TRAIL RIDGE ENERGY, LLC

46280 Dylan Drive, Suite 200, Novi, MI 48377

(248) 380-3920

May 3, 2012

Mr. Syed Arif, P.E.
Emissions Monitoring Section Administrator
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Mail Station 5510
Tallahassee, FL 32301

Subject: Stack Test Report for the verification of select emissions and opacity determinations from a landfill gas-fueled internal combustion engine operated at the Trail Ridge Energy, L.L.C. facility in Jacksonville, Florida.
DEP File No.: 0310358-012-AC

Dear Mr. Arif:

Trail Ridge Energy, L.L.C. is submitting the enclosed test report for the verification of nitrogen oxides, carbon monoxide, and opacity determinations from the Unit #1 (EU004) CAT Model No. G3520C 2,233 brake-horsepower landfill gas-fueled engine used for electricity generation at the Trail Ridge Energy, L.L.C. facility located at the Trail Ridge Landfill in Jacksonville, Florida.

Contact information is provided in the enclosed Stack Test Plan documentation, should you have any questions or require additional information.

Sincerely,

TRAIL RIDGE ENERGY, L.L.C.

Rick DiGia
President and CEO

Enclosure

EMISSIONS TEST REPORT

Title	Compliance Test Report for the ICE #1 (EU004) Landfill Gas Fueled G3520C Internal Combustion Engine Operated at the Trail Ridge Energy, L.L.C., Trail Ridge Landfill, Duval County, Florida
Report Date	May 2, 2012
Test Date(s)	March 28, 2012

Facility Information	
Name	Trail Ridge Energy, L.L.C., Trail Ridge Landfill
City, County	Jacksonville, Duval

Facility Permit Information			
DEP File No.:	0310358-012-AC	Permit No.:	PSD-FL-374C

Testing Contractor	
Company	Derenzo and Associates, Inc.
Mailing Address	39395 Schoolcraft Road Livonia, MI 48150
Phone	(734) 464-3880
Project No.	1201048

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COMPLIANCE TEST REPORT FOR THE LANDFILL GAS FUELED G3520C INTERNAL COMBUSTION ENGINE OPERATED AT THE TRAIL RIDGE ENERGY, L.L.C. TRAIL RIDGE LANDFILL DUVAL COUNTY, FLORIDA

1.0 SOURCE INFORMATION

Trail Ridge Energy, L.L.C. (Trail Ridge Energy) is located at Trail Ridge Landfill in Duval County, Florida. The Facility File No. is 0310358-012-AC and the Permit No. is PSD-FL-374C. At its landfill gas to energy (LFGTE) facility, Trail Ridge Energy is permitted to operate emission units 004 – 009 which consist of six (6) Caterpillar G3520C Lean Burn Reciprocating Engines and electricity generator sets. These engines are fueled with methane-rich gas, which is generated at the Trail Ridge Landfill, to power base load electricity generator operations.

The FDEP permit requires performance testing of a representative engine for the determination of specified pollutant emissions while the unit is operated at near base load conditions.

Compliance testing was performed to measure nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), and oxygen (O_2), concentrations and emission rates and opacity from the exhaust of the ICE #1 (EU004) engine pursuant to the testing requirements specified in the FDEP Air Permit.

The compliance testing was performed on March 28, 2012 by Derenzo and Associates, Inc. personnel Michael Brack, Daniel Wilson, and Robert Bingham. Process operation coordination for the compliance demonstration was preformed by Landfill Energy Systems Operations Manager Damian Schmitt.

The exhaust gas sampling and analysis was performed using procedures specified in the Test Protocol dated February 13, 2012.

Questions regarding this emission test report should be directed to:

Mr. Michael Brack
Field Services Manager
Derenzo and Associates, Inc.
39395 Schoolcraft Road
Livonia, MI 48150
(734) 464-3880

Mr. Damian Schmitt
Operations Manager
Landfill Energy Systems.
46280 Dylan Drive, Suite 200
Novi, Mi 48377
(248) 380-3920

2.0 PLANT AND SAMPLING LOCATION DESCRIPTION

2.1 General Process Description

Methane-rich landfill gas (LFG) is produced in the Trail Ridge Landfill from the anaerobic decomposition of disposed waste materials. The methane-rich LFG is collected from both active and capped landfill cells using a system of wells that are connected to a central header (gas collection system). The collected LFG is directed to the Trail Ridge Energy facility where it is treated and used as fuel for the IC engine generators that produce electricity for transfer to the local utility.

The Trail Ridge Energy facility currently consists of six (6) CAT Model No.G3520C IC internal combustion engines that are connected to individual electricity generators.

A process flow diagram for the LFG to electricity process is presented subsequent to the summary tables in this report.

2.2 Rated Capacities, Type and Quantity of Raw Materials Used

The representative CAT G3520C IC engine generator set was operated at base load conditions (i.e., (+/- 10% of the design capacity of 2,233 brake horsepower) to produce a peak electricity output of 1,600 kilowatts (kW). Fuel (treated landfill gas) consumption is regulated to maintain the required heat input rate to support engine operations and is dependent on the fuel heat value (methane content). The average engine fuel consumption rate during the test periods was 528 scfm based on data recorded from the fuel flow meter installed and operated by Trail Ridge Energy.

Appendix E provides engine generator process data collected during the compliance test.

2.3 Emission Control System Description

The engines incorporate state of the art technology in order to fire lean fuel mixtures and produce low combustion by-product emissions. Emissions from the combustion of LFG are released uncontrolled into the ambient air through a stack connected to the IC engine exhaust manifold and noise control system (noise muffler).

2.4 Sampling Locations (USEPA Method 1)

The exhaust stack sampling port for the Model G3520C IC engine satisfied the USEPA Method 1 criteria for a representative sample location. The inner diameter of the engine exhaust stacks is 15.5 inches. The stack is equipped with two (2) sample ports, opposed 90°, that provide a sampling location 53 inches (3.4 duct diameters) downstream and 124 inches (8 duct diameters) upstream from any flow disturbance.

Velocity pressure traverse locations for the sampling points were determined in accordance with USEPA Method 1 for the representative engine.

Included, following the summary tables is a diagram presenting the performance test sampling locations.

NOx, CO, and VOC results are calculated from the velocity pressure traverse pre-test and post-test averages for each 60-minute sampling period.

3.0 SUMMARY AND DISCUSSION OF TEST RESULTS

3.1 Purpose and Objectives of the Tests

Stack testing is required for emission units 004 through 009 to demonstrate compliance with the CO, NO_X, and opacity emission limits by permit conditions. The facility is required to perform initial, annual and permit renewal testing during a six-year period. This test event satisfies the 2012 annual performance test required by the permit.

The exhausts from the LFG-fueled IC engines were monitored for three (3) one-hour test periods during which the NO_X, CO, VOC, CO_2 and O_2 exhaust gas concentrations were measured using instrumental analyzers. The engine measurements consisted of triplicate 60-minute tests.

Exhaust gas moisture content from the representative engine was determined by gravimetric analysis of the weight gain in the chilled impingers. Velocity and volumetric flow rates were measured prior to and subsequent of each 60-minute test for the gaseous samples (i.e., NO_X and CO).

Opacity observations were made during one of the 60-minute test periods and were observed at the point of greatest opacity in the portion of the plume where condensed water vapor is not present, with continuous readings taken every 15 seconds.

The testing was performed while the IC engine was operated at normal base load conditions (1600 kW peak electricity output +/- 10%).

3.2 Variations from Normal Sampling Procedures or Operating Conditions

Testing for all pollutants were performed in accordance with the Test Protocol dated February 13, 2012 and specified USEPA test methods.

3.3 Operating Conditions during Compliance Tests

The representative LFG-fueled IC engine was operated at base load (100% capacity +/- 10%) conditions during the compliance testing. The average kilowatt (kW) output values and fuel use values were recorded by the in 15 minute intervals during each test event. Process operating data was recorded by Seminole Energy personnel. The average LFG consumption rate during the testing was 528 standard cubic feet per minute (scfm). The average electrical output rate during the test event was 1,638 kW.

3.4 Air Pollutant Sampling Results

The following table presents the engine #1 (EU004) three-test average emission rates from the initial performance evaluation:

Emission Parameter		Unit #1 (EU004) Emissions	Permit Limit
NOx	NO_X emissions (lb/hr)	2.40	3.00
	NO_X emissions (g/bhp-hr)	0.48	0.60
CO	CO emissions (lb/hr)	14.08	17.2
	CO emissions (g/bhp-hr)	2.8	3.5
VOC	VOC emissions (lb/hr)	1.33	1.40
	VOC emissions (g/bhp-hr)	0.26	0.28
O_2	Oxygen concentration (%)	8.13	-
Opacity	Highest 6-minute average (%)	0.0	10
HCl	HCl Emission Factor (lb/MMscf)	0.86	-
SO_2	SO_2 Emission Factor (lb/MMscf)	8.16	-

Notes
(lb/hr) pounds per hour, (g/bhp-hr) grams per brake horsepower hour, (lb/MMscf) pounds per million standard cubic foot

Summary Table 1, following the text portion of this report, present individual 60-minute measured gas conditions, and pollutant emission rates for the representative LFG-fueled IC engine.

Summary Table 2 presents emissions based on Fuel Characterization at the Trail Ridge Energy, L.L.C Facility.

Appendix A provides computer generated and field data sheets for the IC engine tests.

Appendix G provides raw instrumental analyzer response data for each test period.

4.0 SAMPLING AND ANALYTICAL PROCEDURES

A test protocol for the compliance testing was prepared by Derenzo and Associates and reviewed by the FDEP. This section provides a summary of the sampling and analytical procedures that were used during the test and presented in the test plan.

Appendix F presents diagrams of the USEPA sampling trains used for this compliance demonstration.

4.1 Exhaust Gas Velocity and Flowrate Determination (USEPA Method 2)

To properly determine air pollutant emission rates on a mass basis (e.g., pound per hour), IC engine exhaust stack gas velocities, and volumetric flow rates were determined using USEPA Method 2 prior to conducting tests. An S-type pitot tube, connected to a red-oil manometer, was used to determine velocity pressures at each measurement point. Gas temperatures were measured using a K-type thermocouple mounted to Type-S Pitot tube. The stainless-steel Pitot tube and connective tubing were leak-checked prior to each measurement event to verify the integrity of the measurement system.

The absence of cyclonic flow for each sampling location was verified using an S-type Pitot tube and oil manometer. The Pitot tube was positioned at all of the velocity traverse points with the planes of the face openings of the Pitot tube perpendicular to the stack cross-sectional plane. The Pitot tube was then rotated to determine the null angle (rotational angle as measured from the perpendicular, or reference, position at which the differential pressure is equal to zero).

Exhaust gas velocity pressure and temperature measurements were conducted prior to and subsequent of each 60-minute sampling period in accordance with USEPA Method 2.

4.2 Exhaust Gas Molecular Weight Determination (USEPA Method 3A)

CO_2 and O_2 content in the IC engine exhaust gas stream was measured continuously throughout each one-hour test period in accordance with USEPA Method 3A. The CO_2 content of the exhaust was monitored using a non-dispersive infrared (NDIR) gas analyzer. The O_2 content of the exhaust was monitored using a gas analyzer that utilizes a zirconia-ion sensor.

During each one-hour sampling period, a continuous sample of the IC engine exhaust gas stream was extracted from the stack using a stainless steel probe connected to a Teflon® heated sample line. The sampled gas was conditioned by removing moisture prior to being introduced to the analyzer; therefore, measurement of O_2 and CO_2 concentrations correspond to standard dry gas conditions. The instrument was calibrated using appropriate calibration gases to determine accuracy and system bias (described in Section 5.5 of this document).

4.3 Exhaust Gas Moisture Content Determinations (Method 4)

Moisture content of the IC engine exhaust gas was determined in accordance with USEPA Method 4 using a chilled impinger sampling train, which was performed concurrently with the instrumental analyzer sampling methodologies. During each sampling period, a gas sample was extracted at a predetermined rate from the source where moisture was removed from the sampled gas stream using impingers that were submersed in an ice bath. At the conclusion of each sampling period, the moisture gain in the impingers was determined gravimetrically by weighing each impinger to determine net weight gain.

Appendix F presents detailed gas sampling procedures for the USEPA sampling trains.

4.4 NO_x and CO Concentration Measurements (USEPA Method 7E and 10)

NO_X and CO pollutant concentrations in the exhaust of the IC engine were determined using a chemiluminescence NO_X analyzer and NDIR CO analyzer.

Three (3) one-hour sampling periods were performed for the IC engine exhaust testing. Throughout each one-hour test period, a continuous sample of the engine exhaust gas was extracted from the stack using the Teflon® heated sample line and gas conditioning system described in Section 4.2 of this document, and delivered to the instrumental analyzers. Instrument response for each analyzer was recorded on a data logging system that monitored the analog output of the instrumental analyzers continuously and logged data as one-minute averages. Prior to, and at the conclusion of each test, the instruments were calibrated using appropriate upscale calibration and zero gas to determine analyzer calibration error and system bias. Sampling times were recorded on field data sheets.

4.5 Measurement of VOC concentrations (USEPA Alt 078)

VOC as non-methane hydrocarbon (NMHC or NMOC) concentrations in the IC engine exhaust were determined using a Thermo Environmental Instruments, Inc. (TEI), Model 55C Methane-NMHC analyzer in accordance with USEPA Alternate Method (ALT) 078 for direct measurement of NMHC concentrations in exhaust gases for IC engines.

The TEI 55C is an automated batch analyzer that repeatedly collects and analyzes samples of the exhaust gas stream that are drawn into the instrument by the internal sampling pump. The sampled gas is separated by an internal gas chromatography (GC) column into methane and non- methane fractions and each fraction is analyzed separately using a flame ionization detector (FID), in accordance with USEPA Method 25A.

Samples of the exhaust gas were delivered to the instrument analyzer using an extractive gas sampling system that prevents condensation or contamination of the sample. The exhaust gas samples were delivered directly to the instrument analyzer. Therefore, VOC measurements correspond to standard conditions with no moisture correction (wet basis).

The specified instrument analyzers were calibrated using certified propane concentrations in hydrocarbon-free air.

Appendix F provides information of a typical extractive gas sampling and conditioning system that was used to deliver engine exhaust gas samples to the gaseous analyzers.

4.6 Hydrogen Chloride Emission Factor based on Influent Gas Chlorinated Compounds

A representative sample of inlet landfill gas was collected in high-pressure stainless steel cylinders from the LFG common header at a location after the discharge side of the gas blower. The sampling system consisted of Teflon® connective tubing, a 7-micron stainless steel particulate filter, and an evacuated stainless steel sample cylinder.

Prior to shipment to the sampling site, the stainless steel sample cylinder was leak checked at the laboratory, by evacuating the tank within 10 millimeters of mercury (mm Hg) absolute pressure and filled with helium to an absolute pressure of 345 mm Hg, and allowed to sit for at least 60 minutes. If no change in vacuum is observed on a mercury manometer or vacuum gauge, each tank is then considered to have an acceptable pre-test leak check. Final cylinder pressure was recorded at the sampling site prior to shipment to the laboratory. The cylinder pressure/vacuum was verified by laboratory personnel upon receipt to confirm sample container integrity.

The gas sample was shipped to Air Toxics, Ltd. (Folsom, California) and analyzed for specific chlorinated hydrocarbons, according to the procedures found in Compendium Method TO-15 of the USEPA. The target analytes included all chlorinated compounds listed in the TO-15 scan capabilities specified by the laboratory, as well as chlorinated compounds specified under USEPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume 1: *Stationary Point and Area Sources*, Table 2.4-1 (11/98) *Default Concentrations for LFG Constituents*. Target analytes that were not detected in the landfill gas sample were not included in the available chlorine atom total.

The LFG HCl emission factor was calculated by totaling the available chloride atoms in the fuel gas (as pounds per million standard cubic foot) and incorporating the fuel usage rate (as standard cubic feet per minute) for the test period. The resultant emission factor is reported in units of lb/hr.

4.7 Sulfur Dioxide Emission Factor based on Influent Gas Sulfur Bearing Compounds

Three separate integrated samples of the fuel used in the representative IC engine was sampled using a pre-cleaned Tedlar bag and analyzed for sulfur bearing compounds by Columbia Analytical Services, Simi Valley, California, using ASTM D-5504-01.

The Sulfur Dioxide (SO_2) emission rates were calculated by totaling the available sulfur atoms in the fuel gas (as lb/MMscf) and incorporating the fuel usage rate (as scfm) for the test period. The resultant emission rate is reported in units of lb/MMscf fuel burned.

SO_2 emission factor calculations are presented in Appendix A. Laboratory data is presented in Appendix C.

4.8 Visible Emissions Determinations (USEPA Method 9)

Opacity determinations were performed using USEPA Method 9 where 15-second readings recorded on an observation report for a total of 60 minutes. Observations were performed by a certified reader of opacity in accordance USEPA Method 9.

5.0 INTERNAL QA/QC ACTIVITIES

5.1 NO_x Converter Efficiency Test

The NO_2 – NO conversion efficiency of the TEI Model 42C instrumental analyzer was verified prior to the commencement of the performance tests. The instrument analyzer NO_2 – NO converter uses a catalyst at high temperatures to convert the NO_2 to NO for measurement. A USEPA Protocol 1 certified NO_2 calibration gas was used to verify the efficiency of the NO_2 – NO converter.

The NO_2 – NO conversion efficiency test satisfied the USEPA Method 7E criteria (the calculated NO_2 – NO conversion efficiency is greater than or equal to 90%).

5.2 Sampling System Response Time Determination

The response time of the sampling system was determined prior to the compliance test program by introducing upscale gas and zero gas, in series, into the sampling system using a tee connection at the base of the sample probe. The elapsed time for the analyzer to display a reading of 95% of the expected concentration was determined using a stopwatch.

5.3 Determination of Exhaust Gas Stratification

A stratification test for the representative IC engine exhaust stack was performed during the first 60-minute emissions test sampling period. The stainless steel sample probe was positioned at sample points correlating to 16.7, 50.0 (centroid) and 83.3% of the stack diameter. Pollutant concentration data was recorded at each sample point for a minimum of twice the maximum system response time.

The recorded data for the IC engine exhaust stack gas indicated that the measured CO concentrations did not vary by more than 5% of the mean across the stack diameter. Therefore, the stack gas was considered unstratified and the compliance test sampling was performed at a single sampling location which was closest to the mean CO concentration measured during the stratification test.

5.4 Instrumental Analyzer Interference Check

The instrumental analyzers used to measure NOx, CO, O_2 and CO_2 have had an interference response test performed prior to their use in the field, pursuant to the interference response test procedures specified in USEPA Method 7E. The appropriate interference test gases (i.e. gases that would be encountered in the exhaust gas stream) were introduced into each analyzer, separately and as a mixture with the analyte that each analyzer is designed to measure. All of analyzers exhibited a composite deviation of less than 3.0% of the span for all measured interferent gases. No major analytical components of the analyzers have been replaced since performing the original interference tests.

5.5 Instrument Calibration and System Bias Checks

At the beginning of each day, initial three-point instrument calibrations were performed by injecting calibration gas directly into the inlet sample port for each instrument. System bias checks were preformed prior to and at the conclusion of each sampling period by introducing the appropriate upscale calibration gas and zero gas into the sampling system (at the base of the stainless steel sampling probe prior to the particulate filter and Teflon® heated sample line) and verifying the instrument response against the initial instrument calibration readings.

The instruments were calibrated with USEPA Protocol 1 certified concentrations of NO_X, CO, Propane, CO_2, O_2, and were zeroed using pure nitrogen or hydrocarbon-free air (for VOC measurements).

5.6 Meter Box Calibrations

The isokinetic sampling console, which was used for moisture testing, was calibrated prior to and after the testing program. This calibration uses the critical orifice calibration technique presented in USEPA Method 5. The metering consol calibration exhibited no data outside the acceptable ranges presented in USEPA Method 5.

Appendix B presents test equipment quality assurance data (i.e., NO_2 – NO conversion efficiency test data, instrument calibration and system bias check records, calibration gas certifications, interference test results, meter box calibration records, cyclonic flow determinations sheets, pitot tube calibration records, and opacity observation certification).

This test report has been reviewed and is approved for submittal to FDEP by the following representatives:

I hereby certify that the information given in this report is correct to the best of my knowledge.

Report Prepared By:

Daniel Wilson
Field Technician
Derenzo and Associates, Inc.

Report Reviewed By:

Michael J. Brack
Field Services Manager
Derenzo and Associates, Inc.

Report Certification

I certify that all data required and provided to the person conducting the test are true and correct to my knowledge.

Report Certified By:

Scott Salisbury
President
Trail Ridge Energy, L.L.C.

Table 1. Summary of Engine #1 (EU004) Test Results (CAT G3520C)
Trail Ridge Energy, LLC - Jacksonville, Duval County, Florida

Test No.	1	2	3	
Test date	03/28/12	03/28/12	03/28/12	Test
Test period (24-hr clock)	14:12 - 15:12	16:10 - 17:10	17:55 - 18:55	Avg.
Generator Output (kW)	1,654	1,643	1,616	1,638
Engine Horsepower (Hp)	2,309	2,293	2,255	2,286
Exhaust gas composition				
CO_2 content (% vol)	11.1	11.2	11.3	11.2
O_2 content (% vol)	8.16	8.12	8.12	8.13
Moisture (% vol)	12.9	12.9	12.4	12.7
Exhaust gas flowrate				
Standard conditions (scfm)	5,612	5,590	5,555	5,586
Dry basis (dscfm)	4,890	4,883	4,866	4,880
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)*	62.7	71.0	72.5	68.7
NO_X emissions (lb/hr NO_2)	2.20	2.48	2.53	2.40
NO_X permit limit (lb/hr)				*3.00*
NO_X emissions (g/bhp-hr)	0.43	0.49	0.51	0.48
NO_X permit limit (g/bhp-hr)				*0.60*
Carbon monoxide emission rates				
CO conc. (ppmvd)*	644.2	669.4	670.8	661.4
CO emissions (lb/hr)	13.74	14.26	14.24	14.08
CO permit limit (lb/hr)				*17.20*
CO emissions (g/bhp-hr)	2.70	2.82	2.86	2.80
CO permit limit (g/bhp-hr)				*3.50*
VOC/NMHC emission rates				
VOC conc. (ppmv C_3)	34.5	34.7	34.8	34.7
VOC emissions (lb/hr)	1.33	1.33	1.33	1.33
VOC permit limit (lb/hr)				*1.40*
VOC emissions (g/bhp-hr)	0.26	0.26	0.27	0.26
VOC permit limit (g/bhp-hr)				*0.28*
Opacity observations				
Visible emissions (%)- Highest 6-minute average				0.00
Visible emissions (%)- Highest 6-minute average limit				*10.00*

* Corrected for calibration bias.

Table 2. Summary of Engine #1 (EU004) Emissions based on Fuel Characterization
Trail Ridge Energy, LLC - Jacksonville, Duval County, Florida

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Measured Concentrations (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content as H_2S (ppmv)	Resulting SO_2 Emission Factor (lb/MMscf)
Hydrogen sulfide	32.7	H_2S	1	32.7	5.413
Carbonyl sulfide	0.78	CSO	1	0.78	0.129
Methyl mercaptan	5.50	CH_4S	1	5.50	0.910
Dimethyl sulfide	10.33	C_2H_6S	1	10.33	1.710
Total SO2 emission factor (lb/MMscf)				**49.3**	**8.162**

Hydrogen Chloride Emission Factor for LFG Combustion

LFG Influent Chlorine Compounds[1]	Measured Concentration (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Content (ppmv)	Resulting HCl Emission Factor (lb/MMscf)
Freon 12 (Dichlorodifluoromethane)	0.513	CCl_2F_2	2	1.03	0.097
Freon 114 (Dichlorotetrafluroethane)	0.045	$C_2Cl_2F_4$	2	0.09	0.008
Vinyl Chloride	0.096	C_2HCl	1	0.10	0.009
Chloroethane	0.103	C_2H_5Cl	1	0.10	0.010
Freon 11 (Fluorotrichloromethane)	0.089	$CFCl_3$	3	0.27	0.025
Methylene Chloride (Dichloromethane)	0.343	CH_2Cl_2	2	0.69	0.065
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.507	$C_2H_2Cl_2$	2	1.01	0.096
1,2-Dichloroethene (as trans-1,2-Dichloroethen	0.023	$C_2H_2Cl_2$	2	0.05	0.004
1,1-Dichloroethane	0.040	$C_2H_4Cl_2$	2	0.08	0.008
1,2-Dichloroethane	0.610	$C_2H_4Cl_2$	2	1.22	0.115
Trichloroethene	0.350	C_2HCl_3	3	1.05	0.099
1,2-dichloropropane	0.058	$C_3H_6Cl_2$	2	0.12	0.011
Tetrachloroethene (Perchloroethene)	0.387	C_2Cl_4	4	1.55	0.146
Chlorobenzene	0.070	C_6H_5Cl	1	0.07	0.007
1,4-Dichlorobenzene	0.022	$C_6H_4Cl_2$	2	0.04	0.004
Dichlorofluoromethane	0.127	$CHCl_2F$	2	0.25	0.024
Chlorodifluoromethane	1.467	$CHClF_2$	1	1.47	0.138
Total HCl emission factor (lb/MMscf)				**9.18**	**0.865**

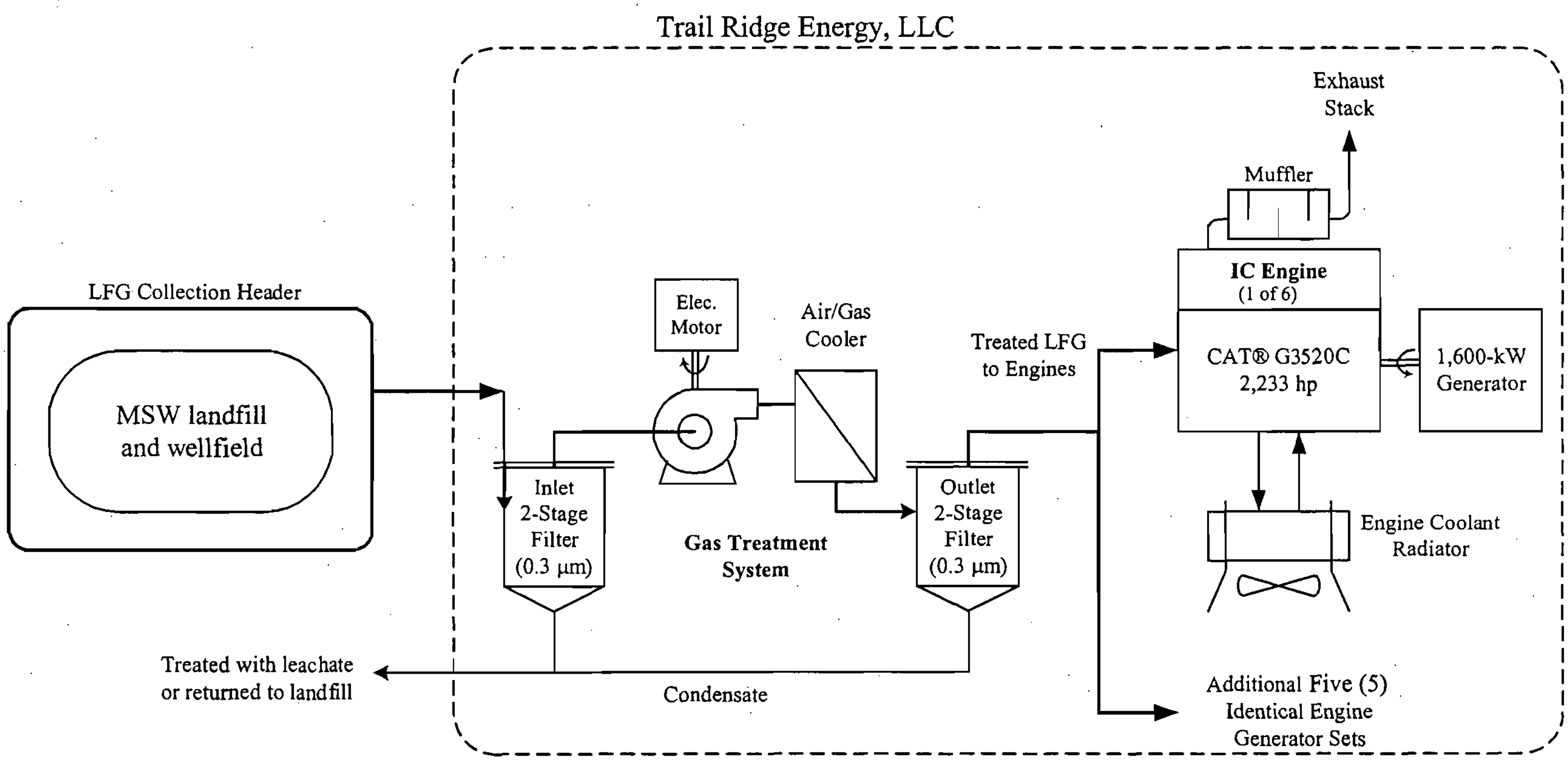

Figure 1.

