Brevard Energy, LLC
46280 Dylan Drive, Suite 200, Novi, MI 48377

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 Plan for the verification of select emissions and opacity determinations from a landfill gas-fueled internal combustion engine operated at the Brevard Energy, L.L.C. facility in Cocoa, Florida.
DEP File No.: 0090069-010-AV

Dear Mr. Arif:

Brevard Energy, L.L.C. is submitting the enclosed test report for the verification of volatile organic compounds, nitrogen oxides, sulfur dioxide, carbon monoxide, hydrogen chloride, and opacity determinations from the Unit #5 (EU008) CAT Model No. G3520C 2,233 brake-horsepower landfill gas-fueled engine used for electricity generation at the Brevard Energy, L.L.C. facility located at the Brevard County Solid Waste Management Central Disposal Facility in Cocoa, Florida.

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

Sincerely,

BREVARD ENERGY, L.L.C.

Rick DiGia
President and CEO

Enclosure

Phone: (248) 380-3920 Fax: (248) 380-2038

Derenzo and Associates, Inc.
Environmental Consultants

EMISSIONS TEST REPORT

Title	Compliance Test Report for the #5 (EU008) Landfill Gas Fueled G3520C Internal Combustion Engine Operated at the Brevard Energy, L.L.C., Brevard County Solid Waste Management Central Disposal Facility, Brevard County, Florida
Report Date	May 3, 2012
Test Date(s)	March 26, 2012

Facility Information	
Name	Brevard Energy, L.L.C., Brevard County Solid Waste Management Central Disposal Facility
City, County	Cocoa, Brevard

Facility Permit Information			
DEP File No.:	0090069-010-AV	Permit No.:	PSD-FL-378C

Testing Contractor	
Company	Derenzo and Associates, Inc.
Mailing Address	39395 Schoolcraft Road Livonia, MI 48150
Phone	(734) 464-3880
Project No.	1201047

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE(S)

LIST OF APPENDICES

COMPLIANCE TEST REPORT
FOR THE
LANDFILL GAS FUELED G3520C INTERNAL COMBUSTION ENGINE
OPERATED AT THE
BREVARD ENERGY, L.L.C.
BREVARD COUNTY SOLID WASTE MANAGEMENT
CENTRAL DISPOSAL FACILITY
BREVARD COUNTY, FLORIDA

1.0 SOURCE INFORMATION

Brevard Energy, L.L.C. (Brevard Energy) is located at the Brevard County Solid Waste Management Central Disposal Facility in Brevard County, Florida. The Facility File No. is 0090069-010-AV and the Permit No. is PSD-FL-378C. At its landfill gas to energy (LFGTE) facility, Brevard Energy is permitted to operate emission units (EU) 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 Brevard County Solid Waste Management Central Disposal Facility 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 volatile organic compounds (VOC), nitrogen oxides (NO_X), carbon monoxide (CO), hydrogen chloride (HCl), sulfur dioxide (SO_2), and oxygen (O_2), concentrations and emission rates, and opacity from the exhaust of the Unit #5 (EU008) engine pursuant to the testing requirements specified in the FDEP Air Construction Permit.

The compliance testing was performed on March 26, 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 Brevard County Solid Waste Management Central Disposal Facility 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 Brevard 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 Brevard 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 (see Figure 1).

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., 100% 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 601 scfm based on data recorded from the fuel flow meter installed and operated by Brevard 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.

Velocity measurements were obtained during the HCl isokinetic tests and used for all emissions calculations.

3.0 SUMMARY AND DISCUSSION OF TEST RESULTS

3.1 Purpose and Objectives of the Tests

Stack testing is required for emission units EU-004 through EU-009 to demonstrate compliance with the VOC, CO, NO_X, HCl, SO_2, 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. Sulfur dioxide emission rates were also determined during the test event as required by FDEP Permit No. PSD-FL-378C (permit revision).

The exhausts from the LFG-fueled IC engines were monitored for three (3) one-hour test periods during which the O_2 and CO_2 exhaust gas concentrations were measured using instrumental analyzers. The engine VOC, NO_X and CO measurements consisted of triplicate 60-minute measurements using instrumental analyzers, and the HCl consisted of triplicate 60-minute measurements using isokinetic sampling equipment. Sulfur Dioxide emissions were determined using USEPA Reference Method 19, ASTM D-5504 for sulfur compound analysis, and ASTM D- 3588 for ultimate fuel analysis

Exhaust gas moisture content from the representative engine was determined by gravimetric analysis of the weight gain in the chilled impingers.

Opacity observations were made during one of the HCl tests 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 for 60 minutes.

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

The testing for all pollutants were performed in accordance with the Test Protocol dated February 13, 2012 and specified USEPA test methods. Isokinetic sampling rates were determined using pre-test velocity measurements.
Instrument calibrations and sampling period results satisfied the quality assurance verifications required by USEPA Methods 3A, 7E, 10,26A, and Alt 078. No variations from the normal operating conditions of the IC engine occurred during the testing program.

A short disruption occurred with the data acquisition system during the initial instrument calibrations. Data was hand written until the data acquisition system was returned to proper working order. No test data was lost during the excursion.

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 Brevard Energy personnel. The average LFG consumption rate during the testing was 601 standard cubic feet per minute (scfm). The average electrical output rate during the test event was 1,642 kW.

3.4 Air Pollutant Sampling Results

The following table presents the engine #5 (EU008) three-test average emission rates from the annual performance evaluation:

Emission Parameter		Unit #5 (EU008) Emissions	Permit Limit
NOx	NO_X emissions (lb/hr)	2.55	2.95
	NO_X emissions (g/bhp-hr)	0.50	0.60
CO	CO emissions (lb/hr)	13.60	17.23
	CO emissions (g/bhp-hr)	2.69	3.50
VOC	VOC emissions (lb/hr)	1.26	1.37
	VOC emissions (g/bhp-hr)	0.25	0.28
HCl	HCl emissions (lb/hr)	0.04	-
	HCl emissions (lb/MMscf)	0.36	10.90
O_2	Oxygen concentration (%)	7.75	-
SO_2	SO_2 emissions (lb/hr)	1.18	2.64
Opacity	Highest 10 second average (%)	0.0	10

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

Tables 1 through 5 present measured gas conditions and pollutant emission rates for the representative LFG-fueled IC engine.

Appendix A provides computer calculated and field data sheets for the IC engine tests.
Appendix G provides raw instrumental analyzer response data for each test periods.

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 descriptions of the operation of the USEPA Methods sampling trains.

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 in conjunction with the USEPA Method 26A sampling train. An S-type pitot tube connected to a red-oil manometer was used to determine velocity pressure. Gas temperature was measured using a K-type thermocouple mounted to the heated sample probe. The pitot and connective tubing were leak-checked 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 were measured during each one-hour isokinetic sampling period in accordance with USEPA Method 26A.

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 paramagnetic 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 as a component of the USEPA sampling procedures for HCl (i.e., not as a separate measurement train), which was performed concurrently with the instrumental analyzer sampling methodologies. During each sampling period, a gas sample was extracted at a pre-

determined 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 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 Hydrogen Chloride Measurements (USEPA Method 26A)

An integrated sample of the exhaust gas was withdrawn isokinetically through a matrix of 0.1 normality sulfuric acid (0.1N H_2SO_4) from the IC engine exhaust stack. The hydrogen chloride concentrations from the engine were determined by ion specific electrode analysis of the impinger contents in accordance with USEPA Method 26A. The 0.1 N H_2SO_4 samples were analyzed by Bureau Veritas, Novi, Michigan. Laboratory data is presented in Appendix C.

4.6 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 analyzer were calibrated using certified propane concentrations in hydrocarbon-free air.

4.7 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.

4.8 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.

4.9 Sulfur Dioxide Measurements (USEPA Method 19)

Three separate integrated samples of the fuel used in the representative IC engine was obtained using a Tedlar bag and analyzed for sulfur bearing compounds and ultimate fuel analysis using ASTM D-5504-01 and ASTM D-3588-98, respectively by Columbia Analytical Services, Simi Valley, California,.

The SO_2 emission rate was calculated by totaling the available sulfur atoms in the fuel gas (as lb/MMscf) and incorporating the ultimate analysis (%C/wt) and fuel usage rate (as scfm) for the test period. The resultant emission rate is reported in units of lb/hr.

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 NO_X, 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 the 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 CO_2, O_2, NO_X, CO, VOC and zeroed using pure nitrogen or hydrocarbon free air.

5.6 Meter Box Calibrations and Percent Isokinetics

The isokinetic sampling console, which was used for HCl 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.

All tests were within the required +-10% isokinetic sampling rate required by USEPA Methods 26A.

Appendix B presents test equipment quality assurance data (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 and probe assembly calibration records, nozzle calibration data, and opacity observation certification.

I hereby certify that the information given in this report is correct to the best of my knowledge. This test report has been reviewed and is approved for submittal to FDEP by the following representatives:

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
Brevard Energy, L.L.C.

Table 1. Measured Exhaust Gas Conditions and Air Pollutant Emission Rates for the Brevard Energy, L.L.C., EU-008 (Unit #5) CAT® G3520C Internal Combustion Engine operated at the Brevard County Central Disposal facility

Test No.	1	2	3	
Test Date	03/26/12	03/26/12	03/26/12	Test
Test Period (24-hr clock)	1055-1155	1315-1415	1522-1622	Avg.
Generator output (kW)	1,632	1,650	1,644	1,642
Engine Horsepower (Hp)	2,278	2,302	2,294	2,291
Engine Fuel Use (scfm)	601	600	602	601
Exhaust gas composition				
CO_2 content (% vol)*	11.5	11.7	11.7	11.6
O_2 content (% vol)*	7.75	7.76	7.74	7.75
Moisture (% vol)	12.9	12.9	12.5	12.8
Exhaust gas flowrate				
Standard conditions (scfm)	5,514	5,477	5,440	5,477
Dry basis (dscfm)	4,805	4,772	4,758	4,778
Nitrogen oxides emission rates				
NO_X conc. (ppmvd)*	71.4	72.0	79.8	74.4
NO_X emissions (lb/hr NO_2)	2.46	2.46	2.72	2.55
NO_X permit limit (lb/hr)				*2.95*
NO_X emissions (g/bhp-hr)	0.49	0.49	0.54	0.50
NO_X permit limit (g/bhp-hr)				*0.60*
Carbon monoxide emission rates				
CO conc. (ppmvd)*	670.0	638.5	647.9	652.1
CO emissions (lb/hr)	14.0	13.3	13.5	13.6
CO permit limit (lb/hr)				*17.23*
CO emissions (g/bhp-hr)	2.80	2.62	2.66	2.69
CO permit limit (g/bhp-hr)				*3.50*
VOC/NMHC emission rates				
VOC conc. (ppmv C_3)*	33.5	33.6	33.7	33.6
VOC emissions (lb/hr)	1.27	1.26	1.26	1.26
VOC permit limit (lb/hr)				*1.37*
VOC emissions (g/bhp-hr)	0.25	0.25	0.25	0.25
VOC permit limit (g/bhp-hr)				*0.28*
Hydrogen chloride emission rates				
HCl conc. (ppmvd)	1.36	1.29	1.34	1.33
HCl emissions (lb/hr)	0.04	0.03	0.04	0.04
HCl Fuel based emissions (lb/MMscf)	0.42	0.34	0.32	0.36
HCl permit limit (lb/MMscf)				*10.90*
Opacity observations				
Visible emissions (%)- Highest 6-minute average				0.00
Visible emissions (%)- Highest 6-minute average limit				*10.00*

* Corrected for calibration bias.

Derenzo and Associates, Inc.

