations
Inlet Determinations
Outlet Emissions Determinations
Laboratory Results

Destruction Efficiency of TAPs

Waste Management Disposal Services of Washington, Inc.
Wenatchee Landfill Flare East Wenatchee, WA
)8-Feb-2007 **mwallace**

Compound	Destruction Efficiency		Outlet (mg/min) 3 Run Average		Inlet (mg/min) 3 Run Average	
	Upper Limit	Lower Limit	HIGH	LOW	HIGH	LOW
Chloromethane	ND		1.7	0.0	13.5	0.0
Vinyl Chloride	100.0%	95.6%	1.7	0.0	39.8	39.8
Bromomethane	ND		1.8	0.0	13.6	0.0
Chloroethane	ND		1.7	0.0	13.2	0.0
Acetone	34.0%		138.1	138.1	209.3	209.3
Trichlorofluoromethane (Freon 11)	100.0%	91.9%	1.8	0.0	21.6	21.6
1,1 - Dichloroethene	ND		1.7	0.0	13.3	0.0
Methylene Chloride	63.6%		9.2	9.2	25.2	25.2
Trichlorofluoroethane (Freon 113)	ND		1.7	0.0	12.8	0.0
Carbon Disulfide	100.0%	90.3%	1.7	0.0	18.1	18.1
trans-1,2-Dichloroethene	ND		1.7	0.0	13.3	0.0
1,1 - Dichloroethane	100.0%	88.1%	1.7	0.0	14.7	14.7
Methyl tert-Butyl Ether	ND		1.7	0.0	13.3	0.0
Vinyl Acetate	ND		1.7	0.0	13.6	0.0
2-Butanone (MEK)	100.0%	99.6%	1.8	0.0	406.2	406.2
cis-1,2-Dichloroethene	100.0%	97.3%	1.7	0.0	65.7	65.7
Chloroform	ND		1.7	0.0	13.1	0.0
1,2 - Dichloroethane	ND		1.7	0.0	13.5	0.0
1,1,1 - Trichloroethane	ND		1.7	0.0	13.7	0.0
)enzene	88.1%		5.7	5.7	47.7	47.7
Carbon Tetrachloride	ND		1.8	0.0	13.7	0.0
1,2 - Dichloropropane	ND		1.7	0.0	13.1	0.0
Bromodichloromethane	ND		2.0	0.0	15.6	0.0
Trichloroethene	100.0%	96.6%	1.8	0.0	51.3	51.3
cis-1,3,Dichloropropene	ND		1.8	0.0	13.7	0.0
4-Methyl-2-pentanone	100.0%	95.8%	1.7	0.0	41.8	41.8
trans-1,3-Dichloropropene	ND		1.8	0.0	13.7	0.0
1,1,2 - Trichloroethane	ND		1.7	0.0	13.7	0.0
Toluene	99.6%		4.3	4.3	987.5	987.5
2-Hexanone	ND		1.7	0.0	13.7	0.0
Dibromochloromethane	ND		1.8	0.0	13.4	0.0
1,2 - Dibromoethane	ND		1.7	0.0	12.9	0.0
Tetrachloroethene	100.0%	98.3%	1.8	0.0	102.9	102.9
Chlorobenzene	ND		1.7	0.0	13.1	0.0
Ethyl Benzene	100.0%	99.5%	1.7	0.0	351.3	351.3
m,p-Xylene	99.4%		5.3	5.3	871.9	871.9
Bromoform	ND		1.8	0.0	13.3	0.0
Styrene	100.0%	93.9%	1.8	0.0	28.5	28.5
o-Xylene	99.5%	99.2%	2.0	1.3	242.2	242.2
1,1,2,2 - Tetrachloroethane	ND		1.8	0.0	13.8	0.0
1,3 - Dichlorobenzene	ND		1.7	0.0	13.1	0.0
',4 - Dichlorobenzene	100.0%	91.5%	1.7	0.0	20.5	20.5
,2 - Dichlorobenzene	ND		1.7	0.0	13.1	0.0
Total TAPs	95.4%	94.1%	229.4	163.8	3,882.7	3,546.1
Total TAPs - (acetone + methylene chloride)	99.5%	97.9%	82.2	16.5		

Inlet Organic TAPs

Waste Management Disposal Services of Washington, Inc. Wenatchee Landfill Flare Inlet Flow Rate (Inlet)	dscf/min	583	584	577	581	Columbia Analytical Lab Results				08-Feb-2007 mwallace			
Compound	Molecular Weights	Run 1 ppbv	Run 2 ppbv	Run 3 ppbv	Average ppbv	Run 1 mg/min	Run 2 mg/min	Run 3 mg/min	Average mg/min	Run 1 ug/m3	Run 2 ug/m3	Run 3 ug/m3	Average ug/m3
Chloromethane	50.5	< 390	< 390	< 390	< 390	< 13.5	< 13.5	< 13.4	< 13.5	< 819	< 819	< 819	< 819
Vinyl Chloride	62.5	920	930	940	930	39.4	40.0	39.9	39.8	2,390	2,416	2,442	2,416
Bromomethane	94.9	< 210	< 210	< 210	< 210	< 13.7	< 13.7	< 13.5	< 13.6	< 828	< 828	< 828	< 828
Chloroethane	64.5	< 300	< 300	< 300	< 300	< 13.3	< 13.3	< 13.1	< 13.2	< 804	< 804	< 804	< 804
Acetone	58.1	5,100	5,300	5,400	5,267	203.2	211.7	213.1	209.3	12,314	12,797	13,038	12,716
Trichlorofluoromethane (Freon 11)	137.4	240	230	220	230	22.6	21.7	20.5	21.6	1,371	1,313	1,256	1,313
1,1 - Dichloroethene	96.9	< 200	< 200	< 200	< 200	< 13.3	< 13.3	< 13.2	< 13.3	< 806	< 806	< 806	< 806
Methylene Chloride	84.9	430	440	430	433	25.0	25.7	24.8	25.2	1,518	1,553	1,518	1,529
Trichlorotrifluoroethane (Freon 113)	187.4	< 100	< 100	< 100	< 100	< 12.9	< 12.9	< 12.7	< 12.8	< 779	< 779	< 779	< 779
Carbon Disulfide	76.1	310	360	370	347	16.2	18.8	19.1	18.1	981	1,139	1,171	1,097
trans-1,2-Dichloroethene	96.9	< 200	< 200	< 200	< 200	< 13.3	< 13.3	< 13.2	< 13.3	< 806	< 806	< 806	< 806
1,1 - Dichloroethane	99.0	210	220	220	217	14.3	15.0	14.8	14.7	864	905	905	891
Methyl tert-Butyl Ether	88.2	< 220	< 220	< 220	< 220	< 13.3	< 13.3	< 13.2	< 13.3	< 807	< 807	< 807	< 807
Vinyl Acetate	86.1	< 230	< 230	< 230	< 230	< 13.6	< 13.6	< 13.5	< 13.6	< 823	< 823	< 823	< 823
2-Butanone (MEK)	72.1	7,900	8,300	8,500	8,233	390.7	411.5	416.4	406.2	23,679	24,878	25,477	24,678
cis-1,2-Dichloroethene	96.9	970	1,000	1,000	990	64.5	66.7	65.9	65.7	3,909	4,030	4,030	3,990
Chloroform	119.4	< 160	< 160	< 160	< 160	< 13.1	< 13.1	< 13.0	< 13.1	< 794	< 794	< 794	< 794
1,2 - Dichloroethane	99.0	< 200	< 200	< 200	< 200	< 13.6	< 13.6	< 13.4	< 13.5	< 823	< 823	< 823	< 823
1,1,1 - Trichloroethane	133.4	< 150	< 150	< 150	< 150	< 13.7	< 13.8	< 13.6	< 13.7	< 832	< 832	< 832	< 832
Benzene	78.1	860	910	910	893	46.1	48.9	48.3	47.7	2,792	2,955	2,955	2,900
Carbon Tetrachloride	153.8	< 130	< 130	< 130	< 130	< 13.7	< 13.7	< 13.6	< 13.7	< 831	< 831	< 831	< 831
1,2 - Dichloropropane	112.9	< 170	< 170	< 170	< 170	< 13.2	< 13.2	< 13.0	< 13.1	< 798	< 798	< 798	< 798
Bromodichloromethane	189.5	< 120	< 120	< 120	< 120	< 15.6	< 15.6	< 15.4	< 15.6	< 945	< 945	< 945	< 945
Trichloroethene	131.4	550	580	580	570	49.6	52.4	51.8	51.3	3,004	3,168	3,168	3,114
cis-1,3,Dichloropropene	111.0	< 180	< 180	< 180	< 180	< 13.7	< 13.7	< 13.6	< 13.7	< 830	< 830	< 830	< 830
4-Methyl-2-pentanone	100.2	600	610	620	610	41.2	42.0	42.2	41.8	2,498	2,540	2,582	2,540
trans-1,3-Dichloropropene	111.0	< 180	< 180	< 180	< 180	< 13.7	< 13.7	< 13.6	< 13.7	< 830	< 830	< 830	< 830
1,1,2 - Trichloroethane	133.4	< 150	< 150	< 150	< 150	< 13.7	< 13.8	< 13.6	< 13.7	< 832	< 832	< 832	< 832
Toluene	92.1	15,000	16,000	16,000	15,667	947.7	1,013.4	1,001.3	987.5	57,431	61,260	61,260	59,984
2-Hexanone	100.2	< 200	< 200	< 200	< 200	< 13.7	< 13.8	< 13.6	< 13.7	< 833	< 833	< 833	< 833
Dibromochloromethane	208.3	< 94	< 94	< 94	< 94	< 13.4	< 13.5	< 13.3	< 13.4	< 814	< 814	< 814	< 814
1,2 - Dibromoethane	187.9	< 100	< 100	< 100	< 100	< 12.9	< 12.9	< 12.8	< 12.9	< 781	< 781	< 781	< 781
Tetrachloroethene	165.8	890	920	910	907	101.2	104.9	102.5	102.9	6,134	6,341	6,272	6,249
Chlorobenzene	112.6	< 170	< 170	< 170	< 170	< 13.1	< 13.2	< 13.0	< 13.1	< 796	< 796	< 796	< 796
Ethyl Benzene	106.2	4,700	4,900	4,900	4,833	342.4	357.9	353.6	351.3	20,750	21,633	21,633	21,339
m,p-Xylene	106.2	12,000	12,000	12,000	12,000	874.0	876.2	865.7	871.9	52,964	52,964	52,964	52,964
Bromoform	252.7	< 77	< 77	< 77	< 77	< 13.3	< 13.4	< 13.2	< 13.3	< 809	< 809	< 809	< 809
Styrene	104.1	390	410	400	400	27.9	29.4	28.3	28.5	1,688	1,774	1,731	1,731
o-Xylene	106.2	3,200	3,400	3,400	3,333	233.1	248.2	245.3	242.2	14,124	15,006	15,006	14,712
1,1,2,2 - Tetrachloroethane	167.9	< 120	< 120	< 120	< 120	< 13.8	< 13.9	< 13.7	< 13.8	< 838	< 838	< 838	< 838
1,3 - Dichlorobenzene	147.0	< 130	< 130	< 130	< 130	< 13.1	< 13.1	< 13.0	< 13.1	< 794	< 794	< 794	< 794
1,4 - Dichlorobenzene	147.0	200	210	200	203	20.2	21.2	20.0	20.5	1,222	1,283	1,222	1,243
1,2 - Dichlorobenzene	147.0	< 130	< 130	< 130	< 130	< 13.1	< 13.1	< 13.0	< 13.1	< 794	< 794	< 794	< 794
Totals		54,470	56,720	57,000	56,063	3,459	3,606	3,573	3,546	209,634	217,957	218,631	215,407

Outlet Or ic TAPs

Waste Management Disposal Services of Washington, Inc.
Wenatchee Landfill Flare Outlet
Flow Rate (Outlet) dscf/min 7,408 7,630 7,212

Columbia Analytical Lab Results

08-Feb-2007
mwallace

Compound	Molecular Weights	Run 1 ppbv	Run 2 ppbv	Run 3 ppbv	Average ppbv	Run 1 mg/min	Run 2 mg/min	Run 3 mg/min	Average mg/min	Run 1 ug/m3	Run 2 ug/m3	Run 3 ug/m3	Average ug/m3
Chloromethane	50.5	< 3.9	< 3.2	< 4.8	< 4.0	< 1.7	< 1.5	< 2.1	< 1.7	< 8.2	< 6.7	< 10.1	< 8.3
Vinyl Chloride	62.5	< 3.1	< 2.6	< 3.9	< 3.2	< 1.7	< 1.5	< 2.1	< 1.7	< 8.1	< 6.8	< 10.1	< 8.3
Bromomethane	94.9	< 2.1	< 1.7	< 2.6	< 2.1	< 1.7	< 1.4	< 2.1	< 1.8	< 8.3	< 6.7	< 10.3	< 8.4
Chloroethane	64.5	< 3.0	< 2.5	< 3.8	< 3.1	< 1.7	< 1.4	< 2.1	< 1.7	< 8.0	< 6.7	< 10.2	< 8.3
Acetone	58.1	**230.0**	**240.0**	**350.0**	**273.3**	**116.5**	**125.2**	**172.6**	**138.1**	**555.3**	**579.5**	**845.1**	**660.0**
Trichlorofluoromethane (Freon 11)	137.4	< 1.4	< 1.2	< 1.8	< 1.5	< 1.7	< 1.5	< 2.1	< 1.8	< 8.0	< 6.9	< 10.3	< 8.4
1,1 - Dichloroethene	96.9	< 2.0	< 1.7	< 2.5	< 2.1	< 1.7	< 1.5	< 2.1	< 1.7	< 8.1	< 6.9	< 10.1	< 8.3
Methylene Chloride	84.9	**8.2**	**12.0**	**17.0**	**12.4**	**6.1**	**9.2**	**12.3**	**9.2**	**28.9**	**42.4**	**60.0**	**43.8**
Trichlorofluoroethane (Freon 113)	187.4	< 1.0	< 0.9	< 1.3	< 1.1	< 1.6	< 1.5	< 2.1	< 1.7	< 7.8	< 6.8	< 10.1	< 8.2
Carbon Disulfide	76.1	< 2.6	< 2.1	< 3.2	< 2.6	< 1.7	< 1.4	< 2.1	< 1.7	< 8.2	< 6.6	< 10.1	< 8.3
trans-1,2-Dichloroethene	96.9	< 2.0	< 1.7	< 2.5	< 2.1	< 1.7	< 1.5	< 2.1	< 1.7	< 8.1	< 6.9	< 10.1	< 8.3
1,1 - Dichloroethane	99.0	< 2.0	< 1.6	< 2.5	< 2.0	< 1.7	< 1.4	< 2.1	< 1.7	< 8.2	< 6.6	< 10.3	< 8.4
Methyl tert-Butyl Ether	88.2	< 2.2	< 1.8	< 2.8	< 2.3	< 1.7	< 1.4	< 2.1	< 1.7	< 8.1	< 6.6	< 10.3	< 8.3
Vinyl Acetate	86.1	< 2.3	< 1.9	< 2.8	< 2.3	< 1.7	< 1.5	< 2.0	< 1.7	< 8.2	< 6.8	< 10.0	< 8.4
2-Butanone (MEK)	72.1	< 2.7	< 2.3	< 3.4	< 2.8	< 1.7	< 1.5	< 2.1	< 1.8	< 8.1	< 6.9	< 10.2	< 8.4
cis-1,2-Dichloroethene	96.9	< 2.0	< 1.7	< 2.5	< 2.1	< 1.7	< 1.5	< 2.1	< 1.7	< 8.1	< 6.9	< 10.1	< 8.3
Chloroform	119.4	< 1.6	< 1.4	< 2.0	< 1.7	< 1.7	< 1.5	< 2.0	< 1.7	< 7.9	< 6.9	< 9.9	< 8.3
1,2 - Dichloroethane	99.0	< 2.0	< 1.6	< 2.5	< 2.0	< 1.7	< 1.4	< 2.1	< 1.7	< 8.2	< 6.6	< 10.3	< 8.4
1,1,1 - Trichloroethane	133.4	< 1.5	< 1.2	< 1.8	< 1.5	< 1.7	< 1.4	< 2.0	< 1.7	< 8.3	< 6.7	< 10.0	< 8.3
Benzene	78.1	**12.0**	**7.2**	**5.8**	**8.3**	**8.2**	**5.1**	**3.8**	**5.7**	**39.0**	**23.4**	**18.8**	**27.1**
Carbon Tetrachloride	153.8	< 1.3	< 1.1	< 1.6	< 1.3	< 1.7	< 1.5	< 2.1	< 1.8	< 8.3	< 7.0	< 10.2	< 8.5
1,2 - Dichloropropane	112.9	< 1.7	< 1.4	< 2.2	< 1.8	< 1.7	< 1.4	< 2.1	< 1.7	< 8.0	< 6.6	< 10.3	< 8.3
Bromodichloromethane	189.5	< 1.2	< 1.0	< 1.5	< 1.2	< 2.0	< 1.7	< 2.4	< 2.0	< 9.5	< 7.9	< 11.8	< 9.7
Trichloroethene	131.4	< 1.5	< 1.2	< 1.9	< 1.5	< 1.7	< 1.4	< 2.1	< 1.8	< 8.2	< 6.6	< 10.4	< 8.4
cis-1,3,Dichloropropene	111.0	< 1.8	< 1.5	< 2.2	< 1.8	< 1.7	< 1.5	< 2.1	< 1.8	< 8.3	< 6.9	< 10.1	< 8.5
4-Methyl-2-pentanone	100.2	< 2.0	< 1.6	< 2.4	< 2.0	< 1.7	< 1.4	< 2.0	< 1.7	< 8.3	< 6.7	< 10.0	< 8.3
trans-1,3-Dichloropropene	111.0	< 1.8	< 1.5	< 2.2	< 1.8	< 1.7	< 1.5	< 2.1	< 1.8	< 8.3	< 6.9	< 10.1	< 8.5
1,1,2 - Trichloroethane	133.4	< 1.5	< 1.2	< 1.8	< 1.5	< 1.7	< 1.4	< 2.0	< 1.7	< 8.3	< 6.7	< 10.0	< 8.3
Toluene	92.1	**6.6**	**4.9**	**4.4**	**5.3**	**5.3**	**4.1**	**3.4**	**4.3**	**25.3**	**18.8**	**16.8**	**20.3**
2-Hexanone	100.2	< 2.0	< 1.6	< 2.4	< 2.0	< 1.7	< 1.4	< 2.0	< 1.7	< 8.3	< 6.7	< 10.0	< 8.3
Dibromochloromethane	208.3	< 0.9	< 0.8	< 1.2	< 1.0	< 1.7	< 1.5	< 2.1	< 1.8	< 8.1	< 6.8	< 10.4	< 8.4
1,2 - Dibromoethane	187.9	< 1.0	< 0.9	< 1.3	< 1.1	< 1.6	< 1.5	< 2.1	< 1.7	< 7.8	< 6.8	< 10.2	< 8.3
Tetrachloroethene	165.8	< 1.2	< 1.0	< 1.5	< 1.2	< 1.7	< 1.5	< 2.1	< 1.8	< 8.3	< 6.8	< 10.3	< 8.5
Chlorobenzene	112.6	< 1.7	< 1.4	< 2.2	< 1.8	< 1.7	< 1.4	< 2.1	< 1.7	< 8.0	< 6.6	< 10.3	< 8.3
Ethyl Benzene	106.2	< 1.8	< 1.5	< 2.3	< 1.9	< 1.7	< 1.4	< 2.1	< 1.7	< 7.9	< 6.6	< 10.2	< 8.2
m,p-Xylene	106.2	**6.4**	**6.4**	**4.2**	**5.7**	**5.9**	**6.1**	**3.8**	**5.3**	**28.2**	**28.2**	**18.5**	**25.0**
Bromoform	252.7	< 0.8	< 0.7	< 1.0	< 0.8	< 1.7	< 1.5	< 2.1	< 1.8	< 8.1	< 6.8	< 10.2	< 8.4
Styrene	104.1	< 1.9	< 1.6	< 2.3	< 1.9	< 1.7	< 1.5	< 2.0	< 1.8	< 8.2	< 6.9	< 10.0	< 8.4
o-Xylene	106.2	**2.0**	**2.1**	< 2.3	< 2.1	**1.9**	**2.0**	< 2.1	< 2.0	**8.8**	**9.3**	< 10.2	< 9.4
1,1,2,2 - Tetrachloroethane	167.9	< 1.2	< 1.0	< 1.5	< 1.2	< 1.8	< 1.5	< 2.1	< 1.8	< 8.4	< 6.8	< 10.5	< 8.5
1,3 - Dichlorobenzene	147.0	< 1.3	< 1.1	< 1.7	< 1.4	< 1.7	< 1.5	< 2.1	< 1.7	< 7.9	< 6.7	< 10.4	< 8.4
1,4 - Dichlorobenzene	147.0	< 1.3	< 1.1	< 1.7	< 1.4	< 1.7	< 1.5	< 2.1	< 1.7	< 7.9	< 6.7	< 10.4	< 8.4
1,2 - Dichlorobenzene	147.0	< 1.3	< 1.1	< 1.7	< 1.4	< 1.7	< 1.5	< 2.1	< 1.7	< 7.9	< 6.7	< 10.4	< 8.4
Totals		265.2	272.6	381.4	305.0	143.8	151.6	195.9	162.5	685.6	701.5	959.3	776

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-001

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.00125 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	2,300	800	920	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
67-64-1	Acetone	12,000	4,000	5,100	1,700	M
75-69-4	Trichlorofluoromethane	1,300	800	240	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	1,500	800	430	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	970	800	310	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	850	800	210	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	23,000	800	7,900	270	
156-59-2	cis-1,2-Dichloroethene	3,900	800	970	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	2,800	800	860	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	**3,000**	800	**550**	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
[illegible]3-10-1	4-Methyl-2-pentanone	**2,500**	800	**600**	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	**58,000**	800	**15,000**	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	**6,000**	800	**890**	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	**20,000**	800	**4,700**	180	
179601-23-1	*m,p* -Xylenes	**50,000**	800	**12,000**	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	**1,700**	800	**390**	190	
95-47-6	o-Xylene	**14,000**	800	**3,200**	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	**1,200**	800	**200**	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

122

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	**2,400**	800	**930**	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
67-64-1	Acetone	**13,000**	4,000	**5,300**	1,700	M
75-69-4	Trichlorofluoromethane	**1,300**	800	**230**	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	**1,500**	800	**440**	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	**1,100**	800	**360**	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	**880**	800	**220**	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	**25,000**	800	**8,300**	270	
156-59-2	cis-1,2-Dichloroethene	**4,000**	800	**1,000**	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	**2,900**	800	**910**	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

123

Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-002

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	**3,100**	800	**580**	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
8-10-1	4-Methyl-2-pentanone	**2,500**	800	**610**	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	**61,000**	800	**16,000**	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	**6,200**	800	**920**	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	**21,000**	800	**4,900**	180	
179601-23-1	*m,p* -Xylenes	**53,000**	800	**12,000**	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	**1,800**	800	**410**	190	
95-47-6	o-Xylene	**15,000**	800	**3,400**	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	**1,300**	800	**210**	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	800	ND	390	
75-01-4	Vinyl Chloride	**2,400**	800	**940**	310	
74-83-9	Bromomethane	ND	800	ND	210	
75-00-3	Chloroethane	ND	800	ND	300	
67-64-1	Acetone	**13,000**	4,000	**5,400**	1,700	M
75-69-4	Trichlorofluoromethane	**1,200**	800	**220**	140	
75-35-4	1,1-Dichloroethene	ND	800	ND	200	
75-09-2	Methylene chloride	**1,500**	800	**430**	230	
76-13-1	Trichlorotrifluoroethane	ND	800	ND	100	
75-15-0	Carbon Disulfide	**1,100**	800	**370**	260	
156-60-5	trans-1,2-Dichloroethene	ND	800	ND	200	
75-34-3	1,1-Dichloroethane	**880**	800	**220**	200	
1634-04-4	Methyl tert-Butyl Ether	ND	800	ND	220	
108-05-4	Vinyl Acetate	ND	800	ND	230	
78-93-3	2-Butanone (MEK)	**25,000**	800	**8,500**	270	
156-59-2	cis-1,2-Dichloroethene	**4,000**	800	**1,000**	200	
67-66-3	Chloroform	ND	800	ND	160	
107-06-2	1,2-Dichloroethane	ND	800	ND	200	
71-55-6	1,1,1-Trichloroethane	ND	800	ND	150	
71-43-2	Benzene	**2,900**	800	**910**	250	
56-23-5	Carbon Tetrachloride	ND	800	ND	130	
78-87-5	1,2-Dichloropropane	ND	800	ND	170	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
M = Matrix interference; results may be biased high.