Trail Ridge Energy, LLC LFG Electricity Generation Facility		
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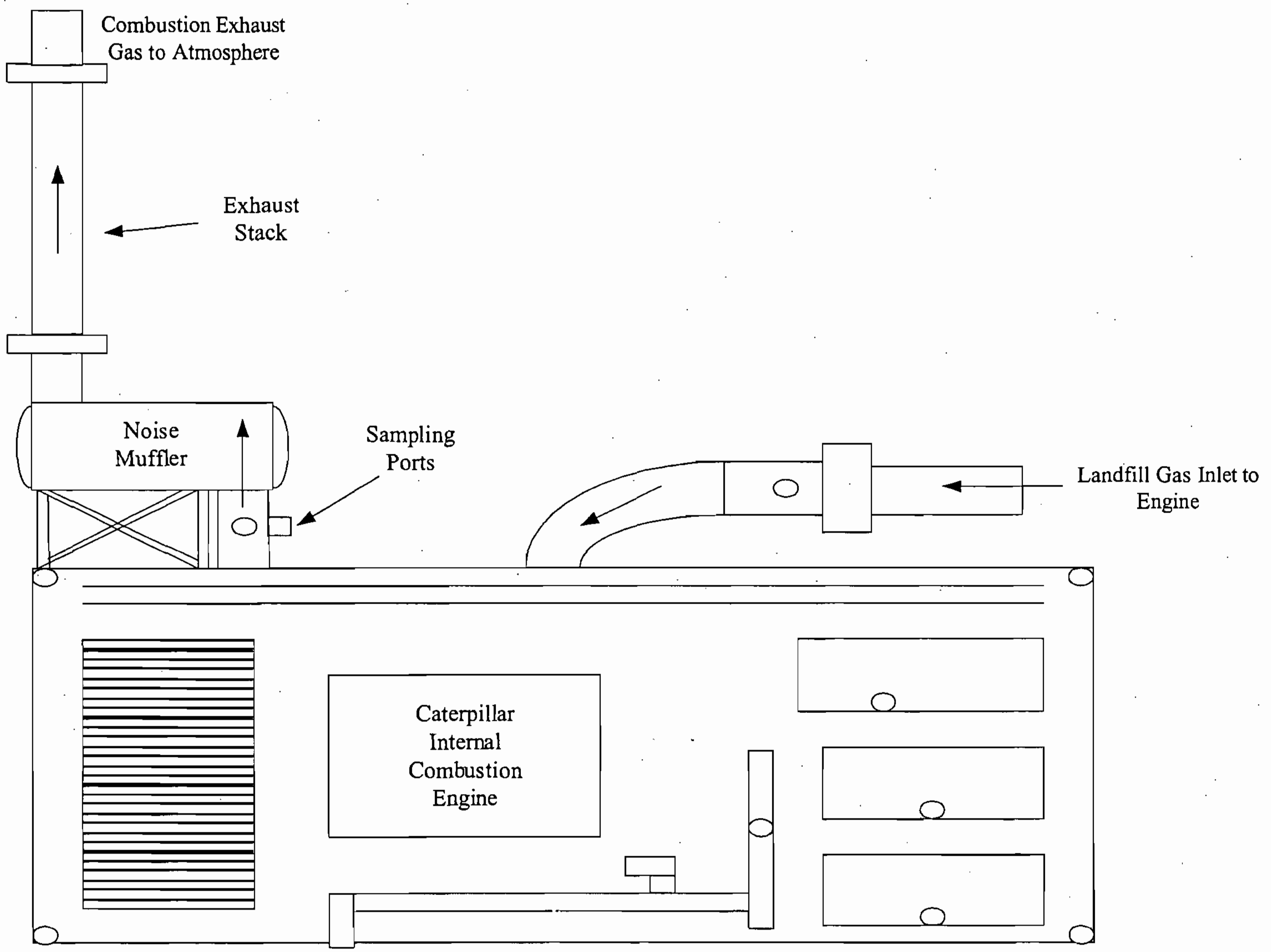
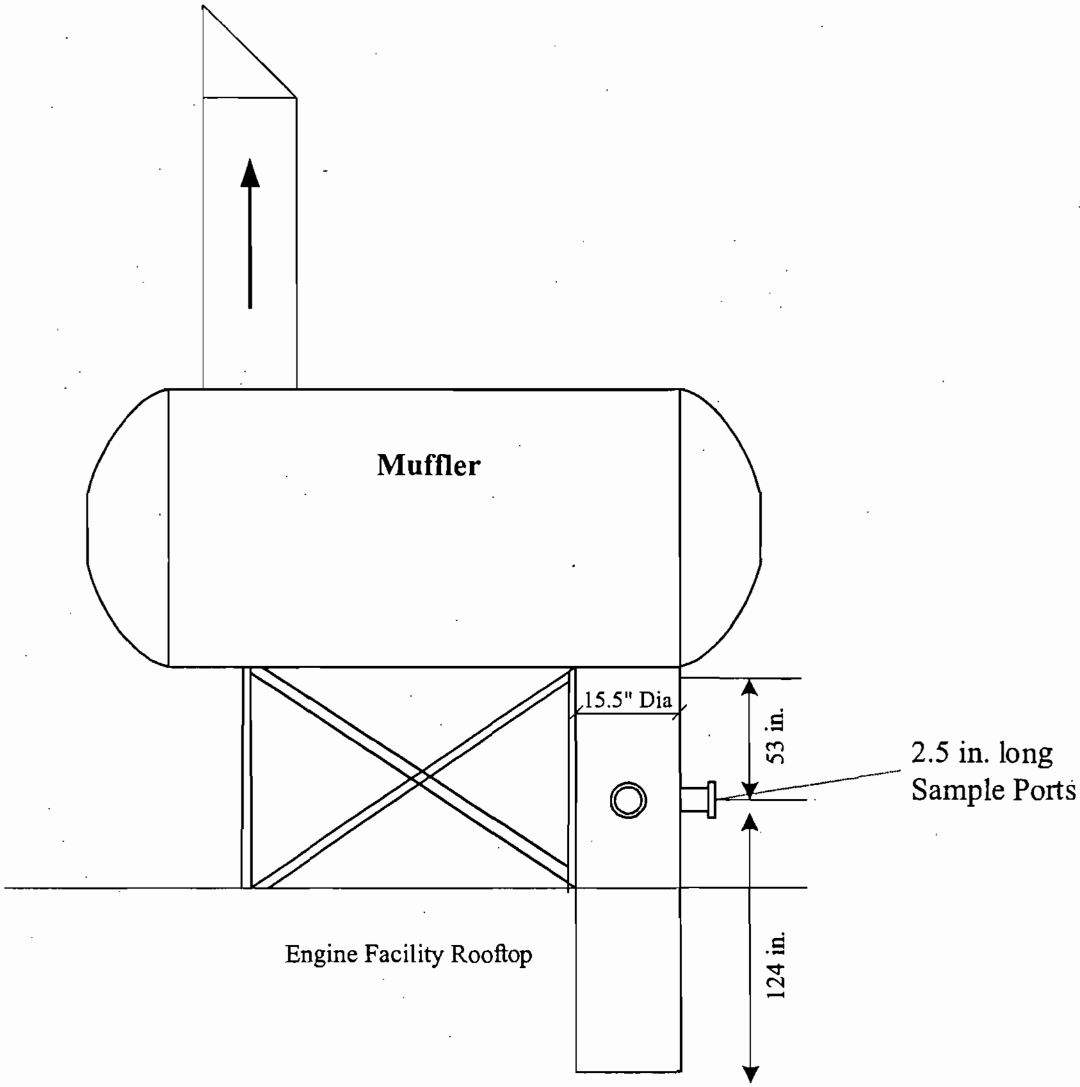
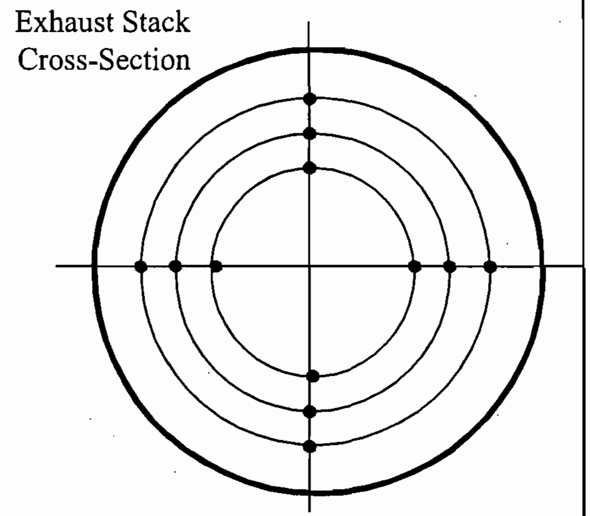


Figure 2

2/7/2012	**Trail Ridge Energy, LLC General Engine Operation Flow Diagram**		
	Scale None	Sheet 1 of 1	Derenzo and Associates Project No. 1201048

Engine Exhausts





Velocity sample locations as measured from sample port opening

Sample Port	
Pt. #	in.
1	3.18
2	4.76
3	7.09
4	13.41
5	15.74
6	17.32

Figure 3

Trail Ridge Energy, LLC
Exhaust Sample Locations

Scale	Sheet	Derenzo and Associates
None	1 of 1	Project No. 1201048

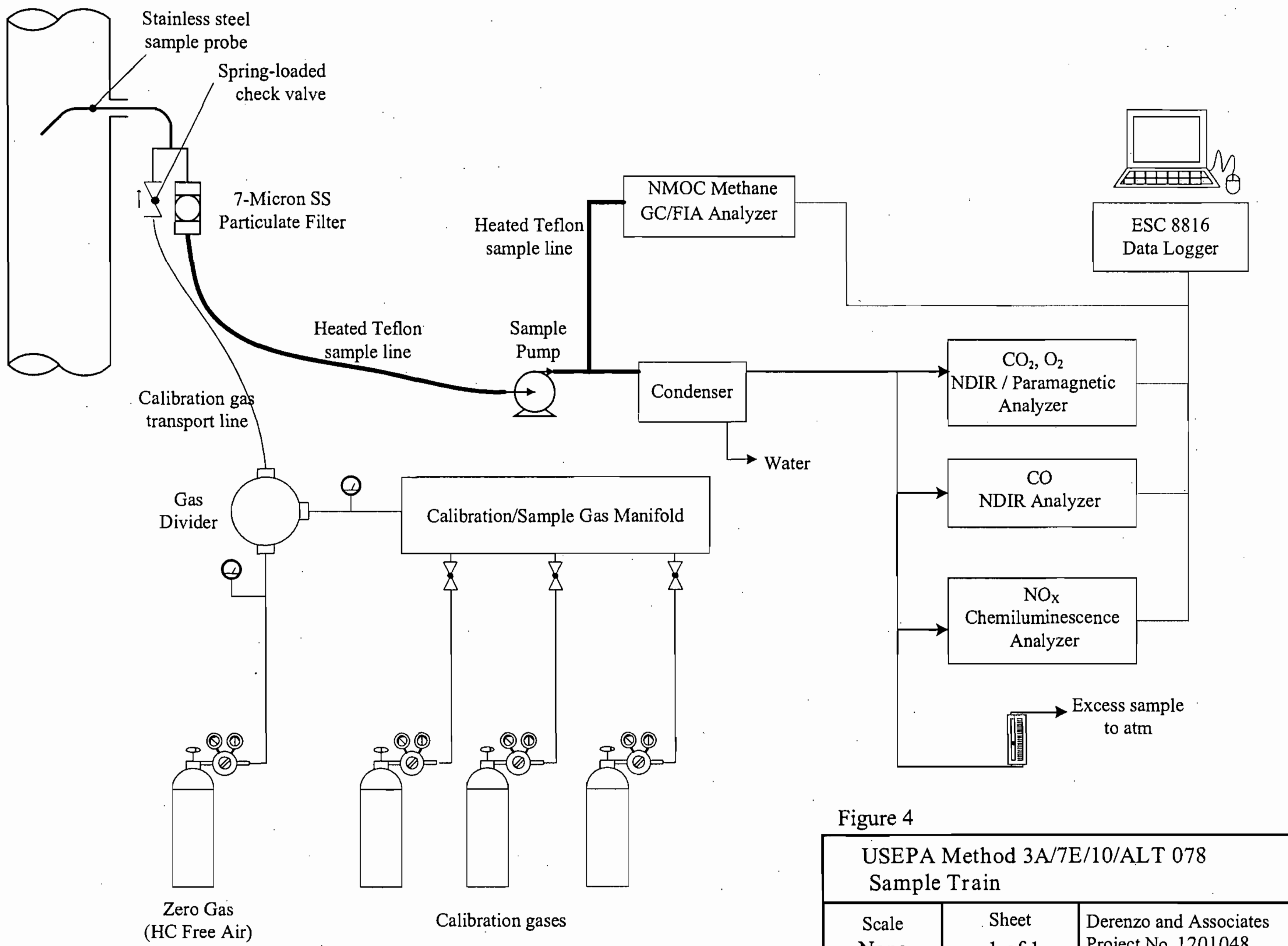


Figure 4

USEPA Method 3A/7E/10/ALT 078 Sample Train		
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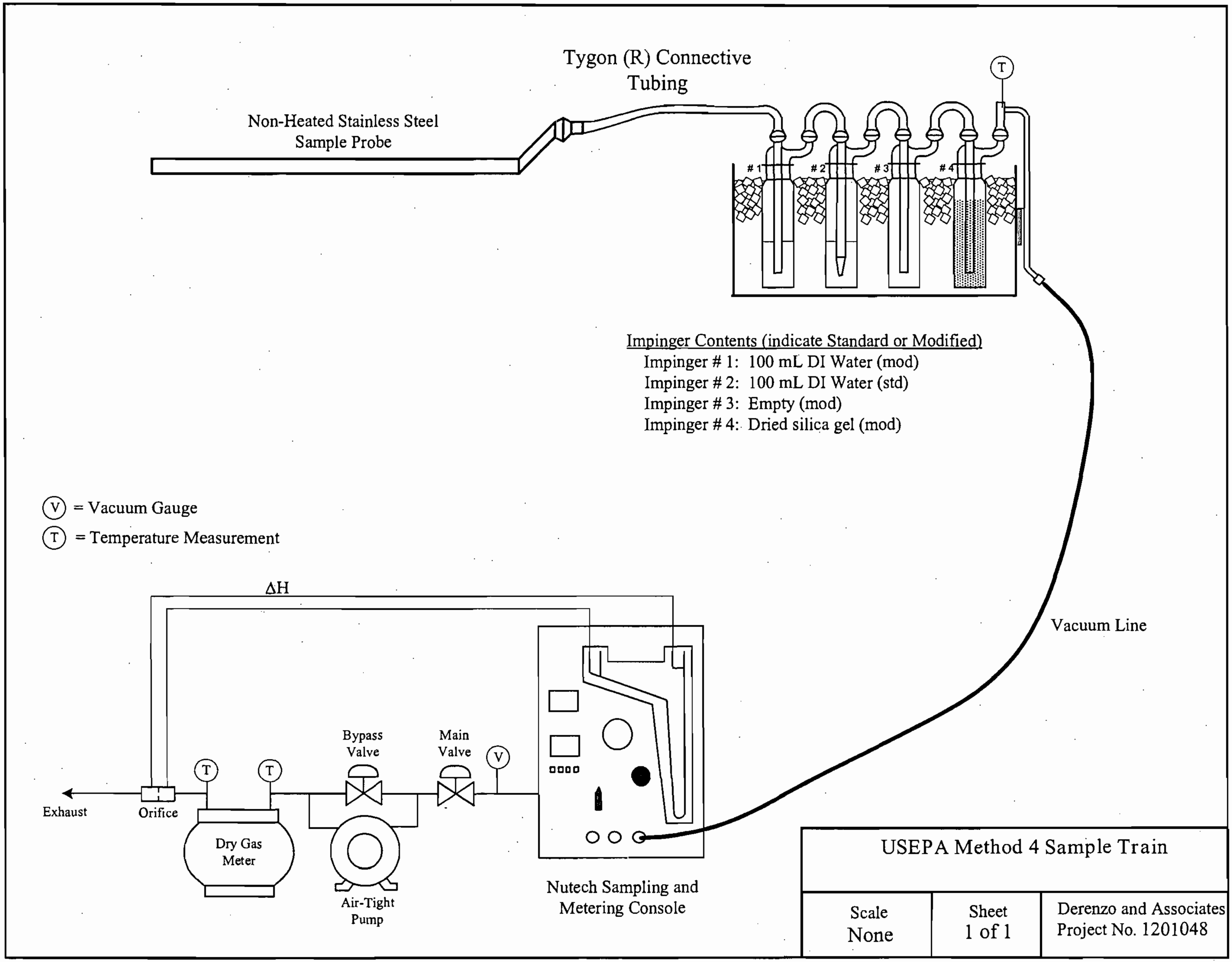

Tygon (R) Connective Tubing
Non-Heated Stainless Steel Sample Probe
T
1
2
3
4
Impinger Contents (indicate Standard or Modified)
Impinger # 1: 100 mL DI Water (mod)
Impinger # 2: 100 mL DI Water (std)
Impinger # 3: Empty (mod)
Impinger # 4: Dried silica gel (mod)
V = Vacuum Gauge
T = Temperature Measurement
ΔH
Vacuum Line
Bypass Valve
Main Valve
V
T
T
Exhaust
Orifice
Dry Gas Meter
Air-Tight Pump
Nutech Sampling and Metering Console
USEPA Method 4 Sample Train
Scale None
Sheet 1 of 1
Derenzo and Associates Project No. 1201048

APPENDIX A

COMPUTER GENERATED AND FIELD DATA

Derenzo & Associates, Inc.

EPA Method 25A/ALT 078 NMOC Calculation Summary

Company	Trail Ridge Energy
Location	Geneva, FL
Source	EU004 (ICE#1)
Date	03/28/12
Measurement	NMOC by TEI 55C - USEPA Method Alt-078

		Test 1	Test 2	Test 3
Average NMOC concentration, as C_3H_8	=	34.55	34.70	34.75

NMOC Emission Rate lb/hr as Propane

Volumetric flow rate	=	5,612	5,590	5,555
$E_{VOC} = (C_{d\ dry\ as\ C3H8})$ (Qwstd) (60 min/hr) (MW_{C3H8}) / (V_M)	=	1.33	1.33	1.33

where:

C_d	= observed NMOC concentration, wet basis (ft^3 NMOC / 10^6 ft^3 stack gas)
$Q_d$std	= stack gas flowrate (scfm)
$MW_{propane}$	= molecular weight Propane (44.01 lb/lb-mol)
V_M	= molar volume of ideal gas at std conditions (385 ft^3/lb-mol)

NMOC Emission Factor g/bHp*hr as Propane

Average generator kilowatt output	=	1,654	1,643	1,616
Engine Output (bHp*hr) = (kWavg)/(0.961)/(0.7457 kW/bHp*hr)	=	2309	2293	2255

where:

kW_{avg}	= average recorded generator kilowatt output
0.961	= engine to generator efficiency
0.7457	= conversion factor, kilowatts to brake horsepower * hour

(E_{VOC}) (453.6 g/lb) / (bHp*hr)	=	0.26	0.26	0.27

where:

E_{CO}	= NMOC emission rate (lb/hr as Propane)
453.6	= conversion factor, grams to pounds
bHp*hr	= engine brake horsepower hour

Derenzo & Associates, Inc.
EPA Method 7E NOx Calculation Summary

Company	Trail Ridge Energy
Location	Geneva, FL
Source	EU004 (ICE#1)
Date	3/28/2012

		Test 1	Test 2	Test 3	
Average NOx concentration	=	62.24	70.60	72.20	ppmv
Average pre-test and post-test instrument zero	=	0.51	0.19	0.30	ppmv
Average pre-test and post-test instrument calibration	=	78.65	78.90	79.01	ppmv
Midrange calibration gas concentration	=	79.3	79.3	79.3	ppmv
Volumetric flow rate	=	4,890	4,883	4,866	dscfm
Average generator kilowatt output	=	1,654	1,643	1,616	kW

NOx CONCENTRATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

C_d = (NOx conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero) = 62.7 71.0 72.5 ppmv

NOx EMISSION RATE, AS NO_2

$E_{NOx} = (C_d)\ (Q_d std)\ (60\ min/hr)\ (MW_{NO2}) / (V_M)$ = 2.20 2.48 2.53 lb/hr as NO_2

where:
C_d = observed NOx concentration, dry basis (ft^3 NOx / 10^6 ft^3 stack gas)
$Q_d$std = stack gas flowrate (dscfm)
MW_{NOx} = molecular weight NO_2 (46.0 lb/lb-mol)
V_M = molar volume of ideal gas at std conditions (385 ft^3/lb-mol)

Engine Output (bHp) = $(kW_{avg})/(0.961)/(0.7457\ kW/bHp)$ = 2309 2293 2255 bHp

where:
kW_{avg} = average recorded generator kilowatt output
0.96 = engine to generator efficiency
0.7457 = conversion factor, kilowatts to brake horsepower

$(E_{NOx})\ (453.6\ g/lb) / (bHp)$ = 0.43 0.49 0.51 g/bHp*hr

where:
E_{NOx} = NOx emission rate (lb/hr)
453.6 = conversion factor, grams to pounds
bHp = engine brake horsepower

Derenzo & Associates, Inc.
EPA Method 10 CO Calculation Summary

Company: Trail Ridge Energy
Location: Geneva, FL
Source: EU004 (ICE#1)
Date: 3/28/2012

		Test 1	Test 2	Test 3	
Average CO concentration	=	642.0	673.8	673.2	ppmv
Average pre-test and post-test instrument zero	=	1.96	1.07	0.15	ppmv
Average pre-test and post-test instrument calibration	=	781.3	789.3	787.2	ppmv
Midrange calibration gas concentration	=	784.3	784.3	784.3	ppmv
Volumetric flow rate	=	4,890	4,883	4,866	dscfm
Average generator kilowatt output	=	1,654	1,643	1,616	kW

CO CONCENTRATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

C_d = (CO conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero)	=	644.2	669.4	670.8	ppmv

CO EMISSION RATE

$E_{CO} = (C_d)\ (Q_d\text{std})\ (60\ \text{min/hr})\ (MW_{CO})\ /\ (V_M)$	=	13.75	14.27	14.25	lb/hr

where:
C_d = observed CO concentration, dry basis (ft^3 CO / 10^6 ft^3 stack gas)
$Q_d$std = stack gas flowrate (dscfm)
MW_{CO} = molecular weight CO (28.0 lb/lb-mol)
V_M = molar volume of ideal gas at std conditions (385 ft^3/lb-mol)

Engine Output (bHp) = (kW_{avg})/(0.961)/(0.7457 kW/bHp)	=	2309	2293	2255	bHp

where:
kW_{avg} = average recorded generator kilowatt output
0.961 = engine to generator efficiency
0.7457 = conversion factor, kilowatts to brake horsepower

(E_{CO}) (453.6 g/lb) / (bHp)	=	2.70	2.82	2.87	g/bHp*hr

where:
E_{CO} = CO emission rate (lb/hr)
453.6 = conversion factor, grams to pounds
bHp = engine brake horsepower

Derenzo & Associates, Inc.

EPA Method 3A CO_2 Calculation Summary

Company: Trail Ridge Energy
Location: Geneva, FL
Source: EU004 (ICE#1)
Date: 3/28/2012

Test ID	=	1	2	3	
Average CO_2 concentration	=	10.88	11.11	11.28	%
Average pre-test and post-test instrument zero	=	0.01	0.00	0.00	%
Average pre-test and post-test instrument calibration	=	13.47	13.57	13.72	%
Midrange calibration gas concentration	=	13.70	13.70	13.70	%

CO_2 CONCENTATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

(CO_2 conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero)	=	11.1	11.2	11.3	%

Derenzo & Associates, Inc.