Table 2
Sulfur Dioxide Emission Rates
from the
Unit #5 (EU008) Engine
at the
Brevard Energy, L.L.C.
Central Disposal Facility - Cocoa, Brevard County, Florida

Test Date(s): March 26, 2012
Derenzo and Associates, Inc. Project No.: 1201047

Test	Engine Output		Fuel Flow	Moisture	CO_2	Carbon in Fuel
ID	(Kw)	(bhp)	(scfm)	(%)	(%)	(wt %)
Unit 4-Test 1	1,632	2,278	601	12.9	11.52	38.14
Unit 4-Test 2	1,650	2,302	600	12.9	11.72	37.92
Unit 4-Test 3	1,644	2,294	602	12.5	11.67	37.65
Average	1,642	2,291	601	12.8	11.64	37.90

Sulfur Dioxide

Test	Sulfur Content	GCV	HHV	HIR	SO_2 Emissions	
ID	(ppmv)	(Btu/lb-HHV)	(Btu/scf)	(MMBtu/hr)	(lb/MMscf)	(lb/hr)
Unit 4-Test 1	207	6,936.8	515.9	18.6	34.4	1.13
Unit 4-Test 2	227	6,936.8	502.8	18.1	37.8	1.20
Unit 4-Test 3	228	6,881.4	499.2	18.0	37.9	1.20
Average	221	6,918.3	506.0	18.2	36.7	1.18
					Permit Limit:	*2.64*

Definitions:

(Kw) = Killowatt
(bhp) = brake horse power
(scfm) = standard cubic feet per minute
(%) = percent
(wt %) = weight percent
(ppmv) = parts per million by volume as Total Reduced Sulfi
(Btu/lb-HHV) = british thermal units per pound - higher heating value
(Btu/scf) = British thermal unit per standard cubic foot
(MMBtu/hr) = million british thermal unit per hour
(lb/MMscf) = pounds per million standard cubic foot
(lb/hr) = pounds per hour

Equations:

F Factor (Fc) = (K) (Kcc)(%C) / GCV
SO_2 - lb/MMscf = ppmv (S atoms) (64.06 lb.SO2/mol) / (385.3 ft3/mol)
SO_2 - lb/hr = ((1b/MMscf)/1000000) (Fc) (MMBtu/hr HHV)

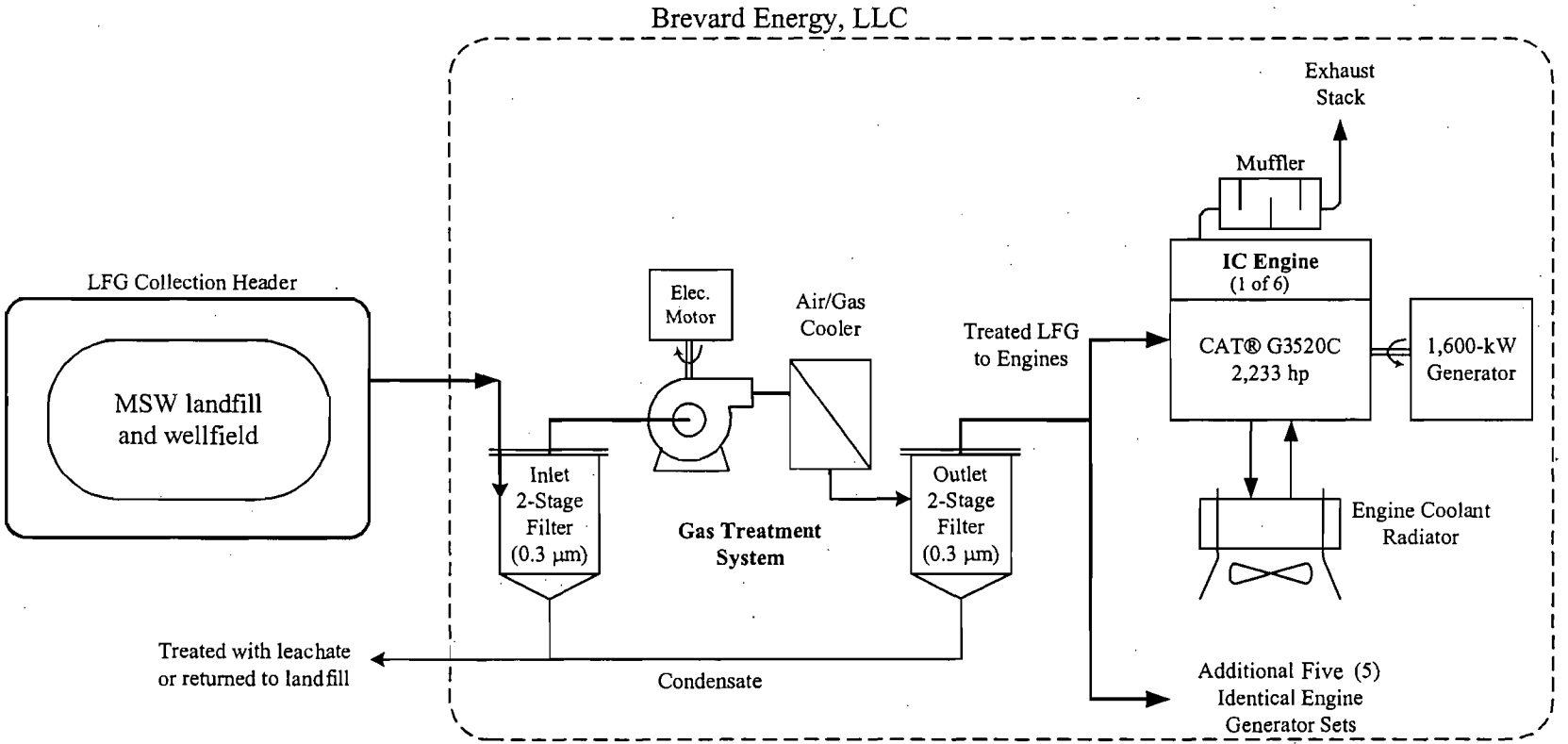

Figure 1.

Brevard Energy, LLC **LFG Electricity Generation Facility**		
Scale None	Sheet 1 of 1	Derenzo and Associates Project No.1201047

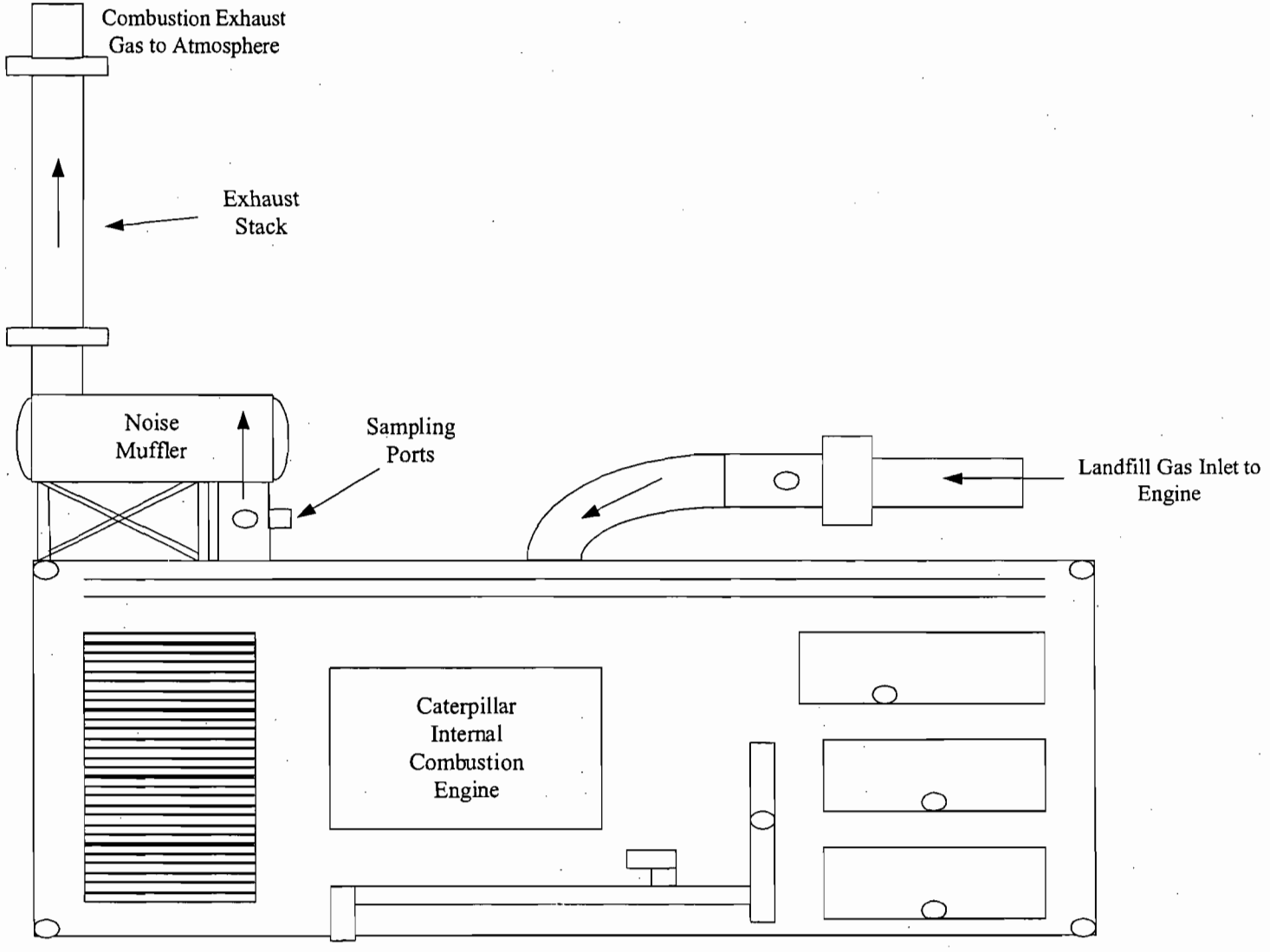

Figure 2

2/7/2012	**Brevard Energy, LLC General Engine Operation Flow Diagram**		
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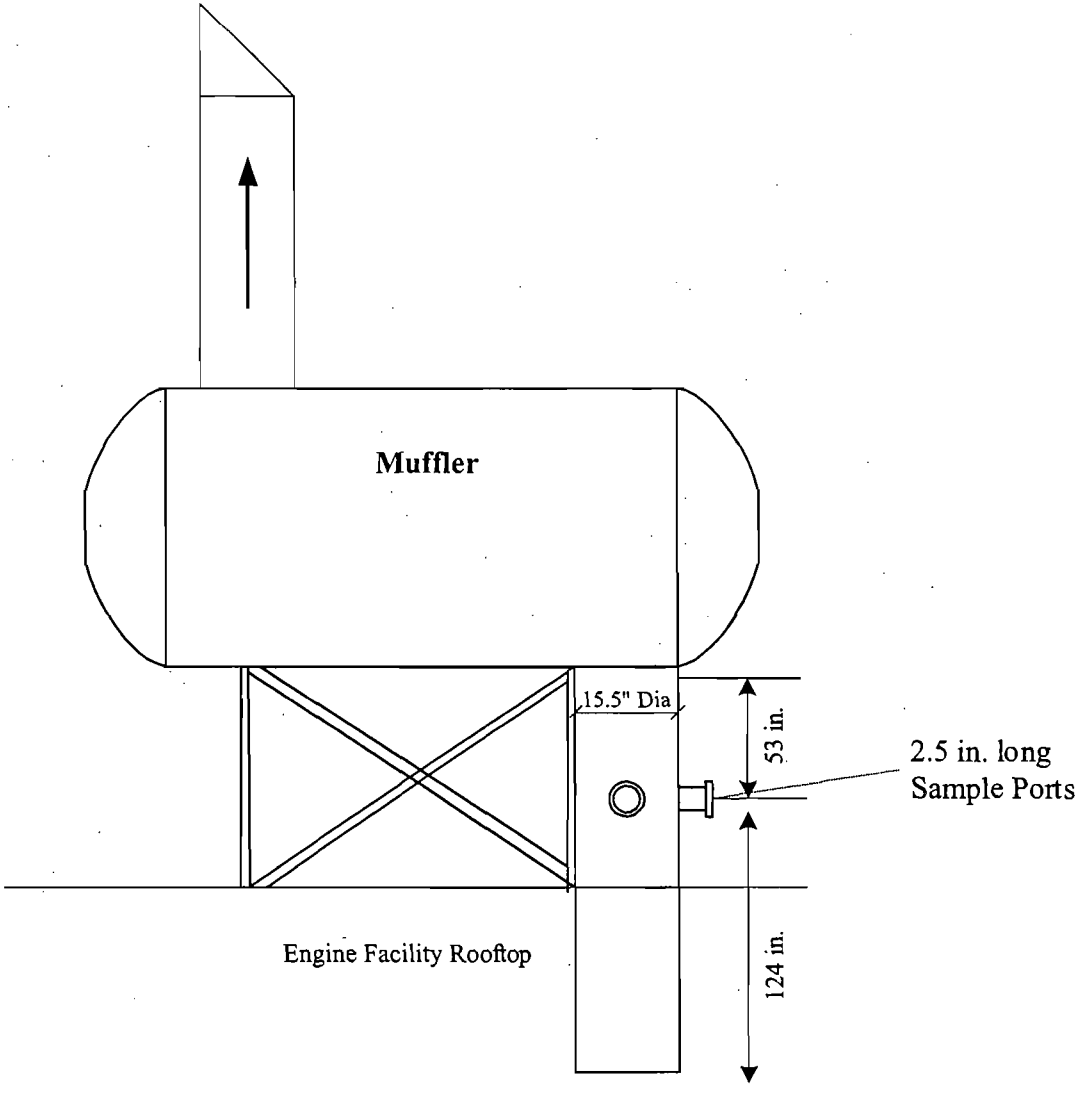
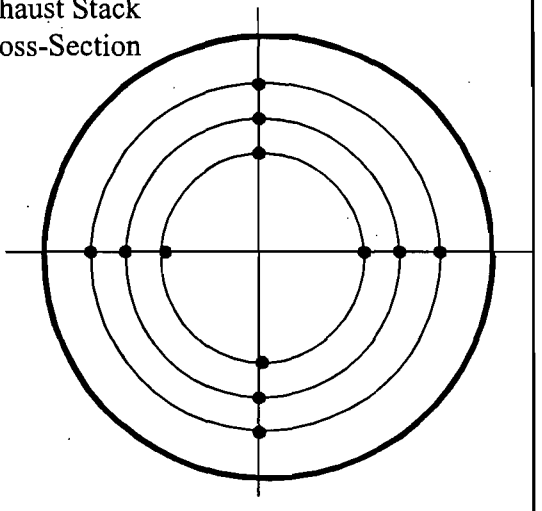
Engine Exhausts