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Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.00125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	800	ND	120	
79-01-6	Trichloroethene	3,100	800	580	150	
10061-01-5	cis-1,3-Dichloropropene	ND	800	ND	180	
108-10-1	4-Methyl-2-pentanone	2,600	800	620	200	
10061-02-6	trans-1,3-Dichloropropene	ND	800	ND	180	
79-00-5	1,1,2-Trichloroethane	ND	800	ND	150	
108-88-3	Toluene	60,000	800	16,000	210	
591-78-6	2-Hexanone	ND	800	ND	200	
124-48-1	Dibromochloromethane	ND	800	ND	94	
106-93-4	1,2-Dibromoethane	ND	800	ND	100	
127-18-4	Tetrachloroethene	6,200	800	910	120	
108-90-7	Chlorobenzene	ND	800	ND	170	
100-41-4	Ethylbenzene	21,000	800	4,900	180	
179601-23-1	*m,p*-Xylenes	52,000	800	12,000	180	
75-25-2	Bromoform	ND	800	ND	77	
100-42-5	Styrene	1,700	800	400	190	
95-47-6	o-Xylene	15,000	800	3,400	180	
79-34-5	1,1,2,2-Tetrachloroethane	ND	800	ND	120	
541-73-1	1,3-Dichlorobenzene	ND	800	ND	130	
106-46-7	1,4-Dichlorobenzene	1,200	800	200	130	
95-50-1	1,2-Dichlorobenzene	ND	800	ND	130	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: _____ Date: 2/22/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-004

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.125 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	8.0	ND	3.9	
75-01-4	Vinyl Chloride	ND	8.0	ND	3.1	
74-83-9	Bromomethane	ND	8.0	ND	2.1	
75-00-3	Chloroethane	ND	8.0	ND	3.0	
67-64-1	Acetone	**540**	40	**230**	17	
75-69-4	Trichlorofluoromethane	ND	8.0	ND	1.4	
75-35-4	1,1-Dichloroethene	ND	8.0	ND	2.0	
75-09-2	Methylene chloride	**28**	8.0	**8.2**	2.3	
76-13-1	Trichlorotrifluoroethane	ND	8.0	ND	1.0	
75-15-0	Carbon Disulfide	ND	8.0	ND	2.6	
156-60-5	trans-1,2-Dichloroethene	ND	8.0	ND	2.0	
75-34-3	1,1-Dichloroethane	ND	8.0	ND	2.0	
1634-04-4	Methyl tert-Butyl Ether	ND	8.0	ND	2.2	
108-05-4	Vinyl Acetate	ND	8.0	ND	2.3	
78-93-3	2-Butanone (MEK)	ND	8.0	ND	2.7	
156-59-2	cis-1,2-Dichloroethene	ND	8.0	ND	2.0	
67-66-3	Chloroform	ND	8.0	ND	1.6	
107-06-2	1,2-Dichloroethane	ND	8.0	ND	2.0	
71-55-6	1,1,1-Trichloroethane	ND	8.0	ND	1.5	
71-43-2	Benzene	**39**	8.0	**12**	2.5	
56-23-5	Carbon Tetrachloride	ND	8.0	ND	1.3	
78-87-5	1,2-Dichloropropane	ND	8.0	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: HJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Outlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-004

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	8.0	ND	1.2	
79-01-6	Trichloroethene	ND	8.0	ND	1.5	
10061-01-5	cis-1,3-Dichloropropene	ND	8.0	ND	1.8	
[illegible]-10-1	4-Methyl-2-pentanone	ND	8.0	ND	2.0	
[illegible]061-02-6	trans-1,3-Dichloropropene	ND	8.0	ND	1.8	
79-00-5	1,1,2-Trichloroethane	ND	8.0	ND	1.5	
108-88-3	Toluene	**25**	8.0	**6.6**	2.1	
591-78-6	2-Hexanone	ND	8.0	ND	2.0	
124-48-1	Dibromochloromethane	ND	8.0	ND	0.94	
106-93-4	1,2-Dibromoethane	ND	8.0	ND	1.0	
127-18-4	Tetrachloroethene	ND	8.0	ND	1.2	
108-90-7	Chlorobenzene	ND	8.0	ND	1.7	
100-41-4	Ethylbenzene	ND	8.0	ND	1.8	
179601-23-1	*m,p* -Xylenes	**28**	8.0	**6.4**	1.8	
75-25-2	Bromoform	ND	8.0	ND	0.77	
100-42-5	Styrene	ND	8.0	ND	1.9	
95-47-6	o-Xylene	**8.9**	8.0	**2.0**	1.8	
79-34-5	1,1,2,2-Tetrachloroethane	ND	8.0	ND	1.2	
541-73-1	1,3-Dichlorobenzene	ND	8.0	ND	1.3	
106-46-7	1,4-Dichlorobenzene	ND	8.0	ND	1.3	
95-50-1	1,2-Dichlorobenzene	ND	8.0	ND	1.3	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: [illegible] Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-005

Test Code: EPA TO-15 Modified Date Collected: 2/8/07
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: 2/9/07
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 0.15 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	6.7	ND	3.2	
75-01-4	Vinyl Chloride	ND	6.7	ND	2.6	
74-83-9	Bromomethane	ND	6.7	ND	1.7	
75-00-3	Chloroethane	ND	6.7	ND	2.5	
67-64-1	Acetone	**570**	33	**240**	14	
75-69-4	Trichlorofluoromethane	ND	6.7	ND	1.2	
75-35-4	1,1-Dichloroethene	ND	6.7	ND	1.7	
75-09-2	Methylene chloride	**43**	6.7	**12**	1.9	
76-13-1	Trichlorotrifluoroethane	ND	6.7	ND	0.87	
75-15-0	Carbon Disulfide	ND	6.7	ND	2.1	
156-60-5	trans-1,2-Dichloroethene	ND	6.7	ND	1.7	
75-34-3	1,1-Dichloroethane	ND	6.7	ND	1.6	
1634-04-4	Methyl tert-Butyl Ether	ND	6.7	ND	1.8	
108-05-4	Vinyl Acetate	ND	6.7	ND	1.9	
78-93-3	2-Butanone (MEK)	ND	6.7	ND	2.3	
156-59-2	cis-1,2-Dichloroethene	ND	6.7	ND	1.7	
67-66-3	Chloroform	ND	6.7	ND	1.4	
107-06-2	1,2-Dichloroethane	ND	6.7	ND	1.6	
71-55-6	1,1,1-Trichloroethane	ND	6.7	ND	1.2	
71-43-2	Benzene	**23**	6.7	**7.2**	2.1	
56-23-5	Carbon Tetrachloride	ND	6.7	ND	1.1	
78-87-5	1,2-Dichloropropane	ND	6.7	ND	1.4	

ND = Compound was analyzed for, but not detected above the **laboratory reporting limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-005

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.15 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	6.7	ND	1.0	
79-01-6	Trichloroethene	ND	6.7	ND	1.2	
10061-01-5	cis-1,3-Dichloropropene	ND	6.7	ND	1.5	
-10-1	4-Methyl-2-pentanone	ND	6.7	ND	1.6	
10061-02-6	trans-1,3-Dichloropropene	ND	6.7	ND	1.5	
79-00-5	1,1,2-Trichloroethane	ND	6.7	ND	1.2	
108-88-3	Toluene	19	6.7	4.9	1.8	
591-78-6	2-Hexanone	ND	6.7	ND	1.6	
124-48-1	Dibromochloromethane	ND	6.7	ND	0.78	
106-93-4	1,2-Dibromoethane	ND	6.7	ND	0.87	
127-18-4	Tetrachloroethene	ND	6.7	ND	0.98	
108-90-7	Chlorobenzene	ND	6.7	ND	1.4	
100-41-4	Ethylbenzene	ND	6.7	ND	1.5	
179601-23-1	*m,p* -Xylenes	28	6.7	6.4	1.5	
75-25-2	Bromoform	ND	6.7	ND	0.65	
100-42-5	Styrene	ND	6.7	ND	1.6	
95-47-6	o-Xylene	9.0	6.7	2.1	1.5	
79-34-5	1,1,2,2-Tetrachloroethane	ND	6.7	ND	0.97	
541-73-1	1,3-Dichlorobenzene	ND	6.7	ND	1.1	
106-46-7	1,4-Dichlorobenzene	ND	6.7	ND	1.1	
95-50-1	1,2-Dichlorobenzene	ND	6.7	ND	1.1	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: KU Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	10	ND	4.8	
75-01-4	Vinyl Chloride	ND	10	ND	3.9	
74-83-9	Bromomethane	ND	10	ND	2.6	
75-00-3	Chloroethane	ND	10	ND	3.8	
67-64-1	Acetone	**840**	50	**350**	21	
75-69-4	Trichlorofluoromethane	ND	10	ND	1.8	
75-35-4	1,1-Dichloroethene	ND	10	ND	2.5	
75-09-2	Methylene chloride	**58**	10	**17**	2.9	
76-13-1	Trichlorotrifluoroethane	ND	10	ND	1.3	
75-15-0	Carbon Disulfide	ND	10	ND	3.2	
156-60-5	trans-1,2-Dichloroethene	ND	10	ND	2.5	
75-34-3	1,1-Dichloroethane	ND	10	ND	2.5	
1634-04-4	Methyl tert-Butyl Ether	ND	10	ND	2.8	
108-05-4	Vinyl Acetate	ND	10	ND	2.8	
78-93-3	2-Butanone (MEK)	ND	10	ND	3.4	
156-59-2	cis-1,2-Dichloroethene	ND	10	ND	2.5	
67-66-3	Chloroform	ND	10	ND	2.0	
107-06-2	1,2-Dichloroethane	ND	10	ND	2.5	
71-55-6	1,1,1-Trichloroethane	ND	10	ND	1.8	
71-43-2	Benzene	**19**	10	**5.8**	3.1	
56-23-5	Carbon Tetrachloride	ND	10	ND	1.6	
78-87-5	1,2-Dichloropropane	ND	10	ND	2.2	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: MJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Date Received: 2/9/07
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 0.10 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	10	ND	1.5	
79-01-6	Trichloroethene	ND	10	ND	1.9	
10061-01-5	cis-1,3-Dichloropropene	ND	10	ND	2.2	
-10-1	4-Methyl-2-pentanone	ND	10	ND	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	10	ND	2.2	
79-00-5	1,1,2-Trichloroethane	ND	10	ND	1.8	
108-88-3	Toluene	16	10	4.4	2.7	
591-78-6	2-Hexanone	ND	10	ND	2.4	
124-48-1	Dibromochloromethane	ND	10	ND	1.2	
106-93-4	1,2-Dibromoethane	ND	10	ND	1.3	
127-18-4	Tetrachloroethene	ND	10	ND	1.5	
108-90-7	Chlorobenzene	ND	10	ND	2.2	
100-41-4	Ethylbenzene	ND	10	ND	2.3	
179601-23-1	*m,p* -Xylenes	18	10	4.2	2.3	
75-25-2	Bromoform	ND	10	ND	0.97	
100-42-5	Styrene	ND	10	ND	2.3	
95-47-6	o-Xylene	ND	10	ND	2.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	10	ND	1.5	
541-73-1	1,3-Dichlorobenzene	ND	10	ND	1.7	
106-46-7	1,4-Dichlorobenzene	ND	10	ND	1.7	
95-50-1	1,2-Dichlorobenzene	ND	10	ND	1.7	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: HJ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2
Analyst: Chaney Humphrey
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date(s) Analyzed: 2/9/07
Volume(s) Analyzed: 1.00 Liter(s)

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
74-87-3	Chloromethane	ND	1.0	ND	0.48	
75-01-4	Vinyl Chloride	ND	1.0	ND	0.39	
74-83-9	Bromomethane	ND	1.0	ND	0.26	
75-00-3	Chloroethane	ND	1.0	ND	0.38	
67-64-1	Acetone	ND	5.0	ND	2.1	
75-69-4	Trichlorofluoromethane	ND	1.0	ND	0.18	
75-35-4	1,1-Dichloroethene	ND	1.0	ND	0.25	
75-09-2	Methylene chloride	ND	1.0	ND	0.29	
76-13-1	Trichlorotrifluoroethane	ND	1.0	ND	0.13	
75-15-0	Carbon Disulfide	ND	1.0	ND	0.32	
156-60-5	trans-1,2-Dichloroethene	ND	1.0	ND	0.25	
75-34-3	1,1-Dichloroethane	ND	1.0	ND	0.25	
1634-04-4	Methyl tert-Butyl Ether	ND	1.0	ND	0.28	
108-05-4	Vinyl Acetate	ND	1.0	ND	0.28	
78-93-3	2-Butanone (MEK)	ND	1.0	ND	0.34	
156-59-2	cis-1,2-Dichloroethene	ND	1.0	ND	0.25	
67-66-3	Chloroform	ND	1.0	ND	0.20	
107-06-2	1,2-Dichloroethane	ND	1.0	ND	0.25	
71-55-6	1,1,1-Trichloroethane	ND	1.0	ND	0.18	
71-43-2	Benzene	ND	1.0	ND	0.31	
56-23-5	Carbon Tetrachloride	ND	1.0	ND	0.16	
78-87-5	1,2-Dichloropropane	ND	1.0	ND	0.22	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P070209-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/HP5972/HP5890 II+/MS2 Date Received: NA
Analyst: Chaney Humphrey Date(s) Analyzed: 2/9/07
Sampling Media: Tedlar Bag Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

D.F. = 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
75-27-4	Bromodichloromethane	ND	1.0	ND	0.15	
79-01-6	Trichloroethene	ND	1.0	ND	0.19	
10061-01-5	cis-1,3-Dichloropropene	ND	1.0	ND	0.22	
[illegible]-10-1	4-Methyl-2-pentanone	ND	1.0	ND	0.24	
10061-02-6	trans-1,3-Dichloropropene	ND	1.0	ND	0.22	
79-00-5	1,1,2-Trichloroethane	ND	1.0	ND	0.18	
108-88-3	Toluene	ND	1.0	ND	0.27	
591-78-6	2-Hexanone	ND	1.0	ND	0.24	
124-48-1	Dibromochloromethane	ND	1.0	ND	0.12	
106-93-4	1,2-Dibromoethane	ND	1.0	ND	0.13	
127-18-4	Tetrachloroethene	ND	1.0	ND	0.15	
108-90-7	Chlorobenzene	ND	1.0	ND	0.22	
100-41-4	Ethylbenzene	ND	1.0	ND	0.23	
179601-23-1	*m,p* -Xylenes	ND	1.0	ND	0.23	
75-25-2	Bromoform	ND	1.0	ND	0.097	
100-42-5	Styrene	ND	1.0	ND	0.23	
95-47-6	o-Xylene	ND	1.0	ND	0.23	
79-34-5	1,1,2,2-Tetrachloroethane	ND	1.0	ND	0.15	
541-73-1	1,3-Dichlorobenzene	ND	1.0	ND	0.17	
106-46-7	1,4-Dichlorobenzene	ND	1.0	ND	0.17	
95-50-1	1,2-Dichlorobenzene	ND	1.0	ND	0.17	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: [illegible] Date: 2/23/07

Inlet and Outlet H_2S and Sulfur Compounds
Inlet and Destruction Efficiency Determinations
Outlet Emissions Determinations
Laboratory Results

Inlet Sulfur Compounds and Destruction Efficiency (as SO2)

Waste Management Disposal Services of Washington, Inc. Wenatchee Landfill Flare East Wenatchee, WA					08-Feb-2007 mwallace	
Number of Completed Runs			Run 1	Run 2	Run 3	Average
INLET FLOW RATE (EPA M2)		dscf/min	582.8	584.2	577.2	581.4
OUTLET FLOW RATE (EPA M2)		dscf/min	7,408	7,630	7,212	7,417
SULFUR COMPOUNDS						
Hydrogen Sulfide (H2S)		ppbv	140,000	140,000	140,000	140,000
		ug/m3	200,000	190,000	190,000	193,333
	34.07	lbm-H2S/hr	**0.433**	**0.434**	**0.429**	**0.432**
OUTLET		lbm-H2S/hr	**0.000134**	**0.000211**	*0.000191*	**0.000178**
		DESTRUCTION	**99.97%**	**99.95%**	*99.96%*	**99.96%**
Carbon Disulfide (CS2)		ppbv	750	170	180	367
		ug/m3	2,300	520	570	1,130
	76.14	lbm-CS2/hr	**0.005182**	**0.001177**	**0.001232**	**0.002530**
OUTLET		lbm-CS2/hr	**0.000263**	**0.001267**	**0.000299**	**0.000610**
		DESTRUCTION	*94.92%*	**-7.57%**	**75.70%**	**54.35%**
Carbonyl Sulfide (COS)		ppbv	360	350	370	360
		ug/m3	890	850	920	887
	60.07	lbm-COS/hr	**0.0020**	**0.0019**	**0.0020**	**0.0020**
OUTLET		lbm-COS/hr	*0.000346*	**0.000435**	**0.000364**	**0.000382**
		DESTRUCTION	**82.35%**	**77.24%**	**81.77%**	**80.45%**
Methyl Mercaptan (CH3SH)		ppbv	2,100	2,100	2,100	2,100
		ug/m3	4,000	4,100	4,200	4,100
	48.11	lbm-CH3SH/hr	0.0092	0.0092	0.0091	0.0091
Ethyl Mercaptan (CH3CH2SH)		ppbv	180	230	210	207
		ug/m3	460	590	540	530
	62.13	lbm-CH3CH2SH/hr	0.0010	0.0013	0.0012	0.0012
Dimethyl Sulfide (C2H6S)		ppbv	3,300	3,300	3,400	3,333
		ug/m3	8,500	8,400	8,700	8,533
	62.13	lbm-C2H6S/hr	0.0186	0.0187	0.0190	0.0187
Isopropyl Mercaptan (C3H8S)		ppbv	780	780	750	770
		ug/m3	2,400	2,400	2,300	2,367
	76.16	lbm-C3H8S/hr	0.0054	0.0054	0.0051	0.0053
tert-Butyl Mercaptan (C4H10S)		ppbv	310	340	310	320
		ug/m3	1,200	1,200	1,100	1,167
	90.19	lbm-C4H10S/hr	0.0025	0.0028	0.0025	0.0026
Thiphene (C4H4S)		ppbv	970	940	940	950
		ug/m3	3,300	3,300	3,100	3,233
	84.14	lbm-C4H4S/hr	0.0074	0.0072	0.0071	0.0072
Isobutyl Mercaptan (C4H10S)		ppbv	71	87	0	53
		ug/m3	260	320		290
	90.19	lbm-C4H10S/hr	0.00058	0.00071	0.00000	0.00043
Total Sulfur - Inlet		ppbv-S	149,571	148,467	148,440	148,826
	64.06	**lbm-SO2/hr**	**0.8695**	**0.8652**	**0.8547**	**0.8631**
Total Sulfur - Outlet		ppbv-S	14.4	39.3	17.4	23.7
		lbm-SO2/hr	**0.0011**	**0.0030**	**0.0013**	**0.0018**
		DESTRUCTION	**99.88%**	**99.65%**	**99.85%**	**99.80%**

Sulfur Emissions

Waste Management Disposal Services of Washington, Inc.								08-Feb-2007	
Wenatchee Regional Landfill Flare Outlet								mwallace	
East Wenatchee, WA									
Number of Completed Runs				Run 1		Run 2		Run 3	Average
Volumetric Flowrate, Dry Standard		dscf/min		7,408		7,630		7,212	
Hydrogen Sulfide (H2S)		ppbv		**3.4**		**5.2**	<	*5.0*	< *4.5*
		ug/m3		**4.7**		**7.2**	<	*7.0*	< *6.3*
	34.07	lbm/hr		**0.000134**		**0.000211**	<	*0.000191*	< *0.000178*
		lbm/yr		**1.17051**		**1.84398**	<	*1.67585*	< *1.56345*
Carbon Disulfide (CS2)		ppbv		**3.0**		**14.0**		**3.5**	**6.8**
		ug/m3		**9.4**		**44.0**		**11.0**	**21.5**
	76.14	lbm/hr		**0.000263**		**0.001267**		**0.000299**	**0.000610**
		lbm/yr		**2.30811**		**11.09488**		**2.62165**	**5.34155**
Carbonyl Sulfide (COS)		ppbv	<	*5.0*		**6.1**		**5.4**	< *5.5*
		ug/m3	<	*12.0*		**15.0**		**13.0**	< *13.3*
	60.07	lbm/hr	<	*0.000346*		**0.000435**		**0.000364**	< *0.000382*
		lbm/yr	<	*3.03494*		**3.81390**		**3.19114**	< *3.34666*
Total Sulfur		ppbv-S		14		39		17	24
	64.06	lbm-SO2/hr		0.0011		0.0030		0.0013	0.0018

*Only the compounds detected are reported.

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #1 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-001

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 12:13
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 11:48
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**200,000**	140	**140,000**	100	
463-58-1	Carbonyl Sulfide	**890**	250	**360**	100	
[illegible]93-1	Methyl Mercaptan	**4,000**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**460**	250	**180**	100	
75-18-3	Dimethyl Sulfide	**8,500**	250	**3,300**	100	
75-15-0	Carbon Disulfide	**2,300**	160	**750**	50	
75-33-2	Isopropyl Mercaptan	**2,400**	310	**780**	100	
75-66-1	tert-Butyl Mercaptan	**1,200**	370	**310**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,300**	340	**970**	100	
513-44-0	Isobutyl Mercaptan	**260**	370	**71**	100	**W , J**
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.
W = Result quantified but corresponding peak was detected outside of generated retention time window.

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Verified By: [illegible] Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Inlet** CAS Project ID: P2700335
Client Project ID: **Greater Wenatchee Regional Landfill/2758** CAS Sample ID: P2700335-002

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 14:00
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 12:31
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**190,000**	140	**140,000**	100	
463-58-1	Carbonyl Sulfide	**850**	250	**350**	100	
74-93-1	Methyl Mercaptan	**4,100**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**590**	250	**230**	100	
75-18-3	Dimethyl Sulfide	**8,400**	250	**3,300**	100	
75-15-0	Carbon Disulfide	**520**	160	**170**	50	
75-33-2	Isopropyl Mercaptan	**2,400**	310	**780**	100	
75-66-1	tert-Butyl Mercaptan	**1,200**	370	**340**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,300**	340	**940**	100	
513-44-0	Isobutyl Mercaptan	**320**	370	**87**	100	**W , J**
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.
W = Result quantified but corresponding peak was detected outside of generated retention time window.

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Verified By: w Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #3 Inlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-003

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 02/08/07
Time Collected: 15:32
Date Received: 02/09/07
Date Analyzed: 2/9/07
Time Analyzed: 13:15
Volume(s) Analyzed: 0.050 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**190,000**	140	**140,000**	100	
463-58-1	Carbonyl Sulfide	**920**	250	**370**	100	
[illegible]3-1	Methyl Mercaptan	**4,200**	200	**2,100**	100	
75-08-1	Ethyl Mercaptan	**540**	250	**210**	100	
75-18-3	Dimethyl Sulfide	**8,700**	250	**3,400**	100	
75-15-0	Carbon Disulfide	**570**	160	**180**	50	
75-33-2	Isopropyl Mercaptan	**2,300**	310	**750**	100	
75-66-1	tert-Butyl Mercaptan	**1,100**	370	**310**	100	
107-03-9	n-Propyl Mercaptan	ND	310	ND	100	
624-89-5	Ethyl Methyl Sulfide	ND	310	ND	100	
110-02-1	Thiophene	**3,100**	340	**910**	100	
513-44-0	Isobutyl Mercaptan	ND	370	ND	100	
352-93-2	Diethyl Sulfide	ND	370	ND	100	
109-79-5	n-Butyl Mercaptan	ND	370	ND	100	
624-92-0	Dimethyl Disulfide	ND	190	ND	50	
616-44-4	3-Methylthiophene	ND	400	ND	100	
110-01-0	Tetrahydrothiophene	ND	360	ND	100	
638-02-8	2,5-Dimethylthiophene	ND	460	ND	100	
872-55-9	2-Ethylthiophene	ND	460	ND	100	
110-81-6	Diethyl Disulfide	ND	250	ND	50	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Verified By: [illegible] Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: Horizon Engineering
Client Sample ID: Run #1 Outlet
Client Project ID: Greater Wenatchee Regional Landfill/2758

CAS Project ID: P2700335
CAS Sample ID: P2700335-004

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 11:30
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 11:26
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	4.7	7.0	3.4	5.0	J
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	9.4	7.8	3.0	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The analyte was positively identified below the laboratory method reporting limit; the associated numerical value is considered estimated.

14.0

Verified By: W Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Run #2 Outlet**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P2700335-005

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 13:30
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 12:09
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**7.2**	7.0	**5.2**	5.0	
463-58-1	Carbonyl Sulfide	**15**	12	**6.1**	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	44	7.8	14	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: MV Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: Horizon Engineering
Client Sample ID: Run #3 Outlet
Client Project ID: Greater Wenatchee Regional Landfill/2758

CAS Project ID: P2700335
CAS Sample ID: P2700335-006

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: 2/8/07
Time Collected: 14:57
Date Received: 2/9/07
Date Analyzed: 2/9/07
Time Analyzed: 13:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	13	12	5.4	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	11	7.8	3.5	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: _____ Date: 2/23/07

COLUMBIA ANALYTICAL SERVICES, INC.

RESULTS OF ANALYSIS

Client: **Horizon Engineering**
Client Sample ID: **Method Blank**
Client Project ID: **Greater Wenatchee Regional Landfill/2758**

CAS Project ID: P2700335
CAS Sample ID: P070209-MB

Test Code: ASTM D 5504-01
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Zheng Wang
Sampling Media: Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 2/09/07
Time Analyzed: 09:37
Volume(s) Analyzed: 1.0 ml(s)

D.F.= 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the **laboratory detection limit.**
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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Verified By: MW Date: 2/23/07

Inlet and Outlet HCl
Inlet Determinations
Outlet Emissions Determinations
Field Data
Laboratory Results

Inlet HCl

Client	Waste Management Disposal Services of Washington, Inc.				08-Feb-2007	Date
Source	Wenatchee Landfill Flare Inlet				mwallace	Analysist/QA
Location	East Wenatchee, WA					
Methods	EPA M26					
Definitions	Symbol	Units	Run 1	Run 2	Run 3	Average
Date	3		08-Feb	08-Feb	08-Feb	
Time, Starting			11:08	12:59	14:29	
Time, Ending			12:08	13:59	15:29	
Volume, Gas sample	Vm	dL	149.35	150.32	156.11	
Volume, Gas sample	Vm	dcf	5.274	5.309	5.513	5.365
Temperature, Dry gas meter	Tm	°F	49.6	63.3	54.3	55.7
Pressure differential across orifice	dH	in H2O	0.00	0.00	0.00	
Dry gas meter calibration factor	Y		1.0230	1.0230	1.0230	
Pressure, Barometric	Pbar	in Hg	28.80	28.80	28.80	
Time, Total sample	Ø	min	60.0	60.0	60.0	60.0
Volume of condensed water	Vlc	ml	1.00	2.00	2.00	1.67
Pressure, avg arcoss orifice	Po	in Hg	28.80	28.80	28.80	28.80
Volume, Dry standard gas sample	Vm(std)	dscf	5.38	5.27	5.57	5.41
Volume, Water Vapor	Vw(std)	scf	0.05	0.09	0.09	0.08
Moisture, % Stack (EPA 4 - M26)	Bws(1)	%	0.87	1.75	1.66	1.43
Moisture, % Stack (psychrometry)	Bws(2)	%	1.66	1.66	1.66	1.66
Mole Fraction dry Gas	mfg		98.3%	98.3%	98.3%	98.3%
Volumetric Flowrate, Dry Standard*	Qsd	dscf/min	582.8	584.2	577.2	581.4
HCl						
Chloride (Cl)	mn	mg	< 0.0056	< 0.0056	< 0.0066	< 0.0059
Hydrogen Chloride (HCl)	mn	mg	< 0.0058	< 0.0058	< 0.0068	< 0.0061
Grain Loading, Actual	cg	gr / dscf	< 0.00002	< 0.00002	< 0.00002	< 0.00002
		mg / dscm	< 0.038	< 0.039	< 0.043	< 0.040
		ppmv	< 0.0249	< 0.0254	< 0.0284	< 0.0262
Mass Emissions	Ct	lbm-HCl / hr	< 0.00008	< 0.00008	< 0.00009	< 0.00009
		gm / hr	< 0.037	< 0.038	< 0.042	< 0.039

*EPA M2 Flow Rate

Outlet HCl Emissions

Client	Waste Management Disposal Services of Washington, Inc.				08-Feb-2007	Date
Source	Wenatchee Landfill Flare Outlet				mew	Analysist/QA
Location	East Wenatchee, WA					
Methods	EPA M26					
Definitions	Symbol	Units	Run 1	Run 2	Run 3	Average
Date	3		08-Feb	08-Feb	08-Feb	
Time, Starting			11:10	13:01	14:31	
Time, Ending			12:10	14:01	15:31	
Volume, Gas sample	Vm	dL	140.72	145.88	143.58	
Volume, Gas sample	Vm	dcf	4.970	5.152	5.071	5.064
Temperature, Dry gas meter	Tm	°F	52.4	62.6	57.1	57.4
Pressure differential across orifice	dH	in H2O	0.00	0.00	0.00	
Dry gas meter calibration factor	Y		0.9872	0.9872	0.9872	
Pressure, Barometric	Pbar	in Hg	28.80	28.80	28.80	
Time, Total sample	Ø	min	60.0	60.0	60.0	60.0
Volume of condensed water	Vlc	ml	10.00	10.00	10.00	10.00
Pressure, avg arcoss orifice	Po	in Hg	28.80	28.80	28.80	28.80
Volume, Dry standard gas sample	Vm(std)	dscf	4.87	4.95	4.92	4.91
Volume, Water Vapor	Vw(std)	scf	0.47	0.47	0.47	0.47
Moisture, % Stack (EPA 4 - M26)	Bws(1)	%	8.82	8.69	8.73	8.75
Moisture, % Stack (EPA 4 - M5/202)	Bws(2)	%	7.86	7.87	7.86	7.87
Mole Fraction dry Gas	mfg		92.1%	92.1%	92.1%	92.1%
Volumetric Flowrate, Dry Standard*	Qsd	dscf/min	7,408	7,630	7,212	7,417
		HCl				
Chloride (Cl)	mn	mg	0.420	0.640	0.502	0.521
Hydrogen Chloride (HCl)	mn	mg	0.432	0.658	0.516	0.535
Grain Loading, Actual	cg	gr / dscf	0.001370	0.002054	0.001620	0.001681
		mg / dscm	3.14	4.70	3.71	3.85
		ppmv	2.07	3.10	2.45	2.54
Mass Emissions	Ct	lbm-HCl / hr	0.0870	0.1343	0.1001	0.1071
		gm / hr	39.46	60.93	45.41	48.60
		tons/yr	0.3810	0.5884	0.4385	0.4693

*EPA M2 Flow Rate

Method 26 Field Data Sheet

HORIZON ENGINEERING

Client: GWRL
Plant: Wenatchee WA
Location: Inlet
Sample Location: —

Date 2/9/07
Test Method 26
Concurrent Testing 5/Gross
Run # 1
Operator JH Support TAR
Temperature, Amb (Ta) 42
Moisture — Tdb — Twb —
Press., Bar (Pb) 28.90
Press., Static (Pstat)