EPA Method 3A O_2 Calculation Summary

Company: Trail Ridge Energy
Location: Geneva, FL
Source: EU004 (ICE#1)
Date: 3/28/2012

Test ID	=	1	2	3	
Average O_2 concentration	=	8.09	8.04	8.04	%
Average pre-test and post-test instrument zero	=	0.01	0.01	0.01	%
Average pre-test and post-test instrument calibration	=	8.31	8.30	8.30	%
Midrange calibration gas concentration	=	8.38	8.38	8.38	%

O_2 CONCENTATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

(O_2 conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero)	=	8.16	8.12	8.12	%

Company	Trail Ridge Energy		
Source Designation	ICE1 (EU004)	**Pitot Tube Number**	5F-1
Test Date	3/28/2012	**Pitot Tube Corr. Factor**	0.84
Test Number	Pre 1	**% CO_2**	11.06
Time	13:49	**% O_2**	8.16
Barometric Pressure	30.21	**% CO**	0.00
Stack Static Pressure	8.0	**% N_2**	80.77
Stack Diameter (in.)	15.5	**Md**	30.10
Traverse points	12	**Ms**	28.54
Operator	RB/DW	**Moisture Content (%)**	12.9

Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)	Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)
Side A			Side B		
1	936	3.80	1	936	3.85
2	939	4.05	2	937	4.15
3	943	4.15	3	939	4.15
4	940	3.95	4	941	4.10
5	936	4.15	5	937	4.35
6	933	4.20	6	935	4.35
Average	938	4.05		938	4.16

Average Velocity Pressure ("H_2O)	4.104
Average Velocity Pressure Sqrt ("H_2O)	2.025
Meter Pressure ("Hg)	30.39
Stack Pressure ("Hg)	30.80
Stack Gas Specific Gravity (Gs)	0.99
Average Stack Temperature (°F)	938
Average Stack Velocity (fps)	183.4
Average Stack Velocity (fpm)	11005.3
Area of Stack (ft^2)	1.310
Flowrate (Actual-CFM)	14,421
Flowrate (Standard Wet-SCFM)	5,608
Flowrate (Standard Dry-DSCFM)	4,885

Moisture Calculation	
Bws=	0.129
Cond. Vol.=	3.72
Samp. Vol. std=	25.16
Vwc=	67.7
Wsg=	11.4
Vmf=	446.729
Vmi=	421.001
Ym=	0.9971
Delta H=	2.5
Tm=	87

Dry Gas Meter Temperatures

Minutes	DGM Temp In	DGM Temp Out
0	81	80
5	87	81
10	91	82
15	94	83
20	96	83
25	97	84

Company	Trail Ridge Energy		
Source Designation	ICE1 (EU004)	**Pitot Tube Number**	5F-1
Test Date	3/28/2012	**Pitot Tube Corr. Factor**	0.84
Test Number	Pre 2	**% CO_2**	11.22
Time	15:37	**% O_2**	8.12
Barometric Pressure	30.21	**% CO**	0.00
Stack Static Pressure	8.00	**% N_2**	80.67
Stack Diameter (in.)	15.5	**Md**	30.12
Traverse points	12	**Ms**	28.56
Operator	RB/DW	**Moisture Content (%)**	12.9

Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)	Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)
Side A			Side B		
1	937	3.80	1	936	3.85
2	939	4.10	2	938	4.05
3	941	4.10	3	940	4.15
4	940	4.00	4	939	4.05
5	936	4.30	5	936	4.35
6	934	4.35	6	934	4.35
Average	938	4.11		937	4.13

Average Velocity Pressure ("H_2O)	4.121
Average Velocity Pressure Sqrt ("H_2O)	2.029
Meter Pressure ("Hg)	30.39
Stack Pressure ("Hg)	30.80
Stack Gas Specific Gravity (Gs)	0.99
Average Stack Temperature (°F)	938
Average Stack Velocity (fps)	183.7
Average Stack Velocity (fpm)	11022.1
Area of Stack (ft^2)	1.310
Flowrate (Actual-CFM)	14,443
Flowrate (Standard Wet-SCFM)	5,617
Flowrate (Standard Dry-DSCFM)	4,894

Moisture Calculation	
Bws=	0.129
Cond. Vol.=	3.77
Samp. Vol. std=	25.51
Vwc=	69.1
Wsg=	10.9
Vmf=	473.163
Vmi=	446.951
Ym=	0.9971
Delta H=	2.5
Tm=	89

Dry Gas Meter Temperatures

Minutes	DGM Temp In	DGM Temp Out
0	83	82
5	88	83
10	95	84
15	99	85
20	100	85
25	101	86

Company	Trail Ridge Energy		
Source Designation	ICE1 (EU004)	**Pitot Tube Number**	5F-1
Test Date	3/28/2012	**Pitot Tube Corr. Factor**	0.84
Test Number	Pre 3	**% CO_2**	11.26
Time	17:12	**% O_2**	8.12
Barometric Pressure	30.21	**% CO**	0.00
Stack Static Pressure	7.60	**% N_2**	80.62
Stack Diameter (in.)	15.5	**Md**	30.13
Traverse points	12	**Ms**	28.62
Operator	RB/DW	**Moisture Content (%)**	12.4

Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)	Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)
Side A			Side B		
1	940	3.45	1	939	3.80
2	940	3.95	2	940	4.00
3	940	4.00	3	938	4.20
4	942	3.80	4	939	4.20
5	937	4.25	5	936	4.35
6	934	4.35	6	934	4.35
Average	939	3.97		938	4.15

Average Velocity Pressure ("H_2O)	4.058
Average Velocity Pressure Sqrt ("H_2O)	2.013
Meter Pressure ("Hg)	30.39
Stack Pressure ("Hg)	30.77
Stack Gas Specific Gravity (Gs)	0.99
Average Stack Temperature (°F)	938
Average Stack Velocity (fps)	182.2
Average Stack Velocity (fpm)	10930.8
Area of Stack (ft^2)	1.310
Flowrate (Actual-CFM)	14,323
Flowrate (Standard Wet-SCFM)	5,562
Flowrate (Standard Dry-DSCFM)	4,873

Moisture Calculation	
Bws=	0.124
Cond. Vol.=	3.58
Samp. Vol. std=	25.28
Vwc=	68.3
Wsg=	7.7
Vmf=	499.389
Vmi=	473.440
Ym=	0.9971
Delta H=	2.5
Tm=	89

Dry Gas Meter Temperatures

Minutes	DGM Temp In	DGM Temp Out
0	84	84
5	88	84
10	92	84
15	95	85
20	97	86
25	99	86

Company	Trail Ridge Energy		
Source Designation	ICE1 (EU004)	**Pitot Tube Number**	5F-1
Test Date	3/28/2012	**Pitot Tube Corr. Factor**	0.84
Test Number	Post 3	**% CO_2**	11.26
Time	19:00	**% O_2**	8.12
Barometric Pressure	30.21	**% CO**	0.00
Stack Static Pressure	7.80	**% N_2**	80.62
Stack Diameter (in.)	15.5	**Md**	30.13
Traverse points	12	**Ms**	28.62
Operator	RB/DW	**Moisture Content (%)**	12.4

Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)	Traverse Point Number	Stack Temp. (°F)	Velocity Pres. ("H2O)
Side A			Side B		
1	938	3.90	1	939	3.75
2	941	3.95	2	941	3.95
3	943	4.00	3	943	4.10
4	944	3.90	4	942	4.00
5	939	4.25	5	938	4.15
6	936	4.25	6	935	4.25
Average	940	4.04		940	4.03

Average Velocity Pressure ("H_2O)	4.038
Average Velocity Pressure Sqrt ("H_2O)	2.009
Meter Pressure ("Hg)	30.39
Stack Pressure ("Hg)	30.78
Stack Gas Specific Gravity (Gs)	0.99
Average Stack Temperature (°F)	940
Average Stack Velocity (fps)	181.8
Average Stack Velocity (fpm)	10910.7
Area of Stack (ft^2)	1.310
Flowrate (Actual-CFM)	14,297
Flowrate (Standard Wet-SCFM)	5,548
Flowrate (Standard Dry-DSCFM)	4,860

Moisture Calculation	
Bws=	0.124
Cond. Vol.=	3.58
Samp. Vol. std=	25.28
Vwc=	68.3
Wsg=	7.7
Vmf=	499.389
Vmi=	473.440
Ym=	0.9971
Delta H=	2.5
Tm=	89

Dry Gas Meter Temperatures

Minutes	DGM Temp In	DGM Temp Out
0	84	84
5	88	84
10	92	84
15	95	85
20	97	86
25	99	86

Six-Minute USEPA Method 9 Opacity Averages
for the
Unit #1 (EU004) Caterpillar Model G3520C Engine
at
Trail Ridge Energy, L.L.C.
Trail Ridge Waste Management Facility - Baldwin, Duval County, Florida
Test Date: March 28, 2012

Start Time: 14:12 End Time: 15:12 Page 1 of 1

Minute	Second 0	15	30	45	6-min Average
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	0.0
7	0	0	0	0	0.0
8	0	0	0	0	0.0
9	0	0	0	0	0.0
10	0	0	0	0	0.0
11	0	0	0	0	0.0
12	0	0	0	0	0.0
13	0	0	0	0	0.0
14	0	0	0	0	0.0
15	0	0	0	0	0.0
16	0	0	0	0	0.0
17	0	0	0	0	0.0
18	0	0	0	0	0.0
19	0	0	0	0	0.0
20	0	0	0	0	0.0
21	0	0	0	0	0.0
22	0	0	0	0	0.0
23	0	0	0	0	0.0
24	0	0	0	0	0.0
25	0	0	0	0	0.0
26	0	0	0	0	0.0
27	0	0	0	0	0.0
28	0	0	0	0	0.0
29	0	0	0	0	0.0
30	0	0	0	0	0.0
31	0	0	0	0	0.0
32	0	0	0	0	0.0
33	0	0	0	0	0.0
34	0	0	0	0	0.0
35	0	0	0	0	0.0
36	0	0	0	0	0.0
37	0	0	0	0	0.0
38	0	0	0	0	0.0
39	0	0	0	0	0.0
40	0	0	0	0	0.0
41	0	0	0	0	0.0
42	0	0	0	0	0.0
43	0	0	0	0	0.0
44	0	0	0	0	0.0
45	0	0	0	0	0.0
46	0	0	0	0	0.0
47	0	0	0	0	0.0
48	0	0	0	0	0.0
49	0	0	0	0	0.0
50	0	0	0	0	0.0
51	0	0	0	0	0.0
52	0	0	0	0	0.0
53	0	0	0	0	0.0
54	0	0	0	0	0.0
55	0	0	0	0	0.0
56	0	0	0	0	0.0
57	0	0	0	0	0.0
58	0	0	0	0	0.0
59	0	0	0	0	0.0
60	0	0	0	0	0.0
			6-minute average maximum		0.0

Trail Ridge Energy, LLC (March 28, 2012 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Analytical Report Concentrations[A] (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content[B] as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	32.7	H_2S	1	32.7	5.413 *
Carbonyl sulfide	0.78	CSO	1	0.78	0.129
Methyl mercaptan	5.50	CH_4S	1	5.50	0.910
Ethyl mercaptan	<0.66	C_2H_6S	1	<0.66	<0.109
Dimethyl sulfide	10.33	C_2H_6S	1	10.33	1.710
Carbon disulfide	<0.50	CS_2	2	<1.00	<0.166
Isopropyl mercaptan	<0.66	C_3H_6S	1	<0.66	0.109
tert-Butyl mercaptan	<0.66	$C_4H_{10}S$	1	<0.66	<0.109
n-Propyl mercaptan	<0.66	C_3H_8S	1	<0.66	<0.109
Ethyl methyl sulfide	<0.66	C_3H_8S	1	<0.66	<0.109
Thiophene	<0.66	C_4H_4S	1	<0.66	<0.109
Isobutyl mercaptan	<0.66	$C_4H_{10}S$	1	<0.66	<0.109
Diethyl sulfide	<0.66	$CH_3CH_2SCH_2CH_3$	1	<0.66	<0.109
n-Butyl mercaptan	<0.66	$C_4H_{10}S$	1	<0.66	<0.109
3-Methyl Thiophene	<0.66	C_5H_6S	1	<0.66	<0.109
Dimethyl disulfide	<0.66	CH_3SSCH_3	2	<1.32	<0.218
Tetrahydrothiophene	<0.66	$C_4H_8O_2S$	1	<0.66	<0.109
2-Ethylthiophene	<0.66	C_6H_8S	1	<0.66	<0.109
2,5-Dimethylthiopene	<0.66	C_6H_8S	1	<0.66	<0.109
Diethyl disulfide	<0.66	CH_3SSCH_3	2	<1.32	<0.218
Total				**<61.5**	**<10.185** [C]

Notes

A. March 29, 2012 LFG sample laboratory analytical results (see Attachment) (average of 3 samples)

B. Determined by multiplying concentration by number of sulfur atoms in the molecule.

C. Calculation of SO_2 emission factor from sulfur content, as H_2S:

(61.5 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (387 ft^3/mol)

10.19 lb SO_2/MMcf LFG

* Sample calculation: SO_2 generation from hydrogen sulfide (H_2S):

(32.7 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (387 ft^3/mol)

= 5.41 lb SO_2/MMcf LFG

Trail Ridge Energy, LLC (March 28, 2012 Sample)

Sulfur Dioxide Emission Factor for LFG Combustion

LFG Influent Sulfur Compound	Measured Concentrations[A] (ppmv)	Molecular Formula	No. Sulfur Atoms	Sulfur Content[B] as H_2S (ppmv)	Resulting SO_2 Emission Rate (lb./MMcf)
Hydrogen sulfide	32.7	H_2S	1	32.7	5.413 *
Carbonyl sulfide	0.78	CSO	1	0.78	0.129
Methyl mercaptan	5.50	CH_4S	1	5.50	0.910
Dimethyl sulfide	10.33	C_2H_6S	1	10.33	1.710
Total				**49.3**	**8.162**

Notes

A. March 29, 2012 LFG sample laboratory analytical results (see Attachment) (average of 3 samples)

B. Determined by multiplying concentration by number of sulfur atoms in the molecule.

* Sample calculation: SO_2 generation from hydrogen sulfide (H_2S):

(32.7 scf H_2S/MMcf LFG) (1 scf SO_2/scf H_2S) (64.06 lb.SO_2/mol) / (387 ft^3/mol)

= 5.41 lb SO_2/MMcf LFG

Trail Ridge Energy, LLC (March 28, 2012 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Coumpounds	Analytical Report Concentration[1] (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.513	CCl_2F_2	2	0.097 *
Freon 114 (Dichlorotetrafluroethane)	0.045	$C_2Cl_2F_4$	2	0.008
Chloromethane	<0.160	CH_3Cl	1	<0.015
Vinyl Chloride	0.096	C_2HCl	1	0.009
Chloroethane	0.103	C_2H_5Cl	1	0.010
Freon 11 (Fluorotrichloromethane)	0.089	$CFCl_3$	3	0.025
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.017	$C_2Cl_2F_3$	2	<0.003
3-Chloropropene	<0.200	C_3H_5Cl	1	<0.019
Methylene Chloride (Dichloromethane)	0.343	CH_2Cl_2	2	0.065
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.507	$C_2H_2Cl_2$	2	0.096
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	0.023	$C_2H_2Cl_2$	2	0.004
1,1-Dichloroethane	0.040	$C_2H_4Cl_2$	2	0.008
1,1-Dichloroethene	<0.017	$C_2H_2Cl_2$	2	<0.003
Chloroform	<0.017	$CHCl_3$	3	<0.005
1,1,1-Trichloroethane	<0.017	$C_2H_3Cl_3$	3	<0.005
Carbon Tetrachloride	<0.017	CCl_4	4	<0.006
1,2-Dichloroethane	0.610	$C_2H_4Cl_2$	2	0.115
Trichloroethene	0.350	C_2HCl_3	3	0.099
1,2-dichloropropane	0.058	$C_3H_6Cl_2$	2	0.011
Bromodichloromethane	<0.017	$CBrCl_2$	2	<0.003
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.017	$C_3H_4Cl_2$	2	<0.003
1,3-Dichloropropene (as trans-1,3-Dichloropropene)	<0.017	$C_3H_4Cl_2$	2	<0.003
1,1,2-Trichloroethane	<0.017	$C_2H_3Cl_3$	3	<0.005
Tetrachloroethene (Perchloroethene)	0.387	C_2Cl_4	4	0.146
Dibromochloromethane	<0.017	$CHBr_2Cl$	1	<0.002
Chlorobenzene	0.070	C_6H_5Cl	1	0.007
1,1,2,2-Tetrachloroethane	<0.017	$C_2H_2Cl_4$	4	<0.006
1,3-Dichlorobenzene	<0.017	$C_6H_4Cl_2$	2	<0.003
1,4-Dichlorobenzene	0.022	$C_6H_4Cl_2$	2	0.004
alpha-Chlorotoluene	<0.017	C_7H_7Cl	1	<0.002
1,2-Dichlorobenzene	<0.017	$C_6H_4Cl_2$	2	<0.003
1,2,4-Trichlorobenzene	<0.063	$C_6H_3Cl_3$	3	<0.018
Hexachlorobutadiene	<0.063	C_4Cl_6	6	<0.036
Dichlorofluoromethane	0.127	$CHCl_2F$	2	0.024
Chlorodifluoromethane	1.467	$CHClF_2$	1	0.138
Total hydrogen chloride emission factor (lb./MMcf)				**<1.00**

Notes

1. April 6, 2012 LFG sample laboratory analytical results.

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl

(0.513 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol)

= 0.097 lb. HCl/MMcf LFG

Trail Ridge Energy, LLC (March 28, 2012 Sample)

LFG Combustion Hydrogen Chloride Emission Factor

LFG Influent Chlorine Compounds	Measured Concentration[1] (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb./MMcf)
Freon 12 (Dichlorodifluoromethane)	0.513	CCl_2F_2	2	0.097 *
Freon 114 (Dichlorotetrafluroethane)	0.045	$C_2Cl_2F_4$	2	0.008
Vinyl Chloride	0.096	C_2HCl	1	0.009
Chloroethane	0.103	C_2H_5Cl	1	0.010
Freon 11 (Fluorotrichloromethane)	0.089	$CFCl_3$	3	0.025
Methylene Chloride (Dichloromethane)	0.343	CH_2Cl_2	2	0.065
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.507	$C_2H_2Cl_2$	2	0.096
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	0.023	$C_2H_2Cl_2$	2	0.004
1,1-Dichloroethane	0.040	$C_2H_4Cl_2$	2	0.008
1,2-Dichloroethane	0.610	$C_2H_4Cl_2$	2	0.115
Trichloroethene	0.350	C_2HCl_3	3	0.099
1,2-dichloropropane	0.058	$C_3H_6Cl_2$	2	0.011
Tetrachloroethene (Perchloroethene)	0.387	C_2Cl_4	4	0.146
Chlorobenzene	0.070	C_6H_5Cl	1	0.007
1,4-Dichlorobenzene	0.022	$C_6H_4Cl_2$	2	0.004
Dichlorofluoromethane	0.127	$CHCl_2F$	2	0.024
Chlorodifluoromethane	1.467	$CHClF_2$	1	0.138
Total hydrogen chloride emission factor (lb./MMcf)				**0.86**

Notes

1. April 6, 2012 LFG sample laboratory analytical results.

* Example calculation for Freon 12 that assumes complete conversion of chloride to HCl
(0.513 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol)
= 0.097 lb. HCl/MMcf LFG

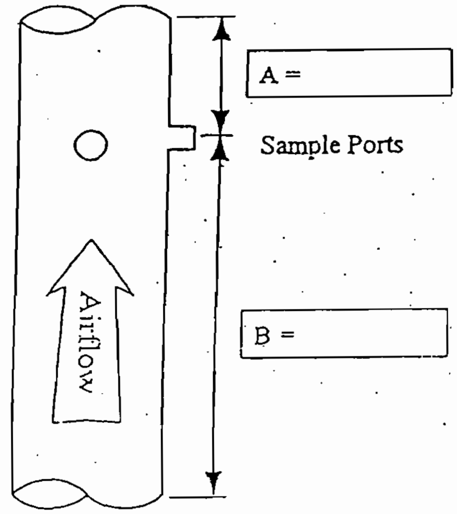
Derenzo and Associates, Inc.

USEPA Method 2
Gas Velocity Measurement Data Sheet

Company	Trail Ridge	No. of Points	12
Source Designation	ICC#1 (EU004)	Operator(s)	DW/LB
Test Date	3/28/12	Pitot Type	Type S or Standard (Type S circled)
Test Number	Pre 1	Pitot Identification	SF
Time (24-hr clock)	1349	O_2 Content (%)	CEM Data
Barometric Press. (in. Hg)	30.21	CO_2 Content (%)	
Static Pressure (in. H_2O)	8.0	Wet Bulb Temp.	

Inches from Stack Wall	Traverse Point Number	Stack Temperature (°F)	Velocity Head (in. H_2O)	Null Angel (zero angle)
	A- 1	936	3.80	3
	2	939	4.05	2
	3	943	4.15	5
	4	940	3.95	3
	5	936	~~[illegible]~~ 4.05	7
	6	933	~~[illegible]~~ 4.20	3
	B- 1	936	3.85	3
	2	937	4.15	0
	3	939	4.15	0
	4	941	4.10	5
	5	937	4.35	7
	6	935	4.35	5

Stack / Duct Measurements



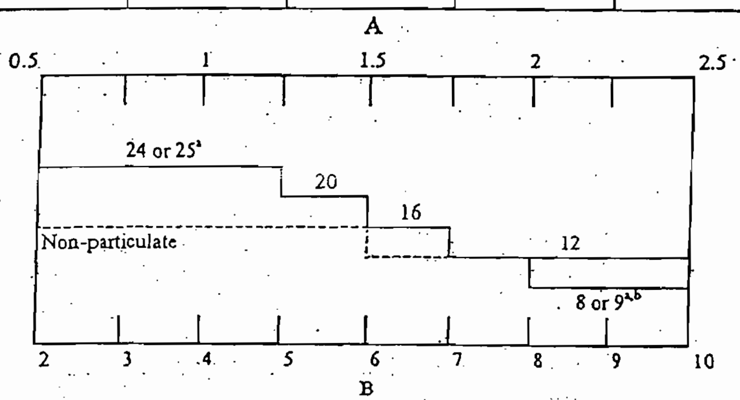
Round Duct Dia. (D) __________

Square Duct (LxW) ______ x ______

Square Duct Dia. (De): __________
De = 2LW / (L+W)

Straight Length: (diameters) A / D __________

B / D __________



a- Higher No. for rectanguar stacks
b- For stacks between 12 and 24 in.

Traverse Point	No. of Traverse Points Per Dia. 6	8	10	12
1	4.4	3.2	2.6	2.1
2	14.6	10.5	8.2	6.7
3	29.6	19.4	14.6	11.8
4	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

Isokinetic Field Sampling Data Sheet

Company	TRAIL Ridge Energy				
Source Designation	ICE #1 (E4004)				
Test Date	3/28/12	Pitot Number	—	Leak Rate Initial	0.0__ @ 15
Test Number	M-1	Meter Number	N-3	Leak Rate Final	0.0__ @ 4
Operator	DW/MB	Kiso	1661.932	Traverse points	—
Filter Numbers	—	Delta H@	1.897	Pitot Cp	0.84
Bar. Press (Pb)	30.21	Assumed H2O	12%	Meter Yd Factor	0.9971
Static Press (Ps)	—	Cond.Vol. (Vlc-1)	67.7	Molecular Weight (%)	
Stack Dia (in.)	15.5	SG Gain (Vlc-2)	11.4	O_2	CEM DATA
		Nozzle Dia (in.)	—	CO_2	

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	768.0	717.9	50.1
2nd	705.5	689.9	15.4
3rd	604.5	602.3	2.2
4th			
5th			
6th			
Silica Gel	981.2	969.8	11.4

Traverse Point Number	Sampling Time (Min) ø	Sampling Time (24 hour)	Train Vacuum ("Hg)	Stack Temp Ts (°F)	Velocity Pressure ("H2O) ΔP	Orifice Differential ("H2O) ΔH	Sample Vol (ft3) Vm	DGM Temp. Inlet (°F) Tm	DGM Temp. Outlet (°F) Tm	Probe Temp (°F)	Filter Box Temp (°F)	Last Imp. Temp. (°F)
	0	1420	3	—	—	2.5	421.001	81	80	—	—	66
	5	1425	3	—	—	2.5	425.42	87	81	—	—	65
	10	1430	3	—	—	2.5	429.71	91	82	—	—	64
	15	1435	3	—	—	2.5	433.85	94	83	—	—	65
	20	1440	3	—	—	2.5	438.13	96	83	—	—	65
	25	1445	3	—	—	2.5	442.44	97	84	—	—	65
	30	1450	—	—	—	—	446.729	—	—	—	—	—

ΔH = Mf * (Tm/Ts) * (ΔP)

Note: All temperatures are °R (°F+460)

Yc= (10/Vm)*((0.0319*(Tm))/Pb)^0.5

Mf = 846.72 * (Dn^4) * (ΔH@) * (Cp^2) * ((1-(Bws/100))^2) * (Md/Ms) * (Ps/Pm)

Mf = 846.72 * (________) * (________) * (________) * (________) * (________) * (________)

Mf = ________

Nozzle Determination:

ΔH@ / Kiso*(Cp)^2*(1-(Bws/100))^2*(Md/Ms)*(Ps/Pm)*(Tm/Ts)* ΔP(average) = $\sqrt[4]{Dn}$

(Recommend multiplying calculate nozzle size by 5%) Dn *1.05= ________

Pm = ________ Pbar + (ΔH@/13.6)

Ps = ________ Pbar + (Pstat/13.6)

Md = ________ 0.44(%CO_2)+0.32(%O_2)+0.28(%N_2+%CO)

Ms = ________ (Md)(1-(Bws/100))+18(Bws/100)

Bws = ________ (Vwc+Vwsg)/(Vwc+Vwsg+Vm)

Vwc = ________ 0.04706(Vf - Vi)

Vwsg = ________ 0.04715(Wf - Wi)

Derenzo and Associates, Inc.

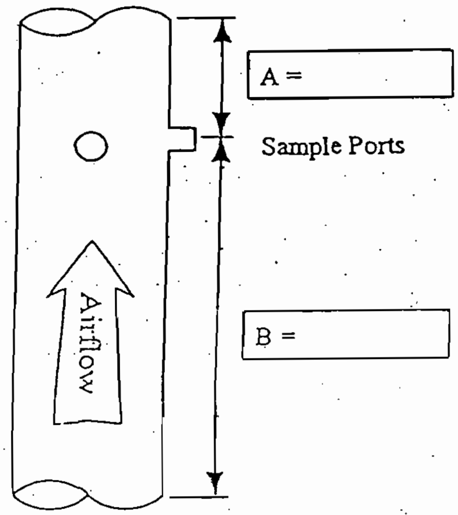
USEPA Method 2

Gas Velocity Measurement Data Sheet

Company	TRAIL Ridge Energy	No. of Points	12
Source Designation	ICE#1 (EU 004)	Operator(s)	DW / LB
Test Date	3 / 28 / 12	Pitot Type	Type S (circled) or Standard
Test Number	Post 1 / Tre 2	Pitot Identification	5P
Time (24-hr clock)	15:37	O_2 Content (%)	CEM Data
Barometric Press. (in. Hg)	30.21	CO_2 Content (%)	
Static Pressure (in. H_2O)	8.0	Wet Bulb Temp.	

Inches from Stack Wall	Traverse Point Number	Stack Temperature (°F)	Velocity Head (in. H_2O)	Null Angel (zero angle)
	A-1	937	3.80	
	2	939	4.10	
	3	941	4.10	
	4	940	4.0	
	5	936	4.30	
	6	934	4.35	
	B-1	936	3.85	
	2	938	4.05	
	3	940	4.15	
	4	939	4.05	
	5	936	4.35	
	6	934	4.35	

Stack / Duct Measurements



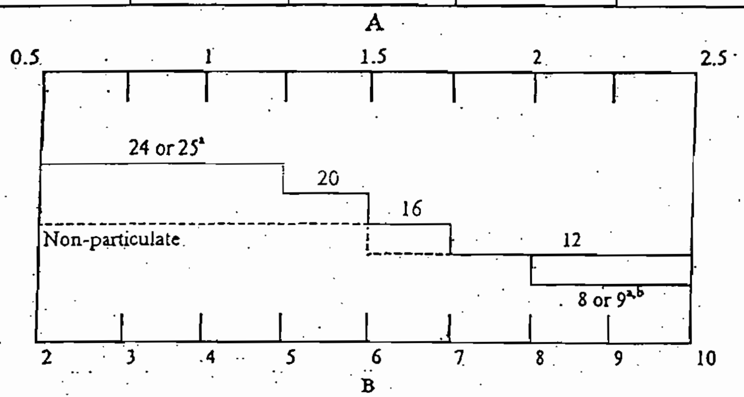
Round Duct Dia. (D) ______

Square Duct (LxW) ______ x ______

Square Duct Dia. (De): ______
De = 2LW / (L+W)

Straight Length: (diameters) A / D ______

B / D ______



a- Higher No. for rectanguar stacks

b- For stacks between 12 and 24 in.

Traverse Point	No. of Traverse Points Per Dia. 6	8	10	12
1	4.4	3.2	2.6	2.1
2	14.6	10.5	8.2	6.7
3	29.6	19.4	14.6	11.8
4	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

Isokinetic Field Sampling Data Sheet

Company	TRAIL Ridge Energy				
Source Designation	ICE #1 (EU004)				
Test Date	3/28/12	Pitot Number	—	Leak Rate Initial	0.000 @ 15
Test Number	M-2	Meter Number	N-3	Leak Rate Final	0.000 @ 4
Operator	DW/MB	Kiso	1661.932	Traverse points	—
Filter Numbers	—	Delta H@	1.897	Pitot Cp	0.84
Bar. Press (Pb)	30.21	Assumed H2O	11%	Meter Yd Factor	0.9971
Static Press (Ps)		Cond.Vol. (Vlc-1)	69.1	Molecular Weight (%)	
Stack Dia (in.)	15.5	SG Gain (Vlc-2)	10.9	O_2	Cem
		Nozzle Dia (in.)	—	CO_2	DATA

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	758.6	702.0	56.6
2nd	699.6	689.1	10.5
3rd	520	518.0	2
4th			
5th			
6th			
Silica Gel	906.8	895.9	10.9

Traverse Point Number	Sampling Time (Min) ø	Time (24 hour)	Train Vacuum ("Hg)	Stack Temp Ts (°F)	Velocity Pressure ("H2O) ΔP	Orifice Differential ("H2O) ΔH	Sample Vol (ft3) Vm	DGM Temp. Inlet (°F) Tm	DGM Temp. Outlet (°F) Tm	Probe Temp (°F)	Filter Box Temp (°F)	Last Imp. Temp. (°F)
1	0	1615	3	—	—	2.5	446.951	83	82	—	—	66
	5	1620	3	—	—	2.5	450.64	88	83	—	—	64
	10	1625	3	—	—	2.5	455.82	95	84	—	—	62
	15	1630	3	—	—	2.5	460.46	99	85	—	—	63
	20	1635	3	—	—	2.5	464.50	100	85	—	—	64
	25	1640	3	—	—	2.5	468.85	101	86	—	—	64
	30	1645	—	—	—	—	473.163	—	—	—	—	—

ΔH = Mf * (Tm/Ts) * (ΔP)

Note: All temperatures are °R (°F+460)

Yc= (10/Vm)*((0.0319*(Tm))/Pb)^0.5

Mf = 846.72 * (Dn^4) * (ΔH@) * (Cp^2) * ((1-(Bws/100))^2) * (Md/Ms) * (Ps/Pm)

Mf = 846.72 * (______) * (______) * (______) * (______) * (______) * (______)

Mf = ______

Nozzle Determination:

ΔH@ / Kiso*(Cp)^2*(1-(Bws/100))^2*(Md/Ms)*(Ps/Pm)*(Tm/Ts)* $\Delta P_{(average)}$ = $\sqrt[4]{Dn}$ ______

(Recommend multiplying calculate nozzle size by 5%) Dn *1.05= ______

Pm = ______ Pbar + (ΔH@/13.6)

Ps = ______ Pbar + (Pstat/13.6)

Md = ______ 0.44(%CO_2)+0.32(%O_2)+0.28(%N_2+%CO)

Ms = ______ (Md)(1-(Bws/100))+18(Bws/100)

Bws = ______ (Vwc+Vwsg)/(Vwc+Vwsg+Vm)

Vwc = ______ 0.04706(Vf - Vi)

Vwsg = ______ 0.04715(Wf - Wi)

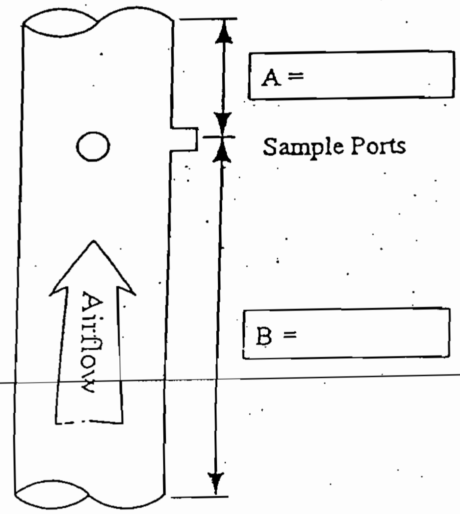
Derenzo and Associates, Inc.

