

**EMISSION SURVEY
MONITORING REPORT
(November 2008 Survey)**

**Prepared for
B.C. Ministry of Agriculture
(Rodear Meats)
Abbotsford, B.C.**

**Prepared by
A. LANFRANCO & ASSOCIATES INC.
Surrey, B.C.**

November 2008

TABLE OF CONTENTS

	Page
SUMMARY	i
1.0 INTRODUCTION	1
2.0 PROCESS DESCRIPTION	2
3.0 METHODOLOGY	3
3.1 Sampling Techniques	3
3.2 Analytical Techniques	4
3.3 Quality Assurance/Quality Control (QA/QC)	5
4.0 RESULTS	6
5.0 DISCUSSION	9

APPENDICES

Appendix 1 - Computer Outputs of Measured and
Calculated Data

Appendix 2 – Analytical Data

Appendix 3 - Field Data Sheets

Appendix 4 - Calibration Data

SUMMARY

The averaged results of duplicate emission tests for HCl, SO₂, nitrogen oxides, CO, total hydrocarbons, flowrates, and particulate from the Incinerator at Rodear Meats on November 12, 2008 are as follows:

PARAMETER	Incinerator Results	
	Run 1	Run 2
Particulate (mg/Sm ³)	276	178
Particulate (mg/Sm ³ at 11 % O ₂)	135	137
Particulate (kg/hr)	0.2	0.1
HCl (mg/Sm ³ @ 11% O ₂)	3.5	0.7
SO _x (mg/Sm ³ @ 11% O ₂)	145	44.5
NO _x as NO ₂ (mg/Sm ³ @ 11% O ₂)	284	119
THC (mg/Sm ³ @ 11% O ₂)	89.7*	0.7
CO (mg/Sm ³ @ 11% O ₂)	646*	43.4
Opacity (%)	<5	<5
Flowrate (Sm ³ /min)	15.0	13.9
Stack Temperature (°C)	949	781
O ₂ (vol % dry)	2.2	8.5
CO ₂ (vol % dry)	14.8	9.8

* Emission result for THC and CO during test 1 went periodically off-scale, therefore, average numbers for test one are not considered representative.

All results are at standard conditions of 25°C and 101.3 KPa (dry).

1.0 INTRODUCTION

B.C. Ministry of Agriculture of Abbotsford, B.C. retained A. Lanfranco and Associates Inc. of Surrey, B.C., to conduct an emission survey on the exhaust of an animal waste combustor unit located at Rodear Meats near Williams Lake, B.C.

The purpose of the survey was to measure and report emission parameters from the stack associated with the animal waste incinerator. The testing was conducted to provide emission information in support or in anticipation of a MOE emission permit application. The data was also gathered to compare to the incinerator manufacturer's performance specifications guarantee.

This report documents the methods used and results found for duplicate emission tests conducted on the incinerator on November 12, 2008.

2.0 PROCESS DESCRIPTION

The Incinerator unit monitored in this survey utilized diesel as the primary combustion fuel. The incinerator off gases were passed through a diesel fired secondary combustion unit prior to exhaust to the atmosphere via a 12 inch diameter smokestack.

3.0 METHODOLOGY

The sampling and analytical methods used throughout this survey conform, in principle to the procedures outlined in the B.C. "Source Testing Code for the Measurement of Emissions of Particulates from Stationery Sources" 1982 Edition, and the B.C. air analytical manual, or EPA Reference Methods (RM). One modification to the test procedures was to measure HCl from a portion (10.0 ml) of the impinger solution prior to condensable organics analysis.

3.1 Sampling Techniques

The incinerator stack test ports were about six diameters downstream and greater than two diameters upstream of the nearest disturbances. From this criteria, a 16 point sampling regime was calculated. (Fig. A). The 16 points were sampled for four minutes (test 2) each. Test one was sampled for a total of 60 minutes from five points only, resulting in final sample volumes of about 0.7 to 1.4 Sm³.

The contaminants investigated during this survey were collected with two independent sampling systems as follows:

Train 1 – Particulate/Condensable Organics/HCl

Sampling of particulate and condensable organics (EPA Method 5/202) from the incinerator stack was conducted using Napp (now Baldwin) sampling trains equipped with heated filter assemblies and a three foot quartz probe and nozzle. (Fig. 1). The impinger sections of the sampling trains were charged with D.I. water for moisture and condensable organics collection. Cyclones were not used as part of the sampling apparatus.

All tests were conducted using 3 – 100 ml portions of deionized water in the impingers as required by EPA 202. The EPA 202 optional back filter was not used for this test program.

CEM System for NO_x, THC, SO₂, CO, CO₂ and O₂

Continuous emission monitoring (CEM) was conducted for NO_x/THC/SO₂/O₂/CO₂/CO using A. Lanfranco and Associates Inc. CEM monitoring mobile laboratory. This unit is a trailer outfitted with the following instrumentation:

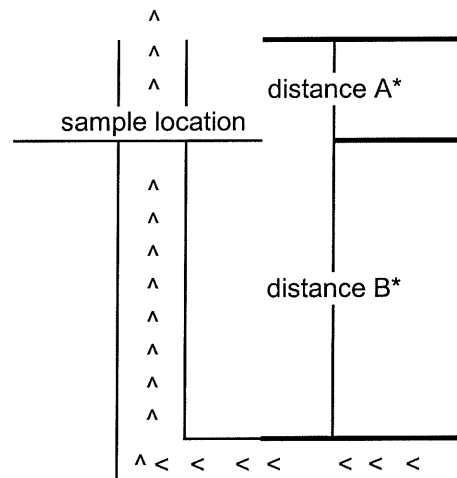
Figure - A Location of Traverse Points in Circular Stacks

(inches from inside wall to traverse point)

Client Stack I.D.: Rodear Meats

Diameter (inches)	12	
Total Points	16	Diameters Upstream: < 2
# of Ports Used	2	
Points / Traverse	8	Diameters Downstream: 6

Point	Distance from Wall
1	0.4
2	1.3
3	2.3
4	3.9
5	8.1
6	9.7
7	10.7
8	11.6



* distance A : duct diameters upstream from flow disturbance
 * distance B : duct diameters downstream from flow disturbance
 < < < < : flow direction

Figure 2a Location of Traverse Points in Circular Stacks

(percent of diameter from inside wall to traverse point)

Traverse Point Number on a Diameter	Number of Traverse Points on a Diameter					
	2	4	6	8	10	12
1	14.6%	6.7%	4.4%	3.2%	2.6%	2.1%
2	85.4%	25.0%	14.6%	10.5%	8.2%	6.7%
3		75.0%	29.6%	19.4%	14.6%	11.8%
4		93.3%	70.4%	32.3%	22.6%	17.7%
5			85.4%	67.7%	34.2%	25.0%
6			95.6%	80.6%	65.8%	35.6%
7				89.5%	77.4%	64.4%
8				96.8%	85.4%	75.0%
9					91.8%	82.3%
10					97.4%	88.2%
11						93.3%
12						97.9%

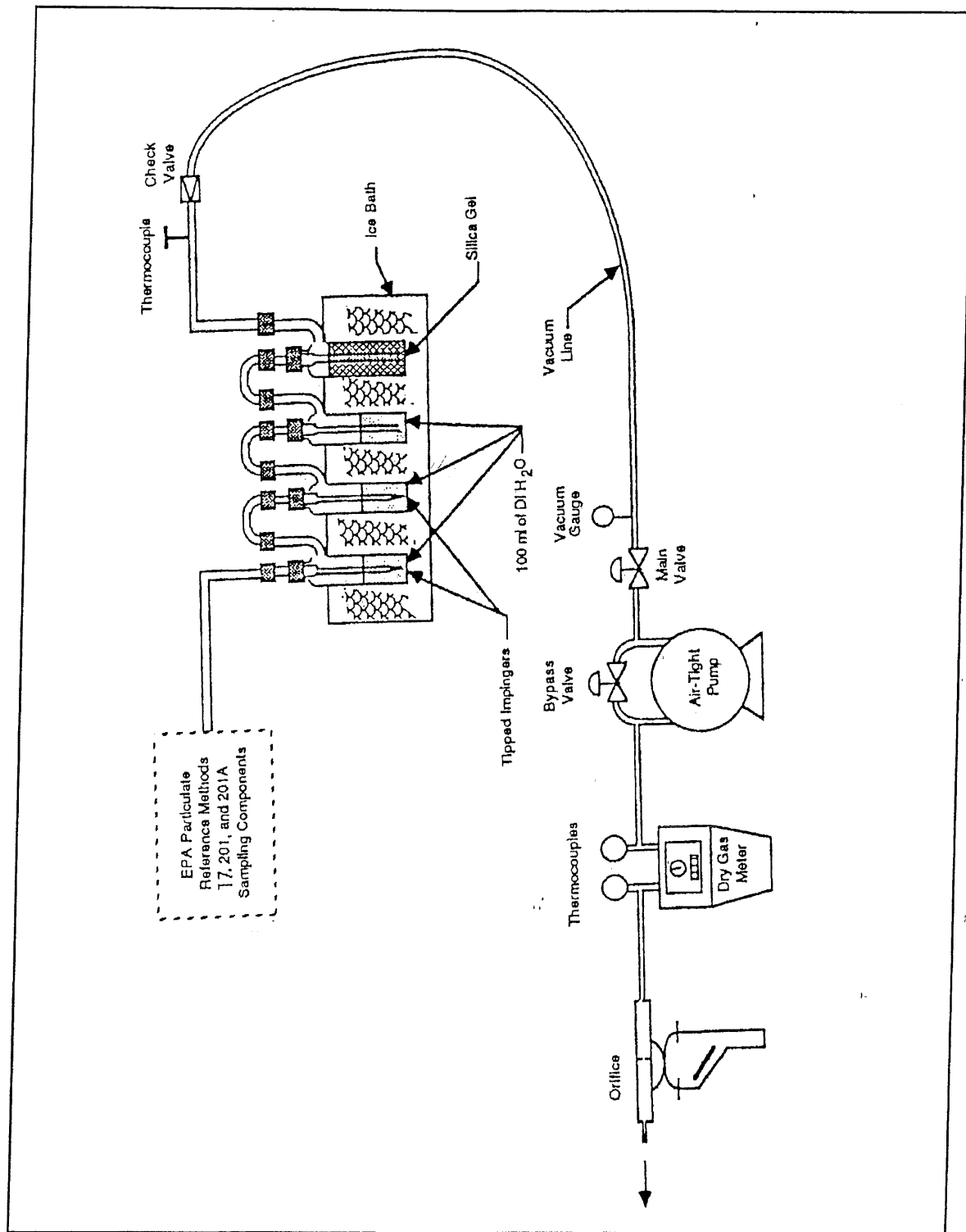


Figure 1: Method 5/202 Sampling Train

NO _x	API Chemiluminescence Monitor, Model 252 for NO/NO ₂ /NO _x with ranges from 0 to 2000 ppm
SO ₂	Western Research Model 900 Nondispersive UV Monitor with a range of 0 – 5000 ppm programmable
CO/CO ₂ /O ₂	California Analytical Model 300 Infrared Analyzer with ranges 0 to 2000 ppm CO, and 0 to 40% CO ₂ , and 0 to 25% O ₂
THC	California Analytical Model 300, Hot FID Analyzer with ranges 0 to 100000 ppm as methane.