Exhaust Stack
Cross-Section



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

Brevard Energy, LLC
Exhaust Sample Locations

Scale	Sheet	Derenzo and Associates
None	1 of 1	Project No. 1201047

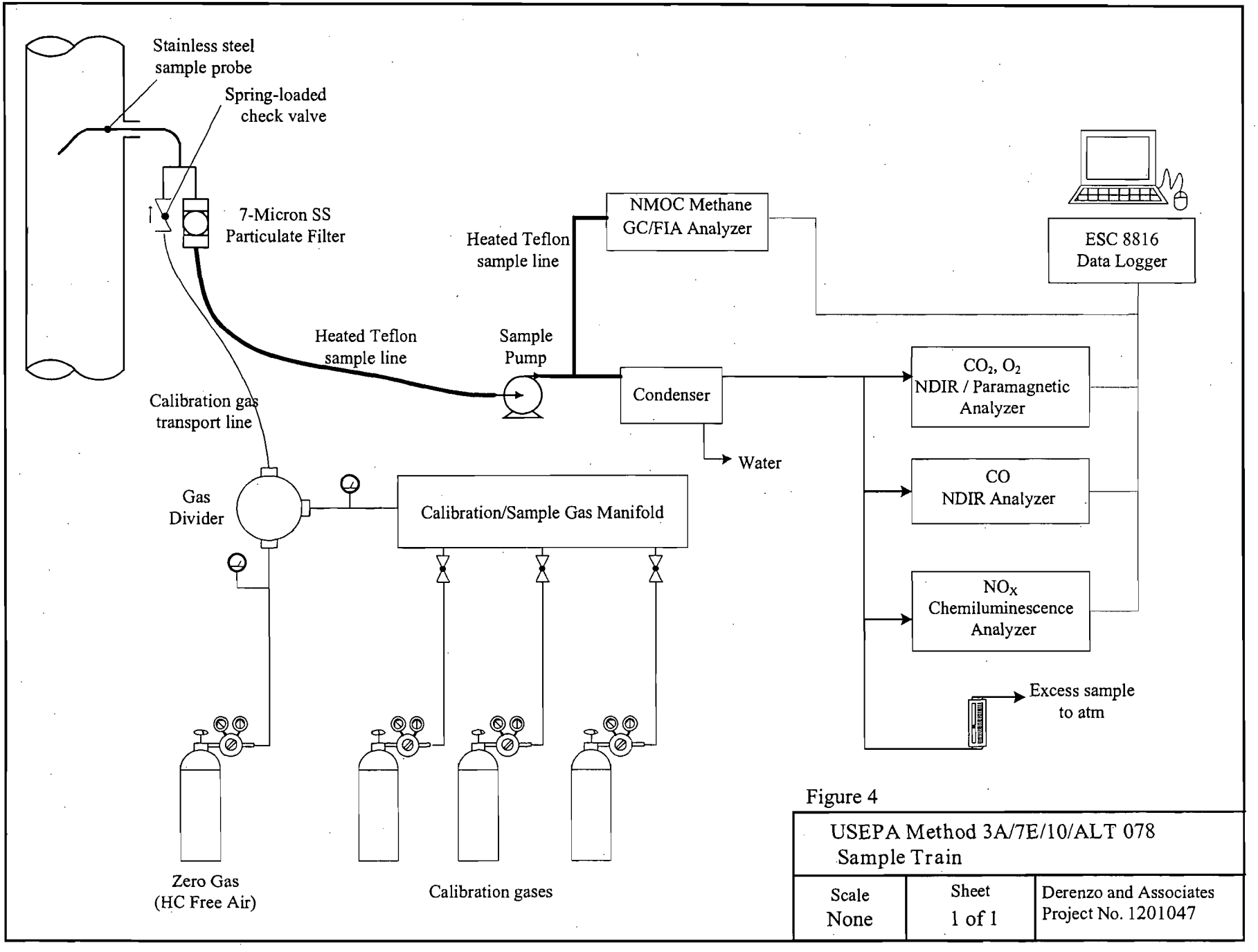


Figure 4

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

Scale	Sheet	Derenzo and Associates
None	1 of 1	Project No. 1201047

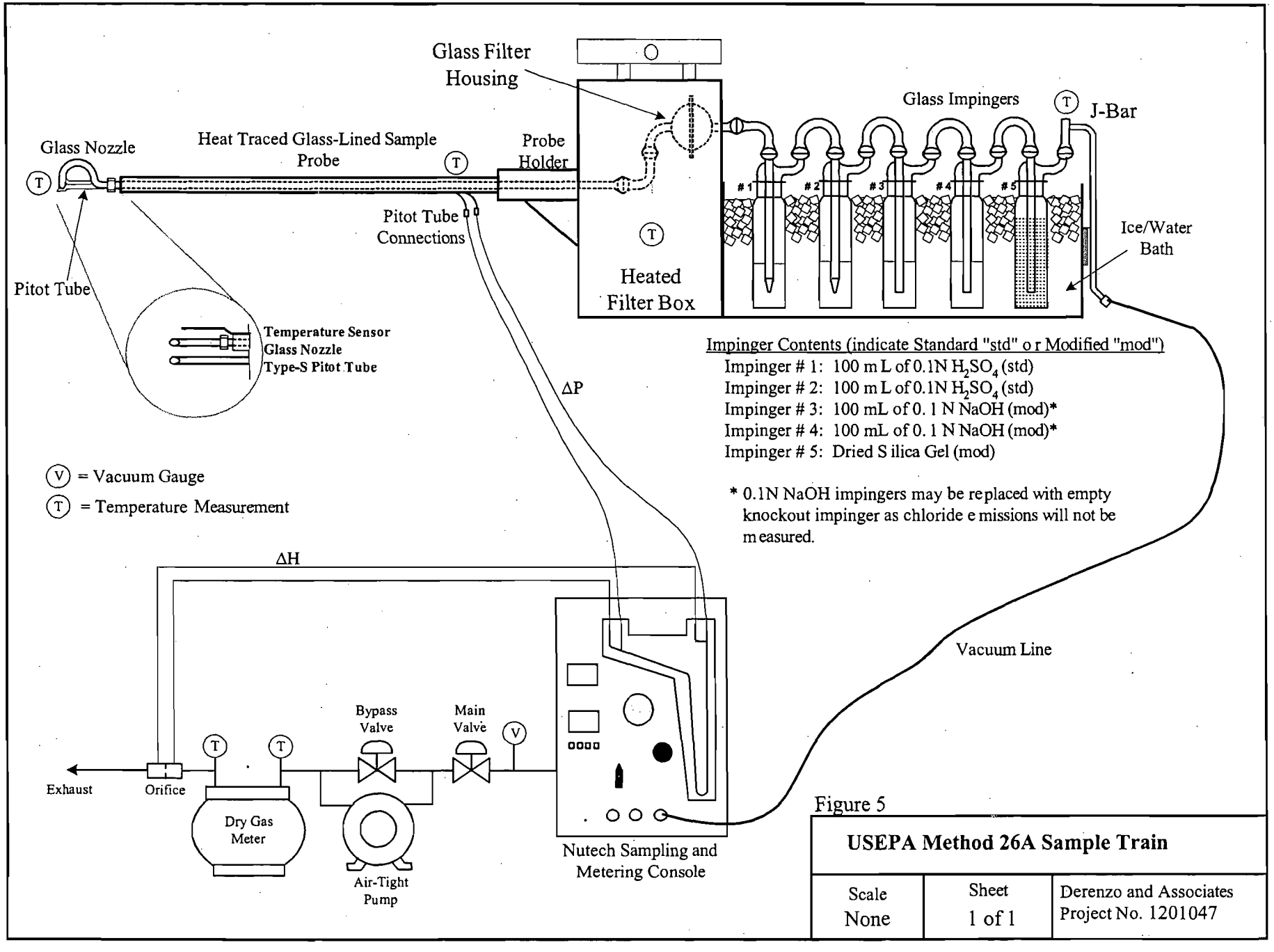


Figure 5

USEPA Method 26A Sample Train

Scale	Sheet	Derenzo and Associates
None	1 of 1	Project No. 1201047

APPENDIX A

COMPUTER CALCULATED AND FIELD DATA

Derenzo and Associates, Inc.

Company	Brevard Energy			
Source Designation	ICE # 5 (EU008) Exhaust			
Test Date	3/26/2012	**Assumed Moisture (Bws)**		11
Test Number	BEH-1	**Condensate Volume (Vlc)**		116.6
Operator	MB/DW	**Silica Gel Weight Gain (Vlc)**		12.2
Filter Number	N/A	**Nozzle Diameter (in.)**		0.184
Barometric Pressure (Pb)	30.02	**Leak Rate Initial**		0.000 @ 15"
Stack Static Pressure (Ps)	8.10	**Leak Rate Final**		0.000 @ 5"
Stack Dimensions (in.)	15.5	**Traverse points**		12
Pitot Tube Number	7F	**Pitot Corr. Factor (Cp)**		0.84
Meter Number	N-1	**Meter Corr. Factor (Y)**		0.9971
Meter Iso. Factor (Kiso)	1661.932	**Method 3A Results (%)**		
Delta H@	1.897	(Analyzer)	CO_2	11.52
		(Analyzer)	O_2	7.75

Traverse Point Number	Sampling Time (Minutes) ø	Clock Time (24 hour)	Sampling Train Vac. ("Hg)	Stack Temp. (°F) Ts	Velocity Pres. ("H_2O) Delta P	Orifice Differential ("H_2O) Delta H	Sample Volume (cubic feet) Vm	Dry Gas Meter Temp. Inlet (°F) Tm	Outlet (°F) Tm	Filter Box Temperature (°F)	Probe Temperature (°F)	Last Impinger Temperature (°F)
1	0	10:55:00	3	924	3.75	1.61	292.433	83	82	247	249	66
2	5	11:00:00	3	923	3.70	1.60	296.00	90	86	252	255	65
3	10	11:05:00	3	924	3.90	1.69	299.44	93	86	253	255	63
4	15	11:10:00	3	933	3.95	1.71	302.87	95	86	254	258	63
5	20	11:15:00	3	923	4.10	1.79	306.43	97	87	253	255	64
6	25	11:20:00	3	928	4.10	1.78	310.07	97	87	253	254	64
off	30	11:25:00	-	-	-	-	313.728	-	-	-	-	-
1	30	15:48:00	3	914	3.60	1.57	313.728	90	87	250	254	65
2	35	15:53:00	3	924	3.70	1.61	317.23	94	88	251	252	64
3	40	15:58:00	3	920	3.95	1.73	320.57	96	88	251	255	63
4	45	16:03:00	3	921	4.15	1.81	324.15	97	88	246	254	63
5	50	16:08:00	3	922	4.10	1.79	327.97	97	88	250	256	64
6	55	16:13:00	4	923	4.15	1.81	331.42	98	88	252	254	64
off	60	16:18:00	-	-	-	-	335.108	-	-	-	-	-
Average	60			923.3	3.93	1.71	42.675	94	87	251	254	64

Derenzo and Associates, Inc.