USEPA Method 2
Gas Velocity Measurement Data Sheet

Company	Trail Ridge Energy	No. of Points	12
Source Designation	ICE#1 (EU004)	Operator(s)	DW/RB
Test Date	3/28/12	Pitot Type	Type S (circled) or Standard
Test Number	Post 2 / Pre 3	Pitot Identification	5F
Time (24-hr clock)	1712	O_2 Content (%)	CEM data
Barometric Press. (in. Hg)	30.21	CO_2 Content (%)	
Static Pressure (in. H_2O)	7.6	Wet Bulb Temp.	

Inches from Stack Wall	Traverse Point Number	Stack Temperature (°F)	Velocity Head (in. H_2O)	Null Angel (zero angle)
	A - 1	940	3.45	
	2	940	3.95	
	3	940	4.00	
	4	942	3.80	
	5	937	4.25	
	6	934	4.35	
	B - 1	939	3.80	
	2	940	4.00	
	3	938	4.20	
	4	939	4.20	
	5	936	4.35	
	6	934	4.35	

Stack / Duct Measurements

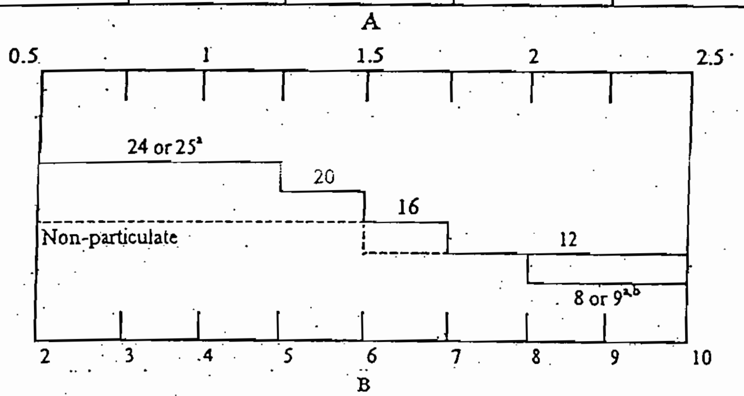


Round Duct Dia. (D) ______

Square Duct (LxW) ______ x ______

Square Duct Dia. (De): ______
De = 2LW / (L+W)

Straight Length: (diameters) A / D ______ B / D ______



a- Higher No. for rectanguar stacks
b- For stacks between 12 and 24 in.

Traverse Point	No. of Traverse Points Per Dia. 6	8	10	12
1	4.4	3.2	2.6	2.1
2	14.6	10.5	8.2	6.7
3	29.6	19.4	14.6	11.8
4	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

Isokinetic Field Sampling Data Sheet

Company: TRAIL Ridge Energy

Source Designation: ICE #1 (E4004)

Test Date	3/28/12	Pitot Number	–	Leak Rate Initial	0.000 @ 15
Test Number	M-3	Meter Number	N-3	Leak Rate Final	0.000 @ 5
Operator	DW/MB	Kiso	1661.932	Traverse points	–
Filter Numbers	–	Delta H@	1.897	Pitot Cp	0.84
Bar. Press (Pb)	30.21	Assumed H2O	1.20	Meter Yd Factor	0.9971
Static Press (Ps)		Cond.Vol. (Vlc-1)	68.3	Molecular Weight (%)	
Stack Dia (in.)	15.5	SG Gain (Vlc-2)	7.7	O_2	Cem
		Nozzle Dia (in.)	–	CO_2	DATA

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	754.2	701.0	53.2
2nd	718.4	705.5	12.9
3rd	606.7	604.5	2.2
4th			
5th			
6th			
Silica Gel	988.9	981.2	7.7

Traverse Point Number	Sampling Time (Min) ø	Sampling Time (24 hour)	Train Vacuum ("Hg)	Stack Temp Ts (°F)	Velocity Pressure ("H2O) ΔP	Orifice Differential ("H2O) ΔH	Sample Vol (ft3) Vm	DGM Temp. Inlet (°F) Tm	DGM Temp. Outlet (°F) Tm	Probe Temp (°F)	Filter Box Temp (°F)	Last Imp. Temp. (°F)
centroid	0	1755	3	–	–	2.5	473.440	84	84	–	–	66
	5	1800	3	–	–	2.5	477.68	88	84	–	–	66
	10	1805	3	–	–	2.5	481.85	92	84	–	–	56
	15	1810	3	–	–	2.5	486.29	95	85	–	–	55
	20	1815	3	–	–	2.5	490.63	97	86	–	–	57
	25	1820	3	–	–	2.5	495.00	99	86	–	–	58
	30	1825	–	–	–	–	499.389	–	–	–	–	–

$\Delta H = Mf * (Tm/Ts) * (\Delta P)$

Note: All temperatures are °R (°F+460)

$Yc = (10/Vm)*((0.0319*(Tm))/Pb)^{0.5}$

Mf = 846.72 * (Dn^4) * (ΔH@) * (Cp^2) * ((1-(Bws/100))^2) * (Md/Ms) * (Ps/Pm)

Mf = 846.72 * (______) * (______) * (______) * (______) * (______) * (______)

Mf = ______

Pm = ______ Pbar + (ΔH@/13.6)

Ps = ______ Pbar + (Pstat/13.6)

Md = ______ $0.44(\%CO_2)+0.32(\%O_2)+0.28(\%N_2+\%CO)$

Ms = ______ (Md)(1-(Bws/100))+18(Bws/100)

Bws = ______ (Vwc+Vwsg)/(Vwc+Vwsg+Vm)

Vwc = ______ 0.04706(Vf-Vi)

Vwsg = ______ 0.04715(Wf-Wi)

Nozzle Determination:

$\Delta H@ / Kiso*(Cp)^2*(1-(Bws/100))^2*(Md/Ms)*(Ps/Pm)*(Tm/Ts)*\Delta P_{(average)} = \sqrt[4]{\quad}$ Dn

(Recommend multiplying calculate nozzle size by 5%) Dn *1.05= ______

DERENZO AND ASSOCIATES, INC.

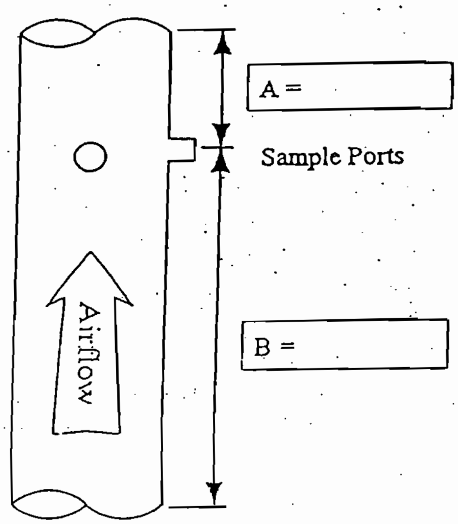
Derenzo and Associates, Inc.

USEPA Method 2
Gas Velocity Measurement Data Sheet

Company	TRAIL Ridge Energy	No. of Points	12
Source Designation	ICE #1 (E4004)	Operator(s)	DW/CB
Test Date	3/28/12	Pitot Type	(Type S) or Standard
Test Number	Post 3	Pitot Identification	5F
Time (24-hr clock)	1900	O_2 Content (%)	CEM Data
Barometric Press. (in. Hg)	30.21	CO_2 Content (%)	
Static Pressure (in. H_2O)	7.8	Wet Bulb Temp.	

Inches from Stack Wall	Traverse Point Number	Stack Temperature (°F)	Velocity Head (in. H_2O)	Null Angel (zero angle)
	1	938	3.90	
	2	941	3.95	
	3	943	4.00	
	4	944	3.90	
	5	939	4.25	
	6	936	4.30	
	1	939	3.75	
	2	941	3.95	
	3	943	4.10	
	4	942	4.00	
	5	938	4.15	
	6	935	4.25	

Stack / Duct Measurements

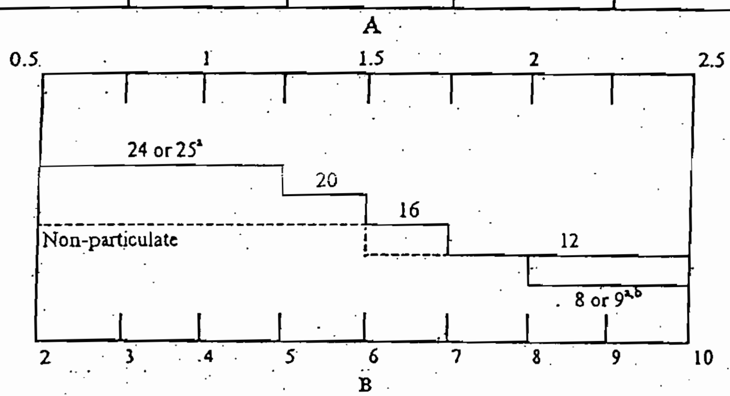


Round Duct Dia. (D) ______

Square Duct (LxW) ______ x ______

Square Duct Dia. (De): ______
De = 2LW / (L+W)

Straight Length: (diameters) A / D ______ B / D ______



a- Higher No. for rectanguar stacks
b- For stacks between 12 and 24 in.

Traverse Point	No. of Traverse Points Per Dia. 6	8	10	12
1	4.4	3.2	2.6	2.1
2	14.6	10.5	8.2	6.7
3	29.6	19.4	14.6	11.8
4	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

Derenzo and Associates, Inc.

Visible Emission Observation Form

Method Used			
(Method 9) (circled)	203a	203b	other:

Obsv. Date	page	of
3/28/12	1	1

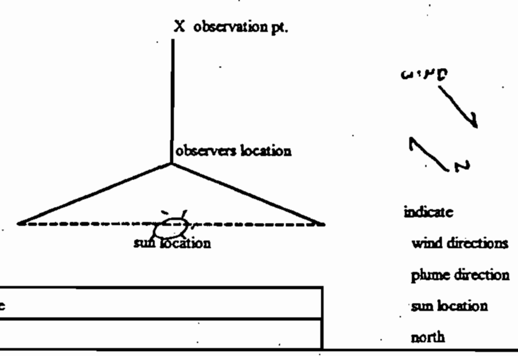
Company Name LES		
Facility Name TRAIL RIDGE		
Street Address		
City	State	Zip

Process Unit	Unit	Op. Mode
Control Equipment		Op. Mode

Describe Emission Point ICE #1 CEU	
height of em. pt. start 25' end	height relative to obsv. start 10' end
distance to em. pt. start end	direction to em. pt. (deg) start end
vertical angle to obsv. pt. start end	direction to obsv. start end
distance and direction to em pt to obsv pt start 50' NE	end
Describe emissions start	end
emission color start end	water droplet plume (circle) attached detached (none) (circled)
Describe plume background start SKY / TREES	end
background color start BLUE/GREEN end	sky conditions start SCATTERED end
wind speed start 5-10 mph end	wind directions start N end
ambient temp start 81° end	wet bulb / relative humidity 38%

	start 2:12					end 3:12			
min	0	15	30	45	min	0	15	30	45
0	0	0	0	0	30	0	0	0	0
1	0	0	0	0	31	0	0	0	0
2	0	0	0	0	32	0	0	0	0
3	0	0	0	0	33	0	0	0	0
4	0	0	0	0	34	0	0	0	0
5	0	0	0	0	35	0	0	0	0
6	0	0	0	0	36	0	0	0	0
7	0	0	0	0	37	0	0	0	0
8	0	0	0	0	38	0	0	0	0
9	0	0	0	0	39	0	0	0	0
10	0	0	0	0	40	0	0	0	0
11	0	0	0	0	41	0	0	0	0
12	0	0	0	0	42	0	0	0	0
13	0	0	0	0	43	0	0	0	0
14	0	0	0	0	44	0	0	0	0
15	0	0	0	0	45	0	0	0	0
16	0	0	0	0	46	0	0	0	0
17	0	0	0	0	47	0	0	0	0
18	0	0	0	0	48	0	0	0	0
19	0	0	0	0	49	0	0	0	0
20	0	0	0	0	50	0	0	0	0
21	0	0	0	0	51	0	0	0	0
22	0	0	0	0	52	0	0	0	0
23	0	0	0	0	53	0	0	0	0
24	0	0	0	0	54	0	0	0	0
25	0	0	0	0	55	0	0	0	0
26	0	0	0	0	56	0	0	0	0
27	0	0	0	0	57	0	0	0	0
28	0	0	0	0	58	0	0	0	0
29	0	0	0	0	59	0	0	0	0

Source layout sketch



longitude	
latitude	

additional information

Comments

Observer's name ROBERT BINGHAM	date 3/28/12
Observer's signature [signature]	
organization name DERENZO & ASSOCIATES	
certified by ETA	date 10/5/11

DERENZO AND ASSOCIATES, INC.
USEPA METHOD 3C/25C
FIELD SAMPLING DATA SHEET

Job #: 120104

Facility: TRAIL Ridge Energy

Location: JACKSONVILLE, FL

Date: 3/28/12

Operator: DW

Control Device: NA

Sample Location: Raw Fuel

Ambient Temperature: 76

Barometric Pressure: 30.21

Contract Laboratory:

SAMPLE 1

Tank #: 4187

Initial Vacuum: 26.0

Final Vacuum: 3.0

TIME	VACUUM ("Hg)
14:20	26
14:30	22
14:40	16.5
14:50	10.5
15:00	7.5
15:10	3.0

Leak Rate Pre:

Leak Rate Post:

SAMPLE 2

Tank #: 5686

Initial Vacuum: 26.5

Final Vacuum: 3.5

TIME	VACUUM ("Hg)
16:10	26.5
16:20	22.5
16:30	18
16:40	13
16:50	8.5
17:00	3.5

Leak Rate Pre:

Leak Rate Post:

SAMPLE 3

Tank #: 34433

Initial Vacuum: 25.5

Final Vacuum: 3

TIME	VACUUM ("Hg)
17:55	25.5
18:05	22
18:15	15.5
18:25	11
18:35	7.0
18:45	3

Leak Rate Pre:

Leak Rate Post:

APPENDIX B

CALIBRATION DATA

METHOD 205 - DILUTION MODULE VERIFICATION

Date: **3/27/2012**
Client: **Trail Ridge Energy**

Evaluate dilution module at two (2) dilutions within the range of the module. Repeat twice (total of 3 trials). Calculate average instrument response for each triplicate injection.

Gas used: 20.95 %, O_2 calibration gas

Divider Setting	Expected Concentration	Injection No. 1	No. 2	No. 3	Average	%Error
100%	20.95	21.02	21.02	21.05	21.03	0.38%
60%	12.57	12.55	12.56	12.58	12.56	-0.05%
40%	8.38	8.36	8.36	8.38	8.37	-0.16%
0%	0.00	0.01	0.01	0.01	0.01	-

Individual Response Errors as Compared to Average		
0.0%	0.0%	0.1%
-0.1%	0.0%	0.1%
-0.1%	-0.1%	0.2%
-	-	-

Introduce mid-level protocol gas (instrument). Repeat twice (total of 3 injections).

Mid-Range Gas	Expected Concentration	Injection No. 1	No. 2	No. 3	Average	%Error
O_2	12.55	12.65	12.69	12.66	12.67	0.93%

Individual Response Errors as Compared to Average		
-0.1%	0.2%	-0.1%

Criteria:

1. Each injection shall differ no more than 2% from the triplicate average.
2. No average shall be greater than 2% of the predicted value.

METHOD 7E - NOx CONVERTER VERIFICATION

Date: **3/28/2012**
Client: **Trail Ridge Energy**

Pre Test Analyzer Calibration Introduce high, mid, low calibration gases (must be within 2% of calibration span).

Gas	Time	Expected Concentration (ppmv)	Observed Concentration (ppmv)	Percent Error
High	8:14	198.3	200.0	**0.86**
Mid	8:17	79.3	78.7	**-0.31**
Low	8:09	0.00	0.58	**0.29**

NO_2 Cal gas (ppm) =	**49.17**	**Date**	**Time**	**NOx**	**Average NOx**
				(ppmv)	(ppmv)
START NOx Converter		3/28/2012	19:18	51.77	-
NOx Converter		3/28/2012	19:19	52.43	52.10
NOx Converter		3/28/2012	19:20	52.66	52.29
NOx Converter		3/28/2012	19:21	52.67	52.38
NOx Converter		3/28/2012	19:22	53.17	52.54
NOx Converter		3/28/2012	19:23	53.18	52.82
NOx Converter		3/28/2012	19:24	53.19	52.72
NOx Converter		3/28/2012	19:25	53.20	52.93
NOx Converter		3/28/2012	19:26	53.19	53.04
END NOx Converter		3/28/2012	19:27	53.20	52.87

$Eff_{NO2} = (C_{dir}/C_v) \times 100 =$ 107.5 % 52.87

The NO_2 to NOx conversion efficiency (Eff_{NO2}), calculated according to equation 7E-7, must be equal to or greater than 90 percent.

Post Test Analyzer Calibration Introduce a calibration gas that most closely matches the concentration observed during the test (must be within 1% of calibration span).

Gas	Time	Expected Concentration (ppmv)	Observed Concentration (ppmv)	Percent Error
Mid	19:44	79.3	79.27	**-0.03**
Zero	19:40	0.00	0.97	**0.49**

Determination of Stratification
USEPA Method 7E Section 8.1.2

Date: 3/28/2012
Client: Trail Ridge Energy
Source: EU-004 - CAT3520 (ICE#1)

Measure three points located at 16.7%, 50.0% and 83.3% of stack diameter for twice the system response time. Determine the pecent difference of the response at each point compared to the three point average.

Sample Point	Time	CO (ppmv)	Variance (% of mean)	Status
Point 1	1412-1431	641.6	0.07%	pass
Point 2	1432-1451	642.5	0.07%	pass
Point 3	1452-1511	642.0	0.00%	pass
	Mean	642.0		

Source considered to be unstratified if concentration at each point differs from the mean concentration by no more than:

a) +/- 5% of the mean, or
b) +/- 0.5 ppmv, whichever is less restrictive

+5% mean	-5% mean
674	642

Date	Hour	CO	Hour	CO
3/28/2012	14:12	638.8	14:42	648.71
3/28/2012	14:13	638.84	14:43	646.03
3/28/2012	14:14	647.16	14:44	647.78
3/28/2012	14:15	645.78	14:45	641.98
3/28/2012	14:16	638.34	14:46	640.47
3/28/2012	14:17	638.6	14:47	637.79
3/28/2012	14:18	651.02	14:48	639.73
3/28/2012	14:19	642.26	14:49	635.33
3/28/2012	14:20	641.62	14:50	633.18
3/28/2012	14:21	637.53	14:51	646.14
3/28/2012	14:22	640.29	14:52	646.33
3/28/2012	14:23	638.02	14:53	640.76
3/28/2012	14:24	645.96	14:54	643.88
3/28/2012	14:25	644.06	14:55	640.67
3/28/2012	14:26	636.92	14:56	637.72
3/28/2012	14:27	635.25	14:57	642.64
3/28/2012	14:28	639.75	14:58	639.45
3/28/2012	14:29	645.75	14:59	641.44
3/28/2012	14:30	639.82	15:00	649.54
3/28/2012	14:31	645.54	15:01	641.26
3/28/2012	14:32	638.58	15:02	638.74
3/28/2012	14:33	638.87	15:03	639.74
3/28/2012	14:34	644.61	15:04	647.71
3/28/2012	14:35	646.8	15:05	643.17
3/28/2012	14:36	644.21	15:06	630.37
3/28/2012	14:37	643.05	15:07	645.14
3/28/2012	14:38	647.94	15:08	645.72
3/28/2012	14:39	643.18	15:09	641.18
3/28/2012	14:40	642.17	15:10	641.25
3/28/2012	14:41	643.07	15:11	643.36

Calibration Error, System Bias, Drift Worksheet

Location: Trail Ridge Energy EU004 (ICE#1)
Date: 3/28/12

NOx	Calibration span (CS)	198.3 ppmv	
CO	Calibration span (CS)	980.4 ppmv	
CO2	Calibration span (CS)	22.83 %	
O2	Calibration span (CS)	20.95 %	

Abbreviations
CS = calibration span
ACE = analyzer calibration error
SB = system bias
dir = direct instrument injection

Initial 3 point instrument calibration

			Actual	Expected	ACE (% of CS)	Criteria
NOx	high	direct (Cdir)	200.00	198.30	1.1%	2%
NOx	mid	direct (Cdir)	78.70	79.32	-0.4%	2%
NOx	zero	direct (Cdir)	0.58	0.00	0.3%	2%
CO	high	direct (Cdir)	980.00	980.40	0.0%	2%
CO	mid	direct (Cdir)	788.10	784.32	0.4%	2%
CO	zero	direct (Cdir)	0.31	0.00	0.0%	2%
CO2	high	direct (Cdir)	22.87	22.83	0.2%	2%
CO2	mid	direct (Cdir)	13.70	13.70	0.0%	2%
CO2	zero	direct (Cdir)	0.00	0.00	0.0%	2%
O2	high	direct (Cdir)	20.99	20.95	0.2%	2%
O2	mid	direct (Cdir)	8.30	8.38	-0.4%	2%
O2	zero	direct (Cdir)	0.00	0.00	0.0%	2%

Initial system bias check/ENG#4 Pretest 1 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Response Time	sec
NOx	upscale	system (Cs)	78.80	78.70	0.1%	5%	Upscale	113
NOx	zero	system (Cs)	0.64	0.58	0.0%	5%	Downscale	105
CO	upscale	system (Cs)	772.00	788.10	-1.6%	5%	Upscale	65
CO	zero	system (Cs)	1.99	0.31	0.2%	5%	Downscale	70
CO2	upscale	system (Cs)	13.40	13.70	-1.3%	5%	Upscale	83
CO2	zero	system (Cs)	0.01	0.00	0.0%	5%	Downscale	75
O2	upscale	system (Cs)	8.30	8.30	0.0%	5%	Upscale	95
O2	zero	system (Cs)	0.01	0.00	0.0%	5%	Downscale	115

ENG#4 Postest 1 Pretest 2 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	78.50	78.70	-0.1%	5%	0.2%	3%
NOx	zero	system (Cs)	0.37	0.58	-0.1%	5%	0.1%	3%
CO	upscale	system (Cs)	790.51	788.10	0.2%	5%	1.9%	3%
CO	zero	system (Cs)	1.93	0.31	0.2%	5%	0.0%	3%
CO2	upscale	system (Cs)	13.54	13.70	-0.7%	5%	0.6%	3%
CO2	zero	system (Cs)	0.00	0.00	0.0%	5%	0.0%	3%
O2	upscale	system (Cs)	8.31	8.30	0.0%	5%	0.0%	3%
O2	zero	system (Cs)	0.01	0.00	0.0%	5%	0.0%	3%

Calibration Error, System Bias, Drift Worksheet

Location: Trail Ridge Energy EU004 (ICE#1)
Date: 3/28/12

ENG#4 Postest 2 Pretest 3 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	79.30	78.70	0.3%	5%	0.4%	3%
NOx	zero	system (Cs)	0.00	0.58	-0.3%	5%	0.2%	3%
CO	upscale	system (Cs)	788.15	788.10	0.0%	5%	0.2%	3%
CO	zero	system (Cs)	0.20	0.31	0.0%	5%	0.2%	3%
CO2	upscale	system (Cs)	13.60	13.70	-0.4%	5%	0.3%	3%
CO2	zero	system (Cs)	0.00	0.00	0.0%	5%	0.0%	3%
O2	upscale	system (Cs)	8.29	8.30	0.0%	5%	0.1%	3%
O2	zero	system (Cs)	0.01	0.00	0.0%	5%	0.0%	3%

ENG#4 Postest 3

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	78.71	78.70	0.0%	5%	0.3%	3%
NOx	zero	system (Cs)	0.60	0.58	0.0%	5%	0.3%	3%
CO	upscale	system (Cs)	786.23	788.10	-0.2%	5%	0.2%	3%
CO	zero	system (Cs)	0.10	0.31	0.0%	5%	0.0%	3%
CO2	upscale	system (Cs)	13.83	13.70	0.6%	5%	1.0%	3%
CO2	zero	system (Cs)	0.00	0.00	0.0%	5%	0.0%	3%
O2	upscale	system (Cs)	8.31	8.30	0.0%	5%	0.1%	3%
O2	zero	system (Cs)	0.01	0.00	0.0%	5%	0.0%	3%

Average Calibration Responses

		EU004 (ICE#1)		
		Test 1	Test 2	Test 3
NOx	upscale	78.65	78.90	79.01
NOx	zero	0.51	0.19	0.30
CO	upscale	781.26	789.33	787.19
CO	zero	1.96	1.07	0.15
CO2	upscale	13.47	13.57	13.72
CO2	zero	0.01	0.00	0.00
O2	upscale	8.31	8.30	8.30
O2	zero	0.01	0.01	0.01

SOURCE COMPANY:	Trail Ridge Energy
SOURCE TESTED:	ICE#1 (EU004) Exhaust
TESTING COMPANY:	Derenzo and Associates, Inc.
REFERENCE METHODS:	ALT-078
DATE OF TEST:	March 28, 2012
ANALYTE:	NMOC
Upscale SB Response Time:	170 Seconds

Calibration Error Check Linearity Check (Must be within 5%)		25-35% of Span	45-55% of Span	80-90% of Span
		50	90	160
		70	110	180
	Zero Gas	Low Gas	Mid Gas	High Gas
Cal. Gas		Propane	Propane	Propane
Serial #				
Tag Value	0.00	34.18	51.28	85.46
Monitor	0.11			82.76
Expected		33.17	49.70	
Monitor		34.43	49.67	
Diff.	0.11	1.26	-0.03	-2.70
% Diff	0.06%	3.69%	-0.06%	-3.16%
	Pass	Pass	Pass	Pass

VOC Reference Method Analyzer
Sampling System Bias Check

NMOC RM Monitor Span = 200.00 PPM

Run No.	(Co)i Initial Zero Gas	(Co)f Final Zero Gas	Zero Gas Drift	Z-Drift Pass if < 3%
1	0.11	0.50	0.20%	Pass
2	0.50	0.77	0.14%	Pass
3	0.77	0.71	-0.03%	Pass

Run No.	(Cm)i Initial Upscale	(Cm)f Final Upscale	Upscale Gas Drift	Up-Drift Pass if < 3%
1	34.43	33.91	-0.26%	Pass
2	33.91	33.71	-0.10%	Pass
3	33.71	32.61	-0.55%	Pass

CALIBRATION SUMMARY

Company: TrAil Ridge Energy
Location: Jacksonville, FL
Source Designation: ICE#1 (EU004)
Date: 3/27/12
Operator(s): MB/DW

Pre 1: Run High, Mid, Low, Zero, for CH_4, NMOC, THC
Run High, Mid, Low (Zero) Inst Cal, and Mid, Zero Dynamic Cal for NOx, O_2, CO, CO_2, SO_2

Cylinder ID	Analyte	Concentration	Unit
	O_2	20.95	%
	O_2	12.55	%
	NOx	198.3	ppm
	CO	980.4	ppm
	CO_2	22.83	%