Stack Diagram

Probe Heat Set NA °F
Filter NA Heat Set NA °F
Meter Box ID 16 Y 1.02303

System	Pretest:	.000	Lpm 14	inHg
Leak Check	Post:	.000	Lpm 10	inHg

No more than 0.04 Lpm @ ≥10 inHg

System	Pretest:	NA	cfm NA	inHg
Leak Check	Post:	NA	cfm NA	inHg

No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour 120 L ± 2.4 L; Liter Meter Reading L (Vm)	Minimum volume required in 1 hour 4.25 cuft ± 0.08 cuft; Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm 2 Lpm = 0.07 cfm	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		2208.450	NA		Amb:	Amb:	Amb:	Amb:	Amb:	
5	1100	2212.84		~2Lpm	NA	NA	NA	39	41	2
10		2225.15						39	41	2
15		2237.50						42	43	2
20		2250.00						44	45	2
25		2262.48						45	46	2
30		2275.00						48	50	2
35		2287.70						51	54	2
40		2300.20						52	54	2
45		2312.63						55	56	2
50		2322.75						56	58	2
55		2339.00						57	58	2
60	1208	2350.80						58	59	2

Notes: 564g start wt > impinger train
565g end wt

Method 26 Field Data Sheet

HORIZON ENGINEERING

Client: GWRI
Plant: Milwaukee WTP
Location: Inlet
Sample Location: —

Date	2/9/07	Probe Heat Set	NA °F
Test Method	26	Filter	NA Heat Set NA °F
Concurrent Testing	5 1	Meter Box ID	16 Y 1.02303
Run #	2	System / Leak Check	Pretest: .00 Lpm 10 inHg / Post: .00 Lpm 10 inHg
Operator	JA Support TAR		No more than 0.04 Lpm @ ≥10 inHg
Temperature, Amb (Ta)	45	System / Leak Check	Pretest: NA cfm NA inHg / Post: NA cfm NA inHg
Moisture —	Tdb — Twb —		No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)
Press., Bar (Pb)	23.4	Stack Diagram	
Press., Static (Pstat)	1.10		

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour 120 L ± 2.4 L — Liter Meter Reading L (Vm)	Minimum volume required in 1 hour 4.25 cuft ± 0.08 cuft — Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm (2 Lpm = 0.07 cfm)	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		2352.490	NA		Amb:	Amb:	Amb:	Amb:	Amb:	
5	1259	2364.95		~2 Lpm	NA	NA	NA	63	63	2
10		2377.41						63	63	2
15		2389.92						62	64	2
20		2402.47						63	65	2
25		2415.00						64	65	2
30		2427.55						65	65	2
35		2440.10						65	66	2
40		2452.65						64	66	2
45		2465.15						63	64	2
50		2477.65						63	62	2
55		2490.21						61	63	2
60	1359	2502.72						59	59	2
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Notes: 567g start wt
569g end wt
> impinger train

Method 26 Field Data Sheet

HORIZON ENGINEERING

Client	WRL
Plant	Wastewater WA
Location	Inlet
Sample Location	—

Date	2/9/07
Test Method	26
Concurrent Testing	5/Gases
Run #	3
Operator	JH Support TAR
Temperature, Amb (Ta)	40
Moisture —	Tdb — Twb —
Press., Bar (Pb)	28.60
Press., Static (Pstat)	1.10

Stack Diagram

Probe Heat Set	NA	°F		
Filter	NA	Heat Set	NA	°F
Meter Box ID	16	Y	1.02303	
System	Pretest:	0.0	Lpm	10 inHg
Leak Check	Post:	0.0	Lpm	10 inHg

No more than 0.04 Lpm @ ≥10 inHg

System	Pretest:	NA	cfm	NA inHg
Leak Check	Post:	NA	cfm	NA inHg

No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour 120 L ± 2.4 L — Liter Meter Reading L (Vm)	Minimum volume required in 1 hour 4.25 cuft ± 0.08 cuft — Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm 2 Lpm = 0.07 cfm	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		2504.70	NR		Amb: 44	Amb: 44	Amb: 40	Amb: 40	Amb: 40	
5	1429	2517.62		~2 Lpm	NA	NA	NA	57	55	~~2~~ 3
10		2530.89						55	55	2 J
15		2544.00						54	55	2
20		2557.10						55	55	2
25		2569.90						54	54	2
30		2582.90						54	55	2
35		2596.16						54	55	2
40		2609.26						54	56	2
45		2622.21						53	53	2
50		2634.96						53	53	2
55		2647.97						53	54	2
60	1529	2660.97						52	54	2

Notes:

569g start wt
571g end wt > impinger train

Method 26 Field Data Sheet

HORIZON ENGINEERING

Client:	GWRL
Plant:	Waukegan WI
Location:	Outlet
Sample Location:	—

Date	2/9/07	Probe Heat Set	NA °F	
Test Method	201 Gravs	Filter	NA	Heat Set NA °F
Concurrent Testing	5/Grays	Meter Box ID	17	Y .9876
Run #	1			
Operator	JH	Support	TAR	
Temperature, Amb (Ta)	42			
Moisture	—	Tdb —	Twb —	
Press., Bar (Pb)	28.90			
Press., Static (Pstat)				

Stack Diagram

System	Pretest:	100 Lpm	10	inHg
Leak Check	Post:	100 Lpm	7	inHg

No more than 0.04 Lpm @ ≥10 inHg

System	Pretest:	NA cfm	NA	inHg
Leak Check	Post:	NA cfm	NA	inHg

No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour 120 L ± 2.4 L; Liter Meter Reading L (Vm)	Minimum volume required in 1 hour 4.25 cuft ± 0.08 cuft; Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm 2 Lpm = 0.07 cfm	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		695.920			Amb:	Amb:	Amb:	Amb:	Amb:	
5	1110	705.90		~2 Lpm	NA	NA	NA	45	44	5
10		717.60						45	44	5
15		729.33						46	45	6
20		741.22						49	47	6
25		753.00						51	49	6
30		764.74						54	51	6
35		776.72						56	53	6
40		788.60						57	55	6
45		800.50						58	56	6
50		812.35						60	57	6
55		824.35						60	58	6
60	1210	836.54			↓	↓	↓	61	59	6

Notes: 620g start wt > impinger train
630g end wt

Method 26 Field Data Sheet

HORIZON ENGINEERING INC

Client:	CWRL
Plant:	Wauchula WTP
Location:	OUTFALL
Sample Location:	—

Date	2/9/07
Test Method	26
Concurrent Testing	Flowers
Run #	2
Operator	JH Support TAR
Temperature, Amb (Ta)	45
Moisture	— Tdb — Twb —
Press., Bar (Pb)	28.90
Press., Static (Pstat)	1.10

Stack Diagram

Probe Heat Set	NA	°F		
Filter	NA	Heat Set		°F
Meter Box ID	17	Y:	.98776	
System Leak Check	Pretest:	1.00	Lpm	12 inHg
	Post:	1.00	Lpm	10 inHg

No more than 0.04 Lpm @ ≥10 inHg

System Leak Check	Pretest:	~~NA~~	cfm	NA inHg
	Post:	NA	cfm	NA inHg

No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour: 120 L ± 2.4 L — Liter Meter Reading L (Vm)	Minimum volume required in 1 hour: 4.25 cuft ± 0.08 cuft — Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm (2 Lpm = 0.07 cfm)	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		936.930	NA		Amb:	Amb:	Amb:	Amb:	Amb:	
5	1301	949.25		2 Lpm	NA	NA	NA	62	60	6
10		961.50						62	61	6
15		977.98						64	62	6
20		985.60						64	62	6
25		997.73						65	63	6
30		909.99						65	63	6
35		921.95						65	63	6
40		934.25						66	62	6
45		946.50					64	~~66~~ 67	62	6
50		958.60						61	61	6
55		970.55						62	62	6
60	1401	982.91						61	61	6

Notes: 627g start wt > Impinger train
677g end wt

Method 26 Field Data Sheet

HORIZON ENGINEERING

Client:	GWRC
Plant:	Wenatchee WA
Location:	Outlet
Sample Location:	—

Date	2/9/07
Test Method	26
Concurrent Testing	5 / Courses
Run #	3
Operator	JH Support TAR
Temperature, Amb (Ta)	
Moisture	— Tdb — Twb —
Press., Bar (Pb)	28.80
Press., Static (Pstat)	1.10

Stack Diagram

Probe Heat Set	NA	°F		
Filter	NA	Heat Set	NA	°F
Meter Box ID	16	Y	1.02303	
System Leak Check	Pretest: 0.0	Lpm	10	inHg
	Post: 0.0	Lpm	10	inHg

No more than 0.04 Lpm @ ≥10 inHg

System Leak Check	Pretest: NA	cfm	NA	inHg
	Post: NA	cfm	NA	inHg

No more than 0.0014 cfm @ ≥10 inHg (0.004 in 3 mins)

Sampling Time min (dt)	Clock Time (24 hr)	Minimum volume required in 1 hour 120 L ± 2.4 L: Liter Meter Reading L (Vm)	Minimum volume required in 1 hour 4.25 cuft ± 0.08 cuft: Dry Gas Meter Reading cuft (Vm)	Sampling Rate Lpm OR cfm (2 Lpm = 0.07 cfm)	STACK °F (Ts)	PROBE °F (Tp)	OVEN Filter °F (To)	METER Inlet/Avg. °F (Tm-in)	METER Outlet °F (Tm-out)	Pump Vacuum inHg (Pv)
		993.500	NA		Amb:	Amb:	Amb:	Amb:	Amb:	
5	1431	995.55		~2 Lpm	NA	NA	NA	55	56	2 6
10		1007.42						57	56	6
15		1020.95						59	56	6
20		1031.63						58	57	6
25		1043.62						59	57	6
30		1055.54						55	57	6
35		1067.42						59	57	6
40		1079.35						58	57	6
45		1091.49						59	57	6
50		1103.36						58	57	6
55		1115.19						57	56	6
60	1531	1127.090	↓	↓	↓	↓	↓	57	56	6

Notes: 603g start wt > impinger train
625g end wt

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Horizon Engineering, LLC	**Service Request:**	K0701148
Project:	Wenatchee/2758	**Date Collected:**	2/8/2007
Sample Matrix:	Aqueous liquid	**Date Received:**	2/12/2007
		Date Extracted:	NA

Inorganic Parameters
Units: Total µg

Analyte:	Volume of Bottle	Chloride
EPA Method:	-	26
Method Reporting Limit:	-	-
Date Analyzed:	-	2/26/2007

Sample Name	Lab Code		
Run #1 Inlet	K0701148-001	56	<5.6
Run #1 Exhaust	K0701148-002	70	420
Run #2 Inlet	K0701148-003	56	<5.6
Run #2 Exhaust	K0701148-004	76	640
Run #3 Inlet	K0701148-005	66	<6.6
un #3 Exhaust	K0701148-006	72	502
Blank H2SO4	K0701148-007	92	<9.2
Blank H2O	K0701148-008	72	<7.2
Method Blank	K0701148-MB	-	<5.6

Approved By: _____ Date: 2/27/07

3ADW/061694

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Horizon Engineering, LLC
Project: Wenatchee/2758
LCS Matrix: Water

Service Request: K0701148
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 02/26/07

Laboratory Control Sample Summary
Chloride
EPA Method 26
Units: mg/L (ppm)

Analyte	EPA Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits
Chloride	26	7.1	6.6	93	85-115

Approved By: _____ Date: 2/27/07

LCS/102194

Production/Process Data

HORIZON ENGINEERING LLC
13585 N.E. Whitaker Way • Portland, OR 97230
Phone (503)255-5050 • Fax (503)255-0505
www.horizonengineering.com

2/8/07

	Temp	Rate	Total	
1102	1639	661	442338	TAC
1123	1633	654	457999	GWLF
1138	1630	646	467522	Flare
1153	1627	653	477261	
1208	1625	660	487536	
1256	1628	652	519075	
1311	1627	656	529243	
1328	1623	661	539260	
1341	1628	661	548460	
1356	1628	655	558519	
1427	1625	658	578960	
1443	1628	663	589391	
1457	1631	660	598630	
1512	1627	661	608140	
1527	1626	661	618553	

units: Temp (°F)
Rate (scfh)
Total (scf)

Calibration Information

Meter Boxes

Calibration Critical Orifices

Pitots

Shortridge Micromanometer

Thermocouples & Indicators

Nozzle Diameters (See M5/202 Field Data Sheets)

Barometer

Calibration Gas Certificates

Biannual Meterbox Calibration

file/date
Method EPA M-5 #7.2
Location Horizon Shop
Meter Box ID 7
Meter ID 1695273
calibrated by jh

Date 1/2/07
Pb= 30.00 (in Hg)
Ta= 60 (oF)
Tamb 520 (oR)

Leak checks
Negative 0.00 in/min
Positive 0.00 in/min @ 5.00 inches H20

0.97<Y<1.03	Old 5/23/06	New 1/2/07	Change (+/-)	
Y=	0.99267	0.98822	-0.5%	pass
dH@=	1.59031	1.62874	2.4%	

	VAC (In Hg)	Critical Orifice ID	K	dH (inH2O)	Meter (ft3)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Y 0.020	dH@ 0.20	Allow. Tolerance
Initial	23.0	48.0	0.34507	0.59	477.4000	6.8300	69.0	68.0	528.0	528.5	15.00	0.99425	1.54935	0.006	0.08	
Final					484.2300		69.0	68.0						pass	pass	
Initial	17.0	73.0	0.80058	3.50	484.2300	7.4600	69.0	67.0	527.5	529.0	7.00	0.97951	1.67940	0.009	0.05	
Final					491.6900		72.0	68.0						pass	pass	
Initial	22.0	55.0	0.45350	1.10	491.6900	5.4100	72.0	68.0	528.0	529.8	9.00	0.99089	1.65745	0.003	0.03	
Final					497.1000		71.0	68.0						pass	pass	
												0.98822	1.62874	0.00348	0.03175	

Post Test Meterbox Calibration

Method	EPA M-5 #7.2
Location	East Wenatchee, WA
Meter Box ID	7
callbrated by	PTH

Date	02/08/07	
Pb=	28.80	(in Hg)
Ta=	61	(oF)
Tamb	521	(oR)

	Blannual 1/2/07	Post-Test 02/08/07	Change (+/-)	
Y=	0.98822	0.99206	0.4%	pass
dH@=	1.62874	1.71497	5.0%	

	VAC (in Hg)	Critical Orifice ID	K	dH (inH2O)	Meter (ft3)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Y 0.020	dH@ 0.20	Allow. Tolerance
Initial	17.5	65.0	0.63354	2.10	629.7000	5.8200	71.0	70.0	529.5	529.8	7.00	0.99720	1.72461	0.005	0.01	
Final					635.5200		69.0	69.0						pass	pass	
Initial	18.0	65.0	0.63354	2.10	635.5200	5.0150	69.0	69.0	529.0	528.5	6.00	0.98960	1.70810	0.002	0.01	
Final					640.5350		67.0	69.0						pass	pass	
Initial	18.0	65.0	0.63354	2.10	640.5350	5.0090	67.0	69.0	529.0	527.8	6.00	0.98938	1.71219	0.003	0.00	
Final					645.5440		66.0	69.0						pass	pass	
												0.99206	1.71497	0.00205	0.00386	

Method	EPA M-5 #7.2	Date	2/8/2007
Location	Wenatchee Landfill	Pb=	28.8 (in Hg)
Meter Box	7	Ta=	61 (oF)
Meter ID			
Calibrated by	Paul	Leak Check Rate	0/0.0 in/min

	VAC (inHg)	Critical Orifice	K	dH inH2O	Meter (ft3)	Field Tdi (oF)	Meter Tdo (oF)	Time t (min)
Initial	17	65	0.63354	2.1	629.700	71	70	7
Final	18				635,520	69	69	
Initial	18	65	0.63354	2.1	635.520	69	69	6
Final	19				640.535	67	69	
Initial	18	65	0.63354	2.1	640.535	67	69	6
Final	18				645,544	66	69	

*If the box leaks or doesn't calibrate for any reason please let report writer know ASAP and docum
Be sure to update new K values from annual calibrations when entering data into spreadsheet.
**You must collect at least 5 cuft.
****For post-test calibrations in field (New 10.3.2, Old 5.3.2) Select orifice nearest to operational conditions
Make 3 runs of 5 cuft each.
Comments:

Method	EPA M-5 #7.2	Date	
Location		Pb=	(in Hg)
Meter Box		Ta=	(oF)
Meter ID			
Calibrated by		Leak Check Rate	in/min

	VAC (inHg)	Critical Orifice	K	dH inH2O	Meter (ft3)	Field Tdi (oF)	Meter Tdo (oF)	Time t (min)
Initial								
Final								
Initial								
Final								
Initial								
Final								

*If the box leaks or doesn't calibrate for any reason please let report writer know ASAP and docum
Be sure to update new K values from annual calibrations when entering data into spreadsheet.
**You must collect at least 5 cuft.
****For post-test calibrations in field (New 10.3.2, Old 5.3.2) Select orifice nearest to operational conditions
Make 3 runs of 5 cuft each.
Comments:

Biannual Liter Meter Calibration

file/date	070505m5
Method	EPA M-5 #7.2
Location	Horizon Shop
Meter Box ID	16
Meter ID	5275830
calibrated by	BG

Date 12/08/06
Pb= 30.20 (in Hg)
Ta= 50 (oF)
Tamb 510 (oR)
Leak check
Rate 0.0 in/min

	Old 06/29/06	New 12/08/06	Change (+/-)
Y=	0.97896	1.02303	4.3%

	VAC (psi)	Critical Orifice ID	K	Meter Pressure H20"	Meter (liters)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Allowable Y 0.020	Tolerance dH@ 0.20
Initial	24.0	35.0	0.17924	10.00	1260.2900	7.0257	50.0	50.0	513.0	512.8	31.00	0.99376	na	0.029	0.00
Final					1459.2300		55.0	56.0							
Initial	23.0	40.0	0.23671	10.00	1459.2300	6.6333	55.0	56.0	517.0	516.5	22.50	1.01626	na	0.007	0.00
Final					1647.0600		57.0	58.0							
Initial	22.0	48.0	0.34507	10.00	1647.0600	19.3159	57.0	58.0	521.0	520.3	46.50	1.05908	na	0.036	0.00
Final					2194.0100		62.0	64.0							
												1.02303		0.024	0.00

Post-Test Liter Meter Calibration

file/date	070505m5
Method	EPA M-5 #7.2
Location	Horizon Shop
Meter Box ID	16
Meter ID	5275830
calibrated by	JB

Date 03/06/2007
Pb= 30.10 (In Hg)
Ta= 62 (oF)
Tamb 522 (oR)
Leak check
Rate 0.0 in/min

	Biannual 12/08/06	Post-Test 03/06/2007	Change (+/-)
Y=	1.02303	1.03596	1.2%

	VAC (psi)	Critical Orifice ID	K	Meter Pressure H20"	Meter (liters)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Allowable Y 0.020	Tolerance dH@ 0.20
Initial	17.0	20.0	0.06318	1.80	3503.0000	2.2729	57.0	57.0	522.0	521.8	29.00	1.03901	na	0.003	0.00
Final					3567.3600		66.0	67.0							
Initial	17.0	20.0	0.06318	1.90	3567.3600	2.1518	66.0	67.0	530.5	530.0	27.00	1.03771	na	0.002	0.00
Final					3628.2900		73.0	74.0							
Initial	17.0	20.0	0.06318	1.90	3630.0000	1.9975	65.0	65.0	528.5	528.0	25.00	1.03118	na	0.005	0.00
Final					3686.5600		70.0	72.0							
												1.03596		0.003	0.00

Post Tes Calibration: Liter Meter

Method	EPA M-5 #7.2
Location	Shop
Meter Box	16
Meter ID	HE500
Calibrated by	JB

Date: 6 March '07
Pb= 30.10 in Hg
Ta= 62 oF

Leak Checks
Negative: 0 in/min @ 25 in Hg

Negative leak check is done on the front of the MB

12/8/06
1.02303

	VAC (inHg)	Critical Orifice	K	Meter Pressure	Meter (liters)	Field Tdi (oF)	Meter Tdo (oF)	Time t (min)
Initial	17	20	0.06318	1.8	3503.000	57	57	29
Final					3537.936	66	67	
Initial	17	"	"	1.9	3567.36	66	67	27
Final					3628.29	73	74	
Initial	17	"	"	1.9	3630.00	65	65	25
Final					3686.56	70	72	

*If the box leaks or doesn't calibrate for any reason please let report writer know ASAP and document it. Be sure to update new K values from annual calibrations when entering data into spreadsheet.
**You must collect at least 5 liters

Biannual Liter Meter Calibration

file/date	070505m5
Method	EPA M-5 #7.2
Location	Horizon Shop
Meter Box ID	17
Meter ID	5276004
calibrated by	BG

Date 6.29.06
Pb= 30.05 (in Hg)
Ta= 76 (oF)
Tamb 536 (oR)
Leak check
Rate 0.00 in/min

	Old	New 6.29.06	Change (+/-)
Y=	na	0.98776	100.0%

	VAC (psi)	Critical Orifice ID	K	dH (inH2O)	Meter (Liters)	Net (Liters)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Allowable Tolerance Y 0.020	Allowable Tolerance dH@ 0.20
Initial	20.0	73.0	0.81651	3.70	4505.48	392.79	13.8716	76.0	76.0	536.5	538.0	12.75	0.97979	na	0.008	0.00
Final					4898.27			83.0	77.0							
Initial	25.0	48.0	0.35298	0.70	4898.27	178.97	6.3204	77.0	77.0	537.0	537.5	13.50	0.99058	na	0.003	0.00
Final					5077.24			79.0	77.0							
Initial	26.0	40.0	0.24216	0.38	5077.24	181.95	6.4257	79.0	77.0	537.5	538.5	20.00	0.99292	na	0.005	0.00
Final					5259.19			80.0	78.0							
													0.98776		0.005	0.00

Post-Test Liter Meter Calibration

file/date	070505m5
Method	EPA M-5 #7.2
Location	Horizon Shop
Meter Box ID	17
Meter ID	5276004
calibrated by	JB

Date 03/06/2007
Pb= 30.10 (in Hg)
Ta= 65 (oF)
Tamb 525 (oR)
Leak check
Rate 0.0 in/min

	Old 06/29/06	New 03/06/2007	Change (+/-)
Y=	0.98776	1.00449	1.7%

	VAC (psi)	Critical Orifice ID	K	Meter Pressure H20"	Meter (liters)	Net (ft3)	Field Tdi (oF)	Meter Tdo (oF)	To (oR)	Tm (oR)	Time t (min)	Y	dH@	Allowable Y 0.020	Tolerance dH@ 0.20
Initial	18.0	20.0	0.06318	2.20	1128.0000	2.1069	60.0	61.0	523.5	523.8	26.00	1.00490	na	0.000	0.00
Final					1187.6600		68.0	66.0							
Initial	17.5	20.0	0.06318	2.20	1187.6600	2.6282	68.0	66.0	530.0	530.8	32.00	1.00475	na	0.000	0.00
Final					1262.0800		75.0	74.0							
Initial	17.5	20.0	0.06318	2.20	1262.0800	2.0755	75.0	74.0	535.5	536.0	25.00	1.00382	na	0.001	0.00
Final					1320.8500		78.0	77.0							
												1.00449		0.000	0.00

Post Tes Calibration: Liter Meter

Method	EPA M-5 #7.2
Location	Shop
Meter Box	17
Meter ID	HE 180
Calibrated by	TD

Date: 6 March '07
Pb= 30.10 in Hg
Ta= 65 oF

Leak Checks
Negative: 0 in/min @ -5 in Hg

Negative leak check is done on the front of the MB

old 6/29/06 0.98776 98.776

	VAC (inHg)	Critical Orifice	K	Meter Pressure	Meter (liters)	Field Tdi (oF)	Meter Tdo (oF)	Time t (min)
Initial	18	20	0.06318	2.2	1128.00	60	61	26
Final					1187.66	68	66	
Initial	17.5	"	"	2.2	1187.66	68	66	32
Final					1262.08	75	74	
Initial	17.5	"	"	2.2	1262.08	75	74	25
Final					1320.85	78	77	

*If the box leaks or doesn't calibrate for any reason please let report writer know ASAP and document it.
Be sure to update new K values from annual calibrations when entering data into spreadsheet.
**You must collect at least 5 liters

Critical Orifice Calibrations

Client	**Horizon in house**										
Job #	**na**										
Date:	**3/23/06**										
DGM (Y) =	**1.00000**										
DGM ID #	**2299046**	***** Minimum 5 minute Runs (times differ +/- 3.0 seconds between run 1 & 2) *****									
Calibrated by:	**krk**										

Horizon Engineering
13585 NE Whitaker Way
Portland, OR 97230
Phone (503) 255-5050
Fax (503) 255-0505

Dry Gas Meter			**Orifice ID: 73**		**Orifice ID: 63**		**Orifice ID: 55**		**Orifice ID: 48**		**Orifice ID: 40**	
K' Critical Orifice Coefficient			**0.81651**		**0.59503**		**0.46478**		**0.35298**		**0.24216**	
	Symbol	**Units**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**
Initial volume	**Vi**	**ft³**	141.205	147.498	130.355	135.688	119.522	124.884	110.373	114.897	101.020	105.644
Final Volume	**Vf**	**ft³**	147.498	153.788	135.688	141.045	124.889	130.258	114.897	119.424	105.644	110.279
Difference	**Vm**	**ft³**	6.293	6.290	5.333	5.357	5.367	5.374	4.524	4.527	4.624	4.635
Temperatures												
Ambient		**°F**	60.0	60.0	59.0	59.0	59.0	59.0	58.0	58.0	58.0	58.0
Absolute ambient	**Ta**	**°R**	519.7	519.7	518.7	518.7	518.7	518.7	517.7	517.7	517.7	517.7
Initial Inlet	**Ti**	**°F**	57.0	66.0	54.0	59.0	54.0	58.0	53.0	56.0	50.0	52.0
Outlet	**Tf**	**°F**	58.0	58.0	56.0	58.0	56.0	57.0	54.0	56.0	51.0	52.0
Final Inlet	**Ti**	**°F**	66.0	70.0	59.0	64.0	58.0	62.0	56.0	58.0	52.0	54.0
Outlet	**Tf**	**°F**	58.0	59.0	58.0	58.0	57.0	58.0	56.0	56.0	52.0	54.0
Avg. Temp	**Tm**	**°R**	519.4	522.9	516.4	519.4	515.9	518.4	514.4	516.2	510.9	512.7
Time		**min**	6	6	7	7	9	9	10	10	15	15
		sec	0	0	0	0	0	0	0	0	0	0
			6.00	6.00	7.00	7.00	9.00	9.00	10.00	10.00	15.00	15.00
Orifice man. rdg	**dH@**	**in H2O**	3.850	3.850	2.000	2.000	1.200	1.200	0.690	0.690	0.320	0.320
Barometric. Pressure	**Pbar**	**inHg**	29.96	29.96	29.96	29.96	29.96	29.96	29.96	29.96	29.96	29.96
Pump vacuum		**inHg**	18.0	18.0	20.0	20.0	22.0	22.0	22.0	22.0	24.0	24.0
K' factor			0.81944	0.81357	0.59542	0.59465	0.46560	0.46396	0.35347	0.35250	0.24228	0.24203
K' factor Average				0.81651		0.59503		0.46478		0.35298		0.24216
% Error (+/- 0.5)		**%**		0.36%		0.07%		0.18%		0.14%		0.05%