Company	Brevard Energy			
Source Designation	ICE # 5 (EU008) Exhaust			
Test Date	3/26/2012	**Assumed Moisture (Bws)**		11.5
Test Number	BEH-2	**Condensate Volume (Vlc)**		119.4
Operator	MB/DW	**Silica Gel Weight Gain (Vlc)**		11.2
Filter Number	N/A	**Nozzle Diameter (in.)**		0.184
Barometric Pressure (Pb)	30.02	**Leak Rate Initial**		0.000 @ 15"
Stack Static Pressure (Ps)	8.40	**Leak Rate Final**		0.000 @ 7"
Stack Dimensions (in.)	15.5	**Traverse points**		12
Pitot Tube Number	7F	**Pitot Corr. Factor (Cp)**		0.84
Meter Number	N-1	**Meter Corr. Factor (Y)**		0.9971
Meter Iso. Factor (Kiso)	1661.932	**Method 3A Results (%)**		
Delta H@	1.897	(Analyzer)	CO_2	11.72
		(Analyzer)	O_2	7.76

Traverse Point Number	Sampling Time (Minutes) ø	Clock Time (24 hour)	Sampling Train Vac. ("Hg)	Stack Temp. (°F) Ts	Velocity Pres. ("H_2O) Delta P	Orifice Differential ("H_2O) Delta H	Sample Volume (cubic feet) Vm	Dry Gas Meter Temp. Inlet (°F) Tm	Outlet (°F) Tm	Filter Box Temperature (°F)	Probe Temperature (°F)	Last Impinger Temperature (°F)
1	0	13:15:00	5	928	3.45	1.48	335.350	86	85	240	257	67
2	5	13:20:00	5	925	3.65	1.58	338.87	89	85	241	258	66
3	10	13:25:00	6	923	3.95	1.72	342.22	93	86	242	256	65
4	15	13:30:00	6	924	4.10	1.78	345.76	96	86	243	258	64
5	20	13:35:00	6	924	4.15	1.81	349.36	97	87	240	255	64
6	25	13:40:00	6	920	4.10	1.80	353.10	99	88	242	255	65
off	30	13:45:00	-	-	-	-	356.982	-	-	-	-	-
1	30	13:50:00	5	913	3.40	1.49	356.982	93	88	240	249	66
2	35	13:55:00	5	918	3.70	1.62	360.81	96	88	242	251	66
3	40	14:00:00	6	915	3.95	1.73	364.35	97	88	246	254	65
4	45	14:05:00	6	918	3.85	1.69	367.83	99	89	247	255	64
5	50	14:10:00	6	918	4.00	1.76	371.37	100	89	248	252	65
6	55	14:15:00	6	919	4.15	1.82	375.00	100	89	245	256	66
off	60	14:20:00	-	-	-	-	378.653	-	-	-	-	-
Average	60			920.4	3.87	1.69	43.303	95	87	243	255	65

Derenzo and Associates, Inc.

Company	Brevard Energy		
Source Designation	ICE # 5 (EU008) Exhaust		
Test Date	3/26/2012	**Assumed Moisture (Bws)**	12.5
Test Number	BEH-3	**Condensate Volume (Vlc)**	111
Operator	MB/DW	**Silica Gel Weight Gain (Vlc)**	11.0
Filter Number	N/A	**Nozzle Diameter (in.)**	0.184
Barometric Pressure (Pb)	30.02	**Leak Rate Initial**	0.000 @ 15"
Stack Static Pressure (Ps)	8.30	**Leak Rate Final**	0.000 @ 7"
Stack Dimensions (in.)	15.5	**Traverse points**	12
Pitot Tube Number	7F	**Pitot Corr. Factor (Cp)**	0.84
Meter Number	N-1	**Meter Corr. Factor (Y)**	0.9971
Meter Iso. Factor (Kiso)	1661.932	**Method 3A Results (%)**	
Delta H@	1.897	(Analyzer) CO_2	11.67
		(Analyzer) O_2	7.74

Traverse Point Number	Sampling Time (Minutes) ø	Clock Time (24 hour)	Sampling Train Vac. ("Hg)	Stack Temp. (°F) Ts	Velocity Pres. ("H_2O) Delta P	Orifice Differential ("H_2O) Delta H	Sample Volume (cubic feet) Vm	Dry Gas Meter Temp. Inlet (°F) Tm	Outlet (°F) Tm	Filter Box Temperature (°F)	Probe Temperature (°F)	Last Impinger Temperature (°F)
1	0	15:22:00	2	917	3.20	1.36	378.940	89	88	242	249	63
2	5	15:27:00	3	919	3.55	1.50	382.12	91	88	251	255	57
3	10	15:32:00	3	922	3.80	1.61	385.48	95	89	255	254	54
4	15	15:37:00	3	920	3.75	1.60	388.95	97	89	257	256	53
5	20	15:42:00	3	922	4.10	1.74	392.42	94	90	255	258	55
6	25	15:47:00	3	924	4.15	1.77	396.12	98	90	250	252	56
off	30	15:52:00	-	-	-	-	399.689	-	-	-	-	-
1	30	16:00:00	3	917	3.40	1.45	399.689	94	91	248	252	63
2	35	16:05:00	3	918	3.70	1.58	402.900	97	91	254	256	55
3	40	16:10:00	3	915	3.85	1.65	406.38	99	91	256	258	55
4	45	16:15:00	6	916	4.00	1.72	409.87	101	92	251	257	58
5	50	16:20:00	6	915	4.15	1.79	413.65	101	92	252	258	60
6	55	16:25:00	6	917	4.20	1.81	417.10	102	92	255	256	59
off	60	16:30:00	-	-	-	-	420.793	-	-	-	-	-
Average	60			918.5	3.82	1.63	41.85	97	90	252	255	57

Derenzo and Associates, Inc.

Company	Brevard Energy			
Source Designation	ICE # 5 (EU008) Exhaust			
Test Date	3/26/2012	3/26/2012	3/26/2012	
Test Start Time	10:55	13:15	15:22	
Meter/Nozzle Information	**BEH-1**	**BEH-2**	**BEH-3**	**Average**
Meter Temperature, Tm (°F)	90.33	91.38	93.38	91.69
Meter Pressure, Pm (in. Hg)	30.15	30.14	30.14	30.14
Measured Sample Volume, Vm (ft^3)	42.675	43.303	41.853	42.61
Meter Correction Factor, Y	0.9971	0.9971	0.9971	0.9971
Sample Volume at STP, Vm (Std ft^3) = (Vm*Y*17.64*Pm)/(Tm+460)	41.12	41.64	40.09	40.95
Sample Volume at STP, Vm (Std m^3) = (Vm(Std ft^3))*0.028317	1.16	1.18	1.14	1.16
Condensate Volume, Vw (std) = (0.04707 * Vwc) + (0.04715 * Vwsg)	6.07	6.15	5.74	5.99
Gas Density, ps (std lbs/ft^3) = (Md(1-Bws) + 18(Bws))/386.9	0.0739	0.0740	0.0741	0.0740
Total weight of sampled gas, Ws (lbs) = (Vm + Vw) * ps	3.487	3.535	3.395	3.472
Nozzle Size, An (sq. ft.) = Π(D/4)², where D = Nozzle dia.	0.0001847	0.0001847	0.0001847	0.0001847
Isokinetic Variation, I =100*((0.002672(Vwc + Wsg))+(Vm/(Tm+460))*Pm)/(3600*Vs*Ps*An)	101.6	103.6	100.1	101.8
Stack Data				
Average Stack Temperature, Ts (°F)	923.3	920.4	918.5	920.7
Molecular Weight Stack Gas-dry, Md (lb/lb mole)	30.15	30.19	30.18	30.17
Molecular Weight Stack Gas-wet, Ms (lb/lb mole)	28.59	28.62	28.65	28.62
Stack Gas Specific Gravity, Gs	0.99	0.99	0.99	0.99
Percent Moisture, Bws = Vw/(Vw+Vm)*100	12.87	12.87	12.53	12.75
Water Vapor Volume (fraction) = Bws/100	0.129	0.129	0.125	0.128
Stack Pressure, Ps("Hg)	30.62	30.64	30.63	30.63
Average Stack Velocity, Vs (ft/s)	178.89	177.18	175.78	177.28
Area of Stack, As (ft^2)	1.31	1.31	1.31	1.31
Exhaust Gas Flowrate				
Actual flowrate, Qs (ACFM)= Vs*As*60	14,065	13,930	13,820	13,938
Standard wet flowrate, Qw (WSCFM) = 528*Qs*Ps/(Ts*29.92)	5,514	5,477	5,440	5,477
Dry standard flowrate, Qstd (DSCFM) = wet *(1-Bws/100)	4,805	4,772	4,758	4,778
Dry standard flowrate, Qstd (DSCMM) = wet*0.028317*(1-Bws/100)	136.1	135.1	134.7	135.3
Fuel Flow (scfm)=	601	600	602	600.9
Fuel Flow (MMscf/hr)=	0.0360	0.0360	0.0361	0.0361
Engine Output (Kw)	1,632	1,650	1,644	1,642.1
Standard Temperature and Pressure = 29.92 "Hg and 68°F				
HCl weights				
Total (µg)	2,400	2,300	2,300	2,333
HCl Concentration				
grains/scf	0.0009	0.0009	0.0009	0.0009
grains/dscf	0.0010	0.0010	0.0010	0.0010
mg/m^3	2.06	1.95	2.03	2.01
ppm	1.36	1.29	1.34	1.33
lb/1000 lb (wet)	0.0017	0.0016	0.0017	0.0017
lb/1000 lb (dry)	0.0020	0.0019	0.0019	0.0019
HCl Emission Rate				
lb/ hr (dry)	0.037	0.035	0.036	0.036
lb/hr (wet)	0.043	0.040	0.041	0.041
lb/hr (dry) - Calculation check	0.037	0.035	0.036	0.036
TpY (based on 8,760 hours per year)	0.16	0.15	0.16	0.158
lb/MMscf	1.029	0.968	1.000	0.999

Derenzo & Associates, Inc.

EPA Method 25A/ALT 078 NMOC Calculation Summary

Company	IPS - Carbon
Location	Lowellville, OH
Source	ICE #5 (EU008) Exhaust
Date	03/26/12
Measurement	NMOC by TEI 55C - USEPA Method Alt-078

		Test 1	Test 2	Test 3	
Average NMOC concentration, as C_3H_8	=	33.48	33.64	33.75	ppmv

NMOC Emission Rate lb/hr as Propane

Volumetric flow rate	=	5,514	5,477	5,440	scfm
$E_{VOC} = (C_{d\ dry\ as\ C3H8})\ (Qwstd)\ (60\ min/hr)\ (MW_{C3H8}) / (V_M)$	=	1.27	1.27	1.26	lb/hr

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	=	1,632	1,650	1,644	kW
Engine Output (bHp*hr) = (kWavg)/(0.961)/(0.7457 kW/bHp*hr)	=	2278	2302	2294	bHp
(E_{VOC}) (453.6 g/lb) / (bHp*hr)	=	0.25	0.25	0.25	g/bHp*l

where:

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

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	Brevard Energy
Location	Cocoa, FL
Source	ICE #5 (EU008)
Date	3/26/2012

		Test 1	Test 2	Test 3	
Average NOx concentration	=	69.86	70.55	78.00	ppmv
Average pre-test and post-test instrument zero	=	0.52	0.53	0.56	ppmv
Average pre-test and post-test instrument calibration	=	77.52	77.70	77.55	ppmv
Midrange calibration gas concentration	=	79.3	79.3	79.3	ppmv
Volumetric flow rate	=	4,805	4,772	4,758	dscfm
Average generator kilowatt output	=	1,632	1,650	1,644	kW

NOx CONCENTRATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

C_d = (NOx conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero)	=	71.4	72.0	79.8	ppmv

NOx EMISSION RATE, AS NO_2

$E_{NOx} = (C_d)\ (Q_d std)\ (60\ min/hr)\ (MW_{NO2}) / (V_M)$	=	2.46	2.46	2.72	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) = $(kW_{avg})/(0.961)/(0.7457\ kW/bHp)$	=	2278	2302	2294	bHp

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

$(E_{NOx})\ (453.6\ g/lb) / (bHp)$	=	0.49	0.49	0.54	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: Brevard Energy
Location: Cocoa, FL
Source: ICE #5 (EU008)
Date: 3/26/12

		Test 1	Test 2	Test 3	
Average CO concentration	=	641.78	643.11	652.08	ppmv
Average pre-test and post-test instrument zero	=	1.40	2.85	2.57	ppmv
Average pre-test and post-test instrument calibration	=	785.54	789.29	788.84	ppmv
Midrange calibration gas concentration	=	784.3	784.3	784.3	ppmv
Volumetric flow rate	=	4,805	4,772	4,758	dscfm
Average generator kilowatt output	=	1,632	1,650	1,644	kW

CO CONCENTRATION CORRECTED FOR CALIBRATION AND ZERO DRIFT

C_d = (CO conc.-Avg. zero)x(Cal. gas conc.)/(Avg. cal.-Avg. zero)	=	670.0	638.5	647.9	ppmv

CO EMISSION RATE

$E_{CO} = (C_d)\ (Q_dstd)\ (60\ min/hr)\ (MW_{CO}) / (V_M)$	=	14.05	13.30	13.46	lb/hr

where:
C_d = observed CO concentration, dry basis (ft^3 CO / 10^6 ft^3 stack gas)
Q_dstd = 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) = $(kW_{avg})/(0.961)/(0.7457\ kW/bHp)$	=	2278	2302	2294	bHp

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

$(E_{CO})\ (453.6\ g/lb) / (bHp)$	=	2.80	2.62	2.66	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:	Brevard Energy
Location:	Cocoa, FL
Source:	ICE #5 (EU008)
Date:	3/26/12

Test ID	=	1	2	3
Average CO_2 concentration	=	11.40	11.62	11.59 %
Average pre-test and post-test instrument zero	=	0.06	0.07	0.08 %
Average pre-test and post-test instrument calibration	=	13.55	13.57	13.59 %
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)	=	11.52	11.72	11.67 %

Derenzo & Associates, Inc.