	Time	Procedure		Response	Exp. Value	Notes
		M205 Divider Certification				
	1316	O_2 Inst	100%	21.02	20.95	
	1323		60%	12.55	12.57	
	1329		40%	8.36	8.38	
	1334		0%	0.01	0.0	
	1338		100%	21.02	20.95	
	1344		60%	12.56	12.57	
	1350		40%	8.36	8.38	
	1354		0%	0.01	0.0	
	1400		100%	21.05	20.95	
	1407		60%	12.58	12.57	
	1416		40%	8.38	8.38	
	1422		0%	0.01	0.0	
	1427	O_2 Inst	mid	12.65	12.55	Must be within 10% of one of the above cuts
	1432		zero	0.01	0.0	
	1441		mid	12.69	12.55	
	1446		zero	0.01	0.0	
	1453		mid	12.66	12.55	
			zero	0.01	0.0	
		Analyzer Calibration Error-Instrument				
	1147	NOx Inst	high	200	198.3	Must be 100 -20% of stack concentration
	1154		mid	78.7	79.32	Must be closest to stack concentration
	1159		zero	0.579	0.0	
	1200	CO Inst	high	980	980.4	
	1203		mid	788.1	784.32	
	1212		zero	0.31	0.0	
	1206	CO_2 Inst	high	22.87	22.83	
	1208		mid	13.7	13.7	
	1212		zero	0.0	0.0	
	1212	O_2 Inst	high	20.99	20.95	
	1220		mid	8.33	8.38	
	1223		zero	0.0	0.0	
Response Times (sec)		System Bias / Pre-Stratification				
125005-125158-113	1253	NOx	upscale	78.8	78.7	Must be closest to stack concentration
125400-125545-105	1257		downscale	0.64	0.58	
125400-125505-65	1259	CO	upscale	772.06	788.1	
130015-130125-70	1303		downscale	1.99	0.31	Stratification probe lengths (in).
130015-130138-83	1303	CO_2	upscale	13.4	13.7	Point 1 (16.7%) -
130455-130610-75	1308		downscale	0.01	0	Point 2 (50.0%) -
130455-130630-95	1309	O_2	upscale	8.30	8.33	Point 3 (83.3%) -
131000-131155-115	1313		downscale	0.01	0	

Calibration Error = $(C_{dir} - C_v)/CS \times 100$ (must be ≤ 2%)

Initial System Bias (SB) = $(C_s - C_{dir})/CS * 100$ (must be ≤ 5%)

Calibration Drift = $(SB_f - SBi)$ (must be ≤ 3%)

Cdir = Concentration direct instrument reading
Cv = Concentration value
Cs = Concentration of system
CS = Calibration Span
SBf = System Bias final
SBi = System Bias initial

CALIBRATION SUMMARY

Company: Trail Ridge Energy
Location: Jacksonville, FL
Source Designation: ICE #1 (EQ001)
Date: 3/28/12
Operator(s): MB/DW

Pre 1: Run High, Mid, Low, Zero, for CF_4, NMOC, THC
Run High, Mid, Low (Zero) Inst Cal, and Mid, Zero Dynamic Cal for NOx, O_2, CO, CO_2, SO_2

Cylinder ID	Analyte	Concentration	Unit
	NOx	198.3	ppm
	CO	980.4	ppm
	CO2	22.83	%
	O2	20.95	%
	VOC	85.46	ppm
	NO2	49.17	ppm

This data was copied from page 1 of 3

Time	Procedure		Response	Exp. Value	Notes
Post Stratification Calibration					
		mid			
		zero			
		mid			
		zero			
		mid			
		zero			
NOx Converter Test					
	From:		1918	1927	To:
NOx Converter Post-Calibration					
1944	NOx Dyn	mid	78	78.7	Must be closest to bag NOx high value
1940		zero	0.0	0.58	
Analyzer Calibration Error pre-test (Instrument)					
	NOx Inst	high	200	198.3	Must be 100 -20% of stack concentration
		mid	78.7	79.32	Must be closest to stack concentration
		zero	0.579	0.0	
	CO Inst	high	980	980.4	
		mid	788.1	784.32	
		zero	0.31	0.0	
	CO2 Inst	high	22.87	22.83	
		mid	13.7	13.7	
		zero	0.0	0.0	
	O2 Inst	high	20.99	20.95	
		mid	8.33	8.38	
		zero	0	0.0	
System Bias Calibration pre-test (dynamic calibration)					
	NOx SB	upscale	78.8	78.7	
		downscale	0.64	0.58	
	CO SB	upscale	772.0	788.1	
		downscale	1.99	0.31	
	CO2 SB	upscale	13.4	13.7	
		downscale	0.01	0	
	O2 SB	upscale	8.30	8.33	
		downscale	0.01	0	
1338	NMOC SB	high	82.76	85.46	
1343		mid	49.67	49.70	
1348	34.43	low	~~33.26~~	33.17	
1320		zero	0.11	0.0	
		high			
		mid			
		low			
		zero			

Calibration Error $=(C_{dir} - C_v)/CS \times 100$ (must be $\leq 2\%$)

Initial System Bias (SB) $= (C_s - C_{dir})/CS * 100$ (must be $\leq 5\%$)

Calibration Drift $=(SB_f - SBi)$ (must be $\leq 3\%$)

Cdir = Concentration direct instrument reading
Cv = Concentration value
Cs = Concentration of system
CS = Calibration Span
SBf = System Bias final
SBi = System Bias initial

CALIBRATION SUMMARY

Company: Trail Ridge Energy
Location: Jacksonville, ~~AL~~ FL
Source Designation: ICE#1 (Ehooch)
Date: 3/28/12
Operator(s): MB/DW

Pre 1: Run High, Mid, Low, Zero, for CH_4, NMOC, THC
Run High, Mid, Low (Zero) Inst Cal, and Mid, Zero Dynamic Cal for NOx, O_2, CO, CO_2, SO_2

Cylinder ID	Analyte	Concentration	Unit
	NOx		ppm
	CO		ppm
	CO_2	22.83	%
	O_2	20.95	%
	VOC	85.46	ppm
	NO_2	49.17	ppm

Test 1 — Start Time: 1412 — Stop Time: 1512

Time	Procedure		Response	Exp. Value	Notes
Post Test 1			System Bias Calibration (dynamic calibration)		
1542	NOx SB	upscale	78.50	78.7	NOx - 61.738
1535		downscale	0.37	0.58	CO - 642.018
1546	CO SB	upscale	790.51	788.1	CO_2 - 10.88
1541		downscale	1.93	0.31	O_2 - 8.092
1557	CO_2 SB	upscale	13.54	13.7	VOC - 34.548
1547		downscale	0.0	0.0	
1603	O_2 SB	upscale	8.31	8.33	
1555		downscale	0.01	0.0	
1532	VOC SB	mid	33.91	34.43	
1526		zero	0.50	0.11	
–		mid	–	–	
–		zero	–	–	

Test 2 — Start Time: 1610 — Stop Time: 1710

Time	Procedure		Response	Exp. Value	Notes
Post Test 2			System Bias Calibration (dynamic calibration)		
1749	NOx SB	upscale	79.3	78.7	NOx - 70.115
1744		downscale	0.0	0.58	CO - 673.779
1744	CO SB	upscale	788.15	788.1	CO_2 - 11.11
1734		downscale	0.20	0.31	O_2 - 8.04
1740	CO_2 SB	upscale	13.60	13.7	VOC - 34.708
1727		downscale	0.0	0.0	
1735	O_2 SB	upscale	8.29	8.33	
1730		downscale	0.01	0	
1725	VOC SB	mid	33.71	33.91	
1720		zero	0.77	0.50	
–		mid	–	–	
–		zero	–	–	

Test 3 — Start Time: 1754 — Stop Time: 1854

Time	Procedure		Response	Exp. Value	Notes
Post Test 3	78.71		System Bias Calibration (dynamic calibration)		
1944	NOx SB	upscale	78.[illegible]	78.7	NOx - 71.705
1940		downscale	0.06	0.58	CO - 673.250
1953	CO SB	upscale	786.23	788.1	CO_2 - 11.278
1943		downscale	0.10	0.31	O_2 - 8.043
1949	CO_2 SB	upscale	13.83	13.7	VOC - 34.754
1930		downscale	0.0	0.0	
1941	O_2 SB	upscale	8.31	8.33	
1933		downscale	0.01	0	
1912	VOC SB	mid	32.61	33.71	
1907		zero	0.71	0.77	
–		mid		–	
–		zero		–	

Calibration Error $=(C_{dir} - C_v)/CS \times 100$ (must be $\leq 2\%$)

Initial System Bias (SB) $= (C_s - C_{dir})/CS * 100$ (must be $\leq 5\%$)

Calibration Drift $=(SB_f - SBi)$ (must be $\leq 3\%$)

Cdir = Concentration direct instrument reading
Cv = Concentration value
Cs = Concentration of system
CS = Calibration Span
SBf = System Bias final
SBi = System Bias initial

PITOT TUBE INSPECTION CRITERIA CHECKLIST

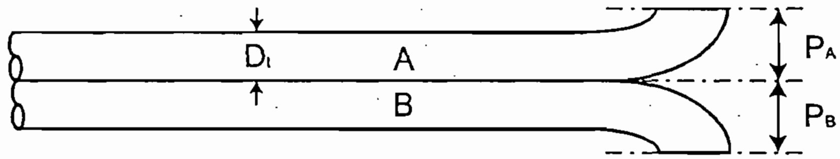
Tube #: SF-1

Date: 3/15/12

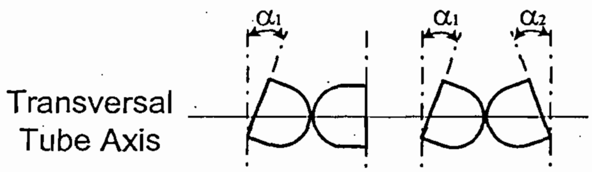
$3/16" \leq D_t \leq 3/8"$ — Yes No

$P_A = P_B$ — Yes No

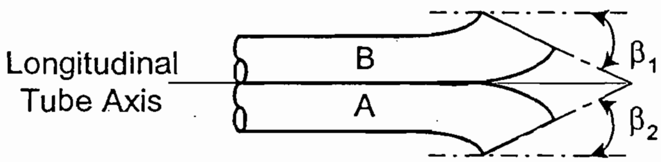
$1.05D_t \leq P_{A,B} \leq 1.5D_t$ — Yes No



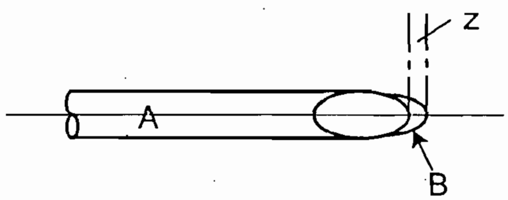
α_1 and $\alpha_2 < 10°$ — Yes No



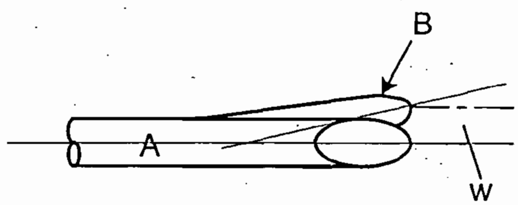
β_1 and $\beta_2 < 5°$ — Yes No



$z < 0.32$ cm — Yes No



$w < 0.08$ cm — Yes No



Pitot Tube Correction Factor: 0.84

MTB

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

DERENZO & ASSOCIATES, INC

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at maximum attainable vacuum (open coarse valve, close fine valve), for period of 5 minutes minimum for large orifice up to 10 minutes for smallest orifice.
4) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 03/05/12
METER PART #: N3

METER SERIAL #: N3
CRITICAL ORIFICE SET SERIAL #: 1316

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	29.56	29.60	29.58

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT³) INITIAL	DGM READINGS FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)
#29 Brass	1	0.7968	18	31.063	36.24	5.177	67	76	78	67	68	72.25	5.00	3.6	5.1237	5.1350	1.0022	
	2	0.7968	18	36.24	41.43	5.190	67	78	78	68	68	73	5.00	3.6	5.1293	5.1350	1.0011	
	3	0.7966	18	41.43	46.632	5.202	67	78	78	68	69	73.25	5.00	3.6	5.1388	5.1350	0.9993	
																AVG =	1.0009	0.38
#24 Brass	1	0.6534	19.5	46.632	55.25	8.616	68	77	76	69	69	72.75	10.00	2.4	6.4960	8.4137	0.9903	
	2	0.6534	19.5	55.25	63.86	8.610	68	78	76	69	70	72.75	10.00	2.4	8.4881	8.4137	0.9912	
	3	0.6534	19.5	63.86	72.516	8.656	68	76	73	70	70	72.25	10.00	2.4	6.5415	8.4137	0.9850	
																AVG =	0.9889	-0.83
#20 Brass	1	0.5333	21	72.516	79.5	6.984	69	77	77	72	72	74.5	10.00	1.6	6.8490	6.8607	1.0017	
	2	0.5333	21	79.5	86.48	6.980	68	77	77	72	72	74.5	10.00	1.6	6.8451	6.8672	1.0032	
	3	0.5333	21	86.48	93.488	7.008	68	77	77	72	73	74.75	10.00	1.6	6.8694	6.8672	0.9997	
																AVG =	1.0015	0.45

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 0.9971

Y-5% = 0.947 1.047
Delta H@ 1.897
Kiso 1661.932

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

(1) $$V_m(std) = K_1 V_m \frac{P_{bar} + (\Delta H/13.6)}{T_m}$$ = Net volume of gas sample passed through DGM, corrected to standard conditions
K_1 = 17.64 °R/in. Hg (English), 0.3858 °K/mm Hg (Metric)
T_m = Absolute DGM avg. temperature (°R - English, °K - Metric)

(2) $$V_{cr}(std) = K' \sqrt{\frac{P_{bar}\,\theta}{T_{amb}}}$$ = Volume of gas sample passed through the critical orifice, corrected to standard conditions
T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)
K' = Average K' factor from Critical Orifice Calibration

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

PYROMETER CALIBRATION

Meter	32	99	251	499	1003	1502
Omega	32	100	250	500	1000	1500
% Difference	0.0	-1.0	0.4	-0.2	0.3	0.1

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

DERENZO & ASSOCIATES, INC

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at maximum attainable vacuum (open coarse valve, close fine valve), for period of 5 minutes minimum for large orifice up to 10 minutes for smallest orifice.
4) Record readings in outlined boxes below, other columns are automatically calculated.

DATE: 4/4/12
METER PART #: N3
METER SERIAL #: N3
CRITICAL ORIFICE SET SERIAL #: 1316

	INITIAL	FINAL	AVG (P_{bar})
BAROMETRIC PRESSURE (in Hg):	29.28	29.25	29.27

IF Y VARIATION EXCEEDS 2.00%, ORIFICE SHOULD BE RECALIBRATED

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS FINAL	NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	(1) V_m (STD)	(2) V_{cr} (STD)	(3) Y	Y VARIATION (%)
#29 Brass	1	0.7968	18	523.655	528.83	5.175	63	76	77	65	66	71	5.00	3.8	5.0798	5.0997	1.0040	
	2	0.7968	18	528.83	534.	5.170	63	77	77	66	66	71.5	5.00	3.8	5.0699	5.0997	1.0059	
	3	0.7968	18	534.	539.165	5.165	64	77	77	66	67	71.75	5.00	3.8	5.0628	5.0948	1.0064	
																AVG =	1.0054	0.37
#24 Brass	1	0.6534	19.5	539.165	547.75	8.585	64	77	76	67	68	72	10.00	2.4	8.3857	8.3558	0.9964	
	2	0.6534	19.5	547.75	556.35	8.600	64	76	75	68	69	72	10.00	2.4	8.4004	8.3556	0.9947	
	3	0.6534	19.5	556.35	564.973	8.623	65	75	76	69	70	72.5	10.00	2.4	8.4149	8.3479	0.9920	
																AVG =	0.9944	-0.73
#20 Brass	1	0.5333	21	564.973	571.93	6.957	66	76	75	70	70	72.75	10.00	1.8	6.7724	6.8070	1.0051	
	2	0.5333	21	571.93	578.88	6.950	65	75	75	70	71	72.75	10.00	1.6	6.7656	6.8135	1.0071	
	3	0.5333	21	578.88	565.848	6.968	86	75	75	71	71	73	10.00	1.6	6.7799	6.8070	1.0040	
																AVG =	1.0054	0.37

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

AVERAGE DRY GAS METER CALIBRATION FACTOR, Y = 1.0017

Y-5% = 0.952 1.052
Delta H@ 1.910
Kiso 1694.554

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

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

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

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

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

K' = Average K' factor from Critical Orifice Calibration

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

PYROMETER CALIBRATION						
Meter	32	99	252	500	1004	1503
Omega	32	100	250	500	1000	1500
% Difference	0.0	-1.0	0.8	0.0	0.4	0.2

Horiba Instruments
5900 Hines Drive
Ann Arbor, MI 48108

Certificate of Calibration

Certificate Number: **2011197-122811**

The calibration was performed using reference standards which have traceability to the International System of Units (SI) through the United States National Institute of Standards and Technology (NIST). This calibration is accredited and meets the requirements of ISO-17025:2005 as verified by ACLASS. Refer to certificate and scope of accreditation (Certificate #ACT-1312).The calibration was performed using the procedure number stated below.

Customer: Derenzo & Associates, Inc.
Customer Address: 39395 Schoolcraft
Livonia, MI 48150-5036

Manufacturer: STEC
Description: Gas Divider
Condition Received: Passed
Cal Procedure: WI-QM-B-010
Date Calibrated: 12/28/11
Calibration Gas: Zero N_2

Part Number: SGD-SC-5L
Serial Number: 2011197
Condition Returned: Passed
Uncertainty: +/- 0.0481 L/min
Recomm. Recalibration Due: 12/28/12
Lot Number: 32-400025828-1

Standards Traceability

Mfr./Model Number	Serial #	Test Number	Cal. Date	Due Date
DHI/3E5	1015	LAB144B	4/27/11	4/27/12
DHI/3E5	1016	LAB144B	4/27/11	4/27/12
DHI/Molbox 1A	448	LAB145B	4/22/11	4/22/12

Service Technician: [signature] **Date:** **12/28/11**

QA Manager: [signature] **Date:** **12/28/11**

This certificate/report may not be reproduced, except in full, without the written approval of Horiba. The calibrated system is operating within the specification. The recommended calibration cycle implies system usage in normal, non extreme, environmental conditions. The uncertainty is calculated at a 95% confidence interval with a coverage factor of k=2.
This certificate is issued under the authority of: Horiba Instruments, 2890 John R Road, Troy, MI 48083.

SGD-A10, SGD-710, SGD-SC-5L GAS DIVIDERS VERIFICATION CHECK SHEET

As Found Data

CUSTOMER: Derenzo DATE: 12/28/11

MODEL: SGD-SC-5L SERIAL NUMBER: 2011197

CUT PT.	COMP A MIXTURE GAS	COMP B DILUTANT GAS	TOTAL FLOW POINT	MIXTURE FLOW %	%POINT ERROR >2.0%	STATUS
0	0.0000	3.9991	3.9991	0.000	0.000	Pass
20	0.8019	3.2014	4.0033	20.031	-0.155	Pass
40	1.5970	2.4032	4.0002	39.923	0.193	Pass
60	2.3960	1.6050	4.0010	59.885	0.192	Pass
80	3.1940	0.8028	3.9968	79.914	0.108	Pass
100	3.9924	0.0000	3.9924	100.000	0.000	Pass

STD. DEV. 0.0038 LPM

MIXTURE GAS INLET PRESSURE TO DIVIDER: 21.0 PSIG
(At 100% CUTPOINT)

DILUTION GAS INLET PRESSURE TO DIVIDER: 17.0 PSIG
(AT 0.0% CUTPOINT)

OUTLET FLOW FROM GAS DIVIDER: 4.00 LPM

Method 7E Interference Response Verification

Date: 7/26/2006

Analyzer: Thermo Model 42c

Tested Calibration Span: 44.0 ppm

Test Gas Type	*Concentration (ppm)*	*Analyzer Response*[1]	*Deviation from Expected Response (ppm)*
CO_2/NO_x	1.72% / 26.4	26.20	0.20
CO_2	4.29%	-0.10	0.10
O_2/NO_x	8.36% / 26.4	26.27	0.13
O_2	20.9%	0.00	0.00
CO/NO_x	23.88 / 26.4	26.40	0.00
CO	59.70	-0.11	0.11
CH_4/NO_x	33.6 / 26.4	26.10	0.30
CH_4	84.0	-0.11	0.11
SO_2/NO_x	8.16 / 26.4	26.20	0.20
SO_2	20.4	-0.10	0.10
C_3H_8/NO_x	33.32 / 26.4	26.34	0.06
C_3H_8	83.3	-0.11	0.11
		Total Deviation (ppm)[2]	1.05
		% of Calibration Span[3]	2.38

1 - Measured concentrations were corrected for system bias.

2 - In summing the total deviation use the larger of the absolute values obtained for the interferent tested with and without the pollutant present.

3 - Total Interference must be less than 2.50% of the calibration span.

Method 7E Interference Response Verification

Date: 7/26/2006

Analyzer: Fuji ZRF CO Cell

Tested Calibration Span: 298.8 ppm

Test Gas Type	*Concentration (ppm)*	*Analyzer Response* [1]	*Deviation from Expected Response (ppm)*
CO_2/CO	1.72% / 179.3	179.1	0.20
CO_2	1.72%	0.06	0.06
O_2/CO	8.36% / 179.3	180.6	1.37
O_2	20.9%	-0.09	0.09
NO_x/CO	26.4 / 179.3	179.3	0.02
NO_x	44.0	-0.10	0.10
CH_4/CO	33.6 / 179.3	180.6	1.28
CH_4	84.0	-0.01	0.01
SO_2/CO	8.16 / 179.3	179.08	0.20
SO_2	20.4	1.29	1.29
C_3H_8/CO	33.32 / 179.3	179.42	0.14
C_3H_8	83.3	0.02	0.02
		Total Deviation (ppm)[2]	4.38
		% of Calibration Span[3]	1.46

1 - Measured concentrations were corrected for system bias.

2 - In summing the total deviation use the larger of the absolute values obtained for the interferent tested with and without the pollutant present.

3 - Total Interference must be less than 2.50% of the calibration span.

Method 7E Interference Response Verification

Date: 7/26/2006

Analyzer: Fuji ZRF CO_2 Cell

Tested Calibration Span: 4.29 %

Test Gas Type	*Concentration (ppm)*	*Analyzer Response* [1]	*Deviation from Expected Response (ppm)*
NO_x/CO_2	26.4 / 1.72%	1.72	0.01
NO_x	44.0	0.00	0.00
O_2/CO_2	8.36% / 1.72%	1.73	0.02
O_2	20.9%	0.00	0.00
CO/CO_2	23.88 / 2.57%	2.57	0.00
CO	59.70	0.00	0.00
CH_4/CO_2	33.6 / 2.57%	2.57	0.00
CH_4	84.0	0.00	0.00
C_3H_8/CO_2	33.32 / 2.57	2.57	0.00
C_3H_8	83.3	0.00	0.00
		Total Deviation (ppm)[2]	0.03
		% of Calibration Span[3]	0.59

1 - Measured concentrations were corrected for system bias.

2 - In summing the total deviation use the larger of the absolute values obtained for the interferent tested with and without the pollutant present.

3 - Total Interference must be less than 2.50% of the calibration span.

Method 7E Interference Response Verification

Date: 7/26/2006

Analyzer: Fuji ZFK3 O_2 Cell

Tested Calibration Span: 20.9 %

Test Gas Type	*Concentration (ppm)*	*Analyzer Response*[1]	*Deviation from Expected Response (ppm)*
CO_2/O_2	1.72% / 12.54%	12.62	0.08
CO_2	4.29%	0.00	0.00
NO_x/O_2	26.4 / 8.36%	8.41	0.05
NO_x	44.0	0.00	0.00
CO/O_2	23.88 / 12.54	12.56	0.02
CO	59.70	0.00	0.00
SO_2/O_2	8.16 / 12.54	12.62	0.08
SO_2	20.4	0.29	0.29
C_3H_8/O_2	33.32 / 12.54	12.58	0.04
C_3H_8	83.3	0.00	0.00
		Total Deviation (ppm)[2]	0.48
		% of Calibration Span[3]	2.30

1 - Measured concentrations were corrected for system bias.

2 - In summing the total deviation use the larger of the absolute values obtained for the interferent tested with and without the pollutant present.

3 - Total Interference must be less than 2.50% of the calibration span.

Airgas

Airgas Great Lakes, Inc.
2009 Bellaire Ave.
Royal Oak, MI 48067
Ph: (248) 399-9150
Fax: (248) 584-2540
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	DERENZO		
Part Number:	E02NI99E15A0284	Reference Number:	32-400026149-1
Cylinder Number:	CC201382	Cylinder Volume:	144 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 (SAP) - MI	Cylinder Pressure:	2015 PSIG
PGVP Number:	B62011	Valve Outlet:	660
		Analysis Date:	Nov 09, 2011

Expiration Date: Nov 09, 2013

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITRIC OXIDE	200.0 PPM	198.3 PPM	[illegible]	[illegible] NIST Traceable
NITROGEN	Balance			
Total oxides of nitrogen		200.1 PPM		For Reference Only

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	11060139	CC332059	248.4PPM NITRIC OXIDE/NITROGEN	Jan 11, 2017

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 54, 250ppmFS NO, Nicolet 6700	Fourier Transform Infrared (FTIR)	Oct 13, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

BEST AVAILABLE COPY

Airgas

Airgas Speciality Gases
12722 S. Wentworth Ave.
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI99E15A1376	Reference Number:	54-124284457-1
Cylinder Number:	CC111390	Cylinder Volume:	144 Cu.Ft.
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12011	Valve Outlet:	660
Gas Code:	NO2	Analysis Date:	Oct 21, 2011

Expiration Date: Apr 21, 2012

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 150 psig,i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
NITROGEN DIOXIDE	50.00 PPM	49.17 PPM	[illegible]	[illegible]
NITROGEN	Balance	[illegible]	[illegible]	[illegible]

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
GMIS/NO2	124233681115	CC283668	61.18PPM NITROGEN DIOXIDE/	Mar 07, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
(CH-3) ECO PHYSICS CLD822S	Chemiluminescence	Oct 13, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

BEST AVAILABLE COPY

Airgas

Airgas Great Lakes
2009 Bellaire Ave.
Royal Oak, MI 48067-8020
www.airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Customer:	DERENZO		
Part Number:	E02NI77E15A0000	Reference Number:	32-400036312-1
Cylinder Number:	CC148234	Cylinder Volume:	159 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 (SAP) - MI	Cylinder Pressure:	2015 PSIG
PGVP Number:	B62012	Valve Outlet:	580
Gas Code:	CO2	Analysis Date:	Jan 17, 2012

Expiration Date: Jan 17, 2015

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON DIOXIDE	22.75 %	22.80 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	08061311	CC254763	20.09% CARBON DIOXIDE/NITROGEN	Jul 15, 2012

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 54, 20% FS CO2, Nicolet 6700	Fourier Transform Infrared (FTIR)	Dec 21, 2011

Triad Data Available Upon Request

Notes:

ATM

Approved for Release

Airgas

Airgas Great Lakes
2009 Bellaire Ave.
Royal Oak, MI 48067-8020
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	DERENZO		
Part Number:	E02NI99E15A0101	Reference Number:	32-400026297-1
Cylinder Number:	SG9146588BAL	Cylinder Volume:	144 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 (SAP) - MI	Cylinder Pressure:	2015 PSIG
PGVP Number:	B62011	Valve Outlet:	350
		Analysis Date:	Nov 15, 2011

Expiration Date: Nov 15, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	1000 PPM	1004 PPM	[illegible]	[illegible] NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	11060318	CC175414	988.8PPM CARBON MONOXIDE/NITROGEN	Dec 13, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 54, 1000ppm CO, Nicolet 6700	Fourier Transform Infrared (FTIR)	Oct 20, 2011

Triad Data Available Upon Request

Notes:

A. F. Muhammad

Approved for Release

Airgas

Airgas Great Lakes
2009 Bellaire Ave.
Royal Oak, MI 48067-8020
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	DERENZO & ASSOIATES		
Part Number:	E02NI79E15AC375	Reference Number:	32-400035860-1
Cylinder Number:	SG9160230BAL	Cylinder Volume:	146 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 (SAP) - MI	Cylinder Pressure:	2015 PSIG
PGVP Number:	B62012	Valve Outlet:	590
Gas Code:	O2	Analysis Date:	Jan 17, 2012

Expiration Date: Jan 17, 2015

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
OXYGEN	[illegible]	[illegible]	[illegible]	[illegible] NIST Traceable
NITROGEN	Balance	[illegible]	[illegible]	[illegible]

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	6060823	CC207967	22.51% OXYGEN/NITROGEN	May 01, 2016

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 51, 25%FS O2, Rosemont 755R	Paramagnetic (Para)	Dec 22, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas.