A diagram of the sampling, conditioning and analyzer system is provided in Figure 2. With this system the stack gas sample is withdrawn from the source through a coarse filter and stainless steel probe with associated pumps, filters and water removal components.

Prior to compliance testing and between each test all measuring instrumentation was calibrated with Protocol 1 and NIST Traceable, 1% certified calibration gas standards.

Calibration gas certificates are appended.

Opacity

Visual opacity readings were conducted manually with EPA Method 9.

3.2 Analytical Techniques

Sample clean-up of the probe and front half glassware from the particulate trains was conducted with sequential rinses of deionized H₂O and acetone. Impingers 1 to 3 were measured from each test for moisture determination and were saved for oil and grease analysis by Bodycote Laboratories in Surrey, B.C. The impingers were rinsed using DCM (dichloromethane) and de-ionized water to recover any oily residues from the impinger walls.

The particulate sampling filter was removed from the filter holder (after cooling) with tweezers and placed in a labelled petri dish for transportation to the laboratory. Any filter material adhering to the silicone gasket was removed and added to the filter.

Gravimetric analysis of the particulate samples was conducted by A. Lanfranco and Associates Inc. at their Surrey laboratory. Following 105°C drying and desiccation, the filters and probe washings particulate were determined by the difference in initial and final weights, adjusted for blank values.

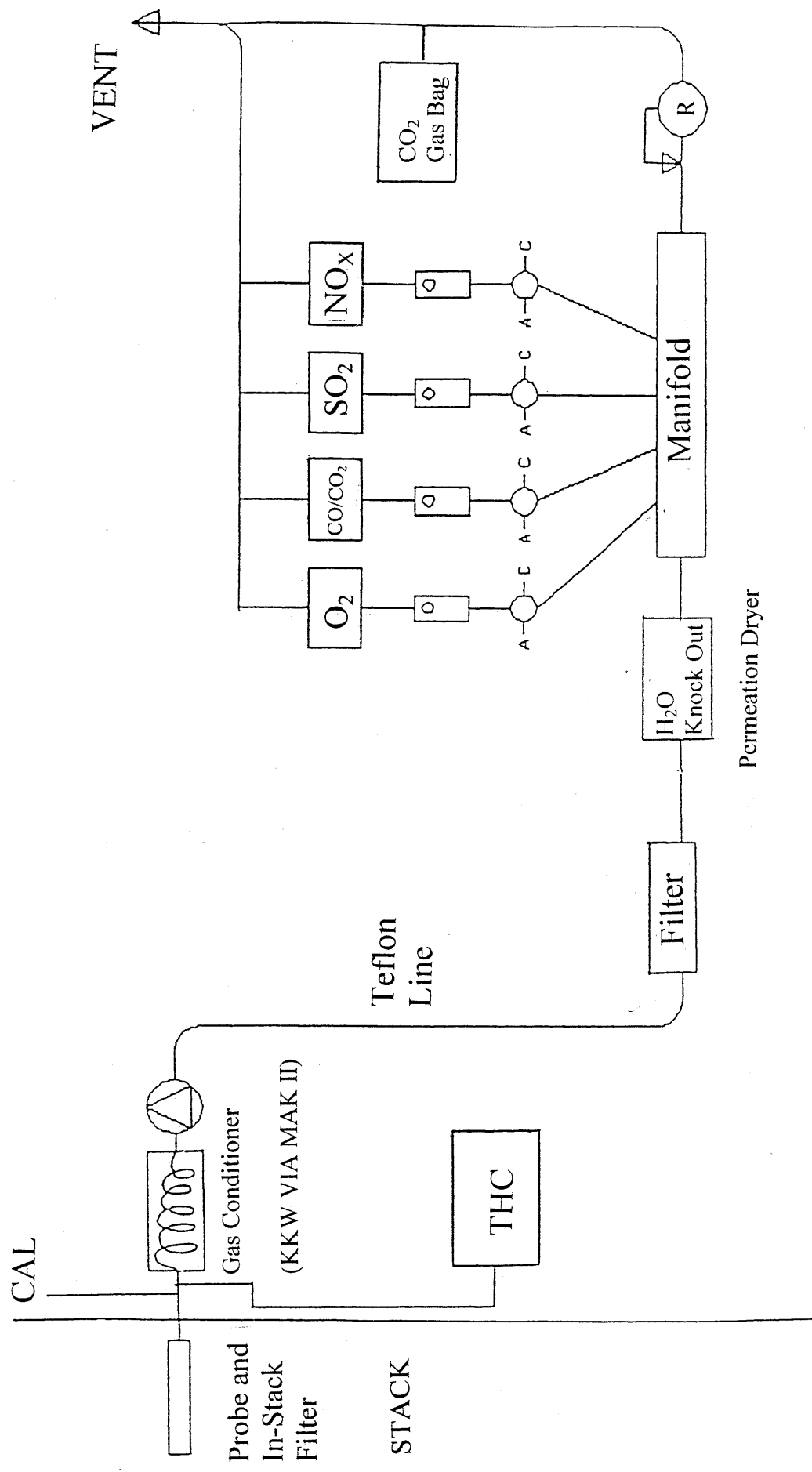


Figure 2

CONTINUOUS GAS SCHEMATIC

Analysis of gaseous components was done on-site by the continuous analyzer system. Additionally, combustion gas analysis for O₂ and CO₂ was conducted on site by grab sample Fyrite analysis.

3.3 Quality Assurance / Quality Control (QA/QC)

QA/QC of this survey was accomplished by the following mechanisms.

1. Pre and Post test leak checks.
2. Use of EPA Protocol calibration gases
3. Calibration of volume measuring and monitoring instrumentation.
4. Analysis of all blank solutions and filters
5. Calibration of CEM system to EPA/EC specifications

CEM Calibration Sequences

All calibrations for the survey were conducted by challenging the analyzers with calibration gas introduced at the probe end of the system. This provided a QA/QC check on system bias and showed the integrity of the overall sampling/conditioning system. The initial and between test calibrations consisted of a check of zero and span drift, followed by calibration with a zero gas and at least two span gases. Span gases utilized were selected as those which most closely approximated the anticipated pollutant/diluent concentrations.

Calibration gas mixtures used were:

Cylinder No.	NO _x (ppm)	CO (ppm)	SO ₂ ppm	O ₂ (Vol %)	THC ppm as methane
Zero Gas	0	0	0	0	0
No. 1 Gas	51.5	51.4	41.8	-	-
No. 3 Gas	229	434	440	-	-
No. 4 Gas	453	898	924	-	-
Ambient Air	-	-	-	20.9	-
Low O ₂ Span	0	0	-	11.00	-
High Methane	-	-	-	-	468
Mid Methane	-	-	-	-	92.1
Low Methane	-	-	-	-	40.3

4.0 RESULTS

The results of the particulate and stack parameters were calculated using a computer program consistent with reporting requirements of the GVRD and MOE. The computer outputs were checked by hand calculation. Some of the computer output results were converted by hand calculations to appropriate units for presentation in Tables 1 to 3.

In the following table, particulate and flowrate are shown in actual, standard or corrected standard terms. The "std" particulate results are mg/m^3 at standard conditions of 25°C and 101.3 KPa (dry) while the "corrected" results are "std" corrected to 11% O_2 by the formula

$$\frac{9.9}{20.9 - \% \text{O}_2}$$

The "actual" flowrate results are volumetric flowrate at stack conditions while the standard flowrates are flowrates corrected to 25°C and 101.3 KPa (dry).

Point by point isokinetic rates are presented in Appendix 1.

Detailed test results are presented in Tables 1, 2 and 3. Supporting data is presented in the Appendices.

Cyclonic flow was checked for and was not present in the stack and all points were sampled isokinetically (100+/- 10%).

TABLE 1 INCINERATOR EMISSIONS RESULTS

Parameter		Test 1	Test 2	Average
Test Date		Nov. 12, 2008	Nov.12/08	
Test Time		09:58 - 10:58	14:08 - 15:18	
Duration	(minutes)	60	64	62
Total Particulate	(mg/Sm ³)	276	178	227
Total Particulate	(mg/Sm ³ @ 11% O ₂)	135	137	136
Condensible Organics	(mg/Sm ³)	21.7	5.9	13.8
Particulate	(Kg/hr)	0.2	0.1	0.2
Opacity	(%)	<5	<5	<5
Flowrate	(Sm ³ /min)	15.0	13.9	14.5
Flowrate	(Am ³ /min)	88.9	66.1	77.5
Temperature	(oC)	949	781	865
O ₂	(vol % dry)	2.2	8.5	5.3
CO ₂	(vol % dry)	14.76	9.78	12.27
H ₂ O	(vol %)	23.5	17.7	20.6
Isokinetic Variation	(%)	88.1	92.5	90.3

standard conditions of 25 deg C and 101.3kPa

TABLE 2 GRAVIMETRIC RESULTS

Test	Filter Particulate (mg)	Probe and Washings Particulate (mg)	Condensable Particulate (mg)	Total Particulate (mg)
1	101.3	74.6	15.0	190.9
2	118.2	114.8	8.0	241.0

TABLE 3 INCINERATER STACK GASEOUS EMISSIONS November 12, 2008

Parameter		Test 1	Test 2	Average
CEM Test Time		10:30 - 11:30	14:20 - 15:20	
Test Duration	(min)	60	60	60
Nitrogen Oxides as NO ₂	(mg/Sm ³ @ 11% O ₂)	284	119	202
Total Hydrocarbons as CH ₄	(mg/Sm ³ @ 11% O ₂)	89.7	0.7	45.2
Sulphur Dioxide (SO ₂)	(mg/Sm ³ @ 11% O ₂)	145	44.5	95.0
HCl	(mg/Sm ³ @ 11% O ₂)	3.5	0.7	2.1
Carbon Monoxide (CO)	(mg/Sm ³ @ 11% O ₂)	646	43.4	345

5.0 DISCUSSION

The emission tests conducted on the Rodear Meats incinerator were conducted under two different load and operating conditions. The initial operation (Test 1) had a charge load of approximately 500 kg while the second charge was approximately 285 kg.