EPA Method 3A O_2 Calculation Summary

Company: Brevard Energy
Location: Cocoa, FL
Source: ICE #5 (EU008)
Date: 3/26/12

Test ID	=	1	2	3	
Average O_2 concentration	=	7.73	7.73	7.70	%
Average pre-test and post-test instrument zero	=	0.01	0.01	0.01	%
Average pre-test and post-test instrument calibration	=	8.36	8.34	8.34	%
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)	=	7.75	7.76	7.74	%

Derenzo and Associates, Inc.

Calculation of HCL Emission Factor - Test 1
Based on Influent Landfill Gas Chlorinated Compounds
to the
Unit #5 (EU008) Caterpillar Model G3520C Engine
Brevard Energy, L.L.C.
at the
Central Disposal Facility - Cocoa, Brevard County, Florida

Test Date(s): March 26, 2012
Derenzo and Associates, Inc. Project No.: 1201047

LFG Influent Chlorine Coumpounds	Analytical Report Concentration (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb/MMscf)
Freon 12 (Dichlorodifluoromethane)	0.250	CCl_2F_2	2	0.047 [1]
Freon 114 (Dichlorotetrafluroethane)	0.039	$C_2Cl_2F_4$	2	0.007
Chloromethane	<0.120	CH_3Cl	1	<0.011
Vinyl Chloride	0.14	C_2HCl	1	0.013
Chloroethane	0.12	C_2H_5Cl	1	0.01
Freon 11 (Fluorotrichloromethane)	0.03	$CFCl_3$	3	0.008
1,1-Dichloroethene	<0.012	$C_2H_2Cl_2$	2	<0.002
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.012	$C_2Cl_2F_3$	2	<0.002
Methylene Chloride (Dichloromethane)	<0.120	CH_2Cl_2	2	<0.023
1,1-Dichloroethane	<0.012	$C_2H_4Cl_2$	2	<0.002
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.340	$C_2H_2Cl_2$	2	0.064
Chloroform	<0.012	$CHCl_3$	3	<0.003
1,1,1-Trichloroethane	<0.012	$C_2H_3Cl_3$	3	<0.003
Carbon Tetrachloride	<0.012	CCl_4	4	<0.005
1,2-Dichloroethane	0.120	$C_2H_4Cl_2$	2	0.023
Trichloroethene	0.093	C_2HCl_3	3	0.026
1,2-dichloropropane	0.035	$C_3H_6Cl_2$	2	0.007
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.012	$C_3H_4Cl_2$	2	<0.002
1,3-Dichloropropene (as trans-1,3-Dichloropropene	<0.012	$C_3H_4Cl_2$	2	<0.002
1,1,2-Trichloroethane	<0.012	$C_2H_3Cl_3$	3	<0.003
Tetrachloroethene (Perchloroethene)	0.110	C_2Cl_4	4	0.041
Chlorobenzene	0.042	C_6H_5Cl	1	0.004
1,1,2,2-Tetrachloroethane	<0.012	$C_2H_2Cl_4$	4	<0.005
1,3-Dichlorobenzene	<0.012	$C_6H_4Cl_2$	2	<0.002
1,4-Dichlorobenzene	0.033	$C_6H_4Cl_2$	2	0.006
alpha-Chlorotoluene	<0.012	C_7H_7Cl	1	<0.001
1,2-Dichlorobenzene	<0.012	$C_6H_4Cl_2$	2	<0.002
1,2,4-Trichlorobenzene	<0.047	$C_6H_3Cl_3$	3	<0.013
Hexachlorobutadiene	<0.047	C_4Cl_6	6	<0.027
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	0.12	$C_2H_2Cl_2$	2	0.02
Bromodichloromethane	<0.012	$CBrCl_2$	2	<0.002
Dibromochloromethane	<0.012	$CHBr_2Cl$	1	<0.001
Dichlorofluoromethane	<0.047	$CHBr_2Cl$	1	<0.004
Chlorodifluoromethane	1.50	$CHClF_2$	1	0.14
Total hydrogen chloride emission factor (lb/MMscf)				**0.42**

March 26, 2012 laboratory analytical results (see Appendix C)

Sample Calculations:

1. Example calculation for Freon 12 that assumes complete conversion of chloride to HCl
(0.35 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol) = 0.066 lb. HCl/MMscf LFG

2. Example hydrogen chloride emission rate calculation as lb/hr
(0.57 lb HCL/MMcf LFG / 1,000,000 scf/MMscf) (548.3 scf/min, avg. inlet flow to engines during sampling) (60 min/hr) = 0.02 lb HCl/hr

Derenzo and Associates, Inc.

Calculation of HCL Emission Factor - Test 2
Based on Influent Landfill Gas Chlorinated Compounds
to the
Unit #5 (EU008) Caterpillar Model G3520C Engine
Brevard Energy, L.L.C.
at the
Central Disposal Facility - Cocoa, Brevard County, Florida

Test Date(s): March 26, 2012
Derenzo and Associates, Inc. Project No.: 1201047

LFG Influent Chlorine Coumpounds	Analytical Report Concentration (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb/MMscf)
Freon 12 (Dichlorodifluoromethane)	0.240	CCl_2F_2	2	0.045 [1]
Freon 114 (Dichlorotetrafluroethane)	<0.039	$C_2Cl_2F_4$	2	<0.007
Chloromethane	<0.390	CH_3Cl	1	<0.037
Vinyl Chloride	0.13	C_2HCl	1	0.012
Chloroethane	<0.160	C_2H_5Cl	1	<0.015
Freon 11 (Fluorotrichloromethane)	<0.039	$CFCl_3$	3	<0.011
1,1-Dichloroethene	<0.039	$C_2H_2Cl_2$	2	<0.007
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.039	$C_2Cl_2F_3$	2	<0.007
Methylene Chloride (Dichloromethane)	<0.390	CH_2Cl_2	2	<0.073
1,1-Dichloroethane	<0.039	$C_2H_4Cl_2$	2	<0.007
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.270	$C_2H_2Cl_2$	2	0.051
Chloroform	<0.039	$CHCl_3$	3	<0.011
1,1,1-Trichloroethane	<0.039	$C_2H_3Cl_3$	3	<0.011
Carbon Tetrachloride	<0.039	CCl_4	4	<0.015
1,2-Dichloroethane	0.093	$C_2H_4Cl_2$	2	0.018
Trichloroethene	0.082	C_2HCl_3	3	0.023
1,2-dichloropropane	<0.039	$C_3H_6Cl_2$	2	<0.007
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.039	$C_3H_4Cl_2$	2	<0.007
1,3-Dichloropropene (as trans-1,3-Dichloropropene	<0.039	$C_3H_4Cl_2$	2	<0.007
1,1,2-Trichloroethane	<0.039	$C_2H_3Cl_3$	3	<0.011
Tetrachloroethene (Perchloroethene)	0.110	C_2Cl_4	4	0.041
Chlorobenzene	0.042	C_6H_5Cl	1	0.004
1,1,2,2-Tetrachloroethane	<0.012	$C_2H_2Cl_4$	4	<0.005
1,3-Dichlorobenzene	<0.012	$C_6H_4Cl_2$	2	<0.002
1,4-Dichlorobenzene	<0.012	$C_6H_4Cl_2$	2	<0.002
alpha-Chlorotoluene	<0.012	C_7H_7Cl	1	<0.001
1,2-Dichlorobenzene	<0.012	$C_6H_4Cl_2$	2	<0.002
1,2,4-Trichlorobenzene	<0.012	$C_6H_3Cl_3$	3	<0.003
Hexachlorobutadiene	<0.012	C_4Cl_6	6	<0.007
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.012	$C_2H_2Cl_2$	2	<0.002
Bromodichloromethane	<0.012	$CBrCl_2$	2	<0.002
Dibromochloromethane	<0.012	$CHBr_2Cl$	1	<0.001
Dichlorofluoromethane	<0.012	$CHBr_2Cl$	1	<0.001
Chlorodifluoromethane	1.50	$CHClF_2$	1	0.14
Total hydrogen chloride emission factor (lb/MMscf)				**0.34**

March 26, 2012 laboratory analytical results (see Appendix C)

Sample Calculations:

1. Example calculation for Freon 12 that assumes complete conversion of chloride to HCl
(0.35 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol) = 0.066 lb. HCl/MMscf LFG

2. Example hydrogen chloride emission rate calculation as lb/hr
(0.57 lb HCL/MMcf LFG / 1,000,000 scf/MMscf) (548.3 scf/min, avg. inlet flow to engines during sampling) (60 min/hr) = 0.02 lb HCl/hr

Derenzo and Associates, Inc.

Calculation of HCL Emission Factor - Test 2
Based on Influent Landfill Gas Chlorinated Compounds
to the
Unit #5 (EU008) Caterpillar Model G3520C Engine
Brevard Energy, L.L.C.
at the
Central Disposal Facility - Cocoa, Brevard County, Florida

Test Date(s): March 26, 2012
Derenzo and Associates, Inc. Project No.: 1201047

LFG Influent Chlorine Coumpounds	Analytical Report Concentration (ppm)	Molecular Formula	No. Chlorine Atoms	HCl Emission Factor (lb/MMscf)
Freon 12 (Dichlorodifluoromethane)	0.230	CCl_2F_2	2	0.043 [1]
Freon 114 (Dichlorotetrafluroethane)	<0.037	$C_2Cl_2F_4$	2	<0.007
Chloromethane	<0.370	CH_3Cl	1	<0.035
Vinyl Chloride	0.12	C_2HCl	1	0.011
Chloroethane	<0.150	C_2H_5Cl	1	<0.014
Freon 11 (Fluorotrichloromethane)	<0.037	$CFCl_3$	3	<0.010
1,1-Dichloroethene	<0.037	$C_2H_2Cl_2$	2	<0.007
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	<0.037	$C_2Cl_2F_3$	2	<0.007
Methylene Chloride (Dichloromethane)	<0.370	CH_2Cl_2	2	<0.070
1,1-Dichloroethane	<0.037	$C_2H_4Cl_2$	2	<0.007
1,2-Dichloroethene (as cis-1,2-Dichloroethene)	0.270	$C_2H_2Cl_2$	2	0.051
Chloroform	<0.037	$CHCl_3$	3	<0.010
1,1,1-Trichloroethane	<0.037	$C_2H_3Cl_3$	3	<0.010
Carbon Tetrachloride	<0.037	CCl_4	4	<0.014
1,2-Dichloroethane	0.100	$C_2H_4Cl_2$	2	0.019
Trichloroethene	<0.037	C_2HCl_3	3	0.010
1,2-dichloropropane	<0.037	$C_3H_6Cl_2$	2	<0.007
1,3-Dichloropropene (as cis-1,3-Dichloropropene)	<0.037	$C_3H_4Cl_2$	2	<0.007
1,3-Dichloropropene (as trans-1,3-Dichloropropene	<0.037	$C_3H_4Cl_2$	2	<0.007
1,1,2-Trichloroethane	<0.037	$C_2H_3Cl_3$	3	<0.010
Tetrachloroethene (Perchloroethene)	0.120	C_2Cl_4	4	0.045
Chlorobenzene	0.045	C_6H_5Cl	1	0.004
1,1,2,2-Tetrachloroethane	<0.037	$C_2H_2Cl_4$	4	<0.014
1,3-Dichlorobenzene	<0.037	$C_6H_4Cl_2$	2	<0.007
1,4-Dichlorobenzene	<0.037	$C_6H_4Cl_2$	2	<0.007
alpha-Chlorotoluene	<0.037	C_7H_7Cl	1	<0.003
1,2-Dichlorobenzene	<0.037	$C_6H_4Cl_2$	2	<0.007
1,2,4-Trichlorobenzene	<0.150	$C_6H_3Cl_3$	3	<0.042
Hexachlorobutadiene	<0.150	C_4Cl_6	6	<0.085
1,2-Dichloroethene (as trans-1,2-Dichloroethene)	<0.037	$C_2H_2Cl_2$	2	<0.007
Bromodichloromethane	<0.037	$CBrCl_2$	2	<0.007
Dibromochloromethane	<0.037	$CHBr_2Cl$	1	<0.003
Dichlorofluoromethane	<0.150	$CHBr_2Cl$	1	<0.014
Chlorodifluoromethane	1.40	$CHClF_2$	1	0.13
Total hydrogen chloride emission factor (lb/MMscf)				**0.32**

March 26, 2012 laboratory analytical results (see Appendix C)
Sample Calculations:

1. Example calculation for Freon 12 that assumes complete conversion of chloride to HCl
(0.35 ft^3 Freon 12/MMcf LFG) (2 mol HCl/mol Freon 12) (36.46 lb. HCl/mol) / (387 ft^3/mol) = 0.066 lb. HCl/MMscf LFG

2. Example hydrogen chloride emission rate calculation as lb/hr
(0.57 lb HCL/MMcf LFG / 1,000,000 scf/MMscf) (548.3 scf/min, avg. inlet flow to engines during sampling) (60 min/hr) = 0.02 lb HCl/hr

Brevard Energy, LLC March 26, 2012 Sample

Sulfur Dioxide Emission Factor for LFG Combustion

Test 1		No.	Measured	Sulfur Content[B]	Resulting SO_2
LFG Influent Sulfur Compound	Molecular Formula	Sulfur Atoms	Concentrations[A] (ppmv)	as TRS (ppmv)	Emission Rate (lb./MMscf)
Hydrogen Sulfide	H_2S	1	190	190	31.59
Carbonyl Sulfide	CSO	1	0.28	0.28	0.05
Methyl Mercaptan	CH_4S	1	5.90	5.90	0.98
Ethyl Mercaptan	C_2H_6S	1	0.22	0.22	0.04
Dimethyl Sulfide	C_2H_6S	1	7.90	7.90	1.31
Isopropyl Mercaptan	C_3H_8S	1	0.81	0.81	0.13
tert-Butyl Mercaptan	$C_4H_{10}S$	1	0.17	0.17	0.03
Thiophene	C_4H_4S	1	0.95	0.95	0.16
Carbon Disulfide	CS_2	2	0.05	0.09	0.02
n-Propyl Mercaptan	C_3H_8S	1	0.11	0.11	0.02
3-Methylthiophene	C_5H_6S	1	0.07	0.07	0.01
2-Ethylthiophene	C_6H_8S	1	0.06	0.06	0.01
Tetrahydrothiophene	C_4H_8S	1	0.05	0.05	0.01
			Test 1 Totals	**206.6**	**34.35**

Test 2		No.	Measured	Sulfur Content[B]	Resulting SO_2
LFG Influent Sulfur Compound	Molecular Formula	Sulfur Atoms	Concentrations[A] (ppmv)	as TRS (ppmv)	Emission Rate (lb./MMscf)
Hydrogen Sulfide	H_2S	1	210	210	34.91
Carbonyl Sulfide	CSO	1	0.30	0.30	0.05
Methyl Mercaptan	CH_4S	1	6.20	6.20	1.03
Ethyl Mercaptan	C_2H_6S	1	0.22	0.22	0.04
Dimethyl Sulfide	C_2H_6S	1	8.30	8.30	1.38
Isopropyl Mercaptan	C_3H_8S	1	0.86	0.86	0.14
tert-Butyl Mercaptan	$C_4H_{10}S$	1	0.17	0.17	0.03
Thiophene	C_4H_4S	1	0.97	0.97	0.16
Carbon Disulfide	CS_2	2	0.05	0.10	0.02
n-Propyl Mercaptan	C_3H_8S	1	0.12	0.12	0.02
3-Methylthiophene	C_5H_6S	1	0.08	0.08	0.01
2-Ethylthiophene	C_6H_8S	1	0.08	0.08	0.01
			Test 2 Totals	**227.4**	**37.81**

Test 3		No.	Measured	Sulfur Content[B]	Resulting SO_2
LFG Influent Sulfur Compound	Molecular Formula	Sulfur Atoms	Concentrations[A] (ppmv)	as TRS (ppmv)	Emission Rate (lb./MMscf)
Hydrogen Sulfide	H_2S	1	210	210	34.91
Carbonyl Sulfide	CSO	1	0.32	0.32	0.05
Methyl Mercaptan	CH_4S	1	6.40	6.40	1.06
Ethyl Mercaptan	C_2H_6S	1	0.23	0.23	0.04
Dimethyl Sulfide	C_2H_6S	1	8.60	8.60	1.43
Isopropyl Mercaptan	C_3H_8S	1	0.90	0.90	0.15
tert-Butyl Mercaptan	$C_4H_{10}S$	1	0.19	0.19	0.03
Thiophene	C_4H_4S	1	0.97	0.97	0.16
Carbon Disulfide	CS_2	2	0.04	0.08	0.01
n-Propyl Mercaptan	C_3H_8S	1	0.14	0.14	0.02
3-Methylthiophene	C_5H_6S	1	0.08	0.08	0.01
2-Ethylthiophene	C_6H_8S	1	0.08	0.08	0.01
2,5-Dimethylthiophene	C_6H_8S	1	0.06	0.06	0.01
			Test 3 Totals	**228.0**	**37.9**

Notes:
TRS = Total Reduced Sulfur
64.04 = Molecular Weight of SO_2
385.3 = molar volume of ideal gas at std conditions
A = March 14, 2011 analytical date for LFG sample laboratory analytical results (see Appendix C)
B = Determined by multiplying concentration by number of sulfur atoms in the molecule.

* Sample calculation: SO_2 (lb/MMscf) generation from hydrogen sulfide (H_2S) - Test 1:

(190 ppmv)* No. S atoms * 64.04 / 385.3 = 31.59

Derenzo and Associates, Inc.

SO_2 Emission Rate Calculation Worksheet using Fuel Specific F Factor

Company:	Brevard Energy
Location:	Cocoa, FL
Source:	ICE #5 (EU008)
Date:	3/26/2012

Paratmeter ID	Test 1	Test 2	Test 3
K	1000000	1000000	1000000
Kcc	0.321	0.321	0.321
%C	38.14	37.92	37.65
GCV' (by wt)	6,936.8	6,936.8	6,881.4
Fc	1,765	1,755	1,756
Fuel flow	601	600	602
HHV	515.9	502.8	499.2
HIR	18.6	18.1	18.0
SO_2 E_F (lb/MMscf)	34.4	37.8	37.9
SO_2 E_R (lb/hr)	**1.13**	**1.20**	**1.20**

Definitions:

K (Btu/MMBtu)	= conversion constant Btu to MMBtu (1000000)
Kcc (scf/Btu) / %	= 0.321 (constant from USEPA Method19)
%C (by wt)	= Percent Carbon (by weight) from ultimate fuel analysis.
GCV' (Btu/lb-HHV)	= Gross calorific value (by weight) of fuel from ultimate fuel analysis.
Fc (scf/MMBtu)	= F Factor Calculation
Fuel flow (scfm)	= standard cubic feet per minute (from facility operating data)
HHV (Btu/scf)	= From ultimate fuel analysis (GHV Dry)
HIR (MMBtu/hr)	= Heat input rate (HHV)
SO_2 E_F (lb/MMscf)	= SO_2 Emission Factor from D-5504 analysis calculations
SO_2 E_R (lb/hr)	= SO_2 Emission Rate

Equations:

Fc (scf/MMBtu) =	= (K) (Kcc)(%C) / GCV
HIR (MMBtu/hr) =	= (fuel flow-scfm*HHV) / K * 60
SO_2 E_F (lb/MMscf) =	= (Sum of ppm S) * 64.06 / 385.3
SO_2 E_R (lb/hr) =	= (lb/MMscf/1000000)*Fc*HIR

Brevard Energy	Compound	Test 1 Result ppbV	Test 2 Result ppbV	Test 3 Result ppbV
7783-06-4	Hydrogen Sulfide	190,000	210,000	210,000
463-58-1	Carbonyl Sulfide	280	300	320
74-93-1	Methyl Mercaptan	5,900	6,200	6,400
75-08-1	Ethyl Mercaptan	220	220	230
75-18-3	Dimethyl Sulfide	7,900	8,300	8,600
75-33-2	Isopropyl Mercaptan	810	860	900
75-66-1	tert-Butyl Mercaptan	170	170	190
110-02-1	Thiophene	950	970	970
75-15-0	Carbon Disulfide	46	51	38
107-03-9	n-Propyl Mercaptan	110	120	140
513-44-0	Isobutyl Mercaptan	ND	ND	ND
616-44-4	3-Methylthiophene	68	79	84 ND
872-55-9	2-Ethylthiophene	61	76	77 ND
110-01-0	Tetrahydrothiophene	51	ND	ND
352-93-2	Diethyl Sulfide	ND	ND	ND
109-79-5	n-Butyl Mercaptan	ND	ND	ND
624-92-0	Dimethyl Disulfide	ND	ND	ND
624-89-5	Ethyl Methyl Sulfide	ND	ND	ND
638-02-8	2,5-Dimethylthiophene	ND	ND	57
110-81-6	Diethyl Disulfide	ND	ND	ND

COLUMBIA ANALYTICAL SERVICES, INC.

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: BEB-1
Client Project ID: Brevard Energy / 1201047

CAS Project ID: P1201174
CAS Sample ID: P1201174-001

Test Code: ASTM D3588-98
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/26/2012
Date Received: 3/27/2012

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.11**	< 0.01	
Oxygen + Argon	**0.91**	**1.03**	
Nitrogen	**9.90**	**9.87**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.74**	**28.97**	
Carbon Dioxide	**38.29**	**59.99**	
Hydrogen Sulfide	**0.02**	**0.02**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.81**	**38.14**
Hydrogen	**52.08**	**7.31**
Oxygen + Argon	**20.05**	**44.66**
Nitrogen	**5.06**	**9.87**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9698**
Specific Volume	ft3/lb	**13.51**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**515.9**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**464.5**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**505.5**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**455.1**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,970.1**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,276.1**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9971**

Verified By:_____ Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: BEB-2
Client Project ID: Brevard Energy / 1201047

CAS Project ID: P1201174
CAS Sample ID: P1201174-002

Test Code: ASTM D3588-98
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: #######
Date Received: #######

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.12**	< 0.01	
Oxygen + Argon	**1.04**	**1.18**	
Nitrogen	**10.33**	**10.31**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.47**	**28.83**	
Carbon Dioxide	**37.98**	**59.54**	
Hydrogen Sulfide	**0.02**	**0.03**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.73**	**37.92**
Hydrogen	**51.96**	**7.27**
Oxygen + Argon	**20.01**	**44.48**
Nitrogen	**5.30**	**10.31**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9694**
Specific Volume	ft3/lb	**13.52**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**513.2**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**462.1**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**502.8**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**452.8**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,936.8**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,246.1**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9972**

Verified By:_____ Date:_____

COLUMBIA ANALYTICAL SERVICES, INC.

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: BEB-3
Client Project ID: Brevard Energy / 1201047

CAS Project ID: P1201174
CAS Sample ID: P1201174-003

Test Code: ASTM D3588-98
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: #######
Date Received: #######

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.12**	< 0.01	
Oxygen + Argon	**1.16**	**1.32**	
Nitrogen	**10.77**	**10.73**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.10**	**28.60**	
Carbon Dioxide	**37.80**	**59.21**	
Hydrogen Sulfide	**0.02**	**0.03**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.66**	**37.65**
Hydrogen	**51.75**	**7.22**
Oxygen + Argon	**20.05**	**44.37**
Nitrogen	**5.54**	**10.74**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9701**
Specific Volume	ft3/lb	**13.51**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**509.5**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**458.8**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**499.2**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**449.5**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,881.4**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,196.3**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9972**

Verified By:_____ Date:_____

Derenzo and Associates, Inc.

Six-Minute USEPA Method 9 Opacity Averages
for the
Caterpillar Model G3520C Engine Unit #5 (EU008)
at the
Brevard Energy, L.L.C.
Central Disposal Facility - Cocoa, Brevard County, Florida
Test Date(s): March 26, 2012

Start Time: 11:21 End Time: 12:21

Minute	Second				6-min
	0	15	30	45	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

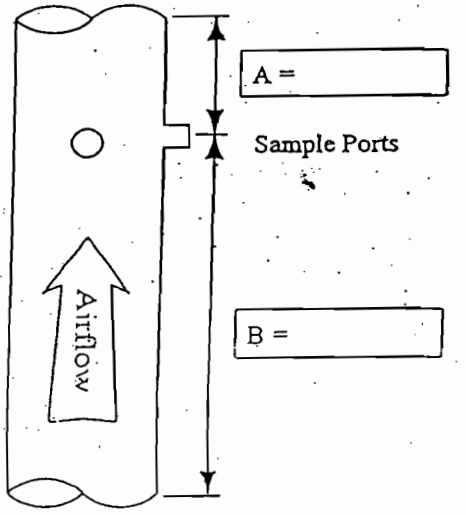
Derenzo and Associates, Inc.

USEPA Method 2
Gas Velocity Measurement Data Sheet

Company	Brevard Energy	No. of Points	12
Source Designation	ICE #5 (EU008)	Operator(s)	DWJRB
Test Date	3/23/12	Pitot Type	(Type S) or Standard
Test Number	Pre-lim	Pitot Identification	SF
Time (24-hr clock)	11:50	O_2 Content (%)	
Barometric Press. (in. Hg)	30.19	CO_2 Content (%)	
Static Pressure (in. H_2O)	-8.4	Wet Bulb Temp.	