Critical Orifice Calibrations

Client	**Horizon in house**									**Horizon Engineering**	
Job #	**na**									**13585 NE Whitaker Way**	
Date:	**8/24/06**									**Portland, OR 97230**	
DGM (Y) =	**1.00000**									**Phone (503) 255-5050**	
DGM ID #	**2299046**		***** Minimum 5 minute Runs (times differ +/- 3.0 seconds between run 1 & 2) *****							**Fax (503) 255-0505**	
Calibrated by:	**JB**										
Dry Gas Meter			**Orifice ID: 73**		**Orifice ID: 63**		**Orifice ID: 55**		**Orifice ID: 48**		**Orifice ID: 40**	
K' Critical Orifice Coefficient			**0.80058**		**0.58297**		**0.45350**		**0.34507**		**0.23671**	
	Symbol	**Units**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**
Initial volume	**Vi**	**ft³**	552.069	562.452	572.877	580.526	588.183	594.174	600.162	604.741	609.294	612.429
Final Volume	**Vf**	**ft³**	562.452	572.877	580.526	588.183	594.174	600.162	604.741	609.294	612.429	615.563
Difference	**Vm**	**ft³**	10.383	10.425	7.649	7.657	5.991	5.988	4.579	4.553	3.135	3.134
Temperatures												
Ambient		**°F**	72.4	72.2	72.4	72.4	73.0	73.8	74.4	73.8	73.6	73.6
Absolute ambient	**Ta**	**°R**	532.1	531.9	532.1	532.1	532.7	533.5	534.1	533.5	533.3	533.3
Initial Inlet	**Ti**	**°F**	78.6	87.6	97.4	95.0	95.4	92.8	92.8	89.4	88.0	85.6
Outlet	**Tf**	**°F**	75.0	76.0	77.5	78.0	78.5	79.0	79.0	79.0	79.0	78.5
Final Inlet	**Ti**	**°F**	87.6	97.4	95.0	95.4	92.8	92.8	89.4	88.0	85.6	84.6
Outlet	**Tf**	**°F**	76.0	77.5	78.0	78.5	79.0	79.0	79.0	79.0	78.5	78.0
Avg. Temp	**Tm**	**°R**	539.0	544.3	546.6	546.4	546.1	545.6	544.7	543.5	542.4	541.3
Time		**min**	10	10	10	10	10	10	10	10	10	10
		sec	0	0	0	0	0	0	0	0	0	0
			10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Orifice man. rdg	**dH@**	**in H2O**	10.100	10.100	9.600	9.600	6.150	6.150	3.800	3.800	2.000	2.000
Barometric. Pressure	**Pbar**	**inHg**	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13
Pump vacuum		**inHg**	19.0	19.0	22.0	22.0	23.0	23.0	25.0	25.0	26.0	26.0
K' factor			0.80297	0.79818	0.58254	0.58341	0.45322	0.45377	0.34577	0.34437	0.23651	0.23692
K' factor Average				0.80058		0.58297		0.45350		0.34507		0.23671
% Error (+/- 0.5)		**%**		0.30%		0.08%		0.06%		0.20%		0.09%

Critical Orifice Calibrations

Client	**TV 2 Orifices**										
Job #											
Date:	**8/24/06**										
DGM (Y) =	**1.00000**										
DGM ID #	**Standard**										
Calibrated by:	**JB**										

***** Minimum 5 minute Runs (times differ +/- 3.0 seconds between run 1 & 2) *****

Horizon Engineering
13585 NE Whitaker Way
Portland, OR 97230
Phone (503) 255-5050
Fax (503) 255-0505

Dry Gas Meter			**Orifice ID:**	**35**	**Orifice ID:**	**44**	**Orifice ID:**	**51**	**Orifice ID:**	**56**	**Orifice ID:**	**65**
K' Critical Orifice Coefficient			**0.17924**		**0.29066**		**0.37686**		**0.46914**		**0.63190**	
	Symbol	**Units**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**
Initial volume	**Vi**	**ft³**	500.933	503.277	505.636	509.429	513.255	518.188	523.147	529.303	535.485	543.768
Final Volume	**Vf**	**ft³**	503.277	505.636	509.429	513.255	518.188	523.147	529.303	535.485	543.768	552.069
Difference	**Vm**	**ft³**	2.344	2.359	3.793	3.826	4.933	4.959	6.156	6.182	8.283	8.301
Temperatures												
Ambient		**°F**	70.8	70.6	71.0	71.0	71.4	71.4	71.8	72.0	72.2	72.4
Absolute ambient	**Ta**	**°R**	530.5	530.3	530.7	530.7	531.1	531.1	531.5	531.7	531.9	532.1
Initial Inlet	**Ti**	**°F**	76.2	76.6	77.0	77.8	80.0	82.8	85.0	88.4	90.4	95.2
Outlet	**Tf**	**°F**	72.5	72.5	73.0	73.5	73.5	74.0	74.5	76.0	76.0	77.0
Final Inlet	**Ti**	**°F**	76.6	77.2	77.8	80.0	82.8	85.0	88.4	90.4	95.2	97.6
Outlet	**Tf**	**°F**	72.5	72.5	73.5	73.5	74.0	74.5	76.0	76.0	77.0	78.0
Avg. Temp	**Tm**	**°R**	534.1	534.4	535.0	535.9	537.2	538.7	540.6	542.4	544.3	546.6
Time		**min**	10	10	10	10	10	10	10	10	10	10
		sec										
			10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Orifice man. rdg	**dH@**	**in H2O**	1.100	1.100	2.300	2.300	3.550	3.550	5.250	5.250	9.000	9.000
Barometric. Pressure	**Pbar**	**inHg**	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13	30.13
Pump vacuum		**inHg**	26.0	26.0	25.0	25.0	24.0	24.0	23.0	23.0	21.0	21.0
K' factor			0.17873	0.17976	0.28964	0.29168	0.37639	0.37732	0.46885	0.46942	0.63249	0.63132
K' factor Average				0.17924		0.29066		0.37686		0.46914		0.63190
% Error (+/- 0.5)		**%**		0.29%		0.35%		0.12%		0.06%		0.09%

Critical Orifice Calibrations

Client	**TV 3 Orifices**		**Horizon Engineering**
Job #	**in house**		**13585 NE Whitaker Way**
Date:	**01/10/07**		**Portland, OR 97230**
DGM (Y) =	**1.00000**		**Phone (503) 255-5050**
DGM ID #	**standard**	***** Minimum 5 minute Runs (times differ +/- 3.0 seconds between run 1 & 2) ****	**Fax (503) 255-0505**
Calibrated by:	**jh**		

Dry Gas Meter			**Orifice ID : 35**		**Orifice ID : 44**		**Orifice ID : 51**		**Orifice ID : 56**		**Orifice ID : 65**	
K' Critical Orifice Coefficient			**0.19266**		**0.29730**		**0.38632**		**0.47554**		**0.63354**	
	Symbol	**Units**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**	**Run 1**	**Run 2**
Initial volume	**Vi**	**ft³**	49.000	51.640	70.000	75.430	95.300	101.390	119.300	129.970	154.400	161.960
Final Volume	**Vf**	**ft³**	51.640	54.275	75.430	87.500	101.390	107.470	129.970	141.560	161.960	169.520
Difference	**Vm**	**ft³**	2.640	2.635	5.430	12.070	6.090	6.080	10.670	11.590	7.560	7.560
Temperatures												
Ambient		**°F**	56.2	56.2	57.4	57.4	57.4	58.0	58.6	58.6	58.6	58.6
Absolute ambient	**Ta**	**°R**	515.9	515.9	517.1	517.1	517.1	517.7	518.3	518.3	518.3	518.3
Initial Inlet	**Ti**	**°F**	63.6	63.0	67.4	68.0	71.2	72.2	76.4	77.4	83.0	83.4
Outlet	**Tf**	**°F**	64.0	62.0	62.0	62.0	64.0	64.0	66.0	66.0	68.0	69.0
Final Inlet	**Ti**	**°F**	63.0	63.0	68.0	68.0	72.2	72.6	77.4	77.2	83.4	83.4
Outlet	**Tf**	**°F**	62.0	62.0	62.0	64.0	64.0	64.0	66.0	66.0	69.0	69.0
Avg. Temp	**Tm**	**°R**	522.8	522.2	524.5	525.2	527.5	527.9	531.1	531.3	535.5	535.9
Time		**min**	10	10	14	31	12	12	17	18	9	9
		sec	30	30						30		
			10.50	10.50	14.00	31.00	12.00	12.00	17.00	18.50	9.00	9.00
Orifice man. rdg	**dH@**	**in H2O**	0.200	0.200	0.530	0.530	0.910	0.910	1.400	1.400	2.600	2.600
Barometric. Pressure	**Pbar**	**inHg**	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10	30.10
Pump vacuum		**inHg**	24.0	24.0	24.0	24.0	22.0	22.0	22.0	22.0	20.0	20.0
K' factor			0.19272	0.19259	0.29691	0.29769	0.38665	0.38598	0.47606	0.47501	0.63374	0.63333
K' factor Average				0.19266		0.29730		0.38632		0.47554		0.63354
% Error (+/- 0.5)		**%**		0.03%		0.13%		0.09%		0.11%		0.03%

Critical Orifice Calibrations

Client									Horizon Engineering
Job #									13585 NE Whitaker Way
Date:	03/05/07								Portland, OR 97230
DGM (Y) =	1.00000								Phone (503) 255-5050
DGM ID #	2299046		*** Minimum 5 minute Runs (times differ +/- 3.0 seconds between run 1 & 2) ***						Fax (503) 255-0505
Calibrated by:	JB								
Dry Gas Meter (			Orifice ID # 12		Orifice ID # 15		Orifice ID # 20		
K' Critical Orifice Coefficient			0.02234		0.03800		0.06318		
	Symbol	Units	Run 1	Run 2	Run 1	Run 2	Run 1	Run 2	
Initial volume	Vi	ft³	870.720	872.000	873.300	875.550	877.900	881.760	
Final Volume	Vf	ft³	871.936	873.213	875.528	877.765	881.760	885.597	
Difference	Vm	ft³	1.216	1.213	2.228	2.215	3.860	3.837	
Temperatures									
Ambient		°F	59.0	60.0	61.0	62.0	59.0	60.0	
Absolute ambient	Ta	°R	518.7	519.7	520.7	521.7	518.7	519.7	
Initial Inlet	Ti	°F	59.0	61.0	62.0	64.0	59.0	63.0	
Outlet	Tf	°F	59.0	60.0	62.0	63.0	58.0	60.0	
Final Inlet	Ti	°F	61.0	62.0	64.0	65.0	63.0	64.0	
Outlet	Tf	°F	60.0	61.0	63.0	64.0	60.0	62.0	
Avg. Temp	Tm	°R	519.4	520.7	522.4	523.7	519.7	521.9	
Time		min	42	42	45	45	47	47	
		sec							
			42.00	42.00	45.00	45.00	47.00	47.00	
Orifice man. rdg	dH@	in H2O	0.000	0.000	0.010	0.010	0.010	0.010	
Barometric. Pressure	Pbar	inHg	30.15	30.15	30.15	30.15	30.10	30.10	
Pump vacuum		inHg	27.0	27.0	27.0	28.0	26.0	27.0	
K' factor			0.02239	0.02230	0.03814	0.03786	0.06347	0.06288	
K' factor Average				0.02234		0.03800		0.06318	
% Error (+/- 0.5)		%		0.20%		0.36%		0.47%	

Date	March-06												
Method	#2 sec 4 (Wind Tunnel)			Location Whitaker Shop									
Pitot	Date Tested	[Cp]	[S]				Pitot	Date Tested	[Cp]	[S]			
3s-1	Jan-29	0.8299	0.006				HT-4	Nov-21	0.8336	0.005			
3s-3	Dec-19	0.8334	0.009				SR-18	Jan-29	0.8286	0.004			
5s-1	Nov-21	0.8334	0.003				SR-36	Oct-20	0.8160	0.010			
5s-3	Dec-9	0.8390	0.008				SR-48A	Jan-19	0.8535	0.008			
6s-1	Not found	ERR	ERR				8s-1	Oct-19	0.8384	0.002			
6s-2	Oct-05	0.8337	0.005				10-s	Oct-19	0.8224	0.006			
6s-3	Dec-19	0.8318	0.005				11-s	Dec-9	ERR	ERR			
6s-4	Dec-19	0.8384	0.007				14s-1	Oct-06	0.8262	0.002			
6s-5	Jan-19	0.8435	0.004				14s-2	Oct-06	0.8071	0.007			
7s-1	Not found	ERR	ERR										
wc3-5	Oct-05	0.8014	0.005										

	dPp P-Type	dPs S-Type	Cp	dS	Avg Cp	S < 0.01
3s-1	0.350	0.490	0.837	0.007	0.8299	0.006
Pass	0.650	0.920	0.832	0.002		
Jan-29	1.100	1.600	0.821	0.009		
KRK	Meets M2-alignment, Leak Check-0in/15sec					
3s-3	0.365	0.500	0.846	0.012	0.8334	0.009
Pass	0.720	1.050	0.820	0.014		
Dec-19	1.350	1.900	0.834	0.001		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
5s-1	0.295	0.420	0.830	0.004	0.8334	0.003
Pass	0.510	0.720	0.833	0.000		
Nov-21	0.930	1.300	0.837	0.004		
KRK	Meets M2-alignment, Leak Check-0in/15sec					
5s-3	0.460	0.660	0.826	0.013	0.8390	0.008
Pass	0.640	0.880	0.844	0.005		
Dec-9	0.950	1.300	0.846	0.007		
JMH	Meets M2-alignment, Leak Check-0in/15sec					
6s-1			ERR	ERR	ERR	ERR
ERR			ERR	ERR		
Not found			ERR	ERR		
initials						
6s-2	0.335	0.470	0.836	0.002	0.8337	0.005
Pass	0.690	0.990	0.826	0.007		
Oct-05	1.400	1.950	0.839	0.005		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
6s-3	0.385	0.540	*0.836*	*0.004*	0.8318	0.005
Pass	0.740	1.040	0.835	0.003		
Dec-19	1.200	1.730	0.825	0.007		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
6s-4	0.370	0.510	0.843	0.005	0.8384	0.007
Pass	0.685	0.980	0.828	0.011		
Dec-19	1.280	1.760	0.844	0.006		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
6s-5	0.410	0.570	0.840	0.004	0.8435	0.004
Pass	0.810	1.100	0.850	0.006		
Jan-19	1.300	1.800	0.841	0.002		
JMH	Meets M2-alignment, Leak Check-0in/15sec					
7s-1			ERR	ERR	ERR	ERR
ERR			ERR	ERR		
Not found			ERR	ERR		
initials						
wc3-5	0.250	0.385	0.798	0.004	0.8014	0.005
Pass	0.650	1.000	0.798	0.003		
Oct-05	1.400	2.100	0.808	0.007		
MJE	Meets M2-alignment, Leak Check-0in/15sec					

	dPp P-Type	dPs S-Type	Cp	dS	Avg Cp	S < 0.01
HT-4	0.395	0.550	0.839	0.005	0.8336	0.005
Pass	0.570	0.800	0.836	0.002		
Nov-21	0.940	1.350	0.826	0.007		
KRK	Meets M2-alignment, Leak Check-0in/15sec					
SR-18	0.340	0.490	0.825	0.004	0.8286	0.004
Pass	0.670	0.960	0.827	0.002		
Jan-29	1.100	1.550	0.834	0.005		
KRK	Meets M2-alignment, Leak Check-0in/15sec					
SR-36	0.280	0.400	0.828	0.012	0.8160	0.010
Pass	0.570	0.870	0.801	0.015		
Oct-20	1.230	1.800	0.818	0.002		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
SR-48A	0.430	0.590	0.845	0.008	0.8535	0.008
Pass	0.810	1.100	0.850	0.004		
Jan-19	1.300	1.700	0.866	0.012		
JMH	Meets M2-alignment, Leak Check-0in/15sec					
8s-1	0.480	0.670	0.838	0.000	0.8384	0.002
Pass	0.820	1.150	0.836	0.002		
Oct-19	1.300	1.800	0.841	0.003		
PTH	Meets M2-alignment, Leak Check-0in/15sec					
10-s	0.460	0.680	0.814	0.008	0.8224	0.006
Pass	0.860	1.250	0.821	0.001		
Oct-19	1.200	1.700	0.832	0.009		
PTH	Meets M2-alignment, Leak Check-0in/15sec					
11-s	0.460	0.660	0.826	ERR	ERR	ERR
ERR	0.660	0.940	0.830	ERR		
Dec-9	0.980	1.400	0.828	ERR		
JMH	Meets M2-alignment, Leak Check-0in/15sec					
14s-1	0.270	0.390	0.824	0.002	0.8262	0.002
Pass	0.690	0.990	0.826	0.000		
Oct-06	1.400	2.000	0.828	0.002		
MJE	Meets M2-alignment, Leak Check-0in/15sec					
14s-2	0.280	0.430	0.799	0.008	0.8071	0.007
Pass	0.660	1.000	0.804	0.003		
Oct-06	1.400	2.050	0.818	0.011		
MJE	Meets M2-alignment, Leak Check-0in/15sec					

SR-1

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer ID: 010473 S/N: M94064

Customer: HORIZON ENGINEERING City: PORTLAND State: OR Order #: R051089

As-Received Model #: ADM-870 Converted to Model #:

PO #: Customer Eqpt ID#: Calibration Due Date: QA Code: 93 10CFR21:

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Quality Assurance Program and calibration procedures meet the requirements for 10CFR50 Appendix B; ANSI/N45.2; ANSI/NCSL Z540-1-1994; MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 24 Dated: 10/06/03

Calibration Technician(s): J. Chandler C. Kautz Calibration Date: 04/22/2005

Calibration Approved by: Ray Baisler Title: Calib Mgr Date: 04/26/2005

AS-Received By	FINAL Test By QIC	Test By
Date 04/18/05 Rh 40 %	Date 04/22/05 Rh 38 %	Date Rh %
Ambient Temperature 74 °F	Ambient Temperature 74 °F	Ambient Temperature °F
Barometric Pressure 28.35 in Hg	Barometric Pressure 28.45 in Hg	Barometric Pressure in Hg
Within spec YES (NO) NA	Within spec (YES) NO	Within spec YES NO

ABSOLUTE PRESSURE TEST (in Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Pressure Standard: Heise #02-R	S/N: 41741/42451	Calibration Date: 03/17/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #04-R	S/N: 41743/42453	Calibration Date: 06/01/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #08-R	S/N: 42186/43328	Calibration Date: 02/07/05	Calibration Due Date: 02/2006	(As-Rcvd)	Test 2 Test 3
Pressure Standard: Heise #10-R	S/N: 42203/43352	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #12-R	S/N: 43166/44731	Calibration Date: 12/13/04	Calibration Due Date: 06/2005	As-Rcvd	(Test 2) Test 3
Pressure Standard: Heise #14-R	S/N: 43412/45043	Calibration Date: 01/10/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3

Heise Model PPM-2 Mfgd by Dresser Industries Rated Accuracy: 0.05% fs (0.0305 in Hg) Range: 0-61 in Hg Resolution: 0.01 Uncertainty: < 0.0358

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
14.0	13.87	13.7	-1.23	13.88	13.8	-.58			
28.4	28.34	28.1	-.85	28.45	28.5	.18			
40.0	40.32	40.0	-.79	40.36	41.0	.34			

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC YES (NO) N/A

Pressure Standard: Heise #01-L	S/N: 41739/42449	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #01-R	S/N: 41739/42446	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #02-L	S/N: 41741/42454	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #03-L	S/N: 41738/42448	Calibration Date: 06/11/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #03-R	S/N: 41738/42445	Calibration Date: 06/09/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #04-L	S/N: 41743/42456	Calibration Date: 06/11/04	Calibration Due Date: 06/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #07-L	S/N: 42185/42186	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	(As-Rcvd)	Test 2 Test 3
Pressure Standard: Heise #07-R	S/N: 42185/43326	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	(As-Rcvd)	Test 2 Test 3
Pressure Standard: Heise #08-L	S/N: 42186/43329	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	(As-Rcvd)	Test 2 Test 3
Pressure Standard: Heise #09	S/N: 42202/43351	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #09	S/N: 42202/43350	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #10-L	S/N: 42203/43353	Calibration Date: 03/02/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #11-L	S/N: 43165/44551	Calibration Date: 12/15/04	Calibration Due Date: 06/2005	As-Rcvd	(Test 2) Test 3
Pressure Standard: Heise #11-R	S/N: 43165/44730	Calibration Date: 12/14/04	Calibration Due Date: 06/2005	As-Rcvd	(Test 2) Test 3
Pressure Standard: Heise #12-L	S/N: 43166/44732	Calibration Date: 12/15/04	Calibration Due Date: 06/2005	As-Rcvd	(Test 2) Test 3
Pressure Standard: Heise #13-L	S/N: 43415/45041	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #13-R	S/N: 43415/45039	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3
Pressure Standard: Heise #14-L	S/N: 43412/45045	Calibration Date: 01/15/05	Calibration Due Date: 07/2005	As-Rcvd	Test 2 Test 3

Differential Pressure Standards: Heise Model PPM1 Manufactured by Dresser Industries

#01-L, 03-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L Rated Accuracy: > 0.07% fs (0.000175 in wc) Range: 0.0-0.25 in wc Res.: 0.00001 Uncertainty: < 0.00035

#01-R, 03-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R Rated Accuracy: > 0.06% fs (0.003 in wc) Range: 0.0-5.0 in wc Res.: 0.0001 Uncertainty: < 0.00348

#02-L, 04-L, 06-L, 08-L, 10-L, 12-L, 14-L, 16-L Rated Accuracy: > 0.06% fs (0.03 in wc) Range: 0.0-50.0 in wc Res.: 0.001 Uncertainty: < 0.0346

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
.0500	.0525	.0000	NA	.0505	.0505	0			
.1250	.1283	.0000	NA	.1231	.1229	-.16			
.2250	.2260	.0000	NA	.2241	.2238	-.13			
.2700	.2727	.2714	-.48	.2727	.2735	.29			
2.000	2.064	2.051	-.63	2.063	2.064	.05			
3.600	3.652	3.626	-.71	3.655	3.669	.38			
4.400	4.427	4.438	.25	4.433	4.455	.50			
27.00	27.36	27.38	.07	27.09	27.16	.26			
50.00	50.39	50.28	-.22	50.25	50.24	-.02			
Overange	✓	✓		✓	✓				

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AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

S/N: M94064
Order #: R051089

LOW VELOCITY CONFIRMATION (FPM)

TEST METER TOLERANCE = ± 3.0% ± 7 FPM AS-RECEIVED TEST WITHIN SPEC YES (NO) N/A

Vel Equiv Standard: AirData Multimeter	S/N: M96151	Calibration Date: 05/20/03	Calibration Due Date: 05/2006	As-Rcvd	Test 2 Test 3
Vel Equiv Standard: AirData Multimeter	S/N: M03538	Calibration Date: 12/11/03	Calibration Due Date: 12/2006	As-Rcvd	(Test 2) Test 3
Vel Equiv Standard: AirData Multimeter	S/N: M03564	Calibration Date: 12/11/03	Calibration Due Date: 12/2006	As-Rcvd	Test 2 Test 3
Vel Equiv Standard: AirData Multimeter	S/N: M03573	Calibration Date: 12/11/03	Calibration Due Date: 12/2006	(As-Rcvd)	Test 2 Test 3

Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm Manufactured by Shortridge Instruments, Inc. Range: 100-5000 fpm Resolution: 0.1
Uncertainty: <3.81 fpm at 100 fpm; <2.55 fpm at 500 fpm

Approx Set Point	Standard	Test Meter	Diff	Standard	Test Meter	Diff	Standard	Test Meter	Diff
100	115.6	0	NA	118.6	122	3.4			
500	503.9	0	NA	540.5	538	-2.5			

ADM-880C, ADM-870/870C and ADM-860/860C AirData Multimeters are read in AirFoil Mode. ADM-850 Multimeters are read in Pitot Tube Mode.

TEMPERATURE TEST - AIRDATA MULTIMETER (° F)

TEST METER TOLERANCE = ± 0.2° F AS-RECEIVED TEST WITHIN SPEC YES (NO) N/A

RTD Simulator: S/N 249	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	(As-Rcvd)	(Test 2)	Test 3	Set Point: (35.6° F	95° F 154.4° F
RTD Simulator: S/N 250	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	(As-Rcvd)	(Test 2)	Test 3	Set Point: 35.6° F	(95° F) 154.4° F
RTD Simulator: S/N 253	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	(As-Rcvd)	(Test 2)	Test 3	Set Point: 35.6° F	95° F (154.4° F)
RTD Simulator: S/N 254	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 256	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N [illegible]	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 292	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 293	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 294	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd	Test 2	Test 3	Set Point: 35.6° F	95° F 154.4° F

RTD Simulators Model RTD-1000/500 Manufactured by General Resistance Rated Accuracy: 0.025% of setting Range: 100 Ω to 11111.10 Ω
Resolution: 0.01 Ω Uncertainty: < 32 ppm

RTD Simulator Temperature Equivalent Set Point	Test Meter	Difference	Test Meter	Difference	Test Meter	Difference
35.60	35.0	-.6	35.7	.1		
95.00	94.4	-.6	95.1	.1		
154.40	154.0	-.4	154.5	.1		

TEMPERATURE TEST OF CUSTOMER'S TEMPROBE (° F)

TEMPROBE TOLERANCE = ± 0.3° F AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Thermometer #4	S/N 92143/Thermistor S/N A310867	Calibration Date: 08/11/03	Cal Due Date: 08/2005	Set Point: 35° F 95° F	(155° F)
Thermometer #1	S/N 8A089/Thermistor S/N A410660	Calibration Date: 04/19/04	Cal Due Date: 06/2006	Set Point: 35° F	(95° F) 155° F
Thermometer #3	S/N 92142/Thermistor S/N 850104	Calibration Date: 07/02/03	Cal Due Date: 07/2005	Set Point:	(35° F) 95° F 155° F
Thermometer #2	S/N 88104/Thermistor S/N 871507	Calibration Date: 10/21/04	Cal Due Date: 10/2006	Set Point: 35° F	95° F 155° F

Rated Accuracy(combined): 0.023° F/0.018° F Mfgd by Hart Scientific Range: 32° F-176° F Resolution: 0.001° F Combined Uncertainty: < 0.025° F

Temperature Standard AirData Multimeter S/N M00136	Calibration Date: 03/11/05	Cal Due Date: 03/2006	Set Point:	(35° F	95° F 155° F)
Temperature Standard AirData Multimeter S/N M96100	Calibration Date: 03/11/05	Cal Due Date: 03/2006	Set Point:	35° F	95° F 155° F

Rated Accuracy: 0.03° F Manufactured by Shortridge Instruments, Inc. Range: 33° F-158° F Resolution: 0.01° F Uncertainty: < 0.023° F
Total combined Uncertainty for TemProbe testing : < 0.039° F

Approx Set Point	Standard	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff
35.0	35.0	35.0	0										
95.0	95.0	94.9	-.1										
155.0	155.0	154.8	-.2										

NOTES:

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SR-2

AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

Customer ID: 010473 S/N: M961010

Customer: HORIZON ENGINEERING, LLC City: PORTLAND State: OR Order #: R052628

As-Received Model #: ADM-870 Converted to Model #:

PO #: Customer Eqpt ID#: Calibration Due Date: QA Code: 93 10CFR21:

This instrument has been calibrated using Calibration Standards which are traceable to NIST (National Institute of Standards and Technology). Quality Assurance Program and calibration procedures meet the requirements for 10CFR50 Appendix B; ANSI/N45.2; ANSI/NCSL Z540-1-1994; MIL-STD 45662A and manufacturer's specifications. Calibration accuracy is certified when meters are used with properly functioning accessories only. All Uncertainties are expressed in expanded terms (twice the calculated uncertainty). This report shall not be reproduced, except in full, without the written approval of Shortridge Instruments, Inc. Results relate only to the item calibrated. For limitations on use, see Shortridge Instruments, Inc. Instruction Manual for the use of AirData Multimeters. Procedure used: Procedure for Differential Pressure, Absolute Pressure and Temperature Recalibration of AirData Multimeters SIP-CP02 Revision: 25 Dated: 06/20/05

Calibration Technician(s): C Rath G. Kaufman Calibration Date: 09/21/2005

Calibration Approved by: [illegible] Title: Cal Mgr Date: 09/27/2005

	Test 2	Final Test
AS-Received By	OK	Test By GK
Date	09/19/05	09/21/05
Rh	36 %	49 %	49 %
Ambient Temperature	74 °F	74 °F	77 °F
Barometric Pressure	28.51 in Hg	28.37 in Hg	28.36 in Hg
Within spec	(YES) NO NA	(YES) NO	(YES) NO

ABSOLUTE PRESSURE TEST (In Hg)