Airgas Great Lakes, Inc.
2009 Bellaire Ave.
Royal Oak, MI 48067
Ph: (248) 399-9150
Fax: (248) 584-2540
http://www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	DERENZO 160625		
Part Number:	E02NI87E15A2082	Reference Number:	32-112275343-2
Cylinder Number:	XC011948B	Cylinder Volume:	146 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 - MI	Cylinder Pressure:	2015 PSIG
Analysis Date:	May 04, 2011	Valve Outlet:	590

Expiration Date: May 04, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
OXYGEN	12.60 %	12.55 %	[illegible]	+/-1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	980509	SG9168307BAL	16.04% OXYGEN/NITROGEN	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 51, 25%FS O2, Rosemont 755R	Paramagnetic (Para)	Apr 28, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

Airgas Great Lakes
2009 Bellaire Ave.
Royal Oak, MI 48067-8020
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Customer:	DERENZO & ASSOCIATES		
Part Number:	E02AI99E15A0461	Reference Number:	32-400030138-1
Cylinder Number:	CC198052	Cylinder Volume:	146 Cu.Ft.
Laboratory:	MIC - Royal Oak-32 (SAP) - MI	Cylinder Pressure:	2015 PSIG
PGVP Number:	B62011	Valve Outlet:	590
		Analysis Date:	Dec 07, 2011

Expiration Date: Dec 07, 2014

Certification performed in accordance with "EPA Traceability Protocol (Sept. 1997)" using the assay procedures listed. Analytical Methodology does not require correction for analytical interferences. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.
Do Not Use This Cylinder below 150 psig.i.e. 1 Mega Pascal

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
PROPANE	85.00 PPM	85.46 PPM	G1	+/- 1% NIST Traceable
Air	Balance			

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM	090617	CC301772	97.82PPM PROPANE/AIR	Oct 02, 2013

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
E/N 54, 250ppmFS C3H8, Nicolet 6700	Fourier Transform Infrared (FTIR)	Nov 18, 2011

Triad Data Available Upon Request

Notes:

Approved for Release

VISIBLE EMISSIONS EVALUATOR

Bingham Robert

This is to certify that the above named observer has met the specifications of Federal Reference Method 9 and is qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates, Inc. of Raleigh N.C.

This certificate is valid for six months from date of issue.

399149
Certificate Number

BIN659898
Student ID Number

10/5/2011
Date of Certification

Detroit, MI
Location

4/5/2012
Certification Expiration Date

DETF09
Last Lecture

Jody Monk
Director of Training

APPENDIX C

LABORATORY DATA

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4/2/2012
Mr. David Derenzo
Derenzo & Associates
39395 Schoolcraft Road

Livonia MI 48150

Project Name: Trail Ridge
Project #: 1201048
Workorder #: 1203620

Dear Mr. David Derenzo

The following report includes the data for the above referenced project for sample(s) received on 3/29/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-5504 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott
Project Manager

A Eurofins Lancaster Laboratories Company

Eurofins Air Toxics, Inc.
180 Blue Ravine Road, Suite B
Folsom, CA 95630
T | 916-985-1000
F | 916-985-1020
www.airtoxics.com

eurofins | Air Toxics

WORK ORDER #: 1203620

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Ms. Donna Povich Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	FLD-18
FAX:	734-464-4368	**PROJECT #**	1201048 Trail Ridge
DATE RECEIVED:	03/29/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/02/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TREB-1	Modified ASTM D-5504	Tedlar Bag	Tedlar Bag
02A	TREB-2	Modified ASTM D-5504	Tedlar Bag	Tedlar Bag
03A	TREB-3	Modified ASTM D-5504	Tedlar Bag	Tedlar Bag
04A	Lab Blank	Modified ASTM D-5504	NA	NA
05A	LCS	Modified ASTM D-5504	NA	NA
05AA	LCSD	Modified ASTM D-5504	NA	NA

CERTIFIED BY: [signature] DATE: 04/02/12

Laboratory Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

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LABORATORY NARRATIVE
ASTM D-5504
Derenzo & Associates
Workorder# 1203620

Three 1 Liter Tedlar Bag samples were received on March 29, 2012. The laboratory performed the analysis of sulfur compounds via ASTM D-5504 using GC/SCD. The method involves direct injection of the air sample into the GC via a fixed 2.0 mL sampling loop. See the data sheets for the reporting limits for each compound.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
SULFUR GASES BY ASTM D-5504 GC/SCD

Client Sample ID: TREB-1

Lab ID#: 1203620-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	600	33000
Carbonyl Sulfide	600	940
Methyl Mercaptan	600	5400
Dimethyl Sulfide	600	10000

Client Sample ID: TREB-2

Lab ID#: 1203620-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	800	31000
Methyl Mercaptan	800	5700
Dimethyl Sulfide	800	10000

Client Sample ID: TREB-3

Lab ID#: 1203620-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	600	34000
Methyl Mercaptan	600	5500
Dimethyl Sulfide	600	11000

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Client Sample ID: TREB-1

Lab ID#: 1203620-01A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032906**	**Date of Collection:**	**3/28/12 3:30:00 PM**
Dil. Factor:	**150**	**Date of Analysis:**	**3/29/12 09:57 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	600	33000
Carbonyl Sulfide	600	940
Methyl Mercaptan	600	5400
Ethyl Mercaptan	600	Not Detected
Dimethyl Sulfide	600	10000
Carbon Disulfide	750	Not Detected
Isopropyl Mercaptan	600	Not Detected
tert-Butyl Mercaptan	600	Not Detected
n-Propyl Mercaptan	600	Not Detected
Ethyl Methyl Sulfide	600	Not Detected
Thiophene	600	Not Detected
Isobutyl Mercaptan	600	Not Detected
Diethyl Sulfide	600	Not Detected
n-Butyl Mercaptan	600	Not Detected
Dimethyl Disulfide	600	Not Detected
3-Methylthiophene	600	Not Detected
Tetrahydrothiophene	600	Not Detected
2-Ethylthiophene	600	Not Detected
2,5-Dimethylthiophene	600	Not Detected
Diethyl Disulfide	600	Not Detected

Container Type: 1 Liter Tedlar Bag

eurofins | Air Toxics

Client Sample ID: TREB-2

Lab ID#: 1203620-02A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032907**	**Date of Collection: 3/28/12 3:34:00 PM**
Dil. Factor:	**200**	**Date of Analysis: 3/29/12 10:19 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	800	31000
Carbonyl Sulfide	800	Not Detected
Methyl Mercaptan	800	5700
Ethyl Mercaptan	800	Not Detected
Dimethyl Sulfide	800	10000
Carbon Disulfide	1000	Not Detected
Isopropyl Mercaptan	800	Not Detected
tert-Butyl Mercaptan	800	Not Detected
n-Propyl Mercaptan	800	Not Detected
Ethyl Methyl Sulfide	800	Not Detected
Thiophene	800	Not Detected
Isobutyl Mercaptan	800	Not Detected
Diethyl Sulfide	800	Not Detected
n-Butyl Mercaptan	800	Not Detected
Dimethyl Disulfide	800	Not Detected
3-Methylthiophene	800	Not Detected
Tetrahydrothiophene	800	Not Detected
2-Ethylthiophene	800	Not Detected
2,5-Dimethylthiophene	800	Not Detected
Diethyl Disulfide	800	Not Detected

Container Type: 1 Liter Tedlar Bag

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Client Sample ID: TREB-3

Lab ID#: 1203620-03A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032908**	**Date of Collection: 3/28/12 3:38:00 PM**
Dil. Factor:	**150**	**Date of Analysis: 3/29/12 10:46 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	600	34000
Carbonyl Sulfide	600	Not Detected
Methyl Mercaptan	600	5500
Ethyl Mercaptan	600	Not Detected
Dimethyl Sulfide	600	11000
Carbon Disulfide	750	Not Detected
Isopropyl Mercaptan	600	Not Detected
tert-Butyl Mercaptan	600	Not Detected
n-Propyl Mercaptan	600	Not Detected
Ethyl Methyl Sulfide	600	Not Detected
Thiophene	600	Not Detected
Isobutyl Mercaptan	600	Not Detected
Diethyl Sulfide	600	Not Detected
n-Butyl Mercaptan	600	Not Detected
Dimethyl Disulfide	600	Not Detected
3-Methylthiophene	600	Not Detected
Tetrahydrothiophene	600	Not Detected
2-Ethylthiophene	600	Not Detected
2,5-Dimethylthiophene	600	Not Detected
Diethyl Disulfide	600	Not Detected

Container Type: 1 Liter Tedlar Bag

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1203620-04A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032904**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/28/12 09:14 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)
Hydrogen Sulfide	4.0	Not Detected
Carbonyl Sulfide	4.0	Not Detected
Methyl Mercaptan	4.0	Not Detected
Ethyl Mercaptan	4.0	Not Detected
Dimethyl Sulfide	4.0	Not Detected
Carbon Disulfide	5.0	Not Detected
Isopropyl Mercaptan	4.0	Not Detected
tert-Butyl Mercaptan	4.0	Not Detected
n-Propyl Mercaptan	4.0	Not Detected
Ethyl Methyl Sulfide	4.0	Not Detected
Thiophene	4.0	Not Detected
Isobutyl Mercaptan	4.0	Not Detected
Diethyl Sulfide	4.0	Not Detected
n-Butyl Mercaptan	4.0	Not Detected
Dimethyl Disulfide	4.0	Not Detected
3-Methylthiophene	4.0	Not Detected
Tetrahydrothiophene	4.0	Not Detected
2-Ethylthiophene	4.0	Not Detected
2,5-Dimethylthiophene	4.0	Not Detected
Diethyl Disulfide	4.0	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1203620-05A

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032902**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 3/28/12 07:52 PM**

Compound	%Recovery
Hydrogen Sulfide	98
Carbonyl Sulfide	91
Methyl Mercaptan	95
Ethyl Mercaptan	89
Dimethyl Sulfide	93
Carbon Disulfide	98
Isopropyl Mercaptan	87
tert-Butyl Mercaptan	88
n-Propyl Mercaptan	86
Ethyl Methyl Sulfide	99
Thiophene	95
Isobutyl Mercaptan	91
Diethyl Sulfide	95
n-Butyl Mercaptan	94
Dimethyl Disulfide	99
3-Methylthiophene	97
Tetrahydrothiophene	103
2-Ethylthiophene	109
2,5-Dimethylthiophene	95
Diethyl Disulfide	111

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1203620-05AA

SULFUR GASES BY ASTM D-5504 GC/SCD

File Name:	**I032903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**3/28/12 08:17 PM**

Compound	%Recovery
Hydrogen Sulfide	97
Carbonyl Sulfide	93
Methyl Mercaptan	104
Ethyl Mercaptan	98
Dimethyl Sulfide	106
Carbon Disulfide	107
Isopropyl Mercaptan	94
tert-Butyl Mercaptan	97
n-Propyl Mercaptan	95
Ethyl Methyl Sulfide	110
Thiophene	102
Isobutyl Mercaptan	97
Diethyl Sulfide	99
n-Butyl Mercaptan	96
Dimethyl Disulfide	106
3-Methylthiophene	105
Tetrahydrothiophene	114
2-Ethylthiophene	116
2,5-Dimethylthiophene	103
Diethyl Disulfide	120

Container Type: NA - Not Applicable

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager: Michael Brack
Collected by: (Print and Sign) Mike Brack [signature]
Company: Derenzo & Assoc Email: mbrack@derenzo.com
Address: 39395 Schoolcraft City: Livonia State: MI Zip: 48150
Phone: 734-464-3880 Fax:

Project Info:
P.O. #: FCD-18
Project #: 1201048
Project Name: Trail Ridge

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	TREB-1	–	3/28/12	1530	D-5504	–	–		
02A	TREB-2	–	↓	1534	↓	–	–		
03A	TREB-3	–	↓	1538	↓	–	–		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	3/28/12 1600	[signature]	3/29/12 0900

Notes: Landfill Gas

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		N/A	Good	Yes No (None)	1203620

Form 1293 rev.11

eurofins | Air Toxics

4/19/2012

Mr. David Derenzo
Derenzo & Associates
39395 Schoolcraft Road

Livonia MI 48150

Project Name: TMIL RIDGE ENERGY
Project #: 1201048
Workorder #: 1204105

Dear Mr. David Derenzo

The following report includes the data for the above referenced project for sample(s) received on 4/5/2012 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott
Project Manager

eurofins | Air Toxics

WORK ORDER #: 1204105

Work Order Summary

CLIENT:	Mr. David Derenzo Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150	**BILL TO:**	Ms. Donna Povich Derenzo & Associates 39395 Schoolcraft Road Livonia, MI 48150
PHONE:	734-464-3880	**P.O. #**	1507
FAX:	734-464-4368	**PROJECT #**	1201048 TMIL RIDGE ENERGY
DATE RECEIVED:	04/05/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/19/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TREC-1	Modified TO-15	2.0 "Hg	5 psi
02A	TREC-2	Modified TO-15	2.5 "Hg	5 psi
03A	TREC-3	Modified TO-15	2.5 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda d. Freeman DATE: 04/19/12

Laboratory Director

Certfication numbers: AZ Licensure AZ0719, CA NELAP - 02110CA, LA NELAP - 02089, NY NELAP - 11291, TX NELAP - T104704434-11-3, UT NELAP -CA009332011-1, WA NELAP - C935
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/11 , Expiration date: 06/30/12.
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
Derenzo & Associates
Workorder# 1204105

Three 6 Liter Summa Canister samples were received on April 05, 2012. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The canisters in this work order were pressurized with Helium prior to sampling, per client request. Dilution factors have been adjusted accordingly.

Dilution was performed on all of the samples due to the presence of high level non-target species.

The reported CCV for each daily batch may be derived from more than one analytical file due to the client's request for non-standard compounds.

Non-standard compounds may have different acceptance criteria than the standard TO-14A/TO-15 compound list as per contract or verbal agreement.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV and/or LCS.
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TREC-1

Lab ID#: 1204105-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	15	520	72	2600
Freon 114	15	43	100	300
Vinyl Chloride	15	100	37	270
Chloroethane	58	100	150	270
Freon 11	15	96	82	540
Methylene Chloride	150	360	510	1200
1,1-Dichloroethane	15	40	59	160
cis-1,2-Dichloroethene	15	510	58	2000
1,2-Dichloroethane	15	610	59	2500
Trichloroethene	15	350	78	1900
1,2-Dichloropropane	15	58	67	270
Tetrachloroethene	15	330	99	2200
Chlorobenzene	15	58	67	270
trans-1,2-Dichloroethene	15	34	58	130
Dichlorofluoromethane	58	120	240	530
Chlorodifluoromethane	58	1600	210	5600

Client Sample ID: TREC-2

Lab ID#: 1204105-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	18	500	88	2500
Freon 114	18	46	120	320
Vinyl Chloride	18	94	46	240
Chloroethane	72	100	190	270
Freon 11	18	85	100	480
Methylene Chloride	180	320	620	1100
1,1-Dichloroethane	18	37	72	150
cis-1,2-Dichloroethene	18	480	71	1900
1,2-Dichloroethane	18	600	72	2400
Trichloroethene	18	330	96	1800
1,2-Dichloropropane	18	64	83	290
Tetrachloroethene	18	390	120	2600

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TREC-2

Lab ID#: 1204105-02A

Chlorobenzene	18	69	82	320
Dichlorofluoromethane	72	130	300	560
Chlorodifluoromethane	72	1400	250	5000

Client Sample ID: TREC-3

Lab ID#: 1204105-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	18	520	88	2500
Freon 114	18	46	120	320
Vinyl Chloride	18	95	46	240
Chloroethane	72	110	190	300
Freon 11	18	87	100	490
Methylene Chloride	180	350	620	1200
1,1-Dichloroethane	18	42	72	170
cis-1,2-Dichloroethene	18	530	71	2100
1,2-Dichloroethane	18	620	72	2500
Trichloroethene	18	370	96	2000
1,2-Dichloropropane	18	53	83	240
Tetrachloroethene	18	440	120	3000
Chlorobenzene	18	83	82	380
1,4-Dichlorobenzene	18	34	110	200
trans-1,2-Dichloroethene	18	18	71	72
Dichlorofluoromethane	72	130	300	540
Chlorodifluoromethane	72	1400	250	4900

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Client Sample ID: TREC-1

Lab ID#: 1204105-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040531**	**Date of Collection: 3/28/12 3:10:00 PM**
Dil. Factor:	**29.2**	**Date of Analysis: 4/6/12 09:52 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	15	520	72	2600
Freon 114	15	43	100	300
Chloromethane	150	Not Detected	300	Not Detected
Vinyl Chloride	15	100	37	270
Chloroethane	58	100	150	270
Freon 11	15	96	82	540
1,1-Dichloroethene	15	Not Detected	58	Not Detected
Freon 113	15	Not Detected	110	Not Detected
Methylene Chloride	150	360	510	1200
1,1-Dichloroethane	15	40	59	160
cis-1,2-Dichloroethene	15	510	58	2000
Chloroform	15	Not Detected	71	Not Detected
1,1,1-Trichloroethane	15	Not Detected	80	Not Detected
Carbon Tetrachloride	15	Not Detected	92	Not Detected
1,2-Dichloroethane	15	610	59	2500
Trichloroethene	15	350	78	1900
1,2-Dichloropropane	15	58	67	270
cis-1,3-Dichloropropene	15	Not Detected	66	Not Detected
trans-1,3-Dichloropropene	15	Not Detected	66	Not Detected
1,1,2-Trichloroethane	15	Not Detected	80	Not Detected
Tetrachloroethene	15	330	99	2200
Chlorobenzene	15	58	67	270
1,1,2,2-Tetrachloroethane	15	Not Detected	100	Not Detected
1,3-Dichlorobenzene	15	Not Detected	88	Not Detected
1,4-Dichlorobenzene	15	Not Detected	88	Not Detected
alpha-Chlorotoluene	15	Not Detected	76	Not Detected
1,2-Dichlorobenzene	15	Not Detected	88	Not Detected
1,2,4-Trichlorobenzene	58	Not Detected	430	Not Detected
Hexachlorobutadiene	58	Not Detected	620	Not Detected
trans-1,2-Dichloroethene	15	34	58	130
Bromodichloromethane	15	Not Detected	98	Not Detected
Dibromochloromethane	15	Not Detected	120	Not Detected
Dichlorofluoromethane	58	120	240	530
Chlorodifluoromethane	58	1600	210	5600

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: TREC-2

Lab ID#: 1204105-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040532**	**Date of Collection:**	**3/28/12 5:00:00 PM**
Dil. Factor:	**35.8**	**Date of Analysis:**	**4/6/12 10:33 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	18	500	88	2500
Freon 114	18	46	120	320
Chloromethane	180	Not Detected	370	Not Detected
Vinyl Chloride	18	94	46	240
Chloroethane	72	100	190	270
Freon 11	18	85	100	480
1,1-Dichloroethene	18	Not Detected	71	Not Detected
Freon 113	18	Not Detected	140	Not Detected
Methylene Chloride	180	320	620	1100
1,1-Dichloroethane	18	37	72	150
cis-1,2-Dichloroethene	18	480	71	1900
Chloroform	18	Not Detected	87	Not Detected
1,1,1-Trichloroethane	18	Not Detected	98	Not Detected
Carbon Tetrachloride	18	Not Detected	110	Not Detected
1,2-Dichloroethane	18	600	72	2400
Trichloroethene	18	330	96	1800
1,2-Dichloropropane	18	64	83	290
cis-1,3-Dichloropropene	18	Not Detected	81	Not Detected
trans-1,3-Dichloropropene	18	Not Detected	81	Not Detected
1,1,2-Trichloroethane	18	Not Detected	98	Not Detected
Tetrachloroethene	18	390	120	2600
Chlorobenzene	18	69	82	320
1,1,2,2-Tetrachloroethane	18	Not Detected	120	Not Detected
1,3-Dichlorobenzene	18	Not Detected	110	Not Detected
1,4-Dichlorobenzene	18	Not Detected	110	Not Detected
alpha-Chlorotoluene	18	Not Detected	93	Not Detected
1,2-Dichlorobenzene	18	Not Detected	110	Not Detected
1,2,4-Trichlorobenzene	72	Not Detected	530	Not Detected
Hexachlorobutadiene	72	Not Detected	760	Not Detected
trans-1,2-Dichloroethene	18	Not Detected	71	Not Detected
Bromodichloromethane	18	Not Detected	120	Not Detected
Dibromochloromethane	18	Not Detected	150	Not Detected
Dichlorofluoromethane	72	130	300	560
Chlorodifluoromethane	72	1400	250	5000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: TREC-3

Lab ID#: 1204105-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040533**	**Date of Collection:**	**3/28/12 6:45:00 PM**
Dil. Factor:	**35.8**	**Date of Analysis:**	**4/6/12 11:06 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	18	520	88	2500
Freon 114	18	46	120	320
Chloromethane	180	Not Detected	370	Not Detected
Vinyl Chloride	18	95	46	240
Chloroethane	72	110	190	300
Freon 11	18	87	100	490
1,1-Dichloroethene	18	Not Detected	71	Not Detected
Freon 113	18	Not Detected	140	Not Detected
Methylene Chloride	180	350	620	1200
1,1-Dichloroethane	18	42	72	170
cis-1,2-Dichloroethene	18	530	71	2100
Chloroform	18	Not Detected	87	Not Detected
1,1,1-Trichloroethane	18	Not Detected	98	Not Detected
Carbon Tetrachloride	18	Not Detected	110	Not Detected
1,2-Dichloroethane	18	620	72	2500
Trichloroethene	18	370	96	2000
1,2-Dichloropropane	18	53	83	240
cis-1,3-Dichloropropene	18	Not Detected	81	Not Detected
trans-1,3-Dichloropropene	18	Not Detected	81	Not Detected
1,1,2-Trichloroethane	18	Not Detected	98	Not Detected
Tetrachloroethene	18	440	120	3000
Chlorobenzene	18	83	82	380
1,1,2,2-Tetrachloroethane	18	Not Detected	120	Not Detected
1,3-Dichlorobenzene	18	Not Detected	110	Not Detected
1,4-Dichlorobenzene	18	34	110	200
alpha-Chlorotoluene	18	Not Detected	93	Not Detected
1,2-Dichlorobenzene	18	Not Detected	110	Not Detected
1,2,4-Trichlorobenzene	72	Not Detected	530	Not Detected
Hexachlorobutadiene	72	Not Detected	760	Not Detected
trans-1,2-Dichloroethene	18	18	71	72
Bromodichloromethane	18	Not Detected	120	Not Detected
Dibromochloromethane	18	Not Detected	150	Not Detected
Dichlorofluoromethane	72	130	300	540
Chlorodifluoromethane	72	1400	250	4900

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1204105-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040517**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/5/12 06:52 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
Dichlorofluoromethane	2.0	Not Detected	8.4	Not Detected
Chlorodifluoromethane	2.0	Not Detected	7.1	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1204105-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040506**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis:**	**4/5/12 12:44 PM**

Compound	%Recovery
Freon 12	113
Freon 114	105
Chloromethane	114
Vinyl Chloride	107
Chloroethane	113
Freon 11	111
1,1-Dichloroethene	100
Freon 113	108
Methylene Chloride	110
1,1-Dichloroethane	108
cis-1,2-Dichloroethene	105
Chloroform	108
1,1,1-Trichloroethane	112
Carbon Tetrachloride	115
1,2-Dichloroethane	111
Trichloroethene	103
1,2-Dichloropropane	102
cis-1,3-Dichloropropene	102
trans-1,3-Dichloropropene	105
1,1,2-Trichloroethane	103
Tetrachloroethene	104
Chlorobenzene	102
1,1,2,2-Tetrachloroethane	102
1,3-Dichlorobenzene	105
1,4-Dichlorobenzene	99
alpha-Chlorotoluene	105
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	100
Hexachlorobutadiene	106
trans-1,2-Dichloroethene	102
Bromodichloromethane	106
Dibromochloromethane	108
Dichlorofluoromethane	111
Chlorodifluoromethane	110

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1204105-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040507**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/5/12 01:26 PM**

Compound	%Recovery
Freon 12	116
Freon 114	107
Chloromethane	111
Vinyl Chloride	108
Chloroethane	118
Freon 11	112
1,1-Dichloroethene	107
Freon 113	109
Methylene Chloride	108
1,1-Dichloroethane	107
cis-1,2-Dichloroethene	108
Chloroform	108
1,1,1-Trichloroethane	112
Carbon Tetrachloride	117
1,2-Dichloroethane	118
Trichloroethene	111
1,2-Dichloropropane	109
cis-1,3-Dichloropropene	112
trans-1,3-Dichloropropene	115
1,1,2-Trichloroethane	110
Tetrachloroethene	109
Chlorobenzene	108
1,1,2,2-Tetrachloroethane	110
1,3-Dichlorobenzene	112
1,4-Dichlorobenzene	105
alpha-Chlorotoluene	110
1,2-Dichlorobenzene	109
1,2,4-Trichlorobenzene	111
Hexachlorobutadiene	111
trans-1,2-Dichloroethene	112
Bromodichloromethane	115
Dibromochloromethane	113
Dichlorofluoromethane	Not Spiked
Chlorodifluoromethane	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1204105-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040508**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/5/12 01:43 PM**

Compound	%Recovery
Freon 12	117
Freon 114	111
Chloromethane	118
Vinyl Chloride	106
Chloroethane	120
Freon 11	113
1,1-Dichloroethene	113
Freon 113	113
Methylene Chloride	111
1,1-Dichloroethane	111
cis-1,2-Dichloroethene	109
Chloroform	111
1,1,1-Trichloroethane	113
Carbon Tetrachloride	118
1,2-Dichloroethane	117
Trichloroethene	112
1,2-Dichloropropane	107
cis-1,3-Dichloropropene	110
trans-1,3-Dichloropropene	112
1,1,2-Trichloroethane	111
Tetrachloroethene	108
Chlorobenzene	111
1,1,2,2-Tetrachloroethane	113
1,3-Dichlorobenzene	116
1,4-Dichlorobenzene	109
alpha-Chlorotoluene	113
1,2-Dichlorobenzene	114
1,2,4-Trichlorobenzene	118
Hexachlorobutadiene	117
trans-1,2-Dichloroethene	122
Bromodichloromethane	115
Dibromochloromethane	113
Dichlorofluoromethane	Not Spiked
Chlorodifluoromethane	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	98	70-130

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CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager MIKE BRAK

Collected by: (Print and Sign) [signature]

Company DELENZO & ASSOCIATES Email

Address 37335 SCHOOLCRAFT City LIVONIA State MI Zip 48150

Phone 734 464 3880 Fax 734 464 4318

Project Info:

P.O. # 1507

Project # 1201048

Project Name TRAIL RIDGE ENERGY

Turn Around Time: ☑ Normal ☐ Rush ______ specify

Lab Use Only Pressurized by: Date: Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	TREC-1	4187	3/28/12	15:10	TO-15 CHLORINATED ONLY	26	3.0		
02A	TREC-2	5686	3/28/12	17:00	" " "	26.5	3.5		
03A	TREC-3	34433	3/28/12	18:45	" " "	25.5	3.0		

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	4/3/12 1200	[signature]	4.5.12 0830

Notes: LANDFILL GAS SAMPLES (PADDED)

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Fed Ex		NA	Good	Yes No None (circled)	1204105

Form 1293 rev.11

APPENDIX D

SAMPLE CALCULATIONS

EXAMPLE CALCULATIONS

Equation 1a - Dry Molecular Weight:

MWd = 0.440(%CO2) + 0.320(%O2) + 0.280(%N2 + %CO)

Equation 1b - Wet Molecular Weight:

MWw = MWd(1-B*ws*) + 18.0(B*ws*)

Equation 2a - Meter Volume at Standard Conditions:

Vm(std) = VmY (Tstd)(Pbar + □H/13.6) / (Tm)(Pstd)

Equation 2b - Volume of Water Vapor Condensed:

Vwc(std) = K1(Wf-Wi)

Equation 2c - Moisture Content:

B*ws* = Vwc(std)/(Vwc(std) + Vm(std))

Equation 3a - Velocity at a Traverse Point:

Vd = KpCp(Ts□P/PsMWw)$^{1/2}$

Equation 3b - Volumetric Flow Rate (Actual Basis):

Q = Vd(avg)Ad 60

Equation 3c - Volumetric Flow Rate (Standard Basis):

Qstd = Q (Tstd)(Ps) / (Ts)(Pstd)

Equation 3d - Volumetric Flow Rate (Standard Dry Basis):

Qstd(dry) = Qstd(1-B*ws*)

Equation 4a – Nitrogen Oxides Concentration (ppmvd)