Inches from Stack Wall	Traverse Point Number	Stack Temperature (°F)	Velocity Head (in. H_2O)	Null Angel (zero angle)
5.18	1	936	3.30	7
6.76	2	938	3.65	3
9.09	3	939	3.90	0
15.41	4	940	3.90	2
17.74	5	936	4.30	2
19.32	6	932	4.25	5
	1	933	3.70	5
	2	936	3.65	3
	3	937	3.90	2
	4	939	3.95	0
	5	932	4.25	5
	6	929	4.15	10

Stack / Duct Measurements



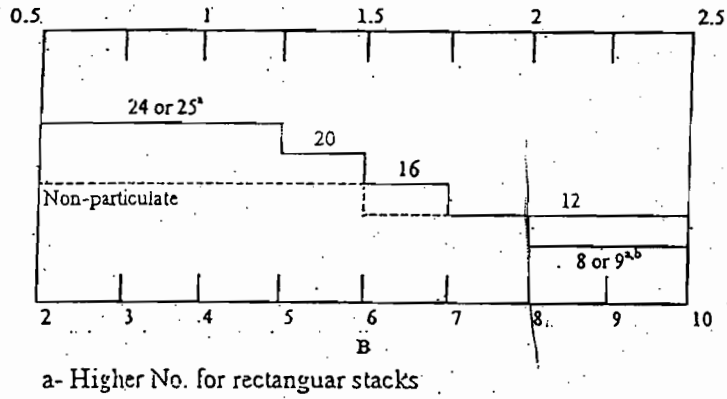
Round Duct Dia. (D) _____

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: Brevard Energy
Source Designation: ICE #5 (EU008)
Test Date: 3/26/12 — Pitot Number: 7F — Leak Rate Initial: 0.000 @ 15.
Test Number: BEH-1 — Meter Number: ~~[illegible]~~ N-3 — Leak Rate Final: 0.000 @ 5.
Operator: DW/MB — Kiso: 1661.932 — Traverse points: 12
Filter Numbers: — — Delta H@: 1.897 — Pitot Cp: 0.84
Bar. Press (Pb): 30.02 — Assumed H2O: 11 — Meter Yd Factor: 0.9971
Static Press (Ps): +8.1 — Cond.Vol. (Vlc-1): 116.6 — Molecular Weight (%)
Stack Dia (in.): 15.5 — SG Gain (Vlc-2): 12.2 — O_2: 11.53
Nozzle Dia (in.): 0.184 — CO_2: 7.78

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	781.0	687.5	93.5
2nd	705.0	685.0	20.0
3rd	520.2	517.1	3.1
4th			
5th			
6th			
Silica Gel	967.8	955.6	12.2

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)
B-1	0	1055	3	924	3.75	1.61	292.433	83	82	247	249	66
2	5	1100	3	923	3.70	1.60	296.00	90	86	252	255	65
3	10	1105	3	924	3.90	1.69	299.44	93	86	253	255	63
4	15	1110	3	933	3.95	1.71	302.87	95	86	254	258	63
5	20	1115	3	923	4.10	1.79	306.43	97	87	253	255	64
6	25	1120	3	928	4.10	1.78	310.07	97	87	253	254	64
off	30	1125	-	-	-	-	313.728	-	-	-	-	-
A-1	30	1132	3	914	3.60	1.57	313.728	90	87	250	254	65
2	35	1137	3	924	3.70	1.61	317.23	94	88	251	252	64
3	40	1142	3	920	3.95	1.73	320.57	96	88	251	255	63
4	45	1147	3	921	4.15	1.81	324.15	97	88	246	254	65
5	50	1152	3	922	4.10	1.79	327.97	97	88	250	256	64
6	55	1157	4	923	4.15	1.81	331.42	98	88	252	254	64
off	60	1202	-	-	-	-	335.108	-	-	-	-	-

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 = ~~1.10~~ 1.09

Pm = 30.16 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:

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= _____

DERENZO AND ASSOCIATES, INC.

Isokinetic Field Sampling Data Sheet

Company	Brevard Energy				
Source Designation	ICEHS (EU008)				
Test Date	3/26/12	Pitot Number	7F	Leak Rate Initial	0.000 @ 15.
Test Number	BEH-2	Meter Number	N-3	Leak Rate Final	0.000 @ 7.
Operator	DW/MB	Kiso	1661.932	Traverse points	12
Filter Numbers	-	Delta H@	1.897	Pitot Cp	0.84
Bar. Press (Pb)	29.92	Assumed H2O	11	Meter Yd Factor	0.9971
Static Press (Ps)	8.40	Cond.Vol. (Vlc-1)	119.4	Molecular Weight (%)	
Stack Dia (in.)	15.5	SG Gain (Vlc-2)	11.2	O_2	CEM data
		Nozzle Dia (in.)	0.184	CO_2	

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	786.4	691.6	94.8
2nd	696.3	675.6	20.7
3rd	605.0	601.1	3.9
4th			
5th			
6th			
Silica Gel	879.6	868.4	11.2

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)
A-1	0	1305	5	928	.345	1.48	335.350	86	85	240	257	67
2	5	1310	5	925	3.65	1.58	338.87	89	85	241	258	66
3	10	1325	6	923	3.95	1.72	342.22	93	86	242	256	65
4	15	1330	6	924	4.10	1.78	345.76	96	86	243	258	64
5	20	1335	6	924	4.15	1.81	349.36	97	87	240	255	64
6	25	1340	6	920	4.10	1.80	353.10	99	88	242	255	65
off	30	1345	-	-	-	-	356.982	-	-	-	-	-
B-1	30	1350	5	913	3.40	1.49	356.982	93	88	240	249	66
2	35	1355	5	918	3.70	1.62	360.81	96	88	242	251	66
3	40	1400	6	915	3.95	1.73	364.35	97	88	246	254	65
4	45	1405	6	918	3.85	1.69	367.83	99	89	247	255	64
5	50	1410	6	918	4.00	1.76	371.37	100	89	248	252	65
6	55	1415	6	919	4.15	1.82	375.00	100	89	245	256	66
off	60	1420	-	-	-	-	378.653	-	-	-	-	-

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)* $\Delta P_{(average)}$ = $\sqrt{Dn}$

(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)

Isokinetic Field Sampling Data Sheet

Company	Brevard Energy				
Source Designation	FCE #5 (EU008)				
Test Date	3/26/12	Pitot Number	7F	Leak Rate Initial	0.00 @ 15
Test Number	BEH-3	Meter Number	N-3	Leak Rate Final	0.00 @ 5
Operator	DW/MB	Kiso	1661.932	Traverse points	12
Filter Numbers	-	Delta H@	1.897	Pitot Cp	0.84
Bar. Press (Pb)	30.02	Assumed H2O	11	Meter Yd Factor	0.9971
Static Press (Ps)	8.3	Cond.Vol. (Vlc-1)		Molecular Weight (%)	
Stack Dia (in.)	15.5	SG Gain (Vlc-2)		O_2	CEM DATA
		Nozzle Dia (in.)	0.184	CO_2	

Impinger	Final Wt (ml / g)	Initial Wt (ml / g)	Net Gain (ml / g)
1st	782.8	689.9	
2nd	704.7	687.9	
3rd	523.6	520.2	
4th			
5th			
6th			
Silica Gel	980.1	967.8	

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)
B-1	0	1522	2	917	3.20	1.36	378.948	89	88	242	249	63
2	5	1527	3	919	3.55	1.50	382.12	91	88	251	255	57
3	10	1532	3	922	3.80	1.61	385.48	95	89	255	254	54
4	15	1537	3	920	3.75	1.60	388.95	97	89	257	256	53
5	20	1542	3	922	4.10	1.74	392.42	94	90	255	258	55
6	25	1547	3	924	4.15	1.77	396.12	98	90	250	252	56
off	30	1552	-	-	-	-	399.689	-	-	-	-	-
A-1	30	1600	3	917	3.40	1.45	399.689	94	91	248	252	63
2	35	1605	3	918	3.70	1.58	402.90	97	91	254	256	55
3	40	1610	3	915	3.85	1.65	406.38	99	91	256	258	55
4	45	1615	4	916	4.00	1.72	409.87	101	92	251	257	58
5	50	1620	4	915	4.15	1.79	413.65	101	92	252	258	60
6	55	1625	4	917	4.20	1.81	417.10	102	92	255	256	59
off	60	1630	-	-	-	-	420.793	-	-	-	-	-

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 = 1.06

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.

Visible Emission Observation Form

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

Obsv. Date	page	of
3/26/12	1	1

Company Name	LCS
Facility Name	BREVARD ENERGY
Street Address	
City / State / Zip	

Process Unit	Unit	Op. Mode
Control Equipment		Op. Mode

Describe Emission Point	ICE #5 (EU008) EXHAUST	
height of em. pt. start 25' end		height relative to obsv. start 25' 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 150' NNW end	

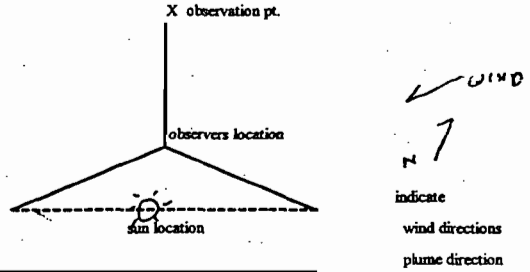
Describe emissions start end	
emission color start end	water droplet plume (circle) attached detached (none)

Describe plume background start SKY end			
background color start BLUE end		sky conditions start CLEAR end	
wind speed start 0-5 MPH end		wind directions start SSE end	
ambient temp start 74° end 75°	wet bulb	relative humidity 56%	

start 10:55 end 11:55

	seconds					seconds			
	0	15	30	45		0	15	30	45
min					min				
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	

Comments

Observer's name	ROBERT BINGHAM	date	3/26/12
Observer's signature			
organization name	DERENZO & ASSOCIATES		
certified by	ESO	date	10/5/12

additional information

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

Job #: 120107 | Control Device: —

Facility: Brevard Energy | Sample Location:

Location: Cocoa, FL | Ambient Temperature: 77-82

Date: 3/26/12 | Barometric Pressure: 30.02

Operator: DW | Contract Laboratory: All Tanks

SAMPLE 1		SAMPLE 2		SAMPLE 3	
Tank #:	33789	Tank #:	33385	Tank #:	35278
Initial Vacuum:	26.5	Initial Vacuum:	26	Initial Vacuum:	26
Final Vacuum:	8.5	Final Vacuum:	3.5	Final Vacuum:	3.0

TIME	VACUUM ("Hg)
10:55	26.5
11:05	21.0
11:15	17.0
11:25	13.5
11:35	9.5
11:45	9.0
11:50	8.5

TIME	VACUUM ("Hg)
13:15	26
13:25	21
13:35	16
13:45	10.5
13:55	7.0
14:05	4.0
14:10	3.5

TIME	VACUUM ("Hg)
15:20	26
15:30	22
15:40	17.5
15:50	12.5
16:00	8.5
16:10	4.5
16:15	3.0

Leak Rate Pre: | Leak Rate Pre: | Leak Rate Pre:

Leak Rate Post: | Leak Rate Post: | Leak Rate Post:

APPENDIX B

EQUIPMENT CALIBRATION DATA AND OPACITY CERTIFICATION

Derenzo and Associates, Inc.

METHOD 205 - DILUTION MODULE VERIFICATION

Date: **3/23/2012**
Client: **Brevard 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	Injection No. 2	Injection No. 3	Average	%Error	Individual Response Errors as Compared to Average		
100%	20.95	21.07	21.11	21.07	21.08	0.64%	-0.1%	0.1%	-0.1%
60%	12.57	12.59	12.61	12.60	12.60	0.24%	-0.1%	0.1%	0.0%
40%	8.38	8.38	8.39	8.38	8.38	0.04%	0.0%	0.1%	0.0%
0%	0.00	0.01	0.01	0.01	0.01	-	-	-	-

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

Mid-Range Gas	Expected Concentration	Injection No. 1	Injection No. 2	Injection No. 3	Average	%Error	Individual Response Errors as Compared to Average		
O_2	12.55	12.56	12.61	12.62	12.60	0.37%	-0.3%	0.1%	0.2%

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.

Derenzo and Associates, Inc.