TEST METER TOLERANCE = ± 2.0 % ± .1 in Hg AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Pressure Standard: Heise #02-R	S/N: 41741/42451	Calibration Date: 03/17/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #04-R	S/N: 41743/42453	Calibration Date: 05/11/05	Calibration Due Date: 05/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #06-R	S/N: 41742/42452	Calibration Date: 04/12/05	Calibration Due Date: 10/2005	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #08-R	S/N: 42186/43328	Calibration Date: 02/07/05	Calibration Due Date: 02/2006	As-Rcvd	(Test 2)	~~Test 3~~
Pressure Standard: Heise #10-R	S/N: 42203/43352	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #12-R	S/N: 43166/44731	Calibration Date: 06/02/05	Calibration Due Date: 12/2005	~~As-Rcvd~~	Test 2	Test 3
Pressure Standard: Heise #14-R	S/N: 43412/45043	Calibration Date: 07/12/05	Calibration Due Date: 07/2006	As-Rcvd	Test 2	Test 3

Heise Model PPM-2 Mfgd by Dresser Industries Rated Accuracy: 0.05% fs (0.0305 in Hg) Range: 0-61 in Hg Resolution: 0.01 Uncertainty: < 0.0358

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
14.0	14.13	14.3	1.20	13.93	14.2	1.94	13.82	13.8	-.14
28.4	28.51	28.7	.67	28.39	28.7	1.09	28.35	28.4	.18
40.0	40.53	40.7	.42	42.49	42.7	.49	42.49	42.5	.02

DIFFERENTIAL PRESSURE TEST (in wc)

TEST METER TOLERANCE = ± 2.0 % ± 0.001 in wc AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Pressure Standard: Heise #01-L	S/N: 41739/42449	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #01-R	S/N: 41739/42446	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #02-L	S/N: 41741/42454	Calibration Date: 03/19/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #03-L	S/N: 41738/42448	Calibration Date: 05/24/05	Calibration Due Date: 05/2006	As-Rcvd	Test 2	Test 3
Prossure Standard: Heise #03-R	S/N: 41738/42445	Calibration Date: 05/24/05	Calibration Due Date: 05/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #04-L	S/N: 41743/42456	Calibration Date: 05/24/05	Calibration Due Date: 05/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #05-L	S/N: 41740/42450	Calibration Date: 04/20/05	Calibration Due Date: 10/2005	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #05-R	S/N: 41740/42447	Calibration Date: 04/20/05	Calibration Due Date: 10/2005	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #06-L	S/N: 41742/42455	Calibration Date: 04/20/05	Calibration Due Date: 10/2005	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #07-L	S/N: 42185/42186	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	(Test 2)	~~Test 3~~
Pressure Standard: Heise #07-R	S/N: 42185/43326	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	(Test 2)	~~Test 3~~
Pressure Standard: Heise #08-L	S/N: 42186/43329	Calibration Date: 02/11/05	Calibration Due Date: 02/2006	As-Rcvd	(Test 2)	(Test 3)
Pressure Standard: Heise #09-L	S/N: 42202/43351	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #09-R	S/N: 42202/43350	Calibration Date: 03/01/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #10-L	S/N: 42203/43353	Calibration Date: 03/02/05	Calibration Due Date: 03/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #11-L	S/N: 43165/44551	Calibration Date: 06/10/05	Calibration Due Date: 12/2005	~~As-Rcvd~~	Test 2	Test 3
Pressure Standard: Heise #11-R	S/N: 43165/44730	Calibration Date: 06/10/05	Calibration Due Date: 12/2005	~~As-Rcvd~~	Test 2	Test 3
Pressure Standard: Heise #12-L	S/N: 43166/44732	Calibration Date: 06/10/05	Calibration Due Date: 12/2005	~~As-Rcvd~~	Test 2	Test 3
Pressure Standard: Heise #13-L	S/N: 43415/45041	Calibration Date: 07/12/05	Calibration Due Date: 07/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #13-R	S/N: 43415/45039	Calibration Date: 07/11/05	Calibration Due Date: 07/2006	As-Rcvd	Test 2	Test 3
Pressure Standard: Heise #14-L	S/N: 43412/45045	Calibration Date: 07/14/05	Calibration Due Date: 07/2006	As-Rcvd	Test 2	Test 3

Differential Pressure Standards: Heise Model PPM1 Manufactured by Dresser Industries

#01-L, 03-L, 05-L, 07-L, 09-L, 11-L, 13-L, 15-L Rated Accuracy: > 0.07% fs (0.000175 in wc) Range: 0.0-0.25 in wc Res.: 0.00001 Uncertainty: < 0.00035

#01-R, 03-R, 05-R, 07-R, 09-R, 11-R, 13-R, 15-R Rated Accuracy: > 0.06% fs (0.003 in wc) Range: 0.0-5.0 in wc Res.: 0.0001 Uncertainty: < 0.00348

#02-L, 04-L, 06-L, 08-L, 10-L, 12-L, 14-L, 16-L Rated Accuracy: > 0.06% fs (0.03 in wc) Range: 0.0-50.0 in wc Res.: 0.001 Uncertainty: < 0.0346

Approx Set Pt	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff	Standard	Test Meter	% Diff
.0500	.0510	.0509	-.20	.0513	.0511	-.39	.0543	.0544	.18
.1250	.1296	.1290	-.46	.1237	.1232	-.40	.1254	.1253	-.08
.2250	.2251	.2243	-.36	.2234	.2222	-.54	.2273	.2270	-.13
.2700	.2725	.2720	-.18	.2723	.2712	-.40	.2726	.2726	0
2.000	2.042	2.037	-.24	2.014	2.006	-.40	2.007	2.005	-.10
3.600	3.645	3.644	-.03	3.650	3.632	-.49	3.634	3.624	-.28
4.400	4.420	4.420	0	4.428	4.415	-.11	4.392	4.391	-.02
27.00	27.17	27.25	.29	27.29	27.26	-.11	27.02	27.04	.07
50.00	50.36	50.43	.14	49.51	49.26	-.50	49.25	49.17	-.22
Overange	NA	✓	NA	NA	✓	NA	NA	✓	NA

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AIRDATA MULTIMETER CERTIFICATE OF RECALIBRATION

S/N: M96101O
Order #: R052628

LOW VELOCITY CONFIRMATION (FPM)

TEST METER TOLERANCE = ± 3.0% ± 7 FPM AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

Vel Equiv Standard: AirData Multimeter	S/N: M04099	Calibration Date: 04/26/04	Calibration Due Date: 04/2007	As-Rcvd	Test 2 Test 3
Vel Equiv Standard: AirData Multimeter	S/N: M03573	Calibration Date: 12/11/03	Calibration Due Date: 12/2006	As-Rcvd	Test 2 Test 3
Vel Equiv Standard: AirData Multimeter	S/N: M03564	Calibration Date: 12/11/03	Calibration Due Date: 12/2006	As-Rcvd	(Test 2) (Test 3)
Vel Equiv Standard: AirData Multimeter	S/N: M96151	Calibration Date: 05/20/03	Calibration Due Date: 05/2006	As-Rcvd	Test 2 Test 3

Rated Accuracy: Velocity ± 1.5 % ± 3.5 fpm Manufactured by Shortridge Instruments, Inc. Range: 100-5000 fpm Resolution: 0.1
Uncertainty: <3.81 fpm at 100 fpm; <2.55 fpm at 500 fpm

Approx Set Point	Standard	Test Meter	Diff	Standard	Test Meter	Diff	Standard	Test Meter	Diff
100	114.2	115	.8	105.9	102	-3.9	107.2	107	-.2
500	504.7	502	-2.7	496.1	494	-2.1	498.3	491	.7

ADM-860C, ADM-870/870C and ADM-860/860C AirData Multimeters are read in AirFoil Mode. ADM-850 Multimeters are read in Pitot Tube Mode.

TEMPERATURE TEST - AIRDATA MULTIMETER (° F)

TEST METER TOLERANCE = ± 0.2° F AS-RECEIVED TEST WITHIN SPEC (YES) NO N/A

RTD Simulator: S/N 249	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 250	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 253	Calibration Date: 03/16/04	Calibration Due Date: 03/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 254	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 256	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 257	Calibration Date: 04/13/04	Calibration Due Date: 04/2006	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 292	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 293	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F
RTD Simulator: S/N 294	Calibration Date: 12/26/03	Calibration Due Date: 12/2005	As-Rcvd Test 2 Test 3	Set Point: 35.6° F	95° F 154.4° F

RTD Simulators Model RTD-1000/500 Manufactured by General Resistance Rated Accuracy: 0.025% of setting Range: 100 Ω to 11111.10 Ω
Resolution: 0.01 Ω Uncertainty: < 32 ppm

RTD Simulator Temperature Equivalent Set Point	Test Meter	Difference	Test Meter	Difference	Test Meter	Difference
35.60	35.6	0	35.6	0	35.6	0
95.00	95.0	0	95.0	0	95.1	.1
154.40	154.3	-.1	154.4	0	154.5	.1

TEMPERATURE TEST OF CUSTOMER'S TEMPROBE (° F)

TEMPROBE TOLERANCE = ± 0.3° F AS-RECEIVED TEST WITHIN SPEC YES NO (N/A)

Thermometer #1	S/N 8A089/Thermistor S/N A410660	Calibration Date: 04/20/04	Cal Due Date: 04/2006	Set Point: 35° F	95° F 155° F
Thermometer #2	S/N 8B104/Thermistor S/N 871507	Calibration Date: 10/21/04	Cal Due Date: 10/2006	Set Point: 35° F	95° F 155° F
Thermometer #3	S/N 92142/Thermistor S/N A560303	Calibration Date: 06/15/05	Cal Due Date: 06/2007	Set Point: 35° F	95° F 155° F
Thermometer #4	S/N 92143/Thermistor S/N A310867	Calibration Date: 08/03/05	Cal Due Date: 08/2006	Set Point: 35° F	95° F 155° F

Rated Accuracy(combined): 0.023° F/0.018° F Mfgd by Hart Scientific Range: 32° F-176° F Resolution: 0.001° F Combined Uncertainty: < 0.025° F

Temperature Standard AirData Multimeter S/N M00136	Calibration Date: 03/11/05	Cal Due Date: 03/2006	Set Point: 35° F	95° F	155° F
Temperature Standard AirData Multimeter S/N M96100	Calibration Date: 03/11/05	Cal Due Date: 03/2006	Set Point: 35° F	95° F	155° F

Rated Accuracy: 0.03° F Manufactured by Shortridge Instruments, Inc. Range: 33° F-158° F Resolution: 0.01° F Uncertainty: < 0.023° F
Total combined Uncertainty for TemProbe testing : < 0.039° F

Approx Set Point	Standard	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff	TemProbe	Diff
35.0													
95.0													
155.0													

NOTES:

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CERTIFICATION OF NIST TRACEABILITY

Calibration equipment and standards used by Shortridge Instruments, Inc. are traceable to the National Institute of Standards & Technology. Calibration Certification reference numbers are: differential and absolute pressure TN-249770-92 dated 2-92; temperature 88024 dated 10-90. Calibration is performed in conformance with 10CFR50, Appendix B; ANSI/N45.2; MIL-STD-45662A and manufacturer's specifications.

Calibration equipment is calibrated using Shortridge Instruments' Inc. Calibration Test Standard Master Meter Serial Number M89216, certified yearly through an outside testing facility which is directly traceable to NIST. The last calibration date for M89216 was June 6, 1993; the calibration due date is June 6, 1994.

All AirData Multimeters and AirData FlowMeters calibrated between the dates of June 6, 1993 and June 6, 1994 are included under this certification. All such meters are certified for accuracy when used with properly functioning accessories only.

CALIBRATION ACCURACY

Calibration accuracy of the Shortridge Instruments, Inc. Calibration Master Meters as compared to AirData Multimeters or AirData FlowMeters being calibrated or recalibrated is as follows:

Differential Pressure: Accuracy ratio for differential pressure is 4:1

Master Meter: ± 0.50% of reading ± one count as compared with a NIST Traceable Calibration Standard with specified accuracy of ± 0.005% of reading ± 0.00003 psi (0.0008 in wc).

Test Meter: ± 2.0% of reading ± 0.0001 in wc.

Absolute Pressure: Accuracy ratio for absolute pressure is 4:1

Master Meter: ± 0.50% of reading ± one count as compared with a NIST Traceable Calibration Standard with specified accuracy of ±0.005% of reading ± 0.003 psi.

Test Meter: ± 2.0% of reading ± 0.1 in Hg.

Temperature: Accuracy ratio for temperature is 2:1

Master Meter: ± 0.25° F as compared with a NIST Traceable Calibration Standard with specified accuracy of ± 0.10° F or better.

Test Meter: ± 0.5° F between 32° F and 212°.

Air Flow: Accuracy ratio for Electronic FlowHood is 2:1

Master Meter: ± 1.38% of reading ± 5.0 cfm. Air flow readout accuracy is the square root of the combined accuracies of differential pressure, absolute pressure and temperature measurements by both the Master Meter and the FlowHood Test Stand Meter used for direct flow readout.

Test Meter: ± 3.0% of reading ± 5.0 cfm.

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Telephone (602) 991-6744 FAX (602) 443-1267

14.6 DUCT TRAVERSE USING THE AIRDATA MULTIMETER

No corrections for density are necessary when the AirData Multimeter is used for the comparison pitot tube traverse if use of the TemProbe is consistent during **both** the air flow measurement using the FlowHood and the velocity measurement using the AirData Multimeter and pitot tube. This means that, if the TemProbe is used, it must be used for <u>both</u> types of measurements.

If the TemProbe is not used for either flow or velocity, it must not be used for the other type of measurement. In this case, both sets of measurements will be calculated using standard 70° F conditions.

14.7 BACKPRESSURE CORRECTED COMPARISON READING

Perform a multipoint pitot tube traverse of a supply duct which serves a single supply diffuser. Calculate the air flow with careful attention to all of the factors discussed in this section. A **backpressure corrected** reading on this **same** diffuser should be within ± 5% of the air flow calculated from this traverse.

14.8 NONBACKPRESSURE CORRECTED READING

After determining the air delivery by duct traverse, measure and record the duct centerline velocity, both with and without the FlowHood (flaps open) in place. (A reduction in the duct centerline velocity when the FlowHood is placed over the diffuser, is caused by the flow resistance (backpressure) of the FlowHood).

A flaps open, nonbackpressure corrected FlowHood reading on this **same** diffuser should be within ± 3% of $FLOW_2$ (calculated from the ratio of the two centerline readings).

$FLOW_2$ is obtained from the following calculation:

$$FLOW_2 = FLOW_1 \times \left(\frac{\textit{duct centerline velocity (with FLOWHOOD)}}{\textit{duct centerline velocity (without FLOWHOOD)}} \right)$$

Where: F_1 = flow calculated from duct traverse
F_2 = flow in duct with FlowHood in place (flaps open)

15.0 METER MAINTENANCE

The AirData Multimeter is a precision instrument designed for long term field use if given reasonable care and maintenance. The meter and FlowHood should be kept reasonably clean, and should be stored in the protective case when not in use. The meter case and internal components are rugged, and well able to withstand normal handling. Continued rough handling will eventually cause damage.

The meter case is water resistant, but is not waterproof. Do not use the meter in conditions where liquids or corrosive gases might enter the case or pneumatic inlets.

Do not use or store the meter in temperatures outside the specified ranges. The meter may seem to tolerate summertime storage in such places as the trunk of a vehicle, but battery life and other functions will eventually deteriorate.

CAUTION

When replacing the batteries, be very careful to insert each cell in its **indicated position** for polarity. The polarity position marking for each cell is embossed in the housing beneath each cell position. Take note that the cells are **not** all oriented in the same way. **Failure to observe proper cell positioning can result in severe damage to the meter.**

Battery life will be prolonged if the batteries are periodically permitted to discharge until the display registers LOCHARGE or RECHARGE. The battery charger cord should be coiled in gentle loops rather than wound tightly around the body of the charger transformer. This will greatly extend the life of the charger cord.

If rechargeable batteries are not available in a field situation, the batteries may be replaced with 12 nonrechargeable, alkaline "AA" pen cell batteries. WARNING: Do not plug the charger in if **any** nonrechargeable batteries are in the meter. The meter may be seriously damaged along with the batteries and charger.

Any attempt to service or repair anything inside the meter will void the Warranty and may cause serious damage to the sensitive electronic components.

The AirData Multimeter should be returned to the factory at least every two years for recalibration, maintenance, and software update. This will keep the meter up to date with ongoing improvements and new features as they develop and will assure that the original accuracy of the meter is maintained throughout the meter's life.

16.0 FLOWHOOD MAINTENANCE

The flow sensing grid in the FlowHood unit is high impact ABS plastic. It can be damaged if subjected to physical abuse or excessive stress. Accurate air flow measurements are dependent on the integrity of this grid. Even a hairline crack will effect the results. The grid should not be exposed to temperatures in excess of 140° F for extended periods, or 160° F for five minutes. **Do not lay anything on the grid or interfere with the tension of the support springs.**

Check the flow sensing grid periodically for damage, poor connections to the meter, or an accumulation of dirt or dust particles. The grid may be cleaned by wiping carefully with alcohol. Care must be taken to avoid knocking dirt or dust particles into the grid orifices.

The top support assembly, consisting of the aluminum rod structure that supports the cloth skirt and frame assembly, should be stored folded with the ends of each pair of legs inserted into the top and middle holes of the two front base corner tubes. The head of the assembly should be toward the back of the base assembly. The four spring rods should be positioned downward to avoid applying pressure to the flow sensing grid.

The fabric tops should be washed periodically in cool water with a mild detergent. The tops must be air dried only as heat may cause the fabric to shrink. Excessive dirt build up should be avoided. Reasonable care will prolong the life of the fabric tops. Sharp objects or corners can puncture the fabric and affect the accuracy of the readings.

Magnehelic Gauge Calibrations

Date	9.5.06						9.5.06	File
Testers	JB						60.00	Temp.(F)
Location	SHOP						30.12	Pb(in H2O)
							0-10"Inc/MB-3	Manometer
Pt. 60, App. A, Method 2, 2.2(Diiferential Pressure Gauges)								
Magnehelic ID	15 sec. High	leak check Low	Scale Inches	Guage in H2O	Manometer in H2O	Difference in H2O	Difference %	Difference Average
50-B	OK	OK	50	0.000	0.000	0.000	< Set to Zero	
Date	8.31.06			42.500	44.600	2.100	4.7%	
Personnel	BG			30.500	31.600	1.100	3.5%	
Status	PASS			14.500	15.000	0.500	3.3%	3.8%
50-C	OK	OK	50	0.000	0.000	0.000	< Set to Zero	
Date	8.31.06			45.000	45.400	0.400	0.9%	
Personnel	BG			35.000	35.400	0.400	1.1%	
Status	PASS			19.000	19.000	0.000	0.0%	0.7%
SR#1	OK	OK	electronic	0.000	0.000	0.000	< Set to Zero	
Date	10.5.06			0.751	0.740	-0.011	-1.5%	
Personnel	JB			3.835	3.800	-0.035	-0.9%	
Status	PASS			13.276	13.300	0.024	0.2%	
				45.630	45.700	0.070	0.2%	-0.5%
SR#2	OK	OK	electronic	0.000	0.000	0.000	< Set to Zero	
Date	8.31.06			9.000	9.000	0.000	0.00%	
Personnel	BG			7.400	7.300	-0.100	-1.4%	
Status	PASS			3.000	3.000	0.000	0.00%	
				0.730	0.740	0.010	1.35%	-0.0%
Dwyer #1	OK	OK	electronic	0.000	0.000	0.000	< Set to Zero	
Date	8.31.06			8.070	8.100	0.030	0.37%	
Personnel	BG			5.440	5.400	-0.040	-0.7%	
Status	PASS			1.050	0.990	-0.060	-6.06%	
				0.550	0.480	-0.070	-14.58%	-5.3%

Date:	7/12/2006	Deviation Limit	@60 F	7.8 Allowable Diff.		Pb=	29.96 in Hg	JB	
			@220 F	10.2 Allowable Diff.		Ta=	70.0 oF		
			@400 F	12.9 Allowable Diff.					
		Ambient			220 +/-			400 +/-			Average
	Probe/ID	Standard, F	Measured, F	Difference %	Standard, F	Measured, F	Difference %	Standard, F	Measured, F	Difference %	Difference %
Probe	3-1	71.0	73.0	-0.4%	315.0	320.0	-0.6%	444.0	443.0	0.1%	-0.3%
Probe	3-2	71.0	69.8	0.2%	235.6	235.8	0.0%	437.4	439.6	-0.2%	0.0%
Probe	3-5	70.8	70.0	0.2%	246.8	248.8	-0.3%	436.4	436.6	0.0%	-0.0%
Probe	3-6	71.4	70.6	0.2%	244.6	246.0	-0.2%	437.6	441.0	-0.4%	-0.1%
Probe	3-7	71.0	73.0	-0.4%	274.0	269.0	0.7%	454.0	460.0	-0.7%	-0.1%
Probe	3-9	70.8	70.4	0.1%	221.4	222.6	-0.2%	428.4	425.4	0.3%	0.1%
Probe	3-10	76.2	75.6	0.1%	269.0	274.0	-0.7%	409.2	398.0	1.3%	0.2%
Probe	4-1	71.4	70.6	0.2%	226.0	228.8	-0.4%	417.0	411.0	0.7%	0.2%
Probe	4-2	72.8	72.2	0.1%	229.0	231.6	-0.4%	434.8	437.4	-0.3%	-0.2%
Probe	4-3	75.8	75.0	0.1%	276.0	270.0	0.8%	423.0	429.0	-0.7%	0.1%
Probe	4-4	75.8	75.8	0.0%	270.4	269.6	0.1%	433.6	429.8	0.4%	0.2%
Probe	4-5	75.8	75.4	0.1%	275.2	276.0	-0.1%	436.6	439.0	-0.3%	-0.1%
Probe	4-6	74.8	72.2	0.5%	251.0	259.0	-1.1%	448.0	440.0	0.9%	0.1%
Probe	4-7	75.8	75.4	0.1%	270.2	271.2	-0.1%	423.4	422.6	0.1%	0.0%
Probe	4-8	72.6	72.4	0.0%	223.4	220.8	0.4%	407.2	406.4	0.1%	0.2%
Probe	4-9	72.6	73.4	-0.2%	240.4	241.2	-0.1%	437.6	437.4	0.0%	-0.1%
Probe	4-10	73.2	73.2	0.0%	210.0	209.0	0.1%	407.8	410.4	-0.3%	-0.1%
Probe	5-2	71.0	74.0	-0.6%	227.0	227.0	0.0%	453.0	443.0	1.1%	0.2%
Probe	5-4	73.0	73.0	0.0%	262.0	261.0	0.1%	466.0	466.0	0.0%	0.0%
Probe	5-5	72.8	73.6	-0.2%	235.4	234.8	0.1%	428.4	427.0	0.2%	0.0%
Probe	5-6	72.8	73.0	0.0%	225.4	222.4	0.4%	412.2	409.8	0.3%	0.2%
Probe	5-7	73.0	73.6	-0.1%	226.0	227.6	-0.2%	437.8	437.6	0.0%	-0.1%
Probe	5-8	73.2	73.6	-0.1%	224.4	225.2	-0.1%	432.4	430.2	0.2%	0.0%
Probe	5-9	73.2	73.6	-0.1%	226.8	227.0	0.0%	436.2	437.4	-0.1%	-0.1%
Probe	5-10	85.2	83.4	0.3%	241.2	239.8	0.2%	422.4	422.4	0.0%	0.2%
Probe	5-11	73.2	73.2	0.0%	222.4	222.8	-0.1%	437.0	440.0	-0.3%	-0.1%
Probe	6-1	74.0	74.0	0.0%	233.0	232.0	0.1%	449.0	441.0	0.9%	0.3%
Probe	6-2	74.0	74.0	0.0%	273.0	272.0	0.1%	468.0	464.0	0.4%	0.2%
Probe	6-3	76.0	73.0	0.6%	226.0	230.0	-0.6%	467.0	473.0	-0.6%	-0.2%
Probe	6-4	74.0	74.0	0.0%	227.0	221.0	0.9%	465.0	470.0	-0.5%	0.1%
Probe	7-1	74.0	76.0	-0.4%	264.0	270.0	-0.8%	414.0	417.0	-0.3%	-0.5%
Probe	7-2	75.0	77.0	-0.4%	223.0	220.0	0.4%	421.0	415.0	0.7%	0.2%
Probe	7-3	75.0	76.0	-0.2%	226.0	224.0	0.3%	450.0	452.0	-0.2%	-0.0%
Probe	7-4	84.0	83.8	0.0%	325.0	320.0	0.6%	459.0	457.0	0.2%	0.3%
Probe	7-5	76.0	77.0	-0.2%	270.0	268.0	0.3%	456.0	452.0	0.4%	0.2%
Probe	7-6	86.0	93.0	-1.3%	268.0	265.0	0.4%	419.0	413.0	0.7%	-0.1%
Probe	7-7	76.0	78.0	-0.4%	234.0	229.0	0.7%	464.0	460.0	0.4%	0.2%
Probe	7-8	76.0	76.0	0.0%	225.0	229.0	-0.6%	460.0	455.0	0.5%	0.0%
Probe	8-1	74.0	73.0	0.2%	264.0	264.0	0.0%	440.0	435.0	0.6%	0.3%
Probe	8-2	74.0	73.0	0.2%	279.0	272.0	0.9%	475.0	470.0	0.5%	0.5%
Probe	9-1	72.0	72.0	0.0%	238.0	234.0	0.6%	473.0	469.0	0.4%	0.3%
Probe	10-1	80.0	75.0	0.9%	225.0	226.0	-0.1%	460.0	467.0	-0.8%	-0.0%
Probe	10-2	78.0	73.0	0.9%	224.0	226.0	-0.3%	460.0	467.0	-0.8%	-0.1%
Probe	10-3	78.0	73.0	0.9%	220.0	220.0	0.0%	410.0	410.0	0.0%	0.3%
Probe	10-4	71.0	68.0	0.6%	254.0	248.0	0.8%	443.0	437.0	0.7%	0.7%
Probe	10-5	71.0	68.0	0.6%	280.0	280.0	0.0%	447.0	440.0	0.8%	0.5%
Probe	10-6	75.6	76.2	-0.1%	240.0	235.8	0.6%	445.0	439.6	0.6%	0.4%
Probe	10-7	78.2	78.2	0.0%	252.6	251.4	0.2%	463.4	461.6	0.2%	0.1%
Probe	10-8	73.0	72.4	0.1%	251.0	248.4	0.4%	416.6	413.4	0.4%	0.3%
FS Pitot	6s-2	75.0	75.0	0.0%	222.0	223.0	-0.1%	468.0	461.0	0.8%	0.2%
FS Pitot	7s-1	75.0	77.0	-0.4%	276.0	272.0	0.5%	431.0	433.0	-0.2%	-0.0%
FS Pitot	10-S	75.6	75.8	0.0%	216.4	217.2	-0.1%	411.1	412.4	-0.1%	-0.1%
FS Pitot	11-S	76.6	77.8	-0.2%	242.2	246.2	-0.6%	441.8	440.6	0.1%	-0.2%
FS Pitot	14s-1	75.6	75.8	0.0%	223.6	218.8	0.7%	445.0	437.2	0.9%	0.5%
FS Pitot	14s-2	75.6	75.6	0.0%	237.0	240.2	-0.5%	457.8	456.0	0.2%	-0.1%
FS Thermocouple	F14	68.0	69.8	-0.3%	249.2	248.8	0.1%	445.4	447.2	-0.2%	-0.1%
FS Thermocouple	F73	67.6	68.2	-0.1%	247.6	251.8	-0.6%	445.4	450.6	-0.6%	-0.4%
FS Thermocouple	F84	73.2	73.0	0.0%	226.2	223.0	0.5%	418.2	417.4	0.1%	0.2%
FS Thermocouple	P2	68.0	67.8	0.0%	249.6	250.6	-0.1%	449.2	451.6	-0.3%	-0.1%
FS Thermocouple	P3	68.4	70.4	-0.4%	248.4	250.4	-0.3%	446.6	452.6	-0.7%	-0.5%
FS Thermocouple	P4	68.0	67.6	0.1%	251.2	249.8	0.2%	445.4	449.8	-0.5%	-0.1%
FS Thermocouple	B1	71.6	69.6	0.4%	252.4	255.8	-0.5%	418.0	413.4	0.5%	0.1%
FS Thermocouple	B14	71.8	71.8	0.0%	239.4	236.4	0.4%	435.4	435.8	0.0%	0.1%
FS Thermocouple	B15	71.6	67.0	0.9%	270.8	268.4	0.3%	449.4	444.4	0.6%	0.6%
FS Thermocouple	B17	67.8	67.0	0.2%	248.0	249.4	-0.2%	445.2	448.8	-0.4%	-0.1%
FS Thermocouple	B18	71.6	68.2	0.6%	275.2	268.0	1.0%	446.0	438.8	0.8%	0.8%
FS Thermocouple	B19	67.8	69.0	-0.2%	252.0	252.4	-0.1%	447.4	447.8	0.0%	-0.1%
FS Thermocouple	C2	71.8	67.8	0.8%	279.6	278.0	0.2%	445.8	445.0	0.1%	0.4%
FS Thermocouple	1	68.2	68.4	0.0%	252.0	254.2	-0.3%	445.4	449.6	-0.5%	-0.3%
	NCASI1	77.4	77.6	0.0%	235.4	249.8	-2.1%	425.0	427.0	-0.2%	-0.8%
	NCAS2	77.0	77.0	0.0%	221.8	219.8	0.3%	426.2	426.0	0.0%	0.1%
AVERAGE		73.9	73.6	0.0%	246.4	246.0	0.1%	440.4	439.2	0.1%	0.1%

Standard Flukes	6982139	7029062	6393007
Standard TCs	200601	200602	410

Date: 8/2/2006	Deviation	7.8	Allowable Diff.	Pb=	30.22	in Hg
Name: BG	Limit	10.2	Allowable Diff.	Ta=	76.0	oF
		12.9	Allowable Diff.			