NOxC = ((NOx ppmvd-avg. zero) x Cal. Gas conc.)) / Avg. cal. – Avg. zero)

Equation 4b – Nitrogen Oxides Emission Rate: (lb/hr)

NOxER (lb/hr) = NOxC x Qstd(dry) x 46.01 x 0.07524/28950000

Equation 4c – Nitrogen Oxides Emission Rate: (g/bHp-hr)

NOxER (g/bHp-hr) = NOxER (lb/hr) *(453.6 g/lb) 0.7457 kW/bHp) / (kW /0.96)

Equation 5a – Carbon Monoxide Concentration (ppmvd)

COC (ppmvd) = (ppmCO x (1-(%CO_2/100)))-avg. zero) x Cal. Gas conc.))/ Avg. cal. – Avg. zero)

Equation 5b – – Carbon Monoxide Emission Rate: (lb/hr)

COER (lb/hr) = COC x Qstd(dry) x 28.20 x 0.07524/28950000

Equation 5c – Carbon monoxide Emission Rate: (g/bHp-hr)

COER (g/bHP-hr) = (COER (lb/hr) *(453.6 g/lb) 0.7457 kW/bHp) / (kW /0.96)

Equation 6a – Brake-horse Power (bHp)

bHp = (kW/0.961) * bHp/0.7457kW

Equation 7a – Hydrogen Chloride Concentration: (ppmv)

HClC (ppmv) = Laboratory Report

Equation 7b – Hydrogen Chloride Emission Factor: (lb/MMscf)

HClER (lb/MMscf) = ppmv*chlorine atoms*(36.46 lb HCl/mol) / (387 ft3/mol)

Equation 8a – Sulfur Dioxide Concentration: (ppmv)

SO2C (ppmv) = Laboratory Report

Equation 8b – Hydrogen Chloride Emission Factor: (lb/MMscf)

SO2ER (lb/MMscf) = ppmv*sulfur atoms*(64.06 lb SO2/mol) / (387 ft3/mol)

SYMBOL IDENTIFICATION

Ad	=	Area of duct (ft^2)
bHp	=	Brake-horse Power
B*ws*	=	Water vapor in gas stream, proportional by volume
COC	=	Carbon monoxide concentration (ppmvd)
COER	=	Carbon monoxide emission rate (lb/hr)
Cp	=	Pitot tube calibration factor (unitless)
K1	=	Constant (0.04715 ft^3/g)
Kp	=	Constant (85.49)
kW	=	Kilowatt
lb/MMscf	=	pounds per million standard cubic foot
MWd	=	Duct gas dry molecular weight (lb/lb-mole)
MWw	=	Duct gas wet molecular weight (lb/lb-mole)
NOxC	=	Nitrogen Oxides Concentration (ppmvd)
NOxER	=	Nitrogen Oxides Emission Rate (g/bHp-hr)
Pbar	=	Barometric pressure ("Hg)
Ps	=	Absolute stack pressure ("Hg)
Pstd	=	Standard pressure (29.92"Hg)
Q	=	Duct volumetric flow rate (actual cfm)
Qstd	=	Duct volumetric flow rate (scfm)
Qstd(dry)	=	Duct volumetric flow rate (dscfm)
Tm	=	Absolute temperature at meter (°R)
Ts	=	Absolute temperature of duct gas (°R)
Tstd	=	Standard temperature (528°R)
Vd	=	Duct velocity at a traverse point (ft/s)
Vm	=	Dry test meter volume (cf)
Vm(std)	=	Dry test meter volume at standard conditions (scf)
Vwc(std)	=	Volume of water vapor condensed at standard conditions (scf)
Wf	=	Final weight of impinger/absorber train (g)
Wi	=	Initial weight of impinger/absorber train (g)
Y	=	Dry test meter calibration factor (unitless)
%CO2	=	Duct gas carbon dioxide content (%volume)
%CO	=	Duct gas carbon monoxide content (%volume)
%N2	=	Duct gas nitrogen content (%volume)
%O2	=	Duct gas oxygen content (%volume)
ΔH	=	Pressure drop across orifice ("H2O)
ΔP	=	Pressure drop across pitot tube ("H2O)

APPENDIX E

PROCESS OPERATING DATA

Trail Ridge U1 (EU0004) Emission Tesing Date 3/28/2012

Time	KW	Ul Gas Flow	Plant GAS Flow	U2 kw	U3 kw	U4 kw	U5 kw	U6 kw	Total kw	U1 % of total kw
Run 1 @ 1410										
1410	1629	537.1	3200	1655	1636	1604	1603	1578	9705	16.8%
1425	1682	545.4	3201	1659	1669	1628	1615	1618	9871	17.0%
1440	1686	546.0	3190	1607	1628	1652	1607	1670	9850	17.1%
1455	1621	524.8	2661	1635	1707	0	1614	1642	8219	19.7%
1510	1654	542.4	2832	1603	1686	472	1612	1609	8636	19.2%
Average	1654	539.2	3017	1632	1665	1071	1610	1623	9256	18.0%
Run 2 @ 1610										
1610	1638	533.4	3185	1620	1677	1595	1617	1634	9781	16.7%
1625	1659	542.1	3176	1598	1652	1588	1612	1610	9719	17.1%
1640	1666	535.5	2622	1626	1644	0	1610	1611	8157	20.4%
1655	1598	507.1	2945	1602	1666	1165	1635	1614	9280	17.2%
1710	1654	527.0	3144	1658	1683	1588	1634	1650	9867	16.8%
Average	1643	529	3014	1621	1664	1187	1622	1624	9361	17.6%
Run 3 @ 1755										
1755	1580	507.3	2580	1586	1628	0	1599	1642	8035	19.7%
1810	1629	521.9	2583	1611	1625	0	1619	1578	8062	20.2%
1825	1643	523.9	2595	1591	1637	0	1632	1635	8138	20.2%
1840	1621	512.5	2570	1618	1640	0	1603	1646	8128	19.9%
1855	1608	506.8	3014	1658	1686	1389	1619	1603	9563	16.8%
Average	1616	515	2668	1613	1643	278	1614	1621	8385	19.4%

APPENDIX F

DETAILED DESCRIPTIONS OF SAMPLING PROCEDURES

Instrument Sampling and Calibration Procedures

1.0 Extractive Gas Sampling System for Instrumental Analyzers

The extractive gas sampling system that serves the instrumental analyzers used for Methods 3A, 7E, 10 and Alt 078 is configured as described below.

Sample probe - Stainless steel single opening probe placed at the required sampling location.

Three-way valve - A stainless steel three-way valve is installed between the sample probe and a stainless steel particulate filter to allow the introduction of calibration gases into the sampling system. The three-way valve is turned toward the desired gas flow direction during this sampling. During system bias checks, excess calibration gas exits the sampling probe tip to avoid the introduction of process gas or ambient air during calibration.

Tee and poppet check valve - A stainless steel "Tee" is installed between the sample probe and a stainless steel particulate filter to allow the introduction of calibration gases through a stainless steel 10 psig poppet check valve into the sampling system. When sampling, the poppet check valve is normally closed, though upon the introduction of pressurized (i.e. > 10 psig) calibration gases from a remote Teflon® line to the poppet check valve, the check valve opens and allows the calibration gases to be introduced near the base of the sample probe. During this dynamic calibration (or sampling system bias check) procedure, excess calibration gas exits the sampling probe tip to avoid the introduction of process gas during calibration.

Heated sample line – A heated Teflon® line is used to transport the sample gas from the stack to the instrument rack. The heated Teflon® line is equipped with a temperature controller which maintains the temperature of the sample line at approximately 250°F to prevent moisture condensation.

Sample pump and flow control valve – A single head 100% oil-free vacuum pump fitted with a stainless steel flow control valve is used to transfer sampled gases from the heated sample line to the instrumental analyzer. The vacuum pump is leak-free and non-reactive to the gases being sampled. Subsequent sample transport lines and fittings are either stainless steel or Teflon®.

Gas Conditioner – thermal-electric based condenser equipped with a peristaltic pump is used to remove moisture from the sampled gas stream that is directed to the instrumental analyzers, which require a conditioned (or dry) gas samples. From the moisture removal system, a sample gas manifold constructed of Teflon® transport lines and stainless steel Tee fittings is used to continuously deliver the sampled gas to the instrumental analyzers. Since the instrumental analyzers are equipped with internal sampling pumps, the end of the sample gas manifold is equipped with an atmospheric dump (or bypass discharge vent) to avoid over pressurization of the instrumental analyzers.

Data Logger – A data logging system is used to record 1-minute average data from the analog output of the instrumental analyzers.

2.0 Instrumental Analyzer Quality Assurance / Calibration Procedures

Upon site arrival, the instrumental analyzers are set-up in accordance with the manufacturer's written recommended procedures. Upon setting the appropriate range for the instrument, zero and appropriate span gases are introduced sequential order to verify instrument accuracy (three-point analyzer calibration error test).

Prior to the first test run, appropriate upscale and low-range (zero) span gases are introduced in series at the three-way valve in the sampling system. This dynamic calibration procedure is the sampling system bias check, and the analyzer's response time is recorded.

The start of the test run occurs when the calibration gases are cleared from the sampling system and the data acquisition system records a consistent instrumental analyzer response on the stack gas sample (at least twice the system response time is allowed to verify representative readings).

At the conclusion of the sampling period, an appropriate upscale and low-range (zero) gases are re-introduced in series at the three-way valve in the sampling system to check against the method's performance specifications for calibration drift and zero drift error. If the drift error is within 3% of the span over the period of the test run, the test run will be considered acceptable.

Calibration gas dilution equipment

A STEC Model SGD-SC-5L five-step gas divider may potentially be used to obtain appropriate calibration span gases in the field, as necessary. The five-step gas divider is National Institute of Standards and Technology (NIST)-certified for primary flow standards in accordance with USEPA Method 205. When cut with an appropriate zero gas, the five-step gas divider delivers calibration gas values at 0, 20, 40, 60, 80, and 100% of the introduced USEPA Protocol 1 calibration gas. The field evaluation procedures described in Section 3.2 of USEPA Method 205 will be performed prior to the compliance testing program, in order to validate the use of the five-step gas divider.

3.0 Evacuated Canister Sampling System and Procedures for LFG Chlorine Content

An evacuated SUMMA passivated sampling canister was utilized to sample the landfill gas for chlorine analysis. The canister was conditioned in accordance with US EPA Method TO-15 guidelines, which includes evacuation of the canister to within 10mm of absolute pressure and allowing the canister to sit for 30 minutes. The tank was acceptable if as change more than ± 2 mm was noted. The leak check value is included in the results report. The canister is then pre-charged with Helium for shipment purposes so that the samples will not be considered dangerous.

Sampling was conducted at a flow rate equivalent to filling the remainder of the canister so that it is approximately 80% full at the completion of the testing. Sampling was conducted at a flow rate of 50 – 70 cc/min. All sample train components consisted of Teflon and stainless steel. The samples were clearly and uniquely marked prior to shipment. Chain-of-custody forms were prepared prior to departing the test site. Sample analysis was conducted using Air Toxics, LTD.

4.0 Exhaust Gas Moisture Determination - USEPA Method 4 Chilled Impinger

The moisture content of the IC Engine exhaust gas was determined in accordance with the USEPA Method 4 chilled impinger method. A gas sample was extracted at a constant rate from the source and bubbled through a condenser where moisture will be removed from the sample stream, and determined gravimetrically.

The moisture sampling train consisted of a non-heated probe connected to the first chilled impinger by a sufficient length of tubing. The impinger train consisted of four (4) impingers, connected in series and immersed in an ice bath. Crushed ice was placed around the impingers to keep the temperatures of the gases leaving the last impinger at 68 °F or less. Each impinger were weighed gravimetrically before and after each test to determine the net moisture gain. The impinger train were constructed and charged as follows:

1. modified Greensburg-Smith (G-S) impinger containing 100 ml of distilled water;
2. standard G-S impinger containing 100 ml of distilled water;
3. modified G-S impinger, dry, to serve as a knockout; and;
4. modified G-S impinger containing approximately 200 - 300 grams of pre-dried silica gel and glass fiber.

An umbilical line was used to connect the sample probe and impinger train to the Nutech® Metering System. The umbilical line includes type K thermocouples, used to measure the impinger outlet.

A Nutech® Metering System was used to maintain a constant sampling rate. The system consists of a vacuum gauge, leak-free carbon vane pump, calibrated dry gas meter and thermocouples. The thermocouples were connected to a digital thermometer that displays temperature readings from the thermocouples on the umbilical line and dry gas meter.

Prior to each test run, the moisture sampling train was assembled and leak-checked at the sampling site by plugging the inlet to the probe and pulling a vacuum of approximately 15 in. Hg. At the conclusion of the test run, a post test leak check was performed by drawing a vacuum equal to or greater than the highest vacuum measured during the test run.

During sampling, a single representative sample location was used in lieu of collecting the sample across the velocity traverse profile. At 5-minute intervals, sampling train data will be recorded. An aneroid-type barometer was used to measure the barometric pressure of the ambient air. All sampling data was recorded on field data sheets. Percent moisture was calculated using the measured mass gain of the impingers along with the metering console and calibration data.

5.0 Tedlar Bag Sampling Procedures for SO2 Emission Factor

Samples of the fuel gas were obtained into a tedlar bag by purging the Teflon sample line and introducing the gas directly into the bag. The fuel feed was under pressure limiting any potential for dilution. Upon conclusion of the bag sampling the valve was securely closed and the bag was placed in a rigid metal container for shipment.

APPENDIX G

RAW INSTRUMENTAL ANALYZER RESPONSE DATA

Trail Ridge Energy - March 27, 2012 CEM Data

Date	Hour	O2	Hour	O2	Hour	O2
3/27/2012	13:00	21.01	13:40	13.01	14:20	0.02
3/27/2012	13:01	21.02	13:41	12.66	14:21	0.01
3/27/2012	13:02	21.02	13:42	12.59	14:22	0.01
3/27/2012	13:03	21.02	13:43	12.57	14:23	0.12
3/27/2012	13:04	21.01	13:44	12.56	14:24	6.88
3/27/2012	13:05	21	13:45	12.1	14:25	12.36
3/27/2012	13:06	21	13:46	8.63	14:26	12.59
3/27/2012	13:07	20.89	13:47	8.41	14:27	12.65
3/27/2012	13:08	3.75	13:48	8.37	14:28	12.47
3/27/2012	13:09	0.45	13:49	8.36	14:29	1.75
3/27/2012	13:10	0.12	13:50	8.36	14:30	0.27
3/27/2012	13:11	2.99	13:51	7.86	14:31	0.02
3/27/2012	13:12	19.95	13:52	0.81	14:32	0.01
3/27/2012	13:13	20.88	13:53	0.15	14:33	0.01
3/27/2012	13:14	21.02	13:54	0.01	14:34	0.01
3/27/2012	13:15	21.01	13:55	0.01	14:35	0.01
3/27/2012	13:16	21.02	13:56	12.63	14:36	6.93
3/27/2012	13:17	18.51	13:57	20.56	14:37	12.37
3/27/2012	13:18	12.88	13:58	20.91	14:38	12.6
3/27/2012	13:19	12.63	13:59	21.01	14:39	12.66
3/27/2012	13:20	12.58	14:00	21.05	14:40	12.68
3/27/2012	13:21	12.56	14:01	17.82	14:41	12.69
3/27/2012	13:22	12.55	14:02	12.86	14:42	12.69
3/27/2012	13:23	12.55	14:03	12.65	14:43	3.58
3/27/2012	13:24	12.2	14:04	12.6	14:44	0.33
3/27/2012	13:25	8.66	14:05	12.58	14:45	0.04
3/27/2012	13:26	8.41	14:06	12.58	14:46	0.01
3/27/2012	13:27	8.37	14:07	12.58	14:47	0.57
3/27/2012	13:28	8.36	14:08	12.59	14:48	11.49
3/27/2012	13:29	8.36	14:09	11.8	14:49	12.49
3/27/2012	13:30	5.17	14:10	8.59	14:50	12.62
3/27/2012	13:31	0.36	14:11	8.43	14:51	12.65
3/27/2012	13:32	0.05	14:12	8.4	14:52	12.66
3/27/2012	13:33	0.01	14:13	8.39	14:53	12.66
3/27/2012	13:34	0.01	14:14	8.39	14:54	2.88
3/27/2012	13:35	2.67	14:15	8.39	14:55	0.31
3/27/2012	13:36	19.8	14:16	8.38	14:56	0.03
3/27/2012	13:37	20.84	14:17	8.38	14:57	0.01
3/27/2012	13:38	21.02	14:18	3.08	14:58	0.01
3/27/2012	13:39	19.6	14:19	0.25	14:59	0.01

Test ID	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
1	1412-1512	34.55	62.24	4.73	57.71	642.02	10.88	8.09
2	1610-1710	34.70	70.60	5.24	65.62	673.79	11.11	8.04
3	1755-1855	34.75	72.20	4.94	67.51	673.25	11.28	8.04

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	11:47		200.00					
3/28/2012	11:54		78.70					
3/28/2012	11:59		0.58					
3/28/2012	12:00					980.00		
3/28/2012	12:03					788.10		
3/28/2012	12:12					0.31		
3/28/2012	12:06						22.87	
3/28/2012	12:08						13.70	
3/28/2012	12:12						0.00	
3/28/2012	12:12							20.99
3/28/2012	12:20							8.33
3/28/2012	12:23							0.00
3/28/2012	12:00	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:01	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:02	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:03	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:04	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:05	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:06	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:07	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:08	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:09	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:10	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:11	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:12	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:13	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:14	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:15	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:16	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:17	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:18	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:19	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:20	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:21	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:22	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:23	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:24	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:25	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:26	0.13	0.63	0.4	0.47	0.5	0	0.01
3/28/2012	12:27	0.13	0.66	0.4	0.45	0.34	0	0.01
3/28/2012	12:28	0.13	0.67	0.4	0.45	0.46	0	0.01
3/28/2012	12:29	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:30	0.11	0.61	0.39	0.46	0.39	0	0.01
3/28/2012	12:31	0.12	0.61	0.4	0.46	0.38	0	0.01
3/28/2012	12:32	0.11	0.6	0.39	0.46	0.74	0	0.01
3/28/2012	12:33	0.11	0.6	0.4	0.46	0.53	0	0.01
3/28/2012	12:34	0.11	0.6	0.39	0.46	0.32	0	0.01
3/28/2012	12:35	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:36	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:37	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:38	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:39	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:40	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:41	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:42	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:43	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:44	-999	-999	-999	-999	-999	-999	-999

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	12:45	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:46	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:47	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:48	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:49	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:50	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:51	-999	-999	-999	-999	-999	-999	-999
3/28/2012	12:52	0.31	78.11	73.49	5.39	1.24	0	0.01
3/28/2012	12:53	0.21	78.8	77.4	1.05	0.95	0	0.01
3/28/2012	12:54	0.17	78.19	77.33	0.98	41.4	0	0.01
3/28/2012	12:55	0.11	21.72	21.31	0.47	743.12	0	0.01
3/28/2012	12:56	0.11	1.16	0.65	0.45	755.62	0	0.01
3/28/2012	12:57	0.12	0.64	0.38	0.43	766.39	0	0.01
3/28/2012	12:58	0.11	0.62	0.38	0.44	770.17	0.03	0.01
3/28/2012	12:59	0.11	0.61	0.38	0.44	772.06	0.11	0.01
3/28/2012	13:00	0.11	0.6	0.38	0.44	771.39	8.65	0.01
3/28/2012	13:01	0.11	0.61	0.38	0.44	77.48	10.67	0.33
3/28/2012	13:02	0.12	0.6	0.38	0.45	2.2	13.36	0.01
3/28/2012	13:03	0.12	0.59	0.39	0.45	1.99	13.4	0.01
3/28/2012	13:04	0.11	0.6	0.39	0.45	1.78	13.44	0.01
3/28/2012	13:05	0.12	0.6	0.39	0.45	1.37	11.01	1.1
3/28/2012	13:06	0.12	0.6	0.39	0.45	1.87	0.33	7.41
3/28/2012	13:07	0.12	0.61	0.39	0.46	1.7	0.05	8.19
3/28/2012	13:08	0.11	0.6	0.38	0.45	1.94	0.01	8.28
3/28/2012	13:09	0.11	0.59	0.38	0.45	2.15	0	8.3
3/28/2012	13:10	0.11	0.59	0.38	0.45	1.32	0	6.87
3/28/2012	13:11	0.11	0.59	0.38	0.45	1.52	0	0.56
3/28/2012	13:12	0.11	0.59	0.38	0.45	1.45	0	0.18
3/28/2012	13:13	0.11	0.59	0.38	0.45	1.51	0	0.02
3/28/2012	13:14	0.11	0.6	0.38	0.45	1.81	0	0.01
3/28/2012	13:15	0.11	0.59	0.38	0.45	1.79	0	0.01
3/28/2012	13:16	0.11	0.59	0.38	0.45	2.08	0	0.01
3/28/2012	13:17	0.11	0.59	0.38	0.45	1.79	0	0.01
3/28/2012	13:18	0.12	0.6	0.38	0.45	1.77	0	0.01
3/28/2012	13:19	0.12	0.6	0.38	0.45	1.89	0	0.01
3/28/2012	13:20	0.11	0.6	0.38	0.45	1.81	0	0.01
3/28/2012	13:21	0.12	0.6	0.38	0.45	2.02	0	0.01
3/28/2012	13:22	0.12	0.6	0.38	0.45	1.89	0	0.01
3/28/2012	13:23	0.12	0.6	0.39	0.45	2.02	0	1.01
3/28/2012	13:24	0.12	0.6	0.38	0.45	1.9	0	19.02
3/28/2012	13:25	16.48	0.6	0.39	0.45	2	0	20.82
3/28/2012	13:26	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:27	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:28	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:29	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:30	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:31	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:32	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:33	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:34	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:35	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:36	-999	-999	-999	-999	-999	-999	-999
3/28/2012	13:37	82.36	0.61	0.38	0.46	1.7	0	21.14
3/28/2012	13:38	82.76	0.61	0.38	0.45	2.04	0	21.14
3/28/2012	13:39	82.64	0.61	0.38	0.45	2.09	0	21.16
3/28/2012	13:40	82.56	0.61	0.38	0.45	1.92	0	21.16
3/28/2012	13:41	82.56	0.6	0.38	0.45	2.16	0	21.13
3/28/2012	13:42	74.47	0.61	0.38	0.45	2.14	0	20.95
3/28/2012	13:43	49.67	0.61	0.38	0.45	2.1	0	20.95
3/28/2012	13:44	49.56	0.62	0.39	0.45	2.13	0	20.95
3/28/2012	13:45	49.46	0.61	0.38	0.45	4.65	0.01	20.86

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	13:46	35.22	0.6	0.38	0.36	2.26	0	20.82
3/28/2012	13:47	33.26	0.6	0.38	0.44	1.72	0	20.84
3/28/2012	13:48	34.43	0.6	0.38	0.45	1.97	0	20.85
3/28/2012	13:49	34.43	0.61	0.38	0.45	2.05	0	20.78
3/28/2012	13:50	34.42	0.61	0.38	0.45	2.08	0	20.64
3/28/2012	13:51	25.49	0.6	0.38	0.44	35.14	0.22	20.63
3/28/2012	13:52	0.33	13.39	2.72	10.8	622.09	9.99	10.64
3/28/2012	13:53	21.05	59.37	9.98	49.59	634.31	10.75	8.57
3/28/2012	13:54	36.43	62.68	8.58	54.22	647.77	11.03	8.17
3/28/2012	13:55	36.25	63.72	9.36	54.69	646.07	11.03	8.1
3/28/2012	13:56	36.23	60.28	8.64	51.94	644.01	11.02	8.09
3/28/2012	13:57	34.99	60.49	8.14	52.64	650.26	11.09	8.06
3/28/2012	13:58	34.23	60.86	7.33	53.64	655.41	11.1	8.03
3/28/2012	13:59	34.05	62.03	7.68	54.71	649.93	11.08	8.05
3/28/2012	14:00	34.05	62.67	-999	-999	-999	-999	-999
3/28/2012	14:01	34.05	62.4	6.92	55.58	-999	-999	-999
3/28/2012	14:02	34.13	58.57	6.32	52.36	-999	-999	-999
3/28/2012	14:03	34.22	59.76	5.83	54.44	-999	-999	-999
3/28/2012	14:04	34.04	61.27	5.71	55.74	-999	-999	-999
3/28/2012	14:05	-999	-999	-999	-999	-999	-999	-999
3/28/2012	14:06	-999	-999	-999	-999	-999	-999	-999
3/28/2012	14:07	34.41	-999	5.14	55.67	-999	-999	-999
3/28/2012	14:08	-999	-999	-999	-999	-999	-999	-999
3/28/2012	14:09	34.67	-999	5.38	60.63	642.65	10.98	8.13
3/28/2012	14:10	34.65	-999	4.89	56.72	636.82	10.97	8.17
3/28/2012	14:11	-999	-999	-999	-999	-999	-999	-999
3/28/2012	14:12	34.76	60.07	4.73	55.45	638.8	10.98	8.15
3/28/2012	14:13	34.62	59.74	4.78	55.16	638.84	10.98	8.13
3/28/2012	14:14	34.74	59.28	4.87	54.74	647.16	11.01	8.1
3/28/2012	14:15	34.81	64.49	5.08	59.73	645.78	11.01	8.07
3/28/2012	14:16	34.42	60.87	5	55.98	638.34	10.98	8.1
3/28/2012	14:17	34.18	59.92	4.87	55.41	638.6	10.99	8.09
3/28/2012	14:18	33.61	60.15	4.85	55.58	651.02	11	8.06
3/28/2012	14:19	34.31	62.5	5.07	57.54	642.26	10.97	8.1
3/28/2012	14:20	34.81	65.25	4.87	60.49	641.62	10.96	8.1
3/28/2012	14:21	34.63	63.69	5.13	58.84	637.53	10.95	8.1
3/28/2012	14:22	34.69	59.27	4.85	54.53	640.29	10.96	8.1
3/28/2012	14:23	35.02	60.5	4.99	55.55	638.02	10.95	8.1
3/28/2012	14:24	34.7	60.96	4.96	56.22	645.96	10.98	8.07
3/28/2012	14:25	34.42	61.65	4.88	56.86	644.06	10.97	8.06
3/28/2012	14:26	34.41	63.25	5.13	58.23	636.92	10.95	8.08
3/28/2012	14:27	34.48	59.31	4.94	54.72	635.25	10.91	8.12
3/28/2012	14:28	35.01	58.16	4.66	53.57	639.75	10.93	8.1
3/28/2012	14:29	35.02	58.88	5.26	53.8	645.75	10.96	8.06
3/28/2012	14:30	35.02	64.46	5.06	59.59	639.82	10.94	8.07
3/28/2012	14:31	35.02	60.13	5.21	55.14	645.54	10.95	8.07
3/28/2012	14:32	35.02	62.75	5.11	57.85	638.58	10.92	8.08
3/28/2012	14:33	35.02	58.21	5.06	53.42	638.87	10.89	8.11
3/28/2012	14:34	34.67	61.88	5.05	57.05	644.61	10.94	8.07
3/28/2012	14:35	34.02	63.65	4.88	58.87	646.8	10.92	8.07
3/28/2012	14:36	34.54	65.43	5.13	60.5	644.21	10.93	8.07
3/28/2012	14:37	34.82	66.23	4.95	61.49	643.05	10.9	8.09
3/28/2012	14:38	34.05	62.29	4.89	57.51	647.94	10.95	8.06
3/28/2012	14:39	34.28	61.61	4.88	56.88	643.18	10.93	8.07
3/28/2012	14:40	35.01	60.9	4.56	56.61	642.17	10.89	8.09
3/28/2012	14:41	34.78	60.53	4.77	56.04	643.07	10.89	8.09
3/28/2012	14:42	34.61	62.43	4.62	58.01	648.71	10.91	8.06
3/28/2012	14:43	34.61	65.88	5.21	60.81	646.03	10.89	8.08
3/28/2012	14:44	34.57	64.56	4.85	59.98	647.78	10.9	8.07