Particulate matter found in Test 1 was black, and appeared to be unburnt carbon which caused plugging off of the filter and, thereby, affecting the ability of the technician to maintain isokinetic sampling. Test 2 particulate matter was “off white” suggesting better combustion efficiency. Gaseous analysis during test 2 supports this suggestion.

In addition, the SO_x content of the emissions during Test 1 were higher than expected and, were probably contributed by either diesel sulphur content or sulphur compounds inherit in slaughterhouse waste.

THC and CO for test 1 were extremely high at times and would, in all likelihood, not be in compliance with provincial standards.

Normal variation between test results was found, particularly in view of the fact that the unit did not appear to run under a “stable” condition during the test period.

Although the reported opacity was <5% (six minute observations), there was a period during Test 1 where opacity would have increased to 20% or greater for a brief period.

Some difficulty with the CEM system was observed during Test 1 as THC and CO “spikes” were above the calibrated ranges. For test 2, all instrumentation was operated within the calibrated ranges. All tests were conducted by certified emission testing technicians using calibrated source sampling equipment.

Otherwise, there were no problems encountered in sample collection or analysis. Samples were collected isokinetically at all points (except for test 1). The test results, therefore, are considered to be an accurate representation of emission characteristics for the process conditions maintained on the test date.

APPENDIX 1

COMPUTER OUTPUTS OF MEASURED AND CALCULATED DATA

Client: Rodear Meats
Jobsite: WilliamsLake B.C.
Source: Incinerater

Date: Nov. 12, 2008
Run: 1 Part/Cond
Run Time: 09:58 - 10:58

Particulate Concentration:	254.7 mg/dscm	0.1113 gr/dscf
	43.0 mg/Acm	0.0188 gr/Acf
Front Half:	254.7 mg/dscm	
Back Half:	0.0 mg/dscm	
	134.9 mg/dscm (@ 11% O2)	0.0590 gr/dscf (@ 11% O2)
Emission Rate:	0.23 Kg/hr	0.506 lb/hr
Sample Gas Volume:	0.6907 dscm	24.391 dscf
Total Sample Time:	60.0 minutes	
Average Isokineticity:	88.1 %	
Flue Gas Characteristics		
Moisture:	23.48	
Temperature	949.1 oC	1740.4 oF
Flow	15.0 dscm/min	531 dscf/min
	0.25 dscm/sec	8.8 dscf/sec
	88.9 Acm/min	3140 Acf/min
Velocity	20.311 m/sec	66.63 f/sec
Gas Analysis	2.21 % O2	14.76 % CO2
	30.451 Mol. Wt (g/gmole) Dry	27.527 Mol. Wt (g/gmole) Wet

*** Standard Conditions:** Metric: 25 deg C, 101.325 kPa
 Imperial: 77 deg F, 29.92 in.Hg

Client: Rodear Meats
Jobsite: WilliamsLake B.C.
Source: Incinerater

Date: Nov. 12, 2008
Run: 1 Part/Cond
Run Time: 09:58 - 10:58

Control Unit (Y) 0.9935
Nozzle Diameter (in.) 0.4860
Pitot Factor 0.8306
Baro. Press. (in. Hg) 27.10
Static Press. (in. H₂O) -0.18
Stack Height (ft) 50
Stack Diameter (in.) 12.0
Stack Area (sq.ft.) 0.785
Minutes Per Reading 4.0
Minutes Per Point 4.0

Gas Analysis (Vol. %):

	CO ₂	O ₂
CEMs	14.76	2.21
Average =	<u>14.76</u>	<u>2.21</u>

Condensate Collection:

Impinger 1 (grams)	127.0
Impinger 2 (grams)	18.0
Impinger 3 (grams)	4.0
Impinger 4 (grams)	10.0

Total Gain (grams) 159.0

Collection:

Filter (grams)	0.1013
Washings (grams)	0.0746
Impinger (grams)	0.0000
Total (grams)	<u>0.1759</u>

Traverse	Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ^P (in. H ₂ O)	Orifice ^H (in. H ₂ O)	Dry Gas Temperature		Stack (oF)	Wall Dist. (in.)	Isokin. (%)
						Inlet (oF)	Outlet (oF)			
		0.0	46.910							
1	1	4.0	50.440	0.260	2.00	58	57	1556	1.8	97.6
	2	8.0	54.000	0.260	2.00	60	58	1767	5.6	103.2
	3	12.0	57.550	0.260	2.00	62	60	1689	9.9	100.7
	4	16.0	61.910	0.320	2.25	63	60	1825	14.9	114.9
	15	60.0	73.020	0.400	2.80	65	61	1865	21.0	24.0
			Average:	0.300	2.210	61.6	59.2	1740.4		88.1

Client: Rodear Meats
Jobsite: WilliamsLake B.C.
Source: WESP

Date: Nov.12/08
Run: 2 - Part/Cond
Run Time: 14:08 - 15:18

Particulate Concentration:	172.0 mg/dscm	0.0752 gr/dscf
	36.3 mg/Acm	0.0158 gr/Acf
Front Half:	172.0 mg/dscm	
Back Half:	0.0 mg/dscm	
	136.9 mg/dscm (@ 11% O2)	0.0598 gr/dscf (@ 11% O2)
Emission Rate:	0.14 Kg/hr	0.317 lb/hr
Sample Gas Volume:	1.3547 dscm	47.843 dscf
Total Sample Time:	64.0 minutes	
Average Isokineticity:	92.5 %	
Flue Gas Characteristics		
Moisture:	17.67	
Temperature	780.6 oC	1437.1 oF
Flow	13.9 dscm/min	492 dscf/min
	0.23 dscm/sec	8.2 dscf/sec
	66.1 Acm/min	2335 Acf/min
Velocity	15.103 m/sec	49.55 f/sec
Gas Analysis	8.47 % O2	9.78 % CO2
	29.903 Mol. Wt (g/gmole) Dry	27.799 Mol. Wt (g/gmole) Wet

* **Standard Conditions:** Metric: 25 deg C, 101.325 kPa
 Imperial: 77 deg F, 29.92 in.Hg

Client: Rodear Meats
Jobsite: WilliamsLake B.C.
Source: WESP

Date: Nov.12/08
Run: 2 - Part/Cond
Run Time: 14:08 - 15:18

Control Unit (Y) 0.9935
 Nozzle Diameter (in.) 0.4860
 Pitot Factor 0.8306
 Baro. Press. (in. Hg) 27.10
 Static Press. (in. H₂O) -0.18
 Stack Height (ft) 50
 Stack Diameter (in.) 12.0
 Stack Area (sq.ft.) 0.785
 Minutes Per Reading 4.0
 Minutes Per Point 4.0

Gas Analysis (Vol. %):

	CO ₂	O ₂
CEM's	9.78	8.47
Average =	<u>9.78</u>	<u>8.47</u>

Condensate Collection:

Impinger 1 (grams)	150.0
Impinger 2 (grams)	48.0
Impinger 3 (grams)	6.0
Impinger 4 (grams)	14.2

Total Gain (grams) 218.2

Collection:

Filter (grams)	0.1182
Washings (grams)	0.1148
Impinger (grams)	0.0000
Total (grams)	<u>0.2330</u>

Traverse	Point	Time (min.)	Dry Gas Meter (ft ³)	Pitot ^P (in. H ₂ O)	Orifice ^H (in. H ₂ O)	Dry Gas Temperature		Stack (oF)	Wall Dist. (in.)	Isokin. (%)
		0.0	73.280							
1	1	4.0	76.480	0.170	1.30	60	56	1330	1.8	96.1
	2	8.0	79.600	0.200	1.50	63	58	1560	5.6	91.3
	3	12.0	82.950	0.200	1.50	67	59	1421	9.9	94.2
	4	16.0	86.220	0.220	1.60	70	60	1550	14.9	90.3
	5	20.0	89.300	0.180	1.35	74	64	1552	21.0	93.3
	6	24.0	92.350	0.180	1.30	76	64	1480	29.9	90.5
	7	28.0	95.550	0.170	1.27	77	66	1346	54.1	94.0
	8	32.0	98.600	0.160	1.16	78	68	1418	63.0	93.9
		0.0	98.600							
2	1	4.0	101.950	0.200	1.45	71	66	1420	1.8	93.2
	2	8.0	105.080	0.200	1.45	75	69	1540	5.6	89.2
	3	12.0	108.440	0.200	1.45	77	70	1429	9.9	92.8
	4	16.0	111.680	0.190	1.40	78	70	1450	14.9	92.2
	5	20.0	115.340	0.220	1.65	81	71	1327	21.0	93.3
	6	24.0	118.820	0.200	1.50	83	72	1306	29.9	92.2
	7	28.0	122.020	0.200	1.40	84	72	1539	54.1	90.1
	8	32.0	125.600	0.210	1.60	84	73	1325	63.0	92.9
			Average:	0.194	1.430	74.9	66.1	1437.1		92.5

DRY GAS METER

[illegible]

A. Lanfranco and Associates Inc.
METLab CEM Report

Client: Rodear Meats
Source: Incinerator
Run: 1

Moisture % =
 23.48

O2 Correction

11

Year: 2008
Date:

Time

		O2 (Vol. %)	CO2 (Vol. %)	CO (ppm)	THC (ppm as CH4)	SO2 (ppm)	NOx (ppm)
12-Nov	1030	2.73	14.61	656.2	60.0	39.5	126.9
12-Nov	1031	2.78	14.36	700.8	60.4	46.5	125.9
12-Nov	1032	2.80	14.29	568.6	36.6	58.3	294.4
12-Nov	1033	3.08	14.09	363.4	25.8	84.9	284.4
12-Nov	1034	2.83	14.31	397.5	32.8	104.3	272.7
12-Nov	1035	2.49	14.57	625.6	77.6	118.8	279.4
12-Nov	1036	2.23	14.77	732.1	83.5	127.6	289.7
12-Nov	1037	2.28	14.74	672.1	75.8	127.8	291.0
12-Nov	1038	1.73	15.12	1597.0	287.4	144.8	294.7
12-Nov	1039	1.80	15.07	1380.8	231.4	165.0	321.8
12-Nov	1040	1.82	15.07	1209.2	171.8	153.2	320.2
12-Nov	1041	1.63	15.22	1492.5	255.8	157.5	319.5
12-Nov	1042	1.45	15.33	1873.2	417.6	166.9	318.8
12-Nov	1043	1.34	15.40	1955.4	364.6	170.0	319.9
12-Nov	1044	1.19	15.49	2289.4	454.5	174.1	322.3
12-Nov	1045	1.07	15.56	2454.9	499.9	170.0	324.9
12-Nov	1046	1.08	15.56	2451.8	475.4	170.1	328.7
12-Nov	1047	1.85	15.03	856.9	87.5	129.7	327.7
12-Nov	1048	1.94	14.98	713.8	90.2	116.9	315.1
12-Nov	1049	1.73	15.14	1022.4	121.8	131.2	314.8
12-Nov	1050	1.45	15.33	1556.4	220.6	153.0	318.5
12-Nov	1051	1.80	15.07	628.6	70.7	124.8	332.0
12-Nov	1052	1.34	15.41	1241.7	137.0	154.8	334.1
12-Nov	1053	1.22	15.48	1380.8	146.9	171.9	334.3
12-Nov	1054	1.19	15.48	1577.7	187.8	170.1	335.4
12-Nov	1055	0.64	15.78	2634.6	616.8	240.8	343.3
12-Nov	1056	0.22	15.94	2687.3	1215.5	420.7	361.3
12-Nov	1057	0.14	16.00	2687.3	1003.8	342.0	316.8
12-Nov	1058	0.13	16.01	2687.3	1026.6	169.7	243.9
12-Nov	1059	0.14	15.94	2687.3	1046.3	102.8	178.0
12-Nov	1100	0.15	15.79	2687.3	895.8	52.2	104.4
12-Nov	1101	0.68	15.46	2556.4	392.9	34.5	64.5
12-Nov	1102	1.82	15.02	1956.4	78.0	21.3	235.4
12-Nov	1103	2.24	14.81	1337.1	87.6	14.3	263.0
12-Nov	1104	2.33	14.76	1239.7	103.9	10.6	249.8
12-Nov	1105	2.13	14.90	1412.3	112.6	8.6	247.2
12-Nov	1106	1.89	15.07	1909.7	142.2	7.3	247.5
12-Nov	1107	1.76	15.15	2111.7	145.5	6.7	259.3
12-Nov	1108	3.15	14.15	421.6	83.4	6.2	265.4
12-Nov	1109	3.56	13.83	157.4	55.8	5.9	278.2
12-Nov	1110	3.58	13.82	158.5	30.1	5.6	275.9
12-Nov	1111	3.59	13.82	156.6	26.1	6.7	276.8
12-Nov	1112	3.53	13.88	153.1	17.7	21.1	278.8
12-Nov	1113	3.61	13.81	146.8	13.1	41.0	281.8
12-Nov	1114	3.68	13.75	140.8	10.8	46.7	283.9
12-Nov	1115	3.62	13.80	143.8	8.4	52.7	285.7
12-Nov	1116	3.42	13.95	169.2	8.4	60.6	287.2
12-Nov	1117	3.33	14.01	167.0	7.9	66.0	289.5
12-Nov	1118	3.22	14.10	211.6	7.7	72.0	292.7
12-Nov	1119	3.15	14.16	236.0	9.9	73.3	295.7
12-Nov	1120	2.85	14.41	320.3	9.9	82.5	298.3
12-Nov	1121	2.66	14.55	489.7	8.9	99.9	300.3
12-Nov	1122	2.81	14.43	260.4	5.4	104.9	312.6
12-Nov	1123	2.83	14.40	252.5	3.6	111.9	320.2
12-Nov	1124	2.98	14.29	256.4	0.8	111.5	321.1
12-Nov	1125	3.18	14.13	212.3	-0.5	111.4	321.2
12-Nov	1126	3.11	14.17	213.0	0.5	115.7	322.2
12-Nov	1127	3.10	14.18	216.6	-1.1	119.7	322.5
12-Nov	1128	3.18	14.12	219.3	-1.1	109.3	323.3
12-Nov	1129	3.49	13.87	189.9	-0.9	100.9	323.5
Average		2.2	14.76	1064.8	197.4	104.81	285.3
Minimum		0.1	13.75	140.8	-1.1	5.60	64.5
Maximum		3.7	16.01	2687.3	1215.5	420.70	361.3

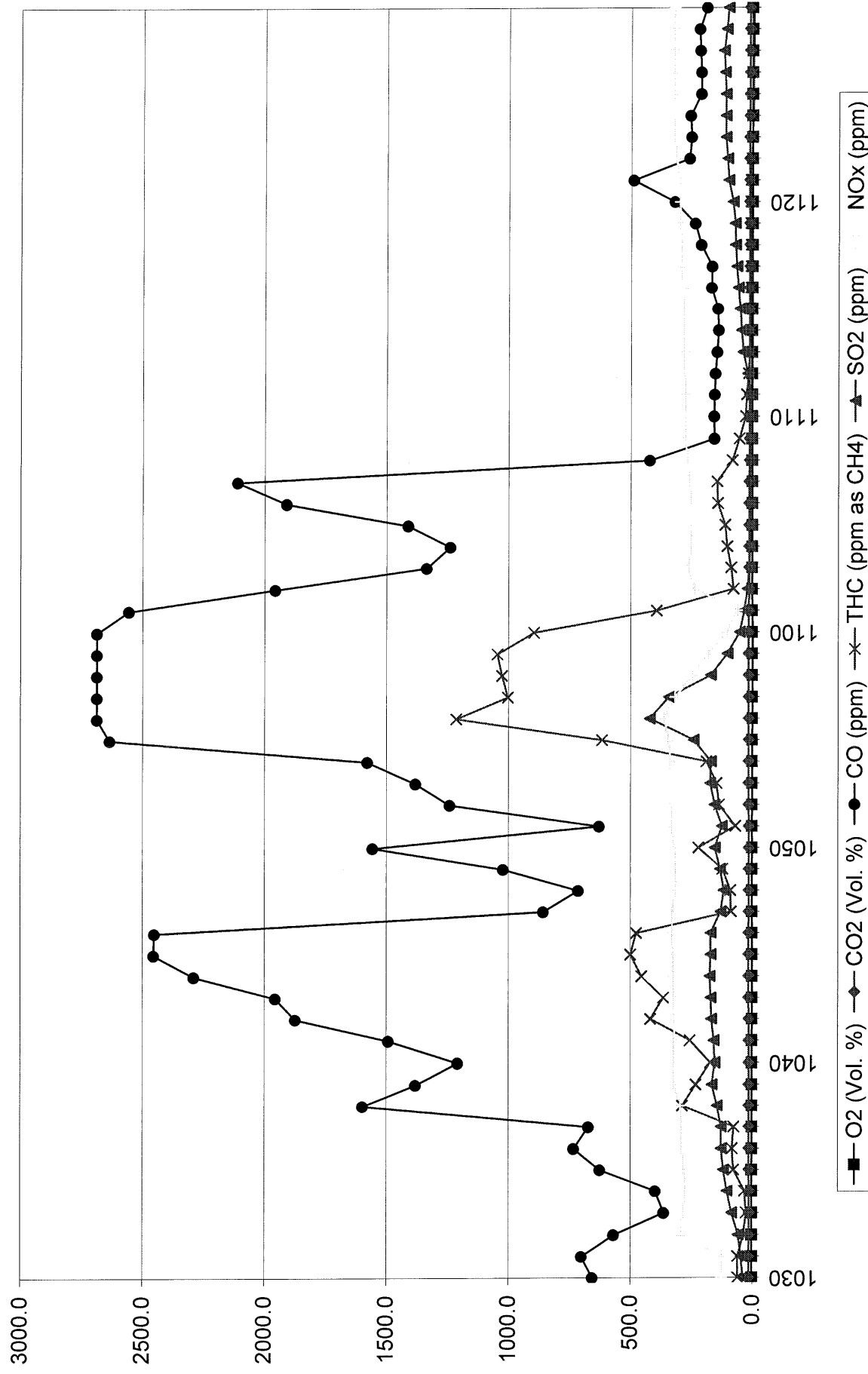
Mass Concentration (mg/m3 dry)	n/a	n/a	1219.8	169.3	274.6	536.8
Mass Concentration (mg/m3 dry) Corrected to 11% O2			646.2	89.7	145.5	284.4

Calibration Summary	O2	CO2	CO	THC	SO2	NOx
Gas (Cert. Value)	11.00	15.52	434.0	92.1	440.0	229.0
Initial Gas Check	10.98	15.40	433.6	92.3	438.1	219.2
Final Gas Check	11.00	15.40	433.2	86.7	419.2	224.6
Initial Zero Drift	0.02	0.11	6.0	0.5	2.21	-6.5
Final Zero Drift	0.03	0.09	5.8	1.0	0.35	-3.6

Incinerator Stack - Run 1 (November 12, 2008)

Rodear Meats

METLab CEM Results



A. Lanfranco and Associates Inc.
METLab CEM Report

Client: Rodear Meats
Source: Incinerator
Run: 2

Moisture % =
 17.67

O2 Correction 11
Year: 2008
Date:

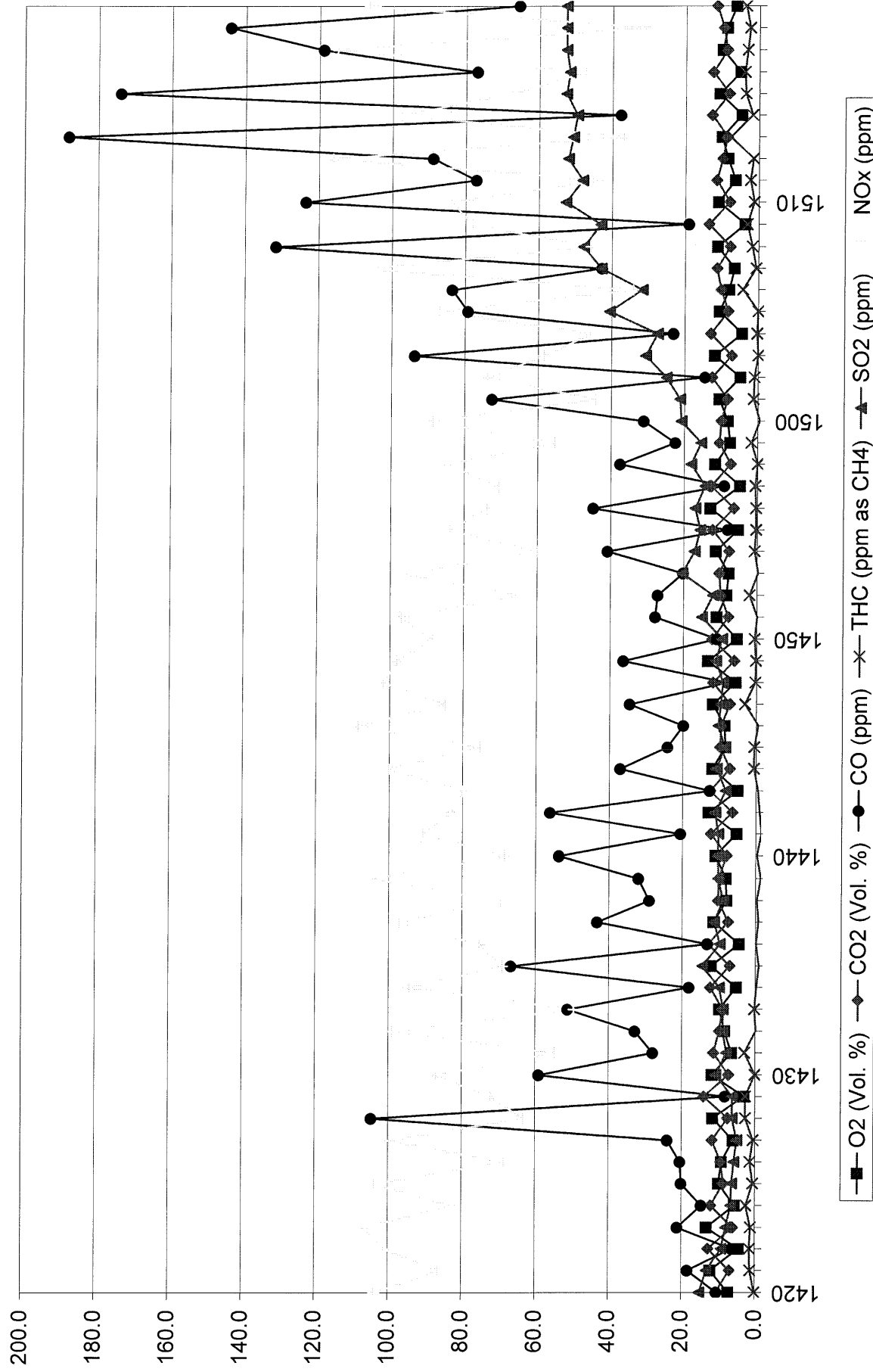
		O2 (Vol. %)	CO2 (Vol. %)	CO (ppm)	THC (ppm as CH4)	SO2 (ppm)	NOx (ppm)
12-Nov	1420	7.27	10.55	10.4	0.1	15.1	103.7
12-Nov	1421	12.15	6.93	18.3	1.3	13.1	86.2
12-Nov	1422	4.45	12.73	6.3	1.4	9.1	100.8
12-Nov	1423	13.20	6.05	21.1	1.2	7.9	106.5
12-Nov	1424	5.51	12.04	14.6	2.5	6.5	83.0
12-Nov	1425	9.88	8.61	20.0	0.6	6.3	103.7
12-Nov	1426	9.08	9.29	20.4	1.4	5.7	68.7
12-Nov	1427	5.92	11.68	23.9	0.5	5.0	99.6
12-Nov	1428	11.57	7.45	104.6	2.6	6.3	63.4
12-Nov	1429	3.02	13.99	8.2	2.6	6.2	72.1
12-Nov	1430	11.73	7.28	59.0	0.1	10.7	87.1
12-Nov	1431	6.49	11.35	27.9	2.9	7.9	54.7
12-Nov	1432	8.35	9.86	32.8	-0.2	8.8	98.9
12-Nov	1433	9.76	8.87	51.2	0.2	8.8	49.4
12-Nov	1434	5.22	12.27	18.1	-0.3	9.8	94.5
12-Nov	1435	12.08	7.02	66.7	-0.9	14.4	69.0
12-Nov	1436	4.50	12.85	13.1	-0.1	9.7	75.2
12-Nov	1437	11.39	7.48	43.2	-0.8	11.3	97.0
12-Nov	1438	7.94	10.21	29.0	-0.3	8.8	69.7
12-Nov	1439	8.10	10.00	32.0	-1.4	10.2	104.6
12-Nov	1440	10.93	7.91	53.6	-0.3	10.3	68.3
12-Nov	1441	5.23	12.18	20.5	-1.5	10.2	90.6
12-Nov	1442	12.85	6.40	56.2	-1.0	11.1	83.0
12-Nov	1443	4.99	12.44	12.6	-0.6	8.2	79.8
12-Nov	1444	11.84	7.13	37.0	0.6	10.7	100.2
12-Nov	1445	8.38	9.83	24.1	0.6	8.6	75.4
12-Nov	1446	8.66	9.54	19.9	-0.5	10.3	108.5
12-Nov	1447	11.81	7.19	34.5	3.1	9.6	84.9
12-Nov	1448	5.65	11.81	7.9	0.3	9.1	101.8
12-Nov	1449	13.28	6.04	36.3	0.2	11.1	98.0
12-Nov	1450	5.43	12.08	10.8	0.6	9.5	88.2
12-Nov	1451	10.94	7.80	27.7	-0.1	14.9	97.1
12-Nov	1452	8.34	9.88	27.1	2.0	11.9	64.0
12-Nov	1453	7.73	10.27	20.1	-0.3	20.3	96.2
12-Nov	1454	11.27	7.63	40.8	0.7	17.0	60.2
12-Nov	1455	5.24	12.14	8.0	0.3	15.5	83.9
12-Nov	1456	12.82	6.39	44.7	0.4	16.9	73.9
12-Nov	1457	4.76	12.58	9.0	0.6	14.3	70.5
12-Nov	1458	11.53	7.35	37.5	0.0	18.0	84.6
12-Nov	1459	7.55	10.45	22.4	1.7	15.4	55.3
12-Nov	1500	8.17	9.93	31.1	-0.5	20.8	88.3
12-Nov	1501	10.49	8.25	72.6	1.2	21.2	44.2
12-Nov	1502	4.80	12.54	14.4	1.0	24.9	73.9
12-Nov	1503	11.79	7.21	93.6	0.0	30.6	58.5
12-Nov	1504	4.41	12.92	23.1	0.4	27.4	45.5
12-Nov	1505	10.56	8.15	79.2	0.1	40.5	86.9
12-Nov	1506	8.01	10.17	83.5	4.2	31.6	34.1
12-Nov	1507	6.55	11.25	42.7	0.7	42.8	106.7
12-Nov	1508	11.17	7.74	131.6	1.7	47.7	45.7
12-Nov	1509	3.67	13.55	19.0	3.1	43.0	78.2
12-Nov	1510	10.98	7.91	123.5	1.3	52.6	83.8
12-Nov	1511	6.42	11.47	77.1	2.3	48.0	42.4
12-Nov	1512	8.41	9.90	88.9	1.5	52.0	116.1
12-Nov	1513	10.12	8.64	188.0	7.7	50.7	36.7
12-Nov	1514	4.68	12.79	37.7	1.8	49.6	97.5
12-Nov	1515	10.78	8.11	174.0	3.6	52.6	67.3
12-Nov	1516	5.11	12.51	76.9	3.9	51.6	47.6
12-Nov	1517	9.94	8.73	118.8	3.2	52.6	115.1
12-Nov	1518	8.77	9.68	144.1	2.5	52.6	31.0
12-Nov	1519	6.29	11.57	65.5	3.7	52.6	106.3
Average		8.5	9.78	47.6	1.1	21.33	79.3
Minimum		3.0	6.04	6.3	-1.5	4.97	31.0
Maximum		13.3	13.99	188.0	7.7	52.56	116.1

Mass Concentration (mg/m3 dry) **n/a** **n/a** **54.5** **0.8** **55.9** **149.2**
Mass Concentration (mg/m3 dry) Corrected to 11% O2 **43.4** **0.7** **44.5** **118.8**

Calibration Summary	O2	CO2	CO	THC	SO2	NOx
Gas (Cert. Value)	11.00	15.52	434.0	92.1	440.0	229.0
Initial Gas Check	11.00	15.40	433.2	86.7	419.2	224.6
Final Gas Check	11.00	15.20	427.1	81.5	414.4	221.3
Initial Zero Drift	0.03	0.09	5.8	1.0	0.35	-3.6
Final Zero Drift	0.03	0.20	-1.5	-1.0	0.4	-1.3

Incinerator Stack - Run 2 (November 12, 2008)

Rodear Meats
METLab CEM Results



APPENDIX 2

ANALYTICAL DATA



Analytical Report

Bill To: A. Lanfranco & Associates
 Report To: A. Lanfranco & Associates
 #101, 9488 - 189 Street
 Surrey, BC, Canada
 V4N 4W7
 Attn: Al LanFranco
 Sampled By:
 Company:

Project:
 ID:
 Name: Rodear Meats
 Location:
 LSD:
 P.O.:
 Acct code:

Lot ID: **655265**
 Control Number: A001498
 Date Received: Nov 13, 2008
 Date Reported: Nov 19, 2008
 Report Number: 1175598