	Ambient			High (+/- 200)			ICE			Average
	Measured	Standard	Difference %	Measured	Standard	Difference %	Standard, F	Measured, F	Difference %	Difference %
Sample Box -impinger out										
017	76.6	76.2	0.1%	x	x		31.6	32.0	-0.1%	0.0%
018	71.4	71.6	0.0%	x	x		32.2	33.2	-0.2%	-0.1%
019	76.0	76.0	0.0%	x	x		31.8	32.0	0.0%	0.0%
020	77.4	76.2	0.2%	x	x		31.4	31.4	0.0%	0.1%
156	77.2	76.2	0.2%	x	x		31.4	31.8	-0.1%	0.1%
172	76.2	75.8	0.1%	x	x		32.0	32.0	0.0%	0.1%
173	76.0	76.4	-0.1%	x	x		32.0	32.0	0.0%	-0.1%
184	76.4	76.0	0.1%	x	x		31.4	31.8	-0.1%	0.0%
185	73.0	73.0	0.0%	x	x		32.6	32.8	0.0%	0.0%
186	76.4	76.0	0.1%	x	x		31.8	31.6	0.0%	0.1%
187	58.0	53.0	1.0%	x	x		34.0	32.0	0.4%	0.7%
188	55.0	57.0	-0.4%	x	x		33.0	34.0	-0.2%	-0.3%
189	76.4	76.4	0.0%	x	x		31.6	32.0	-0.1%	-0.1%
190	76.4	76.0	0.1%	x	x		32.0	32.0	0.0%	0.1%
328	76.4	76.0	0.1%	x	x		31.6	32.0	-0.1%	0.0%
329	70.8	71.6	-0.2%	x	x		33.2	32.6	0.1%	-0.1%
Sample Box - oven										
017	75.4	76.2	-0.1%	249.0	248.0	0.1%	x	x		0.0%
018	68.6	70.4	-0.3%	261.0	265.0	-0.6%	x	x		-0.5%
019	74.8	75.4	-0.1%	245.0	246.0	-0.1%	x	x		-0.1%
020	75.2	75.4	0.0%	256.0	256.0	0.0%	x	x		0.0%
156	75.2	75.8	-0.1%	250.0	243.0	1.0%	x	x		0.5%
172	74.6	75.6	-0.2%	247.0	250.0	-0.4%	x	x		-0.3%
173	75.2	75.8	-0.1%	250.0	250.0	0.0%	x	x		-0.1%
184	77.2	76.2	0.2%	255.0	250.0	0.7%	x	x		0.5%
185	70.6	69.4	0.2%	254.0	258.2	-0.6%	x	x		-0.2%
186	75.4	75.8	-0.1%	252.0	250.0	0.3%	x	x		0.1%
187	58.0	59.0	-0.2%	300.0	292.0	1.1%	x	x		0.5%
188	55.0	58.0	-0.6%	295.0	294.0	0.1%	x	x		-0.3%
189	75.6	76.4	-0.1%	255.0	251.0	0.6%	x	x		0.3%
190	76.4	76.4	0.0%	247.0	250.0	-0.4%	x	x		-0.2%
328	75.0	75.4	-0.1%	246.0	241.0	0.7%	x	x		0.3%
329	70.4	70.8	-0.1%	258.0	258.0	0.0%	x	x		-0.1%
NCASI Box 1	76.2	79.4	-0.6%	260.6	257.6	0.4%	x	x		-0.1%
Standard Flukes	6982139	7029062	6393007							
Standard TCs	200601	200602	410							

Thermocouple Calibration

Date:	8/23/2006	Deviation	7.8	Allowable Diff.	Pb=	29.99	in Hg
Name:	BG	Limit	10.2	Allowable Diff.	Ta=	71.0	oF
			12.9	Allowable Diff.			

Meterbox		Ambient Measured	Ambient Standard	Ambient Difference %	Pump On Measured	Pump On Standard	Pump On Difference %	Average Difference %
4	In	71	72	-0.2%	95	x	x	-0.2%
	Out	71	72	-0.2%	90	87	0.5%	0.2%
5	In	71	72	-0.2%	92	x	x	-0.2%
	Out	70	72	-0.4%	98	96	0.4%	0.0%
6	In	78	74	0.7%	97	x	x	0.7%
	Out	77	74	0.6%	92	94	-0.4%	0.1%
7	In	76	76	0.0%	99	x	x	0.0%
	Out	75	76	-0.2%	90	90	0.0%	-0.1%
8	In	73	72	0.2%	106	x	x	0.2%
	Out	73	72	0.2%	88	89	-0.2%	0.0%
9	In	70	73	-0.6%	99	x	x	-0.6%
	Out	70	73	-0.6%	113	111	0.3%	-0.2%
13	In	77	74	0.6%	92	x	x	0.6%
	Out	77	74	0.6%	87	89	-0.4%	0.1%
14	In	72	72	0.0%	88	x	x	0.0%
	Out	72	72	0.0%	86	90	-0.7%	-0.4%
15	In	75	73	0.4%	95	x	x	0.4%
	Out	73	73	0.0%	99	101	-0.4%	-0.2%
16	In	70	72	-0.4%	95	x	x	-0.4%
	Out	70	72	-0.4%	89	89	0.0%	-0.2%
17	In	70	72	-0.4%	102	x	x	-0.4%
	Out	70	72	-0.4%	99	101	-0.4%	-0.4%
19	In	72	72	0.0%	106	x	x	0.0%
	Out	72	72	0.0%	94	97	-0.5%	-0.3%
Standard Flukes		6982139	7029062	6393007				
Standard TCs		200601	200602	410				

Date: 8.29.06	Deviation Limit	@32 F	7.4	Pb=	29.94 in Hg		BG	Personnel		
		@212 F	10.1	Ta=	70.0 oF					
		@400 F	12.9							

Thermocouple Indicator	Channel	Measured, F	Standard, F	Deviation % absolute	Measured, F	Standard, F	Deviation % absolute	Measured, F	Standard, F	Deviation % absolute	Average Deviation, %
Meter Box 4	1	49	50	-0.2	251	250	0.1	399	400	-0.1	-0.06
	2	50	50	0.0	252	250	0.3	400	400	0.0	0.09
	3	50	50	0.0	252	250	0.3	401	400	0.1	0.13
	4	48	50	-0.4	250	250	0.0	399	400	-0.1	-0.17
	5	49	50	-0.2	251	250	0.1	400	400	0.0	-0.02
Meter Box 5	1	46	50	-0.8	248	250	-0.3	396	400	-0.5	-0.51
	2	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
	3	48	50	-0.4	249	250	-0.1	396	400	-0.5	-0.33
	4	49	50	-0.2	251	250	0.1	400	400	0.0	-0.02
	5	Does not work		0.0	Does not work		0.0	Does not work		0.0	0.00
Meter Box 6	1	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	2	50	50	0.0	250	250	0.0	399	400	-0.1	-0.04
	3	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	4	51	50	0.2	248	250	-0.3	398	400	-0.2	-0.11
	5	49	50	-0.2	248	250	-0.3	399	400	-0.1	-0.20
Meter Box 7	1	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	2	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	3	51	50	0.2	251	250	0.1	401	400	0.1	0.15
	4	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	5	50	50	0.0	250	250	0.0	400	400	0.0	0.00
Meter Box 8	1	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	2	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	3	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	4	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	5	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
Meter Box 9	PROBE	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
	STACK	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
	FILTER	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
	EXIT	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
	AUX	47	50	-0.6	249	250	-0.1	397	400	-0.3	-0.36
Meter Box 13	1	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	2	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	3	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	4	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	5	50	50	0.0	250	250	0.0	400	400	0.0	0.00
Meter Box 14	1	49	50	-0.2	249	250	-0.1	398	400	-0.2	-0.19
	2	50	50	0.0	251	250	0.1	401	400	0.1	0.09
	3	49	50	-0.2	249	250	-0.1	399	400	-0.1	-0.15
	4	49	50	-0.2	250	250	0.0	398	400	-0.2	-0.14
	5	49	50	-0.2	249	250	-0.1	398	400	-0.2	-0.19
Meter Box 15	Probe	46	50	-0.8	247	250	-0.4	396	400	-0.5	-0.56
	Filter	47	50	-0.6	248	250	-0.3	398	400	-0.2	-0.37
	Aux-1	50	50	0.0	250	250	0.0	399	400	-0.1	-0.04
	Aux-2	51	50	0.2	252	250	0.3	401	400	0.1	0.20
Meter Box 16	Probe	50	50	0.0	250	250	0.0	400	400	0.0	0.00
	Filter	47	50	-0.6	247	250	-0.4	396	400	-0.5	-0.49
	Aux-1	53	50	0.6	253	250	0.4	403	400	0.3	0.45
	Aux-2	50	50	0.0	251	250	0.1	400	400	0.0	0.05
Meter Box 17	Probe	47	50	-0.6	248	250	-0.3	397	400	-0.3	-0.41
	Filter	48	50	-0.4	249	250	-0.1	398	400	-0.2	-0.26
	Aux-1	49	50	-0.2	250	250	0.0	399	400	-0.1	-0.10
	Aux-2	49	50	-0.2	250	250	0.0	400	400	0.0	-0.07
Meter Box 19	1	50	50	0.0	251	250	0.1	400	400	0.0	0.05
	2	49	50	-0.2	250	250	0.0	400	400	0.0	-0.07
	3	50	50	0.0	251	250	0.1	400	400	0.0	0.05
	4	51	50	0.2	251	250	0.1	400	400	0.0	0.11
	5	50	50	0.0	251	250	0.1	400	400	0.0	0.05
AVERAGE		48.21	50.00	-0.18	245.35	250.00	-0.04	392.00	400.00	-0.11	-0.11

Standard used: Altek, Series 22 TC Source

Date: 8/2/2006		Deviation Limit	@32 F	7.4	Pb=	30.00 in Hg						
			@212 F	10.1	Ta=	60.0 oF	JB					
			@400 F	12.9								
Thermocouple Indicator	Channel	Measured, F	Standard, F	Deviation % absolute	Measured, F	Standard, F	Deviation % absolute	Measured, F	Standard, F	Deviation % absolute	Average Deviation, %
TV2 Heater Control	1	27.0	25.0	0.4	224.0	225.0	-0.1	421.0	425.0	-0.5	-0.06
	2	25.0	25.0	0.0	224.0	225.0	-0.1	419.0	425.0	-0.7	-0.27
Degrees C	3	-2.0	-3.9	0.4	109.0	107.2	0.3	218.0	218.3	-0.0	0.23
Degrees C	4	-1.0	-3.9	0.6	110.0	107.2	0.5	221.0	218.3	0.4	0.51
TV3 Heater Control	1	25.0	25.0	0.0	222.0	225.0	-0.4	420.0	425.0	-0.6	-0.33
	2	27.0	25.0	0.4	225.0	225.0	0.0	419.0	425.0	-0.7	-0.09
	3	26.0	25.0	0.2	223.0	225.0	-0.3	419.0	425.0	-0.7	-0.25
	4	25.0	25.0	0.0	223.0	225.0	-0.3	422.0	425.0	-0.3	-0.21
Temp. control box: HE 133	1	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
	2	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
	3	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
	4	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
	5	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
	6	26.0	23.8	0.5	225.0	224.4	0.1	422.0	423.0	-0.1	0.14
Temp. control box: HE 142	1	24.0	25.0	-0.2	223.0	225.0	-0.3	418.0	425.0	-0.8	-0.43
	2	24.0	25.0	-0.2	223.0	225.0	-0.3	418.0	425.0	-0.8	-0.43
	3	24.0	25.0	-0.2	223.0	225.0	-0.3	418.0	425.0	-0.8	-0.43
	4	24.0	25.0	-0.2	223.0	225.0	-0.3	418.0	425.0	-0.8	-0.43
	5	24.0	25.0	-0.2	223.0	225.0	-0.3	418.0	425.0	-0.8	-0.43
	6	24.0	25.0	-0.2	223.0	225.0	-0.3	419.0	425.0	-0.7	-0.39
Temp. control box: CAE	Probe	26.0	25.0	0.2	227.0	225.0	0.3	426.0	425.0	0.1	0.20
in A&J case; R63-419	Filter	24.0	25.0	-0.2	225.0	225.0	0.0	424.0	425.0	-0.1	-0.11
	1	Does not work		0.0	Does not work		0.0	Does not work		0.0	0.00
	2	Does not work		0.0	Does not work		0.0	Does not work		0.0	0.00
	3	Does not work		0.0	Does not work		0.0	Does not work		0.0	0.00
Temp. control: HE 136	1	25.0	25.0	0.0	222.0	225.0	-0.4	416.0	425.0	-1.0	-0.48
Temp. control: HE 144 deg C	1	-3.0	-3.9	0.2	106.0	107.2	-0.2	214.0	218.3	-0.6	-0.22
Temp. control: HE 202	Right	28.0	25.0	0.6	226.0	225.0	0.1	426.0	425.0	0.1	0.29
	Left	29.0	25.0	0.8	227.0	225.0	0.3	421.0	425.0	-0.5	0.22
Temp. control: CAE 064-1008-63HC	1	22.0	25.0	-0.6	223.0	225.0	-0.3	421.0	425.0	-0.5	-0.45
Temp display box: HE 143	1	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	2	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	3	25.0	25.0	0.0	224.0	225.0	-0.1	423.0	425.0	-0.2	-0.12
	4	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	5	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	6	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	7	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	8	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	9	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
	10	25.0	25.0	0.0	224.0	225.0	-0.1	424.0	425.0	-0.1	-0.09
Solomat: HE 219	1	24.3	25.0	-0.1	223.8	225.0	-0.2	422.2	425.0	-0.3	-0.21
Fluke #76100133	1	24.6	25.0	-0.1	224.5	225.0	-0.1	424.0	425.0	-0.1	-0.09
	2	24.7	25.0	-0.1	224.5	225.0	-0.1	424.1	425.0	-0.1	-0.08
Fluke #047	1	24.4	25.0	-0.1	224.4	225.0	-0.1	423.8	425.0	-0.1	-0.12
	2	20.4	25.0	-0.9	221.4	225.0	-0.5	420.2	425.0	-0.5	-0.67
Fluke # 197	1	28.6	24.2	0.9	228.0	222.6	0.8	426.8	421.6	0.6	0.76
	2	22.2	24.2	-0.4	222.6	222.6	0.0	421.6	421.6	0.0	-0.14
Fluke # 198	1	24.2	24.2	0.0	222.6	222.6	0.0	421.6	421.6	0.0	0.00
	2	23.0	24.2	-0.2	222.8	222.6	0.0	421.4	421.6	-0.0	-0.08
Digital Thermometer	Box 24	24.0	23.4	0.1	224.0	223.8	0.0	424.0	423.0	0.1	0.09
	Probe 24	24.0	23.4	0.1	224.0	223.8	0.0	424.0	423.0	0.1	0.09
AVERAGE		21.9	22.9	0.07	204.1	217.3	-0.07	385.1	411.5	-0.24	-0.08

Standard used: Altek, Series 22 TC Source

Grant Edgel Company — MFG. RED COMET OVENS
4233 N.E. 147TH AVENUE • P.O. BOX 20115 • PORTLAND, OREGON 97220

CERTIFICATE

FOR

Fluke Digital

Model 52 T1

Serial # 6983739 #000198

Submitted By T2

Horizon Engineering

13585 NE Whitaker Way

Portland, OR 97230

Test	Error T1	T2
100°F	-.6	-.8
500°F	-.6	-.7
1000°F	-.4	-.6
1500°F	-.4	-.7

Certified By:
Gordon Model 5060
#020-8427139
Resubmission Date:
1-30-07

The accuracy stated on this certificate is traceable to the NATIONAL INSTITUTE OF STANDARDS through certification documents on file in the Metrology Laboratory of the Grant Edgel Company.

Test Conditions

AMBIENT TEMP.: 68°F

REL. HUMIDITY: 38%

DATE: 1-26-07

REPORT NO.: 07A-6

SERVICE ORDER:

P.O. NUMBER:

Authorized Signatures

PERFORMED BY: M. I. Edgel

APPROVED BY: R G Edgel

RESUBMISSION DATE: 1-26-08

A Satisfied Customer is Our First Consideration

Grant Edgel Company — MFG. RED COMET OVENS
4233 N.E. 147TH AVENUE • P.O. BOX 20115 • PORTLAND, OREGON 97220

CERTIFICATE

FOR

Fluke Digital

Model 52 T1

Serial # 6393007 #000197

Submitted By T2

Horizon Engineering

13585 NE Whitaker Way

Portland, OR 97230

Test	Error T1	T2
100°F	-.6	-.6
500°F	-.5	-.8
1000°F	-.2	-.7
1500°F	-.4	-.6

Certified By:
Gordon Model 5060
#020-8427139
Resubmission Date:
1-30-07

The accuracy stated on this certificate is traceable to the NATIONAL INSTITUTE OF STANDARDS through certification documents on file in the Metrology Laboratory of the Grant Edgel Company.

Test Conditions

AMBIENT TEMP.: 68°F

REL. HUMIDITY: 38%

DATE: 1-26-07

REPORT NO.: 07A-7

SERVICE ORDER:

P.O. NUMBER:

Authorized Signatures

PERFORMED BY: M. I. Edgel

APPROVED BY: R G Edgel

RESUBMISSION DATE: 1-26-08

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Grant Edgel Company — MFG. RED COMET OVENS
4233 N.E. 147TH AVENUE • P.O. BOX 20115 • PORTLAND, OREGON 97220

CERTIFICATE

FOR

Fluke Digital

Model 52 T1

Serial # 7029003 #000047

Submitted By T2

Horizon Engineering

13585 NE Whitaker Way

Portland, OR 97230

Test	Error T1	T2
100°F	-.6	not working
500°F	-.8	
1000°F	-.7	
1500°F	-.6	

Certified By:
Gordon Model 5060
#020-8427139
Resubmission Date:
1-30-07

The accuracy stated on this certificate is traceable to the NATIONAL INSTITUTE OF STANDARDS through certification documents on file in the Metrology Laboratory of the Grant Edgel Company.

Test Conditions

AMBIENT TEMP.: 68°F

REL. HUMIDITY: 38%

DATE: 1-26-07

REPORT NO.: 07A-5

SERVICE ORDER:

P.O. NUMBER:

Authorized Signatures

PERFORMED BY: M. I. Edgel

APPROVED BY: R G Edgel

RESUBMISSION DATE: 1-26-08

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Grant Edgel Company
MFG. RED COMET OVENS
TELEPHONE 254-6524 (AREA CODE 503)
4233 N.E. 147TH AVENUE ♮ P.O. BOX 20116 ♮ PORTLAND, OREGON 97220

LABORATORY PRIMARY STANDARDS

CERTIFICATE

FOR

Type K Thermocouple 1/8" dia. w/ plug

12" Serial # 0410

12" Serial # 200601

3" Serial # 200602

Submitted By

Horizon Engineering

13585 NE Whitaker Way

Portland, OR 97230

T/C #	100°F	500°F	1000°F	1500°F
0410	+.8	+1.3	+1.9	+2.3
2000601	+.3	+2.5	+2.7	+2.9
2000602	+.6	+2.1	+2.3	+2.5

Certified By: Gordon Model 5060
Serial # 028-8427139
Resubmission Date: 1-30-07

The accuracy stated on this certificate is traceable to the NATIONAL INSTITUTE OF STANDARDS through certification documents on file in the Metrology Laboratory of the Grant Edgel Company.

Test Conditions

AMBIENT TEMP.: 68°F

REL. HUMIDITY: 38%

DATE: 1-26-07

REPORT NO.: 07A-4

SERVICE ORDER:

P.O. NUMBER:

Authorized Signatures

PERFORMED BY: John A. Edgel

APPROVED BY: R G Edgel

RESUBMISSION DATE: 1-8-08

HORIZON ENGINEERING LLC

13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

December 27, 2006
Horizon Engineering Shop
Barometer Calibration

National Weather Service (PDX Int'l Airport)	30.15" Hg
TV 1	30.2" Hg
TV 2	30.20" Hg
TV 3	30.2" Hg
Free standing	30.2" Hg
Shortridge #1	30.3" Hg
Shortridge #2	30.3" Hg

January 18, 2007
Horizon Engineering Shop
Barometer Calibration

National Weather Service (PDX Int'l Airport)	30.51" Hg
Shortridge #3	30.6" Hg

January 31, 2007
Horizon Engineering Shop
Barometer Calibration

National Weather Service (PDX Int'l Airport)	30.09
Hamilton	30.01

All pressures are absolute, read at the Horizon Engineering shop.
Margery Paroissien

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (951) 653-6780 • FAX (951) 653-2430

0-10

1-8-07

Report Of Analysis
EPA Protocol Gas Mixtures

HENG01
TO: Horizon Engineering/Infrared NW
Attn: David Rossman
13585 NE Whitaker Way
Portland, OR 97230
(503) 255-5050

REPORT NO: 51097-01
REPORT DATE: January 3, 2007
CUSTOMER PO NO: 004737

CYLINDER NUMBER: CC83874 CYLINDER SIZE: 150A (141 std cu ft) CYLINDER PRESSURE: 2000 psig

COMPONENT	CONCENTRATION (v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
Oxygen	11.34 ± 0.1 %	GMIS CYLINDER #: CC81204 @ 9.88 %	Varian Model 1860 Serial # None Thermal Conductivity Gas Chromatography LAST CAL DATE: 12/4/2006	1/3/2010	1/3/2007 11.40 % 11.28 % 11.35 % MEAN: 11.34 %
Nitrogen	Balance				

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.

The above analyses are invalid if the cylinder pressure is less than 150 psig.

ANALYST: M.S.Calhoun APPROVED: J. T. Marrin

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (951) 653-6780 • FAX (951) 653-2430

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REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

HENG01
TO: David Rossman
Horizon Engineering / Infrared NW
13585 NE Whitaker Way
Portland, OR 97230

DATE: April 11, 2005

CUSTOMER ORDER NUMBER: 004248

COMPONENT	CONCENTRATION(v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO:	CC97886					
			VARIAN MODEL 1860 TCD		03/31/05	
Carbon Dioxide	6.03 ± 0.02%	GMIS	S/N NONE	03/31/07	6.02%	
		CYLINDER #:	THERMAL CONDUCTIVITY		6.03%	
		CC88828	GAS CHROMATOGRAPHY		6.03%	
		@ 4%	LAST CAL DATE: 03/31/05	MEAN:	6.03%	
			CARLE INST MODEL 8000		04/01/05	04/08/05
Carbon Monoxide	284.0 ± 1.2 ppm	GMIS	S/N 8249	04/08/07	283.5 ppm	284.3 ppm
		CYLINDER #:	METHANATION/FID		284.1 ppm	283.9 ppm
		CC42843	GAS CHROMATOGRAPHY		283.9 ppm	284.3 ppm
		@ 285 ppm	LAST CAL DATE: 03/17/05	MEAN:	283.8 ppm	284.2 ppm
			BOVAR MODEL 922M		03/31/05	04/07/05
Nitric Oxide	51.3 ± 0.4 ppm	GMIS	S/N VD92284844	04/07/07	51.3 ppm	51.0 ppm
NOx	51.3 ppm	CYLINDER #:	CONTINUOUS		51.4 ppm	51.3 ppm
Nitrogen,O2-Free	Balance	CC28420	UV PHOTOMETRY		51.6 ppm	51.1 ppm
CYLINDER PRESSURE:	2000 psig	@ 51.1 ppm	LAST CAL DATE: 03/31/05	MEAN:	51.4 ppm	51.1 ppm

ppm = µmole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.
This cylinder should not be used if the pressure is less than 150 psig.

ANALYST: _____ APPROVED: _____
B.M.MARRIN T.T.MARRIN

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.

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STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.
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TELEPHONE (951) 653-6780 • FAX (951) 653-2430

05-09-05

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REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

HENG01
TO: David Rossman
Horizon Engineering / Infrared NW
13585 NE Whitaker Way
Portland OR 97230

DATE: April 27 2005

CUSTOMER ORDER NUMBER: 004258

COMPONENT	CONCENTRATION(v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
CYLINDER NO:	CC70025					
			VARIAN MODEL 1860 TCD		04/19/05	
Carbon Dioxide	21.83 ± 0.04%	GMIS	S/N NONE	04/19/07	21.80%	
		CYLINDER #:	THERMAL CONDUCTIVITY		21.86%	
		CC51172	GAS CHROMATOGRAPHY		21.84%	
		@ 18.04%	LAST CAL DATE: 04/18/05	MEAN:	21.83%	
			CARLE INST MODEL 8000		04/20/05	04/27/05
Carbon Monoxide	887 ± 10 ppm	GMIS	S/N 8249	04/27/07	888 ppm	888 ppm
		CYLINDER #:	METHANATION/FID		889 ppm	884 ppm
		CC86187	GAS CHROMATOGRAPHY		886 ppm	886 ppm
		@ 1113 ppm	LAST CAL DATE: 04/19/05	MEAN:	888 ppm	886 ppm
			BOVAR MODEL 922M		04/19/05	04/26/05
Nitric Oxide	183.1 ± 1 ppm	GMIS	S/N VD92284844	04/26/07	182.5 ppm	183.4 ppm
NOx	183.1 ppm	CYLINDER #:	CONTINUOUS		182.5 ppm	182.9 ppm
Nitrogen,O2-Free	Balance	CC72078	UV PHOTOMETRY		183.5 ppm	183.6 ppm
CYLINDER PRESSURE:	2000 psig	@ 252.6 ppm	LAST CAL DATE: 04/19/05	MEAN:	182.8 ppm	183.3 ppm

ppm = µmole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.
This cylinder should not be used if the pressure is less than 150 psig.

ANALYST: _____ APPROVED: _____
B.M.MARRIN J.T.MARRIN

The only liability of this company for gas which fails to comply with this analysis shall be replacement or reanalysis thereof by the company without extra cost.

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STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

08-01-05

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REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

HENG01
TO: David Rossman
Horizon Engineering / Infrared NW
13585 NE Whitaker Way
Portland, OR 97230

DATE: July 22 2005

CUSTOMER ORDER NUMBER: 004370

COMPONENT	CONCENTRATION(v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO:	CA06719				
			VARIAN MODEL 1860 FID		07/21/05
Propane	49.2 ± 0.4 ppm	GMIS	S/N NONE	07/21/08	49.2 ppm
		CYLINDER #:	FLAME IONIZATION		49.2 ppm
Zero Air	Balance	CC121986	GAS CHROMATOGRAPHY		49.3 ppm
CYLINDER PRESSURE:	2000 psig	@ 50.6 ppm	LAST CAL DATE: 07/11/05	MEAN:	49.2 ppm

ppm = µmole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.
This cylinder should not be used if the pressure is less than 150 psig.