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	14:45	34.41	65.81	4.89	61.15	641.98	10.88	8.07
3/28/2012	14:46	34.51	63.93	4.95	59.34	640.47	10.86	8.1
3/28/2012	14:47	34.61	63.03	4.46	58.67	637.79	10.85	8.11
3/28/2012	14:48	34.61	61.91	4.95	57.26	639.73	10.84	8.12
3/28/2012	14:49	34.55	59.42	4.55	55.08	635.33	10.79	8.16
3/28/2012	14:50	34.02	60.53	4.63	56.02	633.18	10.81	8.15
3/28/2012	14:51	34.27	60.3	4.61	55.97	646.14	10.86	8.11
3/28/2012	14:52	34.62	65.16	4.63	60.57	646.33	10.83	8.1
3/28/2012	14:53	34.48	63.19	4.95	58.52	640.76	10.84	8.11
3/28/2012	14:54	34.41	62.54	4.62	58.11	643.88	10.85	8.07
3/28/2012	14:55	34.02	62.92	4.73	58.4	640.67	10.81	8.1
3/28/2012	14:56	34.29	61.11	4.46	56.85	637.72	10.78	8.11
3/28/2012	14:57	34.82	61.91	4.46	57.65	642.64	10.81	8.09
3/28/2012	14:58	34.82	62.39	4.38	58.29	639.45	10.81	8.08
3/28/2012	14:59	34.82	61.48	4.21	57.4	641.44	10.79	8.09
3/28/2012	15:00	34.44	63.08	4.38	58.91	649.54	10.83	8.04
3/28/2012	15:01	34.32	65.02	4.46	60.84	641.26	10.8	8.08
3/28/2012	15:02	34.02	63.24	4.38	59.16	638.74	10.78	8.1
3/28/2012	15:03	34.13	61.44	4.38	57.35	639.74	10.77	8.11
3/28/2012	15:04	34.22	62.22	4.13	58.41	647.71	10.83	8.06
3/28/2012	15:05	34.05	66.77	4.55	62.55	643.17	10.76	8.09
3/28/2012	15:06	34.12	62.39	4.38	58.22	630.37	10.73	8.13
3/28/2012	15:07	34.62	57.8	3.96	53.96	645.14	10.77	8.1
3/28/2012	15:08	34.72	63.98	4.38	59.72	645.72	10.79	8.07
3/28/2012	15:09	34.82	64.57	4.3	60.48	641.18	10.75	8.12
3/28/2012	15:10	34.51	62.89	4.47	58.64	641.25	10.75	8.12
3/28/2012	15:11	34.48	63.15	4.05	59.22	643.36	10.76	8.11
3/28/2012	15:12	35.02	65.48	4.14	61.64	642.1	10.78	8.08
3/28/2012	15:13	34.91	62.44	4.29	58.53	586.88	10.24	8.24
3/28/2012	15:14	34.78	45.48	4.62	41.08	22.55	0.8	18.61
3/28/2012	15:15	20.26	10.43	1.62	8.94	3.47	0.15	20.37
3/28/2012	15:16	2.5	5.91	0.95	5.18	2.92	0.11	20.53
3/28/2012	15:17	1.74	3.9	0.86	3.26	2.44	0.08	20.58
3/28/2012	15:18	1.47	3.07	0.86	2.51	2.24	0.07	20.6
3/28/2012	15:19	1.09	2.41	0.86	1.93	1.99	0.05	20.61
3/28/2012	15:20	1.02	2.09	0.7	1.6	2.05	0.03	20.61
3/28/2012	15:21	0.89	1.57	0.37	1.43	2.18	0.02	20.62
3/28/2012	15:22	0.75	1.56	0.37	1.26	2.14	0.01	20.63
3/28/2012	15:23	0.68	1.49	0.38	0.93	2.2	0.01	20.63
3/28/2012	15:24	0.7	1.08	0.37	0.93	1.92	0	20.63
3/28/2012	15:25	0.64	1.08	0.37	0.93	2.12	0	20.62
3/28/2012	15:26	0.5	1.1	0.38	0.94	2.07	0	20.61
3/28/2012	15:27	0.52	1.13	0.4	0.97	2.03	0	20.67
3/28/2012	15:28	0.52	1.13	0.39	0.96	2.23	0	20.82
3/28/2012	15:29	29.75	1.11	0.39	0.96	2.11	0	20.84
3/28/2012	15:30	33.65	1.13	0.39	0.96	2.16	0	20.85
3/28/2012	15:31	33.81	1.13	0.39	0.97	2.05	0	20.85
3/28/2012	15:32	33.91	1.13	0.39	0.88	2.05	0	20.85
3/28/2012	15:33	34.01	1.11	0.39	0.95	4.56	0.03	18.21
3/28/2012	15:34	34.14	1.1	0.72	0.63	1.51	0	1.45
3/28/2012	15:35	34.17	0.72	0.37	0.67	1.86	0	0.41
3/28/2012	15:36	9.89	1.29	0.69	0.92	1.85	0	0.18
3/28/2012	15:37	0.27	60.11	56.58	4.48	1.99	0	0.03
3/28/2012	15:38	0.27	78.63	77.58	1.15	2.09	0	0.01
3/28/2012	15:39	0.27	78.64	77.98	0.67	2	0	0.01
3/28/2012	15:40	0.27	78.4	78.15	0.43	2.05	0	0.01
3/28/2012	15:41	0.27	78.64	78.39	0.43	1.93	0	0.01
3/28/2012	15:42	0.31	78.78	78.5	0.38	8.78	0	0.01
3/28/2012	15:43	0.13	73.26	60.27	13.2	660.78	0	0.01
3/28/2012	15:44	0.08	1.79	1.7	0.56	779.26	0	0.01

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	15:45	0.08	1.06	0.51	0.57	790.21	0	0.01
3/28/2012	15:46	0.08	1.07	0.37	0.43	790.51	0	0.01
3/28/2012	15:47	0.1	0.73	0.37	0.44	790.42	0	0.01
3/28/2012	15:48	0.11	0.61	0.38	0.44	216.78	8.27	0.01
3/28/2012	15:49	0.1	0.64	0.37	0.43	2.29	12.98	0.01
3/28/2012	15:50	0.07	0.53	0.35	0.4	1.49	13.04	0.01
3/28/2012	15:51	0.07	0.53	0.35	0.4	1.43	13.08	0.01
3/28/2012	15:52	0.1	0.6	0.4	0.47	1.79	13.1	0.01
3/28/2012	15:53	0.1	0.57	0.36	0.43	1.46	13.12	0.01
3/28/2012	15:54	0.08	0.54	0.35	0.4	1.88	13.13	0.01
3/28/2012	15:55	0.07	0.53	0.35	0.41	1.87	13.53	0.01
3/28/2012	15:56	0.08	0.54	0.36	0.42	1.97	13.53	0.01
3/28/2012	15:57	0.07	0.54	0.35	0.41	1.77	13.54	0.01
3/28/2012	15:58	0.09	0.57	0.38	0.44	1.24	12.07	0.33
3/28/2012	15:59	0.08	0.54	0.35	0.4	1.03	0.57	7.39
3/28/2012	16:00	0.08	0.54	0.35	0.4	1.54	0.15	8.17
3/28/2012	16:01	0.08	0.54	0.35	0.41	1.07	0.1	8.27
3/28/2012	16:02	0.07	0.53	0.35	0.4	1.48	0.07	8.3
3/28/2012	16:03	0.08	0.56	0.36	0.43	1.77	0.05	8.31
3/28/2012	16:04	0.08	2.49	0.67	2.32	436.96	6.57	8.24
3/28/2012	16:05	30.32	44.02	8.57	35.88	645.42	10.96	8.16
3/28/2012	16:06	34.78	54.13	7.1	47.31	656.16	11.03	8.12
3/28/2012	16:07	33.81	59.06	7.21	52.22	652.92	11.04	8.12
3/28/2012	16:08	33.91	57.69	7.1	50.93	663.25	11.09	8.09
3/28/2012	16:09	34.01	62.78	6.68	56.24	653.14	11.03	8.14
3/28/2012	16:10	34.48	58.58	6.3	52.54	658.24	11.07	8.12
3/28/2012	16:11	34.57	60.59	6.21	54.65	661.02	11.08	8.11
3/28/2012	16:12	34.21	63.03	5.99	57.33	668.56	11.1	8.08
3/28/2012	16:13	34.29	66.31	6.35	60.17	658.49	11.08	8.1
3/28/2012	16:14	34.41	61.34	5.6	55.97	659.68	11.1	8.09
3/28/2012	16:15	34.69	61.54	5.57	56.23	660.94	11.08	8.11
3/28/2012	16:16	34.81	61.45	5.54	56.11	665.38	11.09	8.09
3/28/2012	16:17	34.41	64.51	5.66	59.22	668.36	11.11	8.09
3/28/2012	16:18	34.48	64	5.68	58.51	667.01	11.12	8.07
3/28/2012	16:19	34.62	68.02	5.52	62.78	663.83	11.11	8.09
3/28/2012	16:20	34.73	67.52	5.6	62.25	686.2	11.2	8
3/28/2012	16:21	34.81	74.17	5.68	68.71	672.51	11.15	8.03
3/28/2012	16:22	34.81	69.53	5.67	64.25	671.82	11.15	8.04
3/28/2012	16:23	34.41	69.85	5.41	65.08	674.04	11.16	8.03
3/28/2012	16:24	34.41	68.85	5	64.1	676.12	11.18	8.02
3/28/2012	16:25	34.53	72.21	5.36	67.2	670.18	11.14	8.04
3/28/2012	16:26	34.62	69.72	5.06	65.04	676.01	11.16	8.02
3/28/2012	16:27	34.95	73.19	5.44	68.04	672.58	11.16	8.02
3/28/2012	16:28	34.98	69.4	5.2	64.49	671.97	11.14	8.03
3/28/2012	16:29	34.81	72.24	5.16	67.38	676.21	11.17	8.01
3/28/2012	16:30	34.43	72.28	5.39	67.18	681.61	11.19	7.99
3/28/2012	16:31	34.01	74.84	5.36	69.86	667.81	11.12	8.04
3/28/2012	16:32	34.32	68.63	5.08	63.78	669.95	11.13	8.05
3/28/2012	16:33	34.46	71.06	5.14	66.21	669.96	11.15	8.03
3/28/2012	16:34	35.01	70.24	5.19	65.34	684.06	11.16	8
3/28/2012	16:35	34.94	75.34	5.62	70.11	683.07	11.15	8.01
3/28/2012	16:36	34.81	75.46	5.45	70.23	673.04	11.14	8.02
3/28/2012	16:37	34.95	72.75	5.44	67.6	679.22	11.14	8.01
3/28/2012	16:38	35.01	73.29	5.31	68.19	685.09	11.15	8.01
3/28/2012	16:39	34.81	77.51	5.91	71.9	682.43	11.16	8
3/28/2012	16:40	34.99	74.44	5.36	69.38	665.9	11.07	8.06
3/28/2012	16:41	35.41	64.75	5.12	59.89	664.98	11.08	8.09
3/28/2012	16:42	35.04	70.9	5.17	66.05	679.19	11.12	8.03
3/28/2012	16:43	34.81	73.13	5.1	68.32	672.08	11.1	8.05
3/28/2012	16:44	34.63	71.18	5.24	66.29	674.02	11.11	8.05

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	16:45	34.68	71.67	5.19	66.59	685.31	11.12	8.02
3/28/2012	16:46	34.96	75.82	5.33	70.71	676.68	11.09	8.04
3/28/2012	16:47	34.98	74.31	5.5	69.02	688.27	11.12	8.01
3/28/2012	16:48	34.99	77.6	5.41	72.51	676.79	11.1	8.02
3/28/2012	16:49	34.82	70.87	5.28	65.96	673.92	11.1	8.05
3/28/2012	16:50	34.81	73.64	5.17	68.6	678.41	11.1	8.01
3/28/2012	16:51	34.98	70.93	4.79	66.3	668.47	11.09	8.04
3/28/2012	16:52	34.9	67.25	4.75	62.62	672.46	11.08	8.04
3/28/2012	16:53	34.78	73.89	4.87	69.1	682.58	11.12	8
3/28/2012	16:54	34.63	73.85	5.13	68.89	683.03	11.14	7.99
3/28/2012	16:55	34.54	72.02	5.04	67.09	675.74	11.09	8.02
3/28/2012	16:56	33.99	71.72	4.96	67.01	684.92	11.12	8.01
3/28/2012	16:57	34.2	75.44	5.25	70.4	677.51	11.1	8.02
3/28/2012	16:58	34.59	73.52	4.92	68.77	674.97	11.09	8.02
3/28/2012	16:59	34.31	69.59	4.83	64.96	672.7	11.05	8.05
3/28/2012	17:00	34.19	70.19	4.54	66.01	668.15	11.08	8.04
3/28/2012	17:01	34.58	72.57	4.84	67.94	675.63	11.07	8.04
3/28/2012	17:02	34.68	69.96	4.66	65.58	670.32	11.05	8.06
3/28/2012	17:03	34.97	70.21	4.29	66.13	671.72	11.07	8.04
3/28/2012	17:04	34.84	70.12	4.75	65.74	681.72	11.1	8.01
3/28/2012	17:05	34.76	76.5	4.62	71.99	674.5	11.07	8.02
3/28/2012	17:06	34.94	71.46	4.65	66.99	674.72	11.06	8.05
3/28/2012	17:07	34.96	72.42	4.75	67.89	679.88	11.08	8.03
3/28/2012	17:08	34.96	72.49	4.57	67.97	673.61	11.05	8.06
3/28/2012	17:09	35.07	71.83	4.75	67.42	677.84	11.06	8.05
3/28/2012	17:10	35.18	74.95	4.8	70.42	669.92	11.05	8.05
3/28/2012	17:11	34.51	69.1	4.61	64.69	670.33	11.03	8.07
3/28/2012	17:12	34.47	72.86	4.53	68.45	680.83	11.07	8.04
3/28/2012	17:13	35.19	76.66	4.82	72.09	578.19	9.99	8.47
3/28/2012	17:14	35.2	48.61	4.5	44.29	11.96	0.52	19.22
3/28/2012	17:15	4.78	11.69	2	9.98	2.1	0.16	20.4
3/28/2012	17:16	3.14	7.24	1.43	6.03	1.86	0.12	20.54
3/28/2012	17:17	1.52	5.12	1.37	4.12	1.75	0.09	20.58
3/28/2012	17:18	1.29	3.85	0.92	3.12	1.84	0.07	20.59
3/28/2012	17:19	1.11	3.21	0.92	2.49	1.58	0.06	20.59
3/28/2012	17:20	0.77	2.66	0.93	2.02	1.18	0.04	20.73
3/28/2012	17:21	6.63	2.28	0.93	1.81	0.82	0.03	20.78
3/28/2012	17:22	33	2.17	0.93	1.52	0.42	0.02	20.78
3/28/2012	17:23	33.19	2.15	0.92	1.5	0.91	0.01	20.79
3/28/2012	17:24	33.4	1.74	0.9	1.48	1.71	0.01	20.79
3/28/2012	17:25	33.71	1.71	0.77	1.43	1.1	0.01	5.21
3/28/2012	17:26	30.99	1.43	0.38	0.94	0.78	0	0.54
3/28/2012	17:27	0.49	1.09	0.39	0.95	0.45	0	0.21
3/28/2012	17:28	0.42	1.12	0.41	0.99	0.33	0	0.04
3/28/2012	17:29	0.31	1.15	0.43	1.02	0.41	0	0.01
3/28/2012	17:30	0.3	1.12	0.42	0.99	0.43	0	0.01
3/28/2012	17:31	0.31	1.15	0.43	1.01	0.41	0	0.01
3/28/2012	17:32	0.31	1.14	0.44	1.01	0.22	0	6.31
3/28/2012	17:33	0.31	1.14	0.43	1.01	0.23	0	8.16
3/28/2012	17:34	0.3	1.11	0.41	0.98	0.2	0	8.27
3/28/2012	17:35	0.3	1.11	0.41	0.98	0.68	0	8.29
3/28/2012	17:36	0.31	1.14	0.43	1.01	1.17	1.29	7.85
3/28/2012	17:37	0.32	1.14	0.43	0.84	0.43	12.87	0.9
3/28/2012	17:38	0.29	0.95	0.4	0.95	0.29	13.41	0.22
3/28/2012	17:39	0.3	0.61	0.41	0.97	0.17	13.56	0.03
3/28/2012	17:40	0.29	0.6	0.4	0.82	0.32	13.6	0.01
3/28/2012	17:41	0.11	0.69	0.43	0.65	588.94	4.25	0.01
3/28/2012	17:42	0.11	0.68	0.44	0.63	786.44	0.12	0.01
3/28/2012	17:43	0.11	0.66	0.44	0.52	787.94	0.07	0.01
3/28/2012	17:44	0.12	0.66	0.44	0.53	788.15	0.04	0.01

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	17:45	0.09	0.6	0.39	0.46	788.14	0.03	0.01
3/28/2012	17:46	0.08	4.2	3.83	0.6	202.09	0.15	0.13
3/28/2012	17:47	0.08	71.88	67.76	4.23	2.31	0	0.01
3/28/2012	17:48	0.08	79.4	78.61	1.02	1.7	0	0.01
3/28/2012	17:49	0.09	79.25	79	0.49	1.22	0	0.01
3/28/2012	17:50	0.11	78.9	74.91	4.25	472.89	7.09	4.29
3/28/2012	17:51	28.68	63.27	11.67	51.86	673.65	11.11	7.86
3/28/2012	17:52	34.41	66.7	7.41	59.61	666.47	11.15	8.03
3/28/2012	17:53	34.6	67.61	7.11	60.77	672.62	11.18	8.06
3/28/2012	17:54	34.58	71.67	7.22	64.61	676.25	11.21	8.06
3/28/2012	17:55	34.58	72.28	7.06	65.54	681.81	11.26	8.03
3/28/2012	17:56	34.12	72.2	6.9	65.43	672.56	11.25	8.05
3/28/2012	17:57	33.97	72.41	6.28	66.33	674.48	11.25	8.05
3/28/2012	17:58	33.97	73.94	6.37	67.87	674.21	11.28	8.04
3/28/2012	17:59	34.26	70.92	6.12	65.18	670.71	11.26	8.05
3/28/2012	18:00	34.77	70.85	5.89	65.18	676.69	11.29	8.04
3/28/2012	18:01	34.5	74.78	6.35	68.64	684.11	11.3	8.02
3/28/2012	18:02	34.37	76.41	5.97	70.65	665.77	11.24	8.09
3/28/2012	18:03	34.17	68.12	5.55	62.68	662.34	11.23	8.12
3/28/2012	18:04	34.22	68.1	5.69	62.89	670.11	11.27	8.09
3/28/2012	18:05	34.36	71.86	5.53	66.62	674.78	11.29	8.05
3/28/2012	18:06	34.72	74.27	5.63	68.94	673.83	11.27	8.08
3/28/2012	18:07	34.96	73.63	5.2	68.48	668	11.26	8.08
3/28/2012	18:08	34.6	69.86	5.13	64.93	666.2	11.26	8.09
3/28/2012	18:09	34.61	71.49	5.19	66.52	664.21	11.22	8.11
3/28/2012	18:10	34.81	66.59	4.79	62.09	662.75	11.24	8.1
3/28/2012	18:11	34.71	70.83	5.1	66.01	667.94	11.25	8.09
3/28/2012	18:12	34.61	70.77	4.86	66.12	673.96	11.28	8.06
3/28/2012	18:13	34.61	71.66	5.03	66.76	662.64	11.22	8.12
3/28/2012	18:14	34.66	69.16	4.86	64.68	671.89	11.29	8.07
3/28/2012	18:15	35.01	71.15	4.87	66.66	671.93	11.27	8.06
3/28/2012	18:16	34.92	69.5	5.1	64.7	664.24	11.25	8.08
3/28/2012	18:17	34.81	68.06	4.53	63.82	673.88	11.28	8.06
3/28/2012	18:18	34.96	74.24	4.93	69.52	683.61	11.31	8.03
3/28/2012	18:19	35	76.05	5.09	71.16	688.46	11.34	7.99
3/28/2012	18:20	34.81	76.42	5.36	71.36	681.88	11.3	8.01
3/28/2012	18:21	34.67	74.69	5.19	69.88	669.75	11.26	8.05
3/28/2012	18:22	34.41	72.04	4.7	67.55	667.64	11.27	8.05
3/28/2012	18:23	34.8	70.97	4.84	66.49	663.62	11.23	8.09
3/28/2012	18:24	35.01	69.39	4.77	64.96	682.08	11.31	8.03
3/28/2012	18:25	35.2	76.12	5.18	71.3	683.17	11.31	8.01
3/28/2012	18:26	35.15	72.93	5.1	68.13	675.11	11.28	8.04
3/28/2012	18:27	35.01	73.21	5.11	68.48	680.35	11.3	8.03
3/28/2012	18:28	35.01	76.07	5.03	71.33	671.6	11.27	8.05
3/28/2012	18:29	35.01	71.06	4.62	66.74	675.93	11.28	8.03
3/28/2012	18:30	35.32	73.89	4.63	69.23	679.76	11.31	8.01
3/28/2012	18:31	35.34	73.23	4.81	68.74	676.51	11.29	8.02
3/28/2012	18:32	35.17	73.64	4.47	69.24	677.89	11.28	8.02
3/28/2012	18:33	34.57	73.15	4.73	68.75	671.96	11.27	8.04
3/28/2012	18:34	33.98	73.17	4.49	69.1	675.49	11.3	8.02
3/28/2012	18:35	34.62	73.83	4.73	69.34	675.67	11.3	8.01
3/28/2012	18:36	34.81	71.98	4.46	67.91	674.56	11.27	8.05
3/28/2012	18:37	34.81	73.97	4.61	69.66	670.8	11.27	8.04
3/28/2012	18:38	34.89	72.64	4.45	68.41	679.84	11.31	8.01
3/28/2012	18:39	35.01	76.06	4.45	71.83	673.71	11.28	8.02
3/28/2012	18:40	35.15	72.38	4.53	67.98	674.9	11.29	8.02
3/28/2012	18:41	35.2	71.46	4.53	67.15	667.06	11.25	8.04
3/28/2012	18:42	34.81	68.7	4.2	64.9	665.98	11.26	8.05
3/28/2012	18:43	34.79	70.33	4.23	66.19	669.14	11.28	8.02
3/28/2012	18:44	34.77	71.89	4.04	67.89	676.34	11.3	8.01

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	18:45	34.77	71.6	4.36	67.36	668.71	11.27	8.04
3/28/2012	18:46	34.77	70.57	3.98	66.66	675.7	11.31	8.01
3/28/2012	18:47	34.76	70.68	4.27	66.55	669.94	11.27	8.04
3/28/2012	18:48	34.82	72.41	4.14	68.43	676.59	11.31	8
3/28/2012	18:49	35	73.37	4.33	69.4	674.71	11.29	8.02
3/28/2012	18:50	34.9	72.34	4.35	68.45	672.44	11.29	8.02
3/28/2012	18:51	34.81	72.77	4.27	68.88	672.9	11.29	8.02
3/28/2012	18:52	34.97	72.88	4.17	68.98	672.08	11.29	8.01
3/28/2012	18:53	34.96	70.37	4.16	66.46	672.17	11.28	8.03
3/28/2012	18:54	34.78	71.67	3.9	67.77	676.89	11.32	8
3/28/2012	18:55	34.88	73.14	4.32	69.16	674.25	11.31	8
3/28/2012	18:56	34.99	72.94	4.15	69.04	682.39	11.33	7.98
3/28/2012	18:57	35.29	76.2	4.37	71.96	423.68	7.76	10.68
3/28/2012	18:58	35.4	39.4	4.28	35.21	2.58	0.23	20
3/28/2012	18:59	35.38	10.59	2.04	8.7	1.73	0.15	20.43
3/28/2012	19:00	35.39	6.97	1.8	5.43	1.13	0.11	20.53
3/28/2012	19:01	35.38	5.15	1.38	4.02	0.97	0.09	20.56
3/28/2012	19:02	35.39	4.35	1.39	3.12	1.05	0.07	20.58
3/28/2012	19:03	3.38	3.43	1.14	2.54	0.66	0.05	20.6
3/28/2012	19:04	1.03	2.72	0.94	1.92	0.55	0.04	20.6
3/28/2012	19:05	0.88	2.31	0.86	1.66	0.2	0.03	20.6
3/28/2012	19:06	0.79	1.99	0.85	1.44	0.36	0.02	20.6
3/28/2012	19:07	0.71	1.6	0.38	1.45	0.48	0.01	20.59
3/28/2012	19:08	0.7	1.59	0.62	1.17	0.42	0	20.65
3/28/2012	19:09	5.45	1.56	0.36	0.93	0.35	0	20.81
3/28/2012	19:10	32.38	1.08	0.37	0.92	0.36	0	20.81
3/28/2012	19:11	32.48	1.17	0.37	0.93	0.82	0	20.81
3/28/2012	19:12	32.61	1.1	0.38	0.95	0.23	0	20.8
3/28/2012	19:13	32.59	1.1	0.38	0.94	0.27	0	20.81
3/28/2012	19:14	32.58	1.08	0.39	0.95	0.16	0	15.59
3/28/2012	19:15	32.6	1.11	0.39	0.95	0.32	0	1.04
3/28/2012	19:16	20.75	6.41	0.73	5.94	1.83	0.01	1.5
3/28/2012	19:17	0.3	43.13	2.1	41.4	0.21	0	0.48
3/28/2012	19:18	0.15	51.77	1.36	50.78	0.13	0	0.32
3/28/2012	19:19	0.09	52.43	1.36	51.27	0.1	0	0.3
3/28/2012	19:20	0.09	52.66	1.36	51.51	0.14	0	0.29
3/28/2012	19:21	0.08	52.67	1.35	51.5	0.08	0	0.29
3/28/2012	19:22	0.09	53.17	1.36	51.96	0.14	0	0.29
3/28/2012	19:23	0.1	53.18	1.37	52.03	0.12	0	0.29
3/28/2012	19:24	0.1	53.19	1.36	52.03	0.24	0	0.29
3/28/2012	19:25	0.11	53.2	1.38	52.05	0.08	0	0.29
3/28/2012	19:26	0.11	53.19	1.37	52.04	0.12	0	0.29
3/28/2012	19:27	0.11	53.2	1.37	52.04	0.07	0	0.29
3/28/2012	19:28	0.09	52.92	1.38	51.78	0.12	0	0.28
3/28/2012	19:29	0.09	18.33	0.82	17.72	0.17	0	0.01
3/28/2012	19:30	0.1	2.04	0.37	1.66	0.05	0	0.01
3/28/2012	19:31	0.11	1.59	0.37	1.41	0.15	0	0.01
3/28/2012	19:32	0.12	1.24	0.38	0.94	0.06	0	0.01
3/28/2012	19:33	0.11	1.11	0.38	0.94	0.13	0	0.01
3/28/2012	19:34	0.12	1.1	0.38	0.94	0.06	0	0.01
3/28/2012	19:35	0.12	1.11	0.38	0.94	0.09	0	0.01
3/28/2012	19:36	0.11	1.1	0.38	0.94	0.11	0	0.03
3/28/2012	19:37	0.1	1.1	0.37	0.94	0.1	0	6.82
3/28/2012	19:38	0.1	1.09	0.37	0.93	0.16	0	8.18
3/28/2012	19:39	0.1	0.72	0.36	0.93	0.09	0	8.28
3/28/2012	19:40	0.1	0.6	0.37	0.94	0.21	0	8.3
3/28/2012	19:41	0.11	0.6	0.37	0.51	0.08	0	8.31
3/28/2012	19:42	0.12	2.02	6.27	-1.61	0.16	0	3.2
3/28/2012	19:43	0.12	75.1	71.55	3.73	0.1	0	0.26
3/28/2012	19:44	0.1	78.71	77.83	1.16	0.12	0	0.02

Date	Hour	NMOC	NOX	NO	NO2	CO	CO2	O2
3/28/2012	19:45	0.12	77.35	76.85	0.96	0.22	2.94	0.01
3/28/2012	19:46	0.13	35.57	39.62	-0.17	0.13	13.85	0.01
3/28/2012	19:47	0.12	1.25	0.43	1	0.23	13.78	0.01
3/28/2012	19:48	0.13	1.13	0.39	0.96	0.12	13.81	0.01
3/28/2012	19:49	0.13	0.92	0.38	0.68	0.19	13.83	0.01
3/28/2012	19:50	0.13	0.62	0.38	0.46	451.65	6.37	0.01
3/28/2012	19:51	0.13	0.7	0.38	0.54	785.24	0.05	0.01
3/28/2012	19:52	0.13	0.62	0.38	0.46	785.68	0.02	0.01
3/28/2012	19:53	0.13	0.63	0.38	0.47	786.23	0	0.01
3/28/2012	19:54	0.12	0.62	0.37	0.46	755.58	0	0.03
3/28/2012	19:55	2.16	22.19	15.93	16.95	65.61	0.11	6.3