Aggregate Organic Constituents

Reference Number	Date/Time Sampled	Sample Information	Analyte Description Units Nominal Detection Limit	pH adjustment required	Volume Sample volume mL	Oil and Grease Total - DCM extraction mg/sample
655265-4		Blank	Stack Samples	Yes	635	<1
655265-5		Run-1	Stack Samples	Yes	584	15
655265-6		Run-2	Stack Samples	No	672	8

Air Quality

Reference Number	Date/Time Sampled	Sample Information	Analyte Description Units Nominal Detection Limit	Volume Sample mL	Dilution Factor chloride	Chloride As Tested mg/L
655265-1		Blank	Stack Samples	116	1	0.03
655265-2		Run-1	Stack Samples	7.0	10	7.86
655265-3		Run-2	Stack Samples	10.0	100	1.81

Reference Number	Date/Time Sampled	Sample Information	Analyte Description Units Nominal Detection Limit	Chloride Water Soluble ug/sample
655265-1		Blank	Stack Samples	3
655265-2		Run-1	Stack Samples	550
655265-3		Run-2	Stack Samples	1810

Approved by:

Andrew Garrard, BSc
 Operations Manager

APPENDIX 3

FIELD DATA SHEETS

Downstream Diameters

[illegible]

10/11/14

VISIBLE EMISSIONS FORM

(Make copies for Future Use For Each Equipment)

Permit No.: 0265-01-C

Company Name: Rodear Meats

Equipment and Fuel: Diesel

Site Conditions:

Stack height above ground (ft): 10

Stack distance from observer (ft): 15

Emission color (black or white): BLACK

Sky conditions (% cloud cover): 25

Wind speed (mph): 15 km

Temperature (°F): 60

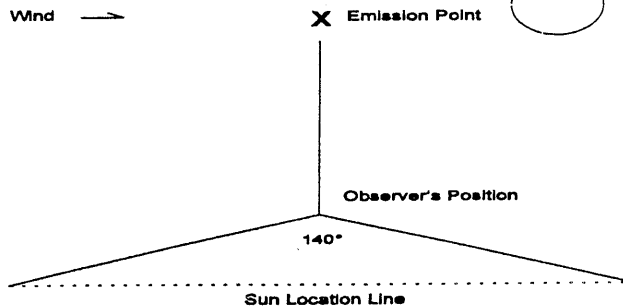
Observer Name: J. Harrington

Certified? (Yes/No): _____

Observation Date and Start Time: Nov 12/08 10:40

Stack ☒
Sun ☒
Wind ☐

Draw North Arrow



SECONDS	0	15	30	45	COMMENTS
MINUTES					
1	5	5	0	0	
2	5	5	5	5	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	5	5	
Six (6) Minute Average Opacity Reading (%): <u><5</u>					

Observation Date and Start Time: Nov 12/08 14:42

SECONDS	0	15	30	45	COMMENTS
MINUTES					
1	5	5	5	5	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	5	5	
5	5	0	0	0	
6	5	5	5	5	
Six (6) Minute Average Opacity Reading (%): <u><5</u>					

CEM FIELD DATA SHEET

Plant : Rodcar Marts
 Source : _____
 Date : Nov 12/08

Technician : _____
 Ambient Temp °C : _____
 Bar. Pressure in Hg : _____

Cylinder Gas Pressure (psi)

1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	N ₂	O ₂	H ₂	Comb Air	Low Prop	Mid Prop	High Prop

Certified Gas Value (ppm)

51.5 NO		229 NO	453 NO								
51.4 CO		434 CO	878 CO			11.0 O ₂					
41.8 SO ₂		440 SO ₂	924 SO ₂			15.5 CO ₂					

CEM Readings

Time	Source	O ₂	CO ₂	CO	THC	SO ₂	NO _x	Response Time (sec)
	N ₂	0.01	0.21	6.1			-6.1	NO _x up
	4gas		0.08	900		924.7	450.2	NO _x dn
	3gas		0.08	436.6		434.2	210.1	O ₂ up
	1gas			55.5		41.7	48.6	O ₂ dn
	O ₂ /CO ₂	10.98	15.50					CO up
	N ₂	0.02	0.07	6.0	0.10	02.0	-6.4	CO dn
	4gas			896		920	447.2	CO ₂ up
	3gas			433.6		438.1	219.2	CO ₂ dn
	1gas			55.9		42.1	48.7	SO ₂ up
	O ₂ /CO ₂	10.98	15.4					SO ₂ dn
	468 CH ₄				469.1			THC up
	92.1 CH ₄				92.3			THC dn
	40.3							
	N ₂	0.02	0.11	6.0	40.81	2.21	-6.5	

CEM FIELD DATA SHEET

Plant : Rodan Meats
 Source : _____
 Date : _____

Technician : _____
 Ambient Temp °C : _____
 Bar. Pressure in Hg : _____

Cylinder Gas Pressure (psi)

1 Gas	2 Gas	3 Gas	4 Gas	5 Gas	N ₂	O ₂	H ₂	Comb Air	Low Prop	Mid Prop	High Prop

Certified Gas Value (ppm)

CEM Readings

Time	Source	O ₂	CO ₂	CO	THC	SO ₂	NO _x	Response Time (sec)
	Run 1	10:30	11:30		Rodan 1			NO _x up
	N ₂	0.03	0.19	5.8	1.0	26.2	-4.90	NO _x dn
	3gas			433.2		49.2	224.6	O ₂ up
	O ₂ /CO ₂	10.0	15.4					O ₂ dn
	92.1 CH ₄				86.7			CO up
	N ₂	0.03	0.09	5.86	1.0	0.35	-3.6	CO dn
								CO ₂ up
	Run 2	14:20	15:20					CO ₂ dn
	N ₂	0.08	0.20	-1.81	0.50	8.7	-1.31	SO ₂ up
	3gas			427.1		414.4	221.3	SO ₂ dn
	O ₂ /CO ₂	11.00	15.2					THC up
	92.1 CH ₄				81.79			THC dn
	N ₂	0.03		-1.5		.4		

APPENDIX 4

CALIBRATION DATA

EPA Method 5
Meter Box Calibration
English Meter Box Units, English K' Factor

Model #: P+T BEI
Serial #: n/a

Date: May 20, 08
Barometric Pressure: 29.74 (in. Hg)
Theoretical Critical Vacuum: 14.03 (in. Hg)

IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.
The Critical Orifice Coefficient, K', must be entered in English units, (ft)³/(deg R)^{0.5}/(in.Hg)^{1/2}(min).

--- DRY GAS METER READINGS ---										-CRITICAL ORIFICE READINGS-									
dH (in H ₂ O)	Time (min)	Volume		Initial Temps.		Final Temps.		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --		Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial Final		Average	(deg F)
		Initial (cu ft)	Final (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)				(deg F)	(deg F)				(deg F)	(deg F)		
0.28	15.00	169.536	174.420	80.0	79.0	81.0	81.0	40	0.2403	22.0	68.0	68.0	40	0.2403	22.0	68.0	68.0	68.0	68.0
0.58	15.00	162.376	169.536	78.0	76.0	84.0	80.0	48	0.3560	21.0	67.0	67.0	48	0.3560	19.0	67.0	67.0	67.0	67.0
1.00	15.00	153.056	162.376	81.0	75.0	86.0	79.0	55	0.4606	19.0	66.0	66.0	55	0.4606	18.0	66.0	66.0	66.0	66.5
1.60	15.00	141.191	153.056	72.0	71.0	86.0	75.0	63	0.5956	18.0	66.0	66.0	63	0.5956	15.0	66.0	66.0	66.0	66.0
3.00	15.00	125.221	141.191	74.0	69.0	87.0	72.0	73	0.8185	15.0	66.0	67.0	73	0.8185	15.0	66.0	67.0	66.5	66.5

***** RESULTS *****

--- DRY GAS METER ---										--- ORIFICE ---									
VOLUME CORRECTED V _m (std) (cu ft)	VOLUME CORRECTED V _m (std) (liters)	VOLUME CORRECTED		VOLUME NOMINAL		CALIBRATION FACTOR Y		CALIBRATION FACTOR dh@		Average Y		Average dh@		Average Ko		Average Ko		Average Ko	
		V _m (std) (cu ft)	V _m (std) (liters)	V _c (cu ft)	V _c (liters)	Value (number)	Variation (number)	Value (in H ₂ O)	Variation (in H ₂ O)	0.9935	0.9935	1.52	38.5	0.783	0.783	0.783	0.783	0.783	0.783
6.972	197.5	6.918	195.9	4.705	132.4	0.985	-0.008	1.576	40.03	0.992	-0.001	1.496	38.00	0.772	0.772	0.772	0.772	0.772	0.772
9.073	256.9	8.955	253.6	4.675	132.4	0.987	-0.006	1.542	39.18	0.987	-0.006	1.486	37.74	0.783	0.783	0.783	0.783	0.783	0.783
11.659	330.2	11.585	328.1	4.675	132.4	0.994	0.000	1.483	37.68	0.994	0.000	1.483	37.68	0.791	0.791	0.791	0.791	0.791	0.791
15.761	446.4	15.913	450.7	4.675	132.4	1.010	0.016	1.483	37.68	1.010	0.016	1.483	37.68	0.781	0.781	0.781	0.781	0.781	0.781

TEMPERATURE CALIBRATION				
Calibration Standard -----> Omega Model CL23A S/N:T-218768				
Reference Temperature Set-Point (deg F)	Temperature Device Reading (deg F)	Results Variation (deg F)	Percent of Absolute	Results Percent of Absolute
32	32	0	0.00%	0.00%
100	98	-2	-0.36%	-0.36%
500	499	-1	-0.10%	-0.10%
800	810	10	0.79%	0.79%

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.
For Orifice Calibration Factor dh@, the orifice differential pressure in inches of H₂O that equates to 0.75 cm of air at 60 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2.
For Temperature Device, the reading must be within 1.5% of certified calibration standard (absolute temperature) to be acceptable.