ANALYST: M.S.CALHOUN APPROVED: P.T.MARRIN

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STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

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Report Of Analysis
EPA Protocol Gas Mixtures

11- 6-06

HENG01
TO: Horizon Engineering/Infrared NW
Attn: David Rossman
13585 NE Whitaker Way
Portland, OR 97230
(503) 255-5050

REPORT NO: 50766-01
REPORT DATE: November 1, 2006
CUSTOMER PO NO: 004686

CYLINDER NUMBER: **CA05197** CYLINDER SIZE: 150A (143 std cu ft) CYLINDER PRESSURE: 2000 psig

COMPONENT	CONCENTRATION (v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
Propane	28.83 ± 0.23 ppm	GMIS CYLINDER #: AAL9805 @ 49.4 ppmv	Varian Model 1860 Serial # None Flame Ionization Gas Chromatography LAST CAL DATE: 10/31/2006	10/31/2009	10/31/2006 29.00 ppm 28.76 ppm 28.72 ppm MEAN: 28.83 ppm
Ultrapure Air	Balance				

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.

The above analyses are invalid if the cylinder pressure is less than 150 psig.

ANALYST: _____ APPROVED: _____

M.S.Calhoun J. T. Marrin

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12-11-06

REPORT OF ANALYSIS
EPA PROTOCOL GAS MIXTURES

HENG01
TO: Horizon Engineering/Infrared NW
Attn: David Rossman
13585 NE Whitaker Way
Portland, OR 97230
(503) 255-5050

DATE: December 1 2006

CUSTOMER ORDER NUMBER: 004725

COMPONENT	CONCENTRATION(v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA
CYLINDER NO:	CC53849				
			BOVAR MODEL 922M		11/29/06
Sulfur dioxide	26.61 ± 0.29 ppm	GMIS	S/N VD92284844	11/29/08	26.56 ppm
		CYLINDER #:	CONTINUOUS		26.56 ppm
Nitrogen	Balance	CC50772	UV PHOTOMETRY		26.72 ppm
CYLINDER PRESSURE:	1300 psig	@ 26.34 ppm	LAST CAL DATE: 11/07/06	MEAN:	26.61 ppm

ppm = µmole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.
This cylinder should not be used if the pressure is less than 150 psig.

ANALYST: Mark Monson APPROVED:
M.J.MONSON J.T.MARRIN

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

SCOTT-MARRIN, INC.
6531 BOX SPRINGS BLVD. • RIVERSIDE, CA 92507
TELEPHONE (951) 653-6780 • FAX (951) 653-2430

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Report Of Analysis
EPA Protocol Gas Mixtures

1-8-07

HENG01
TO: Horizon Engineering/Infrared NW
Attn: David Rossman
13585 NE Whitaker Way
Portland, OR 97230
(503) 255-5050

REPORT NO: 51036-01
REPORT DATE: December 22, 2006
CUSTOMER PO NO: 004724

CYLINDER NUMBER: **CC25763** CYLINDER SIZE: 150A (141 sld cu ft) CYLINDER PRESSURE: 2000 psig

COMPONENT	CONCENTRATION (v/v) ± EPA UNCERTAINTY	REFERENCE STANDARD	ANALYZER MAKE, MODEL, S/N, DETECTION	EXPIRATION DATE	REPLICATE ANALYSIS DATA	
Sulfur dioxide	14.85 ± 0.15 ppm	GMIS	Bovar/W Res Model 922M	6/21/2007	12/14/2006	12/21/2006
		CYLINDER #:	Serial # 9228379-1		14.81 ppm	14.83 ppm
		CC50772	Continuous		14.77 ppm	14.87 ppm
		@ 26.34 ppmv	UV Photometry		14.82 ppm	14.88 ppm
			LAST CAL DATE: 12/18/2006	MEAN:	14.80 ppm	14.86 ppm
Nitrogen	Balance					

ppm = umole/mole % = mole-%

The above analyses were performed in accordance with Procedure G1 of the EPA Traceability Protocol, Report Number EPA-600/R97/121, dated September 1997.

The above analyses are invalid if the cylinder pressure is less than 150 psig.

ANALYST: M.J.Monson APPROVED: J. T. Marrin

STANDARD CALIBRATION GASES IN ALUMINUM CYLINDERS

Polar Cryogenics Inc.

ISO CERT FIED

■ Specialty Gas ■ Cryogenics ■ Bulk Gases ■ Liquid Helium

A-2

Certificate of Analysis

Customer: Horizon Engineering
Product: Air
Grade: Ultra Zero
Cylinder Number: CA03655
Lot Number: B0261302

03-03-06

Pressure: 2000 psig
CGA: 590

Purity Analysis

Component	Specification	Actual Concentration	Analytical Method
Air	Ultra Zero grade	Ultra Zero grade	
Cxygen	<21 %	20.2%	GC-TCD
H_2O	< 2.0 ppm	1.8 ppm	Meeko Aquamatic
THC	< 0.1 ppm	0.03 ppm	Varian GC/MS
CO	< 1.0 ppm	0.10 ppm	Varian GC/MS
CO2	< 1.0 ppm	0.10 ppm	Varian GC/MS
NO	< 0.1 ppm	< 0.1 ppm	Varian GC/MS

I certify the above referenced cylinder was analyzed and found to contain the listed concentrations.

Pamela Albert
Pamela Albert, Chemist

3-3-06
Date

Corporate Offices:
Portland, Oregon
Ph: (503) 239-5252
(800) 426-0689
Fax: (503) 236-0486

Shipping Address: 2734 SE Raymond, Portland, Oregon 97202
Mailing Address: P.O. Box 82039, Portland, Oregon 97282
www.polarcryogenics.com

Albany, Oregon
Ph: (800) 426-0689
Fife, Washington
Ph: (253) 284-9295
(800) 426-0689

QA/QC Documentation
Procedures
NO_x Analyzer Converter Efficiency Data
Analyzer Interference Response Data

Introduction The QA procedures outlined in the U. S. Environmental Protection Agency (EPA) test methods are followed, including procedures, equipment specifications, calibrations, sample extraction and handling, calculations, and performance tolerances. Many of the checks performed have been cited in the Sampling section of the report text. The results of those checks are on the applicable field data sheets in the Appendix.

Continuous Analyzer Methods Field crews operate the continuous analyzers according to the test method requirements, and Horizon's additional specifications. On site quality control procedures include:

- calibrations with EPA Protocol 1 gases or NIST traceable gases
- pre-test zero and span checks and linearity test
- bias checks (introducing calibration gas as near to the probe tip as possible)
- calibration error (linearity) checks if any analyzer adjustments are made
- leak checks on the gas sampling system
- correction of problems that show up as the results of checks
- strip chart recordings for backup to the electronic data acquisition system

Manual Equipment QC Procedures On site quality control procedures include pre- and post-test leak checks on trains and pitot systems. If pre-test checks indicate problems, the system is fixed and rechecked before starting testing. If post-test leak checks are not acceptable, the test run is voided and the run is repeated. Thermocouples and readouts are verified in the field to read ambient prior to the start of any heating or cooling devices. Nozzles are checked for nicks or dents and are measured on three diameters twice each year.

Sample Handling Samples taken during testing are handled to prevent contamination from other runs and ambient conditions. Sample containers are glass, Teflon™, or polystyrene (filter petri dishes) and are pre-cleaned by the laboratory and in the Horizon Engineering shop. Sample levels are marked on containers and are verified by the laboratory. All particulate sample containers are kept upright and are delivered to the laboratory by Horizon personnel.

Data Processing Personnel performing data processing double-check that data entry and calculations are correct. Results include corrections for field blanks and analyzer drift. Any abnormal values are verified with testing personnel and the laboratory, if necessary.

After results are obtained, the data processing supervisor validates the data with the following actions:

- verify data entry
- check for variability within replicate runs
- account for variability that is not within performance goals (check the method, testing, and operation of the plant)
- verify field quality checks

Equipment Calibrations Periodic calibrations are performed on each piece of measurement equipment according to manufacturers' specifications and applicable test method requirements. The Oregon Department of Environmental Quality (ODEQ) Source Testing Calibration Requirements sheet is used as a guideline. Calibrations are performed using primary standard references and calibration curves where applicable.

Thermocouples Thermocouples are calibration checked against an NIST traceable thermocouple and indicator system every six months at three points. Thermocouple indicators and temperature controllers are checked using a NIST traceable signal generator. Readouts are checked over their usable range and are adjusted if necessary (which is very unusual).

Pitots Every six months, S-type pitots are checked for misalignment, angles, lengths, and proximity to thermocouples. They are then calibrated in a wind tunnel at four points against a standard pitot using inclined manometers. They are examined for dents or distortion before each test. Pitots are protected with covers during storage and handling until they are ready to be inserted in the sample ports.

Dry Gas Meters Dry gas meters used in the manual sampling trains are calibrated at five rates using a standard dry gas meter that is never taken into the field. The standard meter is calibration verified by the Northwest Natural Gas meter shop once every year. Dry gas meters are post-test calibrated with documentation provided in test reports.

High Volume Sampler Orifice The orifice for the High Volume sampler is calibrated annually against a positive displacement (Roots type) flow meter, two or more trials at six flow rates. The Roots meter is checked for free rotor movement, indicating accurate flow measurement, before each calibration use.

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Calibration Field Record

Client: ~~ST~~ GWRL
Test Date: 2/5/07
Source: NO_x Conv Check #2758

Tester(s): TAR
Observer:
Datalogger: Testpoint
Conditioner: —

Leak Checks: Pre-OK ✓ Post-OK ✓ Probe placement	Cylinder #	Gas	Cylinder Value (Cv)	Analyzer Calibration Response (Cdir)	Resp. Time (secs)	Start Run 1 / System Calibration Response (Cs)	End Run 1 / Start Run 2 / System Calibration Response (Cs)	End Run 2 / Start Run 3 / System Calibration Response (Cs)	End Run 3 / System Calibration Response (Cs)	
Times				1256		1256	1337			
O2% ch___		O2								
Range/CS /		O2								
Analyzer Model		N2								
Analyzer SN:										
CO2 % ch___		CO2								
Range/CS /		CO2								
Analyzer Model		N2								
Analyzer SN:										
CO ppm ch___		CO								
Range/CS /		CO								
Analyzer Model		N2								
Analyzer SN:										
NOx ppm ch 4	N-3	NO	73.5	73.49		73.49				
Range/CS 20 1735	N-11	NO	40.8	40.51		40.51	40.51			
Analyzer Model 42C	4-2	N2	0.0	0.03		0.03	0.12			
Analyzer SN: 196										
TGOC ppm ch___										
Range										
Analyzer Model										
Analyzer SN:		Air								
ch___										
Range/CS /										
Analyzer Model										
Analyzer SN:										

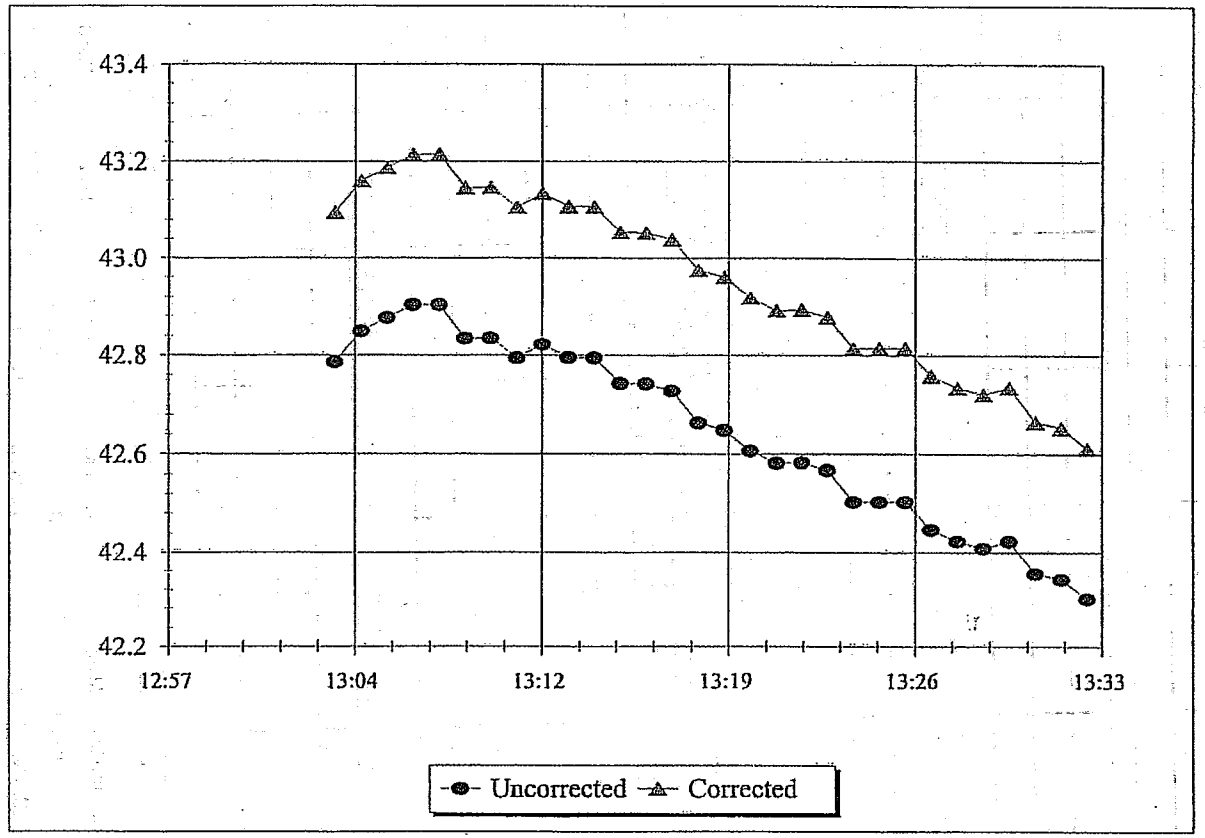
Performance Specs: (3A, 6C, 7E, 10, 20) Note: CS=High Gas Conc.			Performance Specs: (25A)		Test Times	Run 1	Run 2	Run 3
Cal Error*	2%	|Cdir-Cv| / CS	5%	(Cs-Cv) / Cv	Start Time	1303		
Bias* (SB)	5%	|Cs-Cdir| / CS	5%	(Cs-Cv) / Range	End Time	1323		
Drift*	3%	|SBf-SBi|	3%	(Csi-Csf) / Range				

*. late specification: 0.5 ppmv absolute difference

Test Notes: NO Final 34.3

Hot Line Temp —
Hot Line Temp —

NOx Converter Efficiency Test
TECO 42C, Horizon SN 196
02/05/07
Tester - TAR Ananlysis - MP



Cylinder Value		Pre-test	Post-test
	Time	12:56	13:37
73.50	Span	73.49	
40.8	Mid	40.51	40.51
0.00	Zero	0.03	0.18
100	Scale		

	Day	time	NOx	NOx Corrected
1	Feb. 05 2007	13:04:02	42.79	43.10
2	Feb. 05 2007	13:05:02	42.85	43.16
3	Feb. 05 2007	13:06:02	42.88	43.19
4	Feb. 05 2007	13:07:02	42.90	43.22
5	Feb. 05 2007	13:08:02	42.90	43.22
6	Feb. 05 2007	13:09:02	42.84	43.15
7	Feb. 05 2007	13:10:02	42.84	43.15
8	Feb. 05 2007	13:11:02	42.80	43.11
9	Feb. 05 2007	13:12:02	42.82	43.13
10	Feb. 05 2007	13:13:02	42.80	43.11
11	Feb. 05 2007	13:14:02	42.80	43.11
12	Feb. 05 2007	13:15:02	42.74	43.05
13	Feb. 05 2007	13:16:02	42.74	43.05
14	Feb. 05 2007	13:17:02	42.73	43.04
15	Feb. 05 2007	13:18:02	42.66	42.98
16	Feb. 05 2007	13:19:02	42.65	42.96
17	Feb. 05 2007	13:20:02	42.61	42.92
18	Feb. 05 2007	13:21:02	42.58	42.89
19	Feb. 05 2007	13:22:02	42.58	42.89
20	Feb. 05 2007	13:23:02	42.57	42.88
21	Feb. 05 2007	13:24:02	42.50	42.81
22	Feb. 05 2007	13:25:02	42.50	42.82
23	Feb. 05 2007	13:26:02	42.50	42.82
24	Feb. 05 2007	13:27:02	42.45	42.76
25	Feb. 05 2007	13:28:02	42.42	42.73
26	Feb. 05 2007	13:29:02	42.41	42.72
27	Feb. 05 2007	13:30:02	42.42	42.74
28	Feb. 05 2007	13:31:02	42.36	42.67
29	Feb. 05 2007	13:32:02	42.34	42.65
NOx Final	30 Feb. 05 2007	13:33:02	42.30	42.61

	Raw Data	Corrected
Percent Loss =	1.40	1.40
	PASS	PASS

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INTERFERENCE RESPONSE TEST

Date of Test: 3/01/02 Name: Tim Hertel
Analyzer: Type / Model: O_2 / Servomex Serial Number: 000113

Results:

Test Gas	Concentration, ppmv or %	Analyzer Output Response, %	% of Span (25 %)
SO_2	170.3 ppmv	0.0	0.0
*CO_2	10.3%	0.0	0.0
**CO	534 ppmv	0.0	0.0

*Used bottle of CO_2 at 100% concentration and diluted it with 100% N2 to get a concentration of about 10% CO_2.

**Used CO cylinder with 5% concentration and diluted it with 100% N_2 to get a concentration of about 500 ppmv CO.

Bias Check:

Test Gas	Concentration, %	Analyzer Output Response, %	Bias Check (%)
O_2	11.68	11.7	0.1

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: Concentration for SO_2 was slightly lower than listed; 170.3 ppmv was the closest concentration cylinder available at the time of the interference checks.

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INTERFERENCE RESPONSE TEST

Date of Test: 3/01 & 3/07/2002 Name: Tim Hertel
Analyzer: Type / Model: CO_2 / Servomex 1400 Serial Number: 000166

Results:

Test Gas	Concentration, ppmv or %	Analyzer Output Response, %	% of Span (25 %)
SO_2	170.3 ppmv	0.0	0.0
O_2	20.95%	0.0	0.0
*CO	534 ppmv	0.0	0.0

* Used CO cylinder with 5% concentration and diluted it with 100% N_2 to get a concentration of about 500 ppmv CO.

Bias Check:

Test Gas	Concentration, %	Analyzer Output Response, %	Bias Check (%)
**CO_2	10.3	10.3	0.0

** Used bottle of CO_2 at 100% concentration and diluted it with 100% N_2 to get a concentration of about 10% CO_2.

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: Concentration for SO_2 was slightly lower than listed; 170.3 ppmv was the closest concentration cylinder available at the time of the interference checks.

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INTERFERENCE RESPONSE TEST

Date of Test: 3/07/02 Name: Tim Hertel
Analyzer: Type / Model: CO / Thermo Env. Model 48 Serial Number: 000010

Results:

Test Gas	Concentration, ppmv or %	Analyzer Output Response, ppmv	% of Span (1000 ppmv)
SO_2	170.3 ppmv	0.5	0
O_2	20.95%	0.5	0
*CO_2	10%	0.1	0

*Used bottle of CO_2 at 100% concentration and diluted it with 100% N_2 to get a concentration of about 10% CO_2.

Bias Check:

Test Gas	Concentration, ppmv	Analyzer Output Response, ppmv	Bias Check (%)
**CO	512	512	0.0

**Used CO cylinder with 5% concentration and diluted it with 100% N_2 to get a concentration of about 500 ppmv CO.

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: Concentration for SO_2 was slightly lower than listed; 170.3 ppmv was the closest concentration cylinder available at the time of the interference checks.

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INTERFERENCE RESPONSE TEST

Date of Test: 1/4/06 Name: Joe Heffernan III
Analyzer: Type / Model: NO_x / Thermo Env. 42CLS Serial Number: 000196

Results:

Test Gas	Concentration, ppmv or %	Analyzer Output Response, ppmv	% of Span (100 ppmv)
SO_2	170.5 ppmv	0.04	0.04
O_2	20.9 %	0.04	0.04
*CO_2	10.0 %	0.05	0.05
**CO	531 ppmv	0.04	0.04

*Used bottle of CO_2 at 100% concentration and diluted it with 100% N_2 to get a concentration of about 10% CO_2.

**Used CO cylinder with 5% concentration and diluted it with 100% N_2 to get a concentration of about 500 ppmv CO.

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: Concentration for SO_2 was slightly lower than listed; 170.5 ppmv was the closest concentration cylinder available at the time of the interference checks.

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INTERFERENCE RESPONSE TEST

Date of Test: 9/30/03 Name: David Bagwell
Analyzer: Type / Model: SO_2 / 721-M Serial Number: 000181

Results:

Test Gas	Concentration, ppmv or %	Analyzer Output Response, ppmv	% of Span (200 ppmv)
O_2	20.8%	0.0	0.0
CO_2	12.71%	0.0	0.0
CO	472 ppmv	0.0	0.0

Bias Check:

Test Gas	Concentration, ppmv	Analyzer Output Response, ppmv	Bias Check (%)
SO_2	170.3	170.3	0.0

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: CO_2 concentration was slightly higher than listed; 12.71% was the closest concentration cylinder available.

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INTERFERENCE RESPONSE TEST

Date of Test: 1/09/02 & 4/01/02 Name: Mike Eisele & Tim Hertel
Analyzer: Type / Model: VOC / J.U.M. VE-7 Serial Number: 000089

Test Gas	Concentration, ppmv or %	Analyzer Output Response, %	% of Span (100 ppmv)
SO_2	170.3 ppm	0.0	0.0
O_2	20.95 %	0.0	0.0
*CO_2	9.7%	0.0	0.0
**CO	540 ppmv	0.5	0.5

*Used bottle of CO_2 at 100% concentration and diluted it with 100% N2 to get a concentration of about 10% CO_2.

**Used CO cylinder with 5% concentration and diluted it with 100% N_2 to get a concentration of about 500 ppmv CO.

Performance Specifications:

Analyzer	EPA Ref. Method	Allowable Interference (% of analyzer span)	Gas Values To Introduce Into Analyzers (EPA Method 20)
SO_2	6C	7%	200±20 ppm
O_2	6C	7%	20.9±1 percent
CO_2	6C	7%	10±1 percent
CO	20	2%	500±50 ppm

Note: Concentration for SO_2 was slightly lower than listed; 170.3 ppmv was the closest concentration cylinder available at the time of the interference checks.

Correspondence
Source Test Plan and Correspondence
Permit (Selected Pages)

HORIZON ENGINEERING LLC

13585 NE Whitaker Way • Portland, OR 97230
Phone (503) 255-5050 • Fax (503) 255-0505
www.horizonengineering.com

January 9, 2007

Ms. Lynnette A. Haller, PE
Central Region Air Quality Program
Washington State Department of Ecology
15 West Yakima Avenue, Suite 200
Yakima, WA 98902-3452

Re: Source Testing: Waste Management Disposal Services of Washington, Incorporated

Test Location: Greater Wenatchee Regional Landfill and Recycling Center
191 Webb Road, East Wenatchee, WA 98802

This correspondence is notice that Horizon Engineering is to do source testing for the above-referenced facility, scheduled for February 8, 2007. This will serve as the Source Test Plan unless changes are requested prior to the start of testing.

1. **Source(s) to be Tested:** Landfill gas flare inlet and exhaust

2. **Purpose of the Testing:** Compliance with Washington State Air Operating Permit No. 04AQ-C007 First Revision and Notice of Construction Order No. 00AQCR-1000 Second Revision.

3. **Source Description:** The flare is a Parnel design rated for an input of approximately 2000 scf/min of 50% methane landfill gas, with a flare temperature of 1600°F. Photographs and serial numbers of the flare and associated equipment will be in the test report.

4. **Compounds to be Tested:**
   Inlet Gas: NMOC, fixed gases (methane, CO, CO_2, O_2, N_2, and H_2), Btu content, speciated organic TAPs, HCl, H_2S, and other sulfur compounds

   Exhaust: Total particulate, CO, CO_2, O_2, NO_X, NMOC, methane, SO_2, speciated organic TAPs, HCl, H_2S, and other sulfur compounds

5. **Test Methods to be Used:** Testing will be conducted in accordance with EPA Methods in Title 40 Code of Federal Regulations Part 60 (40 CFR 60), Appendix A, July 1, 2005.

Source: Flare Inlet

Velocity and Flow Rate:	EPA Methods 1 and 2C (p-type pitot traverse)
Moisture:	EPA Method 4 (using moisture gain of M-26 sample train)
Btu Content & Fixed Gases:	ASTM D3588-98
NMOC:	EPA Method 25C (as hexane, Tedlar bag samples)
Speciated Organic TAPs:	EPA Method TO-15 (GC/MS, Tedlar bag samples)
HCl:	EPA Method 26 (midget impingers)
H_2S & Hydrogen Sulfides:	ASTM D5504 (GC-SCD, Tedlar bag samples)

Source: Flare Exhaust

Flow Rate:	EPA Methods 1 and 2 (S-type pitot pre-survey before particulate traverses) and EPA Method 19 (calculated from inlet gas flow rate, inlet gas analysis, and outlet gas O_2 concentration)
CO_2 and O_2:	EPA Method 3A (NDIR and paramagnetic analyzers)
Moisture:	EPA Method 4 (included with M-5/202 train)
Particulate:	EPA Methods 5/202 (front and back halves)
SO_2:	EPA Method 6C (nondispersive ultraviolet analyzer)
NO_X:	EPA Method 7E (chemiluminescent analyzer)
CO:	EPA Method 10 (gas filter correlation analyzer)
NMOC:	EPA Method 25A (heated sample line and analyzer with Tedlar bag sample methane subtraction)
Methane:	ASTM D1946 (Tedlar bag samples)
Speciated Organic TAPs:	EPA Method TO-15 (GC/MS, Tedlar bag samples)
HCl:	EPA Method 26 (midget impingers and heated sample line)
H_2S & Hydrogen Sulfides:	ASTM D5504 (GC-SCD, Tedlar bag samples)
Opacity:	DOE Method 9A/EPA Method 9 (six total minutes per test run)
Emission Rates:	EPA Method 19 (F-factor methodology)

6. **Continuous Analyzer Data Recording:** Data acquisition system (DAS) with strip chart records as backup. Either 10-second data points or one-minute averages of one-second readings are logged. Normally only run averages and the graphic outputs from the DAS are included in the test reports.

7. **Continuous Analyzer Gas Sampling:** Fixed point near the centroid of the exhaust or traversed to 16.7%, 50%, and 83.3% of the exhaust inner diameter.

8. **Quality Assurance /Quality Control (QA/QC):** Method-specific quality assurance/quality control procedures must be performed to ensure that the data is valid for determining source compliance. Documentation of the procedures and results will be presented in the source test report for review. Omission of this critical information may result in rejection of the data, requiring a retest. This documentation will include at least the following:

Continuous analyzer QC procedures: Field crews will operate the analyzers according to the test method requirements. On-site quality control procedures include:

- Daily calibration (zero and span) and calibration error (linearity) checks
- Pre- and post-test zero bias and span bias checks
- Checks performed with EPA Protocol 1 or NIST traceable gases
- Data acquisition systems record 10-second data points or one-minute averages of one second readings
- Strip chart recordings taken for backup to the electronic data acquisition system

Manual equipment QC procedures: Operators will perform pre- and post-test leak checks on the sampling system and pitot lines. Thermocouple systems are checked for ambient temperature before heaters are started. Nozzles and pitots are inspected for nicks or dents before each test. Pre- and post-test calibrations on the meter boxes will be included with the report, along with semi-annual calibrations on the pitots, thermocouples, and nozzles. Blank reagents (water, acetone, and filter) are submitted to the laboratory with the samples. Liquid levels are marked on sample jars in the field and are verified by the laboratory.

EPA Method 26 (HCl) Testing: Horizon Engineering requests that the DOE procure audit sample(s) from EPA and provide them to Horizon on or before the test date so that we can submit them to the laboratory with the samples. This will allow us to comply with paragraph 11.2 of EPA Method 26. If audit samples are not provided by the completion of the field sampling, it will be assumed that audit samples are not available and that the audit sample requirement is waived.