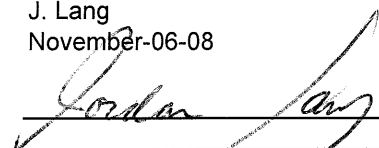
SIGNED:  Date: May 20 08

A. LANFRANCO and ASSOCIATES INC.

ENVIRONMENTAL CONSULTANTS

UNI PROBE NOZZLE DIAMETER CALIBRATION FORM

Technician: J. Lang
Date: November-06-08

Signature: 

Nozzle I.D.	d1	d2	d3	difference	average	average area
3 FT # A	0.5620	0.5630	0.5640	0.0020	0.5630	0.0017288
3 FT # B	0.5780	0.5750	0.5760	0.0030	0.5763	0.0018117
3 FT # C	0.5170	0.5180	0.5160	0.0020	0.5170	0.0014578
3 FT # D	0.5720	0.5740	0.5730	0.0020	0.5730	0.0017908
3 FT # E	0.3070	0.3080	0.3050	0.0030	0.3067	0.0005129
3 FT # F	0.4870	0.4850	0.4860	0.0020	0.4860	0.0012882
4ft #1	0.3240	0.3240	0.3255	0.0015	0.3245	0.0005743
4ft #2	0.3409	0.3413	0.3411	0.0004	0.3411	0.0006346
5ft #10	0.7400	0.7420	0.7410	0.0020	0.7410	0.0029948
5ft #11	0.8180	0.8190	0.8180	0.0010	0.8183	0.0036525
5ft #13	0.9770	0.9780	0.9780	0.0010	0.9777	0.0052133

Where:

- (a) D1, D2, D3 = three different nozzle diameters; each diameter must be measured to within (0.025mm) 0.001 in.
- (b) Difference = maximum difference between any two diameters; must be less than or equal to (0.1mm) 0.004 in.
- (c) Average = average of D1, D2 and D3

S - TYPE PITOT CALIBRATION FORM

Date: June 4, 2008
 Technician: Jordan Lang
 Pitot I.D.: A.L. 3A
 Nozzle I.D.: 0.250

Approx. Wind Vel.	Pitot Vel. Pressure		S-Type Pitot Vel. Press.		Pitot Coefficient
	Δ Pref.	Cref. SQRT(Δ Pref.)	Δ Ps	SQRT(Δ Ps)	
21.83	0.110	0.32835	0.160	0.40000	0.82086
41.63	0.400	0.62613	0.580	0.76158	0.82215
50.98	0.600	0.76685	0.850	0.92195	0.83177
57.76	0.770	0.86872	1.050	1.02470	0.84779

AVERAGE C_p = 0.8306

Calibration Equation: $C_p = C_{ref} \cdot \text{SQRT}(\Delta P_{ref}/\Delta P_s)$

$C_{ref} = 0.99$

Where:

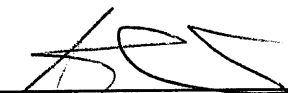
ΔP_{ref} = velocity pressure measured by reference pitot

C_{ref} = coefficient of reference pitot

ΔP_s = velocity pressure measured by S - type pitot

C_p = coefficient of S - type pitot

AUTHORIZATION


 Calibration Section



Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER A LAN FRANCO

P.O NUMBER

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE GMIS	vs. SRM#1686	CC 137743	491 ppm
CARBON MONOXIDE GMIS	vs. SRM#1681	CC 160128	997 ppm
SULFUR DIOXIDE GMIS	vs. SRM#1662	CC 134330	1006 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

COMPONENT	NITRIC OXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	Thermo Env. 42H S/N 42H-44979-273
ANALYTICAL PRINCIPLE		CHEMILUMINESCENCE		LAST CALIBRATION DATE 10/02/06
FIRST ANALYSIS DATE		10/04/06		SECOND ANALYSIS DATE 10/11/06
Z 0	R 465	C 432	CONC. 456	Z 0 R 503 C 464 CONC. 453
R 469	Z 0	C 432	CONC. 452	R 505 Z 0 C 466 CONC. 453
Z 0	C 430	R 469	CONC. 450	Z 0 C 467 R 507 CONC. 452
U/M ppm		MEAN TEST ASSAY	453	U/M ppm MEAN TEST ASSAY 453
2. COMPONENT	CARBON MONOXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	HORIBA, VIA-510, S/N 576876015
ANALYTICAL PRINCIPLE		NDIR		LAST CALIBRATION DATE 10/03/06
FIRST ANALYSIS DATE		10/04/06		SECOND ANALYSIS DATE 10/11/06
Z 0	R 997	C 898	CONC. 899	Z 0 R 997 C 898 CONC. 898
R 997	Z 0	C 898	CONC. 898	R 997 Z 0 C 898 CONC. 898
Z 0	C 898	R 997	CONC. 898	Z 0 C 898 R 997 CONC. 898
U/M ppm		MEAN TEST ASSAY	898	U/M ppm MEAN TEST ASSAY 898
3. COMPONENT	SULFUR DIOXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	Siemens Ultramat 5E S/N C1-009
ANALYTICAL PRINCIPLE		NDIR		LAST CALIBRATION DATE 10/03/06
FIRST ANALYSIS DATE		10/04/06		SECOND ANALYSIS DATE 10/11/06
Z 0	R 1006	C 924	CONC. 924	Z 0 R 1006 C 924 CONC. 924
R 1006	Z 0	C 924	CONC. 926	R 1006 Z 0 C 924 CONC. 924
Z 0	C 924	R 1006	CONC. 924	Z 0 C 924 R 1006 CONC. 924
U/M ppm		MEAN TEST ASSAY	925	U/M ppm MEAN TEST ASSAY 924

THIS CYLINDER NO. CC 170909

HAS BEEN CERTIFIED ACCORDING TO SECTION

EPA-600/R97/121

OF TRACEABILITY PROTOCOL NO.

Rev. 9/97

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 10/11/06

EXPIRATION DATE 10/11/08 TERM 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	453 ppm
CARBON MONOXIDE	898 ppm
SULFUR DIOXIDE	924 ppm
NITROGEN	BALANCE

All values not valid below 150 psig.

NOx=461 ppm value for reference use only.

ANALYZED BY

Henry Koung

CERTIFIED BY

IMPORTANT

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall liability of Praxair Distribution, Inc. arising out of the use of the information contained herein exceed the fee established for providing such information.



Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (213) 585-2154
Facsimile: (323) 585-0582

DocNumber: 00000000437

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

ALAN FRANCO

Praxair Order Number: 05163502-00

Customer P. O. Number:

Customer Reference Number: PD999

Fill Date:

Part Number: EV NIX4E274-AS

Lot Number: 109804603

Cylinder Style & Outlet: AS 660

Cylinder Pressure & Volume: 2000 psi 140 cu ft

Certified Concentration:

Expiration Date:	3/7/2010		
Cylinder Number:	CC 92405	Analytical Uncertainty:	
229	ppm	NITRIC OXIDE	± 1 %
434	ppm	CARBON MONOXIDE	± 1 %
440	ppm	SULFUR DIOXIDE	± 1 %
Balance		NITROGEN	

NOx ppm = 230 ppm

NOX Values for Reference Only

Certification Information: Certification Date: 3/7/2008 Term: 24 Months Expiration Date: 3/7/2010

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. Component: NITRIC OXIDE

Requested Concentration: 220 ppm
Certified Concentration: 229 ppm
Instrument Used: Thermo Env. 42H S/N 42H-44979-273
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 2/14/2008

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 230220
Ref. Std. Conc: 254.5 ppm
Ref. Std. Traceable to SRM #: vs. 1685b
SRM Sample #: 43-K-57
SRM Cylinder #: FF28103

First Analysis Data:		Date: 2/29/2008	
Z: 0	R: 255.7	C: 230.4	Conc: 229
R: 256.8	Z: 0	C: 230.7	Conc: 229
Z: 0	C: 231.7	R: 258.5	Conc: 228
UOM: ppm	Mean Test Assay: 229 ppm		

Second Analysis Data:		Date: 3/7/2008	
Z: 0	R: 258	C: 232	Conc: 229
R: 258	Z: 0	C: 231	Conc: 228
Z: 0	C: 232	R: 257	Conc: 230
UOM: ppm	Mean Test Assay: 229 ppm		

2. Component: CARBON MONOXIDE

Requested Concentration: 450 ppm
Certified Concentration: 434 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method: NDIR
Last Multipoint Calibration: 2/14/2008

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SGAL 2381
Ref. Std. Conc: 504 ppm
Ref. Std. Traceable to SRM #: vs. 1680b
SRM Sample #: 2-7-G
SRM Cylinder #: FF-33980

First Analysis Data:		Date: 2/29/2008	
Z: 0	R: 504	C: 436	Conc: 436
R: 504	Z: 0	C: 436	Conc: 436
Z: 0	C: 437	R: 504	Conc: 437
UOM: ppm	Mean Test Assay: 436 ppm		

Second Analysis Data:		Date: 3/7/2008	
Z: 0	R: 504	C: 432	Conc: 432
R: 504	Z: 0	C: 433	Conc: 433
Z: 0	C: 432	R: 504	Conc: 432
UOM: ppm	Mean Test Assay: 432 ppm		

3. Component: SULFUR DIOXIDE

Requested Concentration: 450 ppm
Certified Concentration: 440 ppm
Instrument Used: Siemens Ultramat 5E S/N C1-009
Analytical Method: NDIR
Last Multipoint Calibration: 2/14/2008

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 115604
Ref. Std. Conc: 502 ppm
Ref. Std. Traceable to SRM #: vs. 1661a
SRM Sample #: 94-H-05
SRM Cylinder #: FF28146

First Analysis Data:		Date: 2/29/2008	
Z: 0	R: 502	C: 439	Conc: 439
R: 502	Z: 0	C: 440	Conc: 440
Z: 0	C: 440	R: 503	Conc: 439
UOM: ppm	Mean Test Assay: 439 ppm		

Second Analysis Data:		Date: 3/7/2008	
Z: 0	R: 502	C: 441	Conc: 441
R: 502	Z: 0	C: 440	Conc: 440
Z: 0	C: 442	R: 502	Conc: 442
UOM: ppm	Mean Test Assay: 441 ppm		

Analyzed by:
Ben McCauley

Certified by:
Phu Nguyen



Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 00000005672

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

A LAN FRANCO

Praxair Order Number: 06719803-00

Customer P. O. Number:

Customer Reference Number: PD999

Fill Date:

Part Number: NI CO50MNS4E-AS

Lot Number: 109818908

Cylinder Style & Outlet: AS 660

Cylinder Pressure & Volume: 2000 psi 140 cu ft

Certified Concentration:

Expiration Date:	7/23/2010	Analytical Uncertainty:
Cylinder Number:	CC 230413	
51.4 ppm	CARBON MONOXIDE	± 1 %
51.5 ppm	NITRIC OXIDE	± 1 %
41.8 ppm	SULFUR DIOXIDE	± 1 %
Balance	NITROGEN	

NOx ppm = 51.6 ppm

NOx Values for Reference Only

Certification Information: Certification Date: 7/23/2008 Term: 24 Months Expiration Date: 7/23/2010
This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. Component: CARBON MONOXIDE

Requested Concentration: 50 ppm
Certified Concentration: 51.4 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method: NDIR
Last Multipoint Calibration: 7/19/2008

First Analysis Data:		Date: 7/14/2008	
Z: 0	R: 49.1	C: 51.4	Conc: 51.4
R: 49.1	Z: 0	C: 51.4	Conc: 51.4
Z: 0	C: 51.5	R: 49.1	Conc: 51.5
UOM: ppm	Mean Test Assay:	51.4 ppm	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA 14358
Ref. Std. Conc: 49.07 ppm
Ref. Std. Traceable to SRM #: vs. 1678c
SRM Sample #: 4-J-21
SRM Cylinder #: XF001068b

Second Analysis Data:		Date: 7/21/2008	
Z: 0	R: 49.1	C: 51.4	Conc: 51.4
R: 49.1	Z: 0	C: 51.5	Conc: 51.5
Z: 0	C: 51.5	R: 49.2	Conc: 51.4
UOM: ppm	Mean Test Assay:	51.4 ppm	

2. Component: NITRIC OXIDE

Requested Concentration: 50 ppm
Certified Concentration: 51.5 ppm
Instrument Used: Thermo Electron 42C S/N 518112467
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 7/19/2008

First Analysis Data:		Date: 7/14/2008	
Z: 0	R: 50.2	C: 51.5	Conc: 51.5
R: 50.2	Z: 0	C: 51.6	Conc: 51.6
Z: 0	C: 51.6	R: 50.2	Conc: 51.6
UOM: ppm	Mean Test Assay:	51.6 ppm	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 24541
Ref. Std. Conc: 50.2 ppm
Ref. Std. Traceable to SRM #: vs. 1683b
SRM Sample #: 45-U-65
SRM Cylinder #: CAL015626

Second Analysis Data:		Date: 7/21/2008	
Z: 0	R: 50.2	C: 51.4	Conc: 51.4
R: 50.2	Z: 0	C: 51.4	Conc: 51.4
Z: 0	C: 51.5	R: 50.2	Conc: 51.5
UOM: ppm	Mean Test Assay:	51.4 ppm	

3. Component: SULFUR DIOXIDE

Requested Concentration: 41 ppm
Certified Concentration: 41.8 ppm
Instrument Used: Ametek 921CE S/N AW-921-S321
Analytical Method: ULTRAVIOLET ABSORPTION
Last Multipoint Calibration: 7/19/2008

First Analysis Data:		Date: 7/14/2008	
Z: 0	R: 508	C: 420	Conc: 41.8
R: 509	Z: 0	C: 421	Conc: 41.8
Z: 0	C: 421	R: 509	Conc: 41.8
UOM: ppm	Mean Test Assay:	41.8 ppm	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 218729
Ref. Std. Conc: 50.6 ppm
Ref. Std. Traceable to SRM #: vs. 1694a
SRM Sample #: 95-46-E
SRM Cylinder #: CLLM-004741

Second Analysis Data:		Date: 7/21/2008	
Z: 0	R: 509	C: 421	Conc: 41.8
R: 510	Z: 0	C: 421	Conc: 41.8
Z: 0	C: 422	R: 510	Conc: 41.8
UOM: ppm	Mean Test Assay:	41.8 ppm	

Analyzed by:

Ben McCauley

Certified by:

Henry Kountz

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

Making Our Planet More Productive



Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (323) 585-0582

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER A LAN FRANCO

P.O NUMBER

REFERENCE STANDARD

COMPONENT
METHANE GMIS

NIST SRM NO.
vs. SRM#2751

CYLINDER NO.
SA 20217

CONCENTRATION
96.7 ppm

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT METHANE GMIS

ANALYZER MAKE-MODEL-S/N

HORIBA, FID-510, 851135122

ANALYTICAL PRINCIPLE

Flame Ionization Detector

LAST CALIBRATION DATE

07/02/07

FIRST ANALYSIS DATE

07/26/07

SECOND ANALYSIS DATE

Z 0 R 96.7
R 96.7 Z 0
Z 0 C 93.5
U/M ppm

C 93.5 CONC. 93.5
C 93.5 CONC. 93.5
R 96.7 CONC. 93.5
MEAN TEST ASSAY 93.5

Z R C CONC.
R Z C CONC.
Z C R CONC.
U/M ppm MEAN TEST ASSAY

All values not valid below 150 psig.

G2 ANALYSIS DONE @ 20 % DILUTION POINT. STEC INC. SGD-710C GAS DIVIDER

ASSAY DATE & RESULT: 07/26/07, 468 ppm CH4/N2

THIS CYLINDER NO. CC 258409

HAS BEEN CERTIFIED ACCORDING TO SECTION

EPA-630/R97/121

CERTIFIED CONCENTRATION

OF TRACEABILITY PROTOCOL NO.

REV 9/97

METHANE

468 ppm

PROCEDURE

G2 REV 08/25/99

NITROGEN

BALANCE

CERTIFIED ACCURACY ± 2 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 07/26/07

EXPIRATION DATE 07/26/10 TERM 36 MONTHS

ANALYZED BY

ERIC YOUNG

CERTIFIED BY

PABLO REYES

IMPORTANT

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall



DocNumber: 00000005328

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

A LAN FRANCO

Praxair Order Number: 06719932-00

Customer P. O. Number:

Customer Reference Number PD999

Fill Date:

Part Number: NI MER2E-AS

Lot Number: 109818303

Cylinder Style & Outlet: AS 350

Cylinder Pressure & Volume: 2000 psi 140 cu ft

Certified Concentration:

Expiration Date:	7/10/2011	Analytical Uncertainty:
Cylinder Number:	SA 5445	
92.1 ppm METHANE	± 1 %	
Balance NITROGEN		

NOx ppm = N/A

NOx Values for Reference Only

Certification Information: Certification Date: 7/10/2008 Term: 36 Months Expiration Date: 7/10/2011

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1

Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. Component: METHANE

Requested Concentration: 93 ppm
Certified Concentration: 92.1 ppm
Instrument Used: HORIBA, FIA-510, 851135122
Analytical Method: Flame Ionization Detector
Last Multipoint Calibration: 6/19/2008

First Analysis Data:		Date: 7/10/2008	
Z: 0	R: 101	C: 92.1	Conc: 92.1
R: 101	Z: 0	C: 92.1	Conc: 92.1
Z: 0	C: 92.1	R: 101	Conc: 92.1
UOM: PPM	Mean Test Assay:		92.1 PPM

Analyzed by:

Peter Su

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 115659
Ref. Std. Conc: 101 ppm
Ref. Std. Traceable to SRM #: vs. 2751
SRM Sample #: 212-09-AL
SRM Cylinder #: SX-20000

Second Analysis Data:		Date:	
Z: 0	R: 0	C: 0	Conc: 0
R: 0	Z: 0	C: 0	Conc: 0
Z: 0	C: 0	R: 0	Conc: 0
UOM: PPM	Mean Test Assay:		0 PPM

Certified by:

Helena Tran



Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (323) 585-0582

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER A LAN FRANCO

P.O NUMBER

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON DIOXIDE GMIS	vs. SRM#2745	CC 200179	15.01 %
OXYGEN GMIS	vs. SRM#2658	CC 257765	10.01 %

ANALYZER READINGS

R=REFERENCE STANDARD

Z=ZERO GAS

C=GAS CANDIDATE

1. COMPONENT	CARBON DIOXIDE	GMIS	ANALYZER MAKE-MODEL-S/N	Siemens Ultramat 5E	S/N A12-730
ANALYTICAL PRINCIPLE			NDIR	LAST CALIBRATION DATE 02/14/08	
FIRST ANALYSIS DATE			02/19/08	SECOND ANALYSIS DATE	
Z 0	R 15.00	C 15.12	CONC. 15.13	Z	R C CONC.
R 15.00	Z 0	C 15.10	CONC. 15.11	R	Z C CONC.
Z 0	C 15.10	R 15.00	CONC. 15.11	Z	C R CONC.
U/M %	MEAN TEST ASSAY		15.12	U/M %	MEAN TEST ASSAY

2. COMPONENT	OXYGEN	GMIS	ANALYZER MAKE-MODEL-S/N	Siemens Oxymat 5E	S/N A12-839
ANALYTICAL PRINCIPLE			Paramagnetic	LAST CALIBRATION DATE 02/14/08	
FIRST ANALYSIS DATE			02/19/08	SECOND ANALYSIS DATE	
Z 0	R 10.00	C 10.98	CONC. 10.99	Z	R C CONC.
R 10.00	Z 0	C 11.00	CONC. 11.01	R	Z C CONC.
Z 0	C 11.00	R 10.00	CONC. 11.01	Z	C R CONC.
U/M %	MEAN TEST ASSAY		11.00	U/M %	MEAN TEST ASSAY

Values not valid below 150 psig

O2 concentration is corrected for CO2 interference.

THIS CYLINDER NO. CC 121023

HAS BEEN CERTIFIED ACCORDING TO SECTION

EPA-600/R97/121

OF TRACEABILITY PROTOCOL NO.

Rev. 9/97

PROCEDURE

G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 02/19/08

EXPIRATION DATE 02/19/11 TERM 36 MONTHS

CERTIFIED CONCENTRATION

CARBON DIOXIDE	15.12 %
OXYGEN	11.00 %
NITROGEN	BALANCE

ANALYZED BY

PETER SU

CERTIFIED BY

HELENA TRAN

IMPORTANT

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall liability of Praxair Distribution, Inc. arising out of the use of the information contained herein exceed the fee established for providing such information.