9. **Number of Sampling Replicates and their Duration:** Three (3) test runs of at least 60 minutes each.

10. **Reporting Units for Results:** Results will be expressed as concentrations (ppmv and mg/dscm) and as mass emission rates (lb/hr, mg/min, and lb/MMBtu).

11. **Horizon Engrg. Contacts:** David Bagwell or
Thomas Rhodes
(503) 255-5050
Fax (503) 255-0505
E-mail dbagwell@horizonengineering.com
E-mail trhodes@horizonengineering.com

12. **GC Environmental:** Dan Waineo
(503) 235-8068
Fax (503) 503-231-0044
E-mail dwaineo@gc-environmental.com

13. **Waste Management:** Ted Woodard, District Manager
(509) 884-2802
Cell (509) 860-3335
E-mail twoodard@wm.com

Brian Hall, P.E., Engineer

(425) 577-2683
E-mail bhal30@wm.com

14. **Regulatory Contacts:** Lynnette A. Haller, P.E.
Washington State DOE
(509) 457-7126
Fax (509) 575-2809
E-mail lhul461@ecy.wa.gov

15. **Applicable Process/Production Information:** Process operating data and production information that characterizes the source operation is considered to be:

- Flow rates for the flare (site instrument readings)
- Flare operating temperature
- Pressure differential indicator across the flame arrester

Process information is to be gathered by the Source Site Personnel and provided to Horizon for inclusion in the report. We recommend that any manual data recording be done at the beginning and end of each test run and at no less than 15 minute intervals during the testing.

The process rate during testing should be as specified in the Air Operating Permit (if it is specified). If it is not specified, we recommend operating at a normal maximum rate during testing. Rates not in agreement with those stipulated in the Notice of Construction can result in test rejection for application to determine compliance. Imposed process limitations could also result from atypical rates.

16. **Control Device Operating Parameters:** Flare operating temperature

17. **Other Process Considerations,** including intermittent production, special feed or product, etc.: None known

18. **Administrative:** Unless notified prior to the start of testing, this test plan is considered to be approved for compliance testing of this source. A letter acknowledging receipt of this plan and agreement on the content (or changes as necessary) would be appreciated.

DOE will be notified of any changes in source test plans prior to testing. It is recognized that significant changes not acknowledged, which could affect accuracy and reliability of the results, could result in test report rejection.

Source test reports will be prepared by Horizon Engineering and will include all results and example calculations, field sampling and data reduction procedures, laboratory analysis reports, and QA/QC documentation. Source test reports will be submitted to you within 30 days of the completion of the fieldwork, unless another deadline has been stipulated. Waste Management should send two (2) copies of the completed source test report to you at the address above.

Any questions or comments relating to this test plan should be directed to me.

Sincerely,

David Bagwell, QSTI
General Manager
Horizon Engineering LLC

cc: Ted Woodard, Waste Management
Brian Hall, P.E., Waste Management
Dan Waineo, GC Environmental

Margery Heffernan

From: Haller, Lynnette A. (ECY) [LHUL461@ECY.WA.GOV]
Sent: Tuesday, March 06, 2007 6:47 PM
To: Margery Heffernan
Cc: twoodard@wm.com
Subject: RE: AOP Permit Extension Request

Marge,

A post-mark is not sufficient. However, if you also send it to me electronically (at least the cover page and results summary), I would consider that to be Ecology's receipt and base compliance upon the date of electronic receipt.

Lynnette Haller

From: Margery Heffernan [mailto:mheffernan@horizonengineering.com]
Sent: Tue 3/6/2007 6:18 PM
To: Haller, Lynnette A. (ECY)
Subject: RE: AOP Permit Extension Request

Lynnette,

Thank you for getting in touch with me. This Friday, March 9 is the 29th day following testing (Feb.8). If the report is post-marked March 9th, would this even be considered late? There is a good chance we can send it out by this Friday. Would it still be necessary for the Landfill to certify noncompliance when they do their next AOP certification?

Thanks again,
Marge

From: Haller, Lynnette A. (ECY) [mailto:LHUL461@ECY.WA.GOV]
Sent: Tuesday, March 06, 2007 6:02 PM
To: mheffernan@horizonengineering.com; twoodard@wm.com
Cc: Mathey, Jared W. (ECY)
Subject: RE: AOP Permit Extension Request

Marge,

Thank you for contacting us regarding submittal of the Greater Wenatchee Regional Landfill Source Test Report. Unfortunately, we cannot extend a deadline specified in the Air Operating Permit without revising the permit. Please do submit the report as soon as it is ready. The Landfill will have to certify noncompliance with the submittal requirement, if it is received after the specified due date, when they do their next air operating permit compliance certification. We do not consider a late submittal to be a huge deal, as long as it is received within a reasonable time and is not of a reoccurring nature. I consider receipt by March 16 to be within a reasonable time.

Lynnette Haller

From: Mathey, Jared W. (ECY)
Sent: Tue 3/6/2007 11:14 AM

To: Haller, Lynnette A. (ECY)
Cc: 'mheffernan@horizonengineering.com'; Mathey, Jared W. (ECY)
Subject: AOP Permit Extension Request

Lynnette,

Marge from Horizon Engineering called today to request an extension to submit the Wenatchee Landfill Gas Source Test Report. The Source Test Report is due this Friday, March 9, 2007 and she is requesting if we can extend the deadline till Friday, March 16, 2007.

They are waiting on lab results and need a bit extra time to get the report into us.

Can we grant this extension?

I will leave a v-mail about this as well.

Thanks, Jared Mathey
Commercial Industrial Compliance Inspector
Department of Ecology
Air Quality Program
(509) 454-7845

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WASHINGTON STATE DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE
15 W YAKIMA, SUITE 200
YAKIMA, WASHINGTON 98902

IN THE MATTER OF THE COMPLIANCE BY WASTE MANAGEMENT DISPOSAL SERVICES OF WASHINGTON, INC. GREATER WENATCHEE REGIONAL LANDFILL AND RECYCLING CENTER with Section 70.94.161 RCW, Operating Permits for Air Contaminant Sources, and the applicable rules and regulations of the Department of Ecology	)	AIR OPERATING PERMIT No. 04AQ-C007 First Revision FINAL PERMIT

To: Ted Woodard, District Manager
Greater Wenatchee Regional Landfill and Recycling Center
PO Box 2963
Wenatchee, Washington 98807

Issuance Date:	April 13, 2006
Effective Date:	April 13, 2006
Expiration Date:	April 2, 2009

Responsible Official: Ted Woodard, District Manager

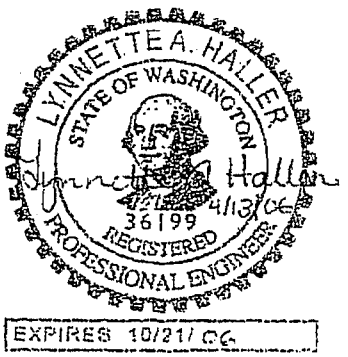
Source Location: 191 South Webb Road, East Wenatchee, Washington 98802

Legal Authority: This AIR OPERATING PERMIT is issued under the authority and provisions of the Federal Clean Air Act, (42 U.S.C. 7401, et seq.), the Washington Clean Air Act, Chapter 70.94 Revised Code of Washington and the Operating Permit Regulation, Chapter 173-401 Washington Administrative Code.

Hereinafter, Waste Management Disposal Services of Washington Incorporated is called the permittee. The permittee is required to comply with the provisions contained within this permit.

The original permit was dated at Yakima, Washington on the 8th day of March, 2004. This First Revision, to incorporate a significant modification, is dated at Yakima, Washington on the 13th day of April, 2006.

REVIEWED BY: Lynnette A Haller 4/13/06
Lynnette A. Haller, PE
Central Regional Air Quality Section
Department of Ecology
State of Washington



APPROVED BY: Susan M. Billings 4-13-06
Susan M. Billings
Section Manager
Central Regional Air Quality Section
Department of Ecology
State of Washington

	Applicable Requirement (Municipal Solid Waste Landfill)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.2.22	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.2	F	Active gas collection must be operated to avoid excess air infiltration, which creates a fire hazard. No fires in landfill.		The O&M Manual shall include temperature, oxygen and nitrogen monitoring of wells to detect excess air infiltration and immediate response to abnormal readings. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.2] Records shall be kept of all well monitoring of an activ gas collection system. [WAC 173-401-615(1), 8/15/01]

5.3 Landfill Gas Flare. The following applicable requirements apply to the LANDFILL GAS FLARE.

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.1	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.1, 2.3.2, 2.3.3	F	PM, CO, & NO_X emissions shall be controlled by flare design and proper O&M.	None specified.	Comply with Condition 5.2.14. [WAC 173-401-615(1), 8/15/01] Control shall include maintenance of landfill cap vegetation and routine inspections and maintenance specified by LTI and included in the 6/22/01 O&M Manual. [6/22/01 O&M Manual & 6/22/01 FDCP submitted per Proposed Decision Regarding NOC Order No. 00AQCR-1000, 4/21/00, Conditions 2.3.1, 2.3.2, 2.3.3]
5.3.2	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.1	F	LFG shall be treated by a knockout vessel prior to being combusted in the enclosed flare.	None specified.	No additional monitoring required.
5.3.3	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.2, 2.5.3, 2.6.3	F	Enclosed flare CO emissions not to exceed 0.1 lb/MMBtu.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 10 (exhaust only). Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing. Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.4	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.5, 2.5.3, 2.6.3	F	Enclosed flare SO_2 emissions not to exceed 0.011 lb/MMBtu.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 6 (exhaust only). Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing. Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]
5.3.5	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.3, 2.5.4, 2.6.3	F	Enclosed flare NO_X emissions not to exceed 0.06 lb/MMBtu.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 7E (exhaust only). Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing. Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]
5.3.6	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.4, 2.4.1, 2.4.2	F	VOC, H_2S and other sulfur compounds, & organic TAP emissions shall be controlled by continuous operation of an active gas collection system.	An active gas collection system shall meet the gas collection system requirements of Title 40 Part 60 Code of Federal Regulations, Subpart WWW. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.4]	Keep records of the date of installation and the location of each well or collection system expansion added. [WAC 173-401-615(1), 9/16/02]

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.7	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition, 2.5.7, 2.7.4, 2.7.7.1, 2.7.7.6, 2.11.2, 2.11.9	F	Flare capacity shall not exceed 2000 scfm and 60.5 MMBtu/hr. Additional flare(s) construction must be commenced within eighteen (18) months and completed within a reasonable time.	None specified.	Install a device that records flow to, or bypass of, the enclosed flare. Monitor LFG flow rate with a flow indicator & recorder, which must operate continuously[1] [2]. Notify Ecology at least 10 days prior to initial startup of each flare. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.4, 2.7.7.1, 2.11.2]
5.3.8	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.5, 2.7.7.2, 2.7.7.6	F	An interlock or some other failsafe device shall prevent LFG from entering the flare if the temperature in the combustion chamber is < 1500 °F, except during the first 15 minutes following startup of the flare.	None specified.	The flare shall be equipped with a temperature indicator & recorder which measures and records the gas temperature in the flare stack. This temperature indicator and recorder must operate continuously[1] [2]. The temperature indicator shall be located above the flame zone, at least three feet below the top of the flare shroud and at least 0.6 seconds downstream of the burner. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.2]
5.3.9	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.6	F	Flare shall be equipped with a LFG shut-off safety system, which in the event of emergency, automatically isolates the flare from the LFG supply line, shuts off the blower, and triggers a failure alarm to notify a responsible party of the shutdown.	None specified.	The safety system shall be tested monthly to ensure it is working properly and the results recorded. Tests may be conducted electronically, without an actual flare shutdown. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.6]
5.3.10	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.3, 2.7.7.6	F	A pressure differential indicator must be continuously[1] maintained across the flame arrester.	None specified.	No additional monitoring required.

[1] Continuously shall mean 95% of the monthly enclosed flare operation, except for periods of monitoring system down-time, provided that the permittee demonstrates that the down time was not a result of inadequate design, operation, maintenance, or any other reasonably preventable condition, and any necessary repairs to the monitoring system were conducted in a timely manner. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.6]

[2] All recording devices must be synchronized based on the time of the day. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.5]

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.11	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.4	F	Monthly readings of BTU content of the gas at the inlet of the flare shall be taken.	Calculate the BTUs as follows: $BTU_{LFG}/scf=(\%CH_4)x(101200)$.	Measure percentage of methane ($\%CH_4$) in the LFG and calculate BTUs. [WAC 173-401-615(1), 5/7/94]
5.3.12	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.5	F	All recording devices must be synchronized based on the time of the day.	None specified.	No additional monitoring required.
5.3.13	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.4, 2.4.2, 2.5.6, 2.7.7.2	F	Flare shall be operated at a temperature ≥ 1500 °F with a retention time ≥ 0.6 seconds.	None specified.	The flare shall be equipped with a temperature indicator & recorder which measures and records the gas temperature in the flare stack. This temperature indicator and recorder must operate continuously[1,2]. The temperature indicator shall be located above the flame zone, at least three feet below the top of the flare shroud and at least 0.6 seconds downstream of the burner. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.7.7.2]
5.3.14	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.3.4, 2.4.2, 2.5.6, 2.6.3	F	NMOC &organic TAP destruction efficiency ≥ 99%.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 25A (as hexane) for NMOC, TO-14 for TAP. Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing. Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.15	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.4.1, 2.5.6, 2.6.3	F	H_2S & other sulfur compounds shall undergo ≥ 99% conversion to SO_2.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 16 for H_2S and other speciated sulfur compounds and RM 6 (exhaust only) for SO_2.. Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]
5.3.16	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3	F	Source tests shall be performed within 180 days of the first operation of any enclosed LFG flare & then at intervals ≤ five years for the life of the unit. Source tests shall include a test for: velocity & flowrate, moisture, BTU content (inlet only), O_2, CO_2, NO_X (exhaust only), CO (exhaust only), SO_2 (exhaust only), total PM (exhaust only), NMOC, methane, speciated organic TAPs, HCl, H_2S and other speciated sulfur compounds, and opacity.	Methods as indicated in other applicable requirements. 40 CFR 60, Appendix A, RM 2C for velocity and flowrate; RM 4 for moisture; RM TO-14 (inlet only), for BTU content; RM3A for O_2 and CO_2; RM 5 (exhaust only) & 40 CFR 51 RM 202 (exhaust only) for total PM; RM 25A (as methane) for methane; and RM 26 for HCl. Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.3, 2.6.3.4]	Test plans shall be submitted to Ecology at least 30 days prior to any source testing Within 30 days of conducting any testing the permittee shall submit a written report of the results to Ecology. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.2, 2.8.3]

	Applicable Requirement (Landfill Gas Flare)	Enforceability (Federal = F, State = S)	Description (for clarification purposes only, enforceable as listed under 'applicable requirement')	Monitoring and Analysis Procedure or Test Method	Monitoring, Recordkeeping, and Reporting to be Performed by Permittee
5.3.17	NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.5.2, 2.6.3.1, 2.6.3.2, 2.6.3.3, 2.6.3.4	F	Flare emissions ≤ zero percent opacity.	An independent testing firm shall conduct 40 CFR 60 Appendix A, RM 9. Test plans shall be submitted to Ecology at least 30 days prior to any source testing. Sampling ports and platforms must be provided. Adequate permanent and safe access to the test ports must be provided. All source testing shall consist of 3 separate runs. [NOC Order No. 00AQCR-1000 2nd Revision, 4/13/06, Condition 2.6.3.1, 2.6.3.2, 2.6.3.3, 2.6.3.4]	1) The permittee shall conduct monthly visible emissions surveys of each flare during daylight hours as follows: a) the survey shall be conducted from a location with a clear view of the emission unit and where the sun is not directly in the observer's eyes. The survey location shall be at least 15 feet but not more than 0.25 miles from the source; b) survey shall be conducted during operation; c) the observer will be educated in the general procedures for determining the presence of visible emissions (i.e. effects on the visibility of emissions caused by background contrast, position of the sun and amount of ambient lighting, and observer position relative to source and sun); d) the survey shall consist of a minimum 15-second visual observation of each emission unit to identify those emission units which exhibit visible emissions; e) in addition to the records required under condition 2.15, the observer shall record the wind direction, sky condition, sun location with respect to the source and the survey location, and the time duration of the survey. 2) The permittee shall conduct EPA Method 9 testing of an emission unit when visible emissions, other than uncombined water, are observed during a survey or are otherwise observed by the permittee. Testing shall be conducted as follows: a) testing shall be initiated as soon as possible, but not later than 24 hours after the requirement to conduct such testing is triggered; b) all testing shall be performed during periods when the subject emissions unit is operating; c) testing shall consist of certified opacity readings at 15-second intervals over a minimum period of six consecutive minutes. If a violation is documented, appropriate and timely action shall be taken (as soon as possible, but within 24 hours) to identify and correct the problem causing the opacity. The required recordkeeping shall include the name of the person recording the information, the name(s) of the person(s) taking the corrective action, and the nature, time, date, and effectiveness of any corrective action taken in response to a violation. [WAC 173-401-615(1), 8/15/01]

6.0 INAPPLICABLE REQUIREMENTS

The permittee did not request that any requirements be deemed inapplicable.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF APPROVING A NEW CONTAMINANT SOURCE FOR WASTE MANAGEMENT DISPOSAL SERVICES OF WASHINGTON INCORPORATED	)))))	**ORDER NO. 00AQCR-1000** **Second Revision**

To: **Greater Wenatchee Regional Landfill and Recycling Center**
Waste Management Disposal Services of Washington Incorporated
191 Webb Road
East Wenatchee, Washington 98802

1.0 PROJECT SUMMARY:

Waste Management Disposal Services of Washington Incorporated owns and operates the existing Greater Wenatchee Regional Landfill and Recycling Center, located at 191 Webb Road within the North ½ of Section 14, Township 22 North, Range 21 East, W.M., Douglas County, approximately four miles east of East Wenatchee.

On December 30, 1999, Waste Management Disposal Services of Washington Incorporated submitted a Notice of Construction application to the Department of Ecology regarding the installation of a final cover on a portion (Trench 1 and approximately the northeast half of North Berm) of the landfill and the installation of associated gas collection equipment and flares. On April 21, 2000, Ecology approved the application under Order No. 00AQCR-1000.

On July 25, 2000, and June 28, 2001, the permittee requested amendments to the Order conditions addressing the landfill gas (LFG) collection and control system and the subsurface methane monitoring. In response to these requests, Ecology revised the number of flares allowed by replacing the number of open flares allowed with LFG flow limits, until January 31, 2002, when an active LFG collection system and single enclosed LFG control system were required to be installed and operated. Additionally, Ecology deleted previously required landfill gas monitoring probe requirements.

On December 14, 2004, February 24, 2005, and May 20, 2005, Waste Management applied to increase their landfill gas flaring capacity, stated that they are nearing their flaring limit of 500 scfm. Ecology proposes to grant this request provided that all flaring capacity is achieved through the use of enclosed flares meeting Best Available Control Technology as specified herein. As this proposed decision addresses facility-wide landfill gas collection and control requirements, the Proposed Decision is no longer specific to the final cover of Trench 1 and the northeast half of North Berm. All requirements apply facility-wide. All proposed revisions are indicated herein in strikeout / underline format.

In relation to the above, the Department of Ecology, State of Washington, pursuant to RCW 70.94.152, makes the following determinations:

1.1 The proposed project, if constructed and operated as herein required, will be in accordance with applicable rules and regulations, as set forth in Chapter 173-400 WAC and 173-460 WAC, and the operation thereof, at the location proposed, will not result in ambient air quality standards being exceeded.

1.2 The proposed project, if constructed and operated as herein required, will provide all known, available and reasonable methods of emission control (best available control technology.)

THEREFORE, IT IS ORDERED that the project as described in said Notice of Construction and more specifically detailed in plans, specifications and other information submitted to the Department of Ecology in reference thereto, is approved for construction, installation and operation, provided the following conditions are met:

2.0 APPROVAL CONDITIONS

2.1 LAWS AND REGULATIONS

The proposed project shall comply with all current state laws and regulations, including Revised Code of Washington (RCW) 70.94, 1998, Washington Clean Air Act; WAC 173-400, General Regulations for Air Pollution Sources, October 23, 1998; and WAC 173-460, New Sources of Toxic Air Pollutants, June 3, 1998. The project also shall comply with Title 40 Part 60 Code of Federal Regulations Subpart WWW Standards of Performance for Municipal Solid Waste Landfills.

2.2 EMISSIONS

Maximum estimated potential facility-wide landfill gas related emissions, including those from the flare(s):

Pollutant	Fugitive	Flare	Total	
Carbon Monoxide (CO)		26.50	26.50	tons per year
Nitrogen Oxides (NO_X)		15.90	15.90	tons per year
Sulfur Dioxide (SO_2)		2.915	2.915	tons per year
Total Suspended Particulate		4.459	4.459	tons per year
PM_{10}		4.459	4.459	tons per year
Non-Methane Organic Compounds (NMOC)	23.32	0.1749	24.02	tons per year
Toxic Air Pollutants (TAPs)				
Acetone	293.1	2.198	301.8	pounds per year
Acrylonitrile	75.11	0.5644	77.37	pounds per year
Benzene	193.9	1.455	199.7	pounds per year
Butane	110.1	0.8257	113.4	pounds per year

Pollutant	Fugitive	Flare	Total	
Carbon disulfide	9.875	0.07406	10.18	pounds per year
Carbon Tetrachloride	0.1377	0.001033	0.1418	pounds per year
Carbonyl sulfide	6.583	0.04937	6.780	pounds per year
Chlorobenzene	6.293	0.04720	6.482	pounds per year
Chlorodifluoromethane	19.62	0.1472	20.21	pounds per year
Chloroethane	18.04	0.1353	18.58	pounds per year
Chloroform	801.0	6.008	825.0	pounds per year
1,2-Dichlorobenzene	6.904	0.05178	7.111	pounds per year
1,4-Dichlorobenzene	2.167	0.01625	2.232	pounds per year
Dichlorodifluoromethane	424.5	3.1838	437.3	pounds per year
1,1-Dichloroethane	52.00	0.3900	53.6	pound per year
1,1-Dichloroethene	4.336	0.03252	4.47	pounds per year
1,2-Dichloroethane	9.074	0.06805	9.35	pound per year
1,2-Dichloroethene	61.57	0.4618	63.42	pounds per year
Dichlorofluoromethane	60.30	0.4523	62.11	pounds per year
Dichlorotetrafluoroethane	11.28	0.08457	11.62	pounds per year
Ethanol	280.3	2.103	288.7	pounds per year
Ethylbenzene	109.5	0.8208	112.8	pounds per year
Ethylene Dibromide	0.04202	0.0003152	0.0433	pounds per year
Ethyl Mercaptan	31.68	0.2376	32.63	pounds per year
Hexane	126.6	0.9495	130.4	pounds per year
Hydrogen sulfide	270.6	2.030	278.7	pounds per year
Mercury	0.01310	0.03930	0.05240	pounds per year
Methyl chloride	13.67	0.1025	14.08	pounds per year
Methylene chloride	271.7	2.038	279.8	pounds per year
Methyl ethyl ketone	114.4	0.8574	117.8	pounds per year
Methyl isobutyl ketone	41.89	0.3142	43.15	pounds per year
Methyl mercaptan	26.79	0.2009	27.59	pounds per year
Pentane	53.09	0.3982	54.68	pounds per year
2-Propanol	673.5	5.051	693.7	pounds per year
Propylene dichloride	4.548	0.03411	4.685	pounds per year
Styrene	4.309	0.03232	4.438	pounds per year
1,1,2,2-Tetrachloroethane	41.67	0.3125	43.0	pounds per year
Tetrachloroethene	138.4	1.038	142.5	pounds per year
Toluene	3400	25.50	3502	pounds per year
1,1,1-Trichloroethane	14.33	0.1075	14.8	pounds per year
Trichloroethene	82.87	0.6215	85.35	pounds per year
Trichlorofluoromethane	23.35	0.1752	24.05	pounds per year
Trimethyl Benzene	25.95	0.1946	26.73	pounds per year
Vinyl chloride	102.6	0.7594	105.7	pounds per year
Xylenes	287.3	2.155	295.9	pounds per year

2.3 BACT

As required by WAC 173-400-113(2), this project shall use Best Available Control Technology (BACT) to control emissions of carbon monoxide, nitrogen oxides, sulfur dioxide, volatile organic compounds, and particulate matter. The following is considered BACT:

2.3.1 Particulate Matter – Particulate matter emissions shall be controlled by proper operation and maintenance as described in the Operations and Maintenance Manual and the Fugitive Dust Control Plan required under Conditions 2.9 and 2.10 below. LFG shall be treated by a knockout vessel prior to being combusted in the enclosed flare.

2.3.2 Carbon Monoxide – CO emissions shall be controlled by flare design and proper operation and maintenance as described in the Operations and Maintenance Manual required under Condition 2.9 below. Enclosed flare CO emissions not to exceed 0.1 pounds per million British thermal units (lb/MMBtu).

2.3.3 Nitrogen Oxides – NO_X emissions shall be controlled by flare design and proper operation and maintenance as described in the Operations and Maintenance Manual required under Condition 2.9 below. Enclosed flare NO_X emissions not to exceed 0.06 lb/MMBtu.

2.3.4 Volatile Organic Compounds – VOC emissions shall be controlled by continuous operation of an active gas collection system designed in accordance with the requirements of Title 40 Part 60 Code of Federal Regulations, Subpart WWW, with the landfill gas routed to an enclosed flare(s). The enclosed flare(s) shall be operated at a temperature not lower than 1500 degrees Fahrenheit with a retention time of at least 0.6 seconds and a NMOC destruction efficiency of at least 99 percent.

2.3.5 Sulfur Dioxide – SO_2 emissions vary according to the sulfur content of the landfill gas and are essentially uncontrolled by this project. Enclosed flare SO_2 emissions not to exceed 0.011 lb/MMBtu.

2.4 T-BACT

This project is required by WAC 173-460-040(4)(b), June 3, 1998, to use Best Available Control Technology for Toxics (T-BACT). The following technologies and procedures shall be used to attain T-BACT.

2.4.1 Hydrogen Sulfide (H_2S) and other sulfur compounds: Enclosed flare(s) shall be utilized to combust LFG. H_2S and other sulfur compounds shall undergo 99 percent conversion to SO_2.

2.4.2 Organic TAPs: Enclosed flare(s) shall be utilized to combust LFG. Flare(s) shall be operated at a temperature not lower than 1500 degrees Fahrenheit with a retention time of at least 0.6 seconds and a control efficiency of at least 99 percent.

2.5 EMISSION LIMITS

2.5.1 Fugitive dust emissions during construction and operation shall not exceed 10 percent opacity, averaged over a 6-minute time period.

2.5.2 No visible emissions from the flare(s).

2.5.3 CO emissions not to exceed 0.1 lb/MMBtu.

2.5.4 NO_X emissions not to exceed 0.06 lb/MMBtu.

2.5.5 SO_2 emissions not to exceed 0.011 lb/MMBtu.

2.5.6 The enclosed flare(s) shall be operated at a temperature not lower than 1500 degrees Fahrenheit, with a retention time of at least 0.6 seconds, and a destruction efficiency of at least 99 percent for NMOC, sulfur compounds, and organic TAPs.

2.5.7 Capacity of flare(s) shall not exceed 2000 scfm and 60.5 MMBtu/hr.

2.6 TESTING

2.6.1 Surface concentrations of methane shall be monitored along the entire perimeter of the final cover area and along a pattern that traverses the landfill cover at 100 foot intervals (or a site-specific spacing proposed by the permittee in writing and approved by Ecology in writing in advance of testing) on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the following specifications:

2.6.1.1 The portable analyzer shall meet the instrument specifications provided in section 3 of Method 21 of Appendix A, Title 40 Part 60 Code of Federal Regulations, except that "methane" shall replace all references to VOC.

2.6.1.2 The calibration gas shall be methane, diluted to a nominal concentration of 500 parts per million in air.

2.6.1.3 To meet the performance evaluation requirements in section 3.1.3 of Method 21 of Appendix A, Title 40 Part 60 Code of Federal Regulations, the instrument evaluation procedures of section 4.4 of Method 21 of Appendix A, Title 40 Part 60 Code of Federal Regulations shall be used.