METHOD 7E - NOx CONVERTER VERIFICATION

Date: **3/26/2012**
Client: **Brevard 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	8:09	198.30	199.02	**0.36**
Mid	8:15	79.32	78.37	**-0.48**
Low	8:21	0.00	0.53	**0.27**

NO_2 Cal gas (ppm) =	**50.88**	**Date**	**Time**	**NOx**	**Average NOx**
				(ppmv)	(ppmv)
START NOx Converter		3/26/2012	8:26	50.17	-
NOx Converter		3/26/2012	8:27	50.62	50.40
NOx Converter		3/26/2012	8:28	50.75	50.51
NOx Converter		3/26/2012	8:29	51.12	50.67
NOx Converter		3/26/2012	8:30	51.12	50.76
NOx Converter		3/26/2012	8:31	51.12	50.95
NOx Converter		3/26/2012	8:32	51.12	50.86
NOx Converter		3/26/2012	8:33	51.41	51.04
NOx Converter		3/26/2012	8:34	51.62	51.18
END NOx Converter		3/26/2012	8:35	51.61	51.07

$Eff_{NO2} = (C_{dir}/C_v) \times 100 =$ 100.4 % 51.066

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	8:47	78.37	78.79	**0.21**
Zero	8:59	0.53	0.52	**-0.01**

Derenzo and Associates, Inc.

Determination of Stratification
USEPA Method 7E Section 8.1.2

Date: 3/26/2012
Client: Brevard Energy
Source: EU-008 - CAT3520 (ICE#5)

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	1055-1114	644.6	0.44%	pass
Point 2	1115-1134	637.2	0.72%	pass
Point 3	1135-1154	643.5	0.28%	pass
	Mean	641.8		

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
3/26/2012	10:55	639.71	11:25	644.99
3/26/2012	10:56	641.11	11:26	642.64
3/26/2012	10:57	641.26	11:27	642.01
3/26/2012	10:58	643.06	11:28	635.28
3/26/2012	10:59	639.53	11:29	628.17
3/26/2012	11:00	643.9	11:30	641.19
3/26/2012	11:01	641.73	11:31	639.43
3/26/2012	11:02	638.12	11:32	630.03
3/26/2012	11:03	635.23	11:33	633.75
3/26/2012	11:04	638.87	11:34	638.14
3/26/2012	11:05	647.25	11:35	644.91
3/26/2012	11:06	642.41	11:36	642.35
3/26/2012	11:07	635.62	11:37	641.35
3/26/2012	11:08	638.31	11:38	650.4
3/26/2012	11:09	637.32	11:39	639.41
3/26/2012	11:10	644.18	11:40	639.09
3/26/2012	11:11	716.38	11:41	634.97
3/26/2012	11:12	638.86	11:42	640.79
3/26/2012	11:13	638.54	11:43	640.36
3/26/2012	11:14	650.22	11:44	639.59
3/26/2012	11:15	647.39	11:45	639.57
3/26/2012	11:16	635.8	11:46	642.47
3/26/2012	11:17	638.42	11:47	645.07
3/26/2012	11:18	629.83	11:48	646.77
3/26/2012	11:19	629.13	11:49	648.55
3/26/2012	11:20	637.39	11:50	652.3
3/26/2012	11:21	641.66	11:51	646.98
3/26/2012	11:22	634.58	11:52	645.14
3/26/2012	11:23	637.31	11:53	643.81
3/26/2012	11:24	636.15	11:54	646.99

Derenzo and Associates, Inc.

Calibration Error, System Bias, Drift Worksheet

Location: Brevard Energy
Date: 3/26/12

			Abbreviations
NOx	Calibration span (CS)	198.3 ppmv	CS = calibration span
CO	Calibration span (CS)	980.4 ppmv	ACE = analyzer calibration error
CO2	Calibration span (CS)	22.83 %	SB = system bias
O2	Calibration span (CS)	20.95 %	dir = direct instrument injection

Initial 3 point instrument calibration

			Actual	Expected	ACE (% of CS)	Criteria	
NOx	high	direct (Cdir)	199.02	198.30	0.4%	2%	100%
NOx	mid	direct (Cdir)	78.37	79.32	-0.5%	2%	40%
NOx	zero	direct (Cdir)	0.53	0.00	0.3%	2%	
CO	high	direct (Cdir)	980.23	980.40	0.0%	2%	100%
CO	mid	direct (Cdir)	782.62	784.32	-0.2%	2%	80%
CO	zero	direct (Cdir)	0.18	0.00	0.0%	2%	
CO2	high	direct (Cdir)	22.87	22.83	0.2%	2%	100%
CO2	mid	direct (Cdir)	13.67	13.70	-0.1%	2%	60%
CO2	zero	direct (Cdir)	0.04	0.00	0.2%	2%	
O2	high	direct (Cdir)	21.03	20.95	0.4%	2%	100%
O2	mid	direct (Cdir)	8.34	8.38	-0.2%	2%	40%
O2	zero	direct (Cdir)	0.01	0.00	0.0%	2%	

Initial system bias check/EU008 Pretest 1 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Response Time	sec
NOx	upscale	system (Cs)	77.16	78.37	-0.6%	5%	Upscale	115
NOx	zero	system (Cs)	0.53	0.53	0.0%	5%	Downscale	105
CO	upscale	system (Cs)	782.35	782.62	0.0%	5%	Upscale	63
CO	zero	system (Cs)	0.25	0.18	0.0%	5%	Downscale	65
CO2	upscale	system (Cs)	13.52	13.67	-0.7%	5%	Upscale	70
CO2	zero	system (Cs)	0.05	0.04	0.0%	5%	Downscale	75
O2	upscale	system (Cs)	8.37	8.34	0.1%	5%	Upscale	95
O2	zero	system (Cs)	0.01	0.01	0.0%	5%	Downscale	100

EU008 Postest 1 Pretest 2 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	77.88	78.37	-0.2%	5%	0.4%	3%
NOx	zero	system (Cs)	0.51	0.53	0.0%	5%	0.0%	3%
CO	upscale	system (Cs)	788.73	782.62	0.6%	5%	0.7%	3%
CO	zero	system (Cs)	2.55	0.18	0.2%	5%	0.2%	3%
CO2	upscale	system (Cs)	13.57	13.67	-0.4%	5%	0.2%	3%
CO2	zero	system (Cs)	0.06	0.04	0.1%	5%	0.0%	3%
O2	upscale	system (Cs)	8.34	8.34	0.0%	5%	0.1%	3%
O2	zero	system (Cs)	0.01	0.01	0.0%	5%	0.0%	3%

EU008 Postest 2 Pretest 3 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	77.51	78.37	-0.4%	5%	0.2%	3%
NOx	zero	system (Cs)	0.55	0.53	0.0%	5%	0.0%	3%
CO	upscale	system (Cs)	789.84	782.62	0.7%	5%	0.1%	3%
CO	zero	system (Cs)	3.14	0.18	0.3%	5%	0.1%	3%
CO2	upscale	system (Cs)	13.56	13.67	-0.5%	5%	0.0%	3%
CO2	zero	system (Cs)	0.08	0.04	0.2%	5%	0.1%	3%
O2	upscale	system (Cs)	8.34	8.34	0.0%	5%	0.0%	3%
O2	zero	system (Cs)	0.01	0.01	0.0%	5%	0.0%	3%

Derenzo and Associates, Inc.

Calibration Error, System Bias, Drift Worksheet

Location: Brevard Energy
Date: 3/14/11

EU008 Postest 3 System Bias

			Actual	Cdir	SB (% of CS)	Criteria	Drift (SBi-SBf)	Criteria
NOx	upscale	system (Cs)	77.59	78.37	-0.4%	5%	0.0%	3%
NOx	zero	system (Cs)	0.57	0.53	0.0%	5%	0.0%	3%
CO	upscale	system (Cs)	787.83	782.62	0.5%	5%	0.2%	3%
CO	zero	system (Cs)	2.00	0.18	0.2%	5%	0.1%	3%
CO2	upscale	system (Cs)	13.61	13.67	-0.3%	5%	0.2%	3%
CO2	zero	system (Cs)	0.08	0.04	0.2%	5%	0.0%	3%
O2	upscale	system (Cs)	8.33	8.34	0.0%	5%	0.0%	3%
O2	zero	system (Cs)	0.01	0.01	0.0%	5%	0.0%	3%

Average Calibration Responses

		EU008 (ICE#5)		
		Test 1	Test 2	Test 3
NOx	upscale	77.5	77.7	77.6
NOx	zero	0.5	0.5	0.6
CO	upscale	785.5	789.3	788.8
CO	zero	1.40	2.8	2.6
CO2	upscale	13.5	13.6	13.6
CO2	zero	0.06	0.07	0.08
O2	upscale	8.4	8.3	8.3
O2	zero	0.01	0.01	0.01

Derenzo and Associates, Inc.

SOURCE COMPANY:	Brevard Energy
SOURCE TESTED:	ICE#5 (EU008) Exhaust
TESTING COMPANY:	Derenzo and Associates, Inc.
REFERENCE METHODS:	ALT-078
DATE OF TEST:	March 26, 2012
ANALYTE:	NMOC
Upscale SB Response Time:	185 Seconds

Calibration Error Check
Linearity Check (Must be within **5%**)

	Zero Gas	Low Gas Propane	Mid Gas Propane	High Gas Propane
Cal. Gas Serial #				
Tag Value	0.00	34.18	51.28	85.46
Monitor	0.21			83.83
Expected		33.66	50.38	
Monitor		33.1	49.74	
Diff.	0.21	-0.56	-0.64	-1.63
% Diff	0.11%	-1.63%	-1.25%	-1.91%
	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	0.21	0.21	0.00%	Pass
2	0.21	0.42	0.11%	Pass
3	0.42	0.43	0.01%	Pass

Run No.	(Cm)i Initial Upscale	(Cm)f Final Upscale	Upscale Gas Drift	Up-Drift Pass if **< 3%**
1	33.10	34.50	0.70%	Pass
2	34.50	32.68	-0.91%	Pass
3	32.68	33.92	0.62%	Pass

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 SERIAL #: N3 | BAROMETRIC PRESSURE (In Hg): INITIAL 29.58, FINAL 29.60, AVG (P_{bar}) 29.58

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

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 (FT^3) 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	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	
Brass	2	0.7968	18	36.24	41.43	5.190	67	78	78	66	68	73	5.00	3.6	5.1293	5.1350	1.0011	
	3	0.7968	18	41.43	46.632	5.202	67	78	78	68	69	73.25	5.00	3.8	5.1388	5.1350	0.9993	
																AVG =	1.0009	0.38
#24	1	0.6534	19.5	46.632	55.25	8.618	68	77	76	69	69	72.75	10.00	2.4	8.4960	8.4137	0.9903	
Brass	2	0.6534	19.5	55.25	63.86	8.610	68	76	76	69	70	72.75	10.00	2.4	8.4881	8.4137	0.9912	
	3	0.6534	19.5	63.86	72.516	8.658	68	76	73	70	70	72.25	10.00	2.4	8.5415	8.4137	0.9850	
																AVG =	0.9889	-0.83
#20	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	
Brass	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	1.8	6.8694	6.8872	0.9997	
																AVG =	1.0015	0.45

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 = 0.9971

Y-5%= 0.947 1.047

Delta H@ 1.897

Kiso 1661.932

(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 SERIAL #:	N3	BAROMETRIC PRESSURE (In Hg):	INITIAL 29.28	FINAL 29.25	AVG (P_{bar}) 29.27
METER PART #:	N3	CRITICAL ORIFICE SET SERIAL #:	1316				

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 (FT^3) 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	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	
Brass	2	0.7968	18	528.83	534.	5.170	63	77	77	66	66	71.5	5.00	3.6	5.0699	5.0997	1.0059	
	3	0.7968	18	534.	539.165	5.165	64	77	77	66	67	71.75	5.00	3.6	5.0626	5.0948	1.0064	
																AVG =	1.0054	0.37
#24	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	
Brass	2	0.6534	19.5	547.75	556.35	8.600	64	76	75	68	69	72	10.00	2.4	8.4004	8.3558	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	1	0.5333	21	564.973	571.93	6.957	66	76	75	70	70	72.75	10.00	1.8	6.7724	6.6070	1.0051	
Brass	2	0.5333	21	571.93	578.88	6.950	65	75	75	70	71	72.75	10.00	1.8	6.7656	6.8135	1.0071	
	3	0.5333	21	578.68	585.848	6.968	68	75	75	71	71	73	10.00	1.8	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 1894.554

(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

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	BIN659898
Certificate Number	Student ID Number
10/5/2011	Detroit, MI
Date of Certification	Location
4/5/2012	DETF09
Certification Expiration Date	Last Lecture

Jody Monk

Director of Training

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: Kerry D. Fife **Date:** 12/28/11

QA Manager: Dan Flanni **Date:** 12/28/11

 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 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.

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 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.

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		1% 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

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	G1	1.2%
NITROGEN	Balance			

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

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 %	22.83 %	G2	0.71% 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:

AFM

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	980.4 PPM	G1	+/-1% 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	21.00 %	20.95 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

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	12.50 %	12.55 %	G1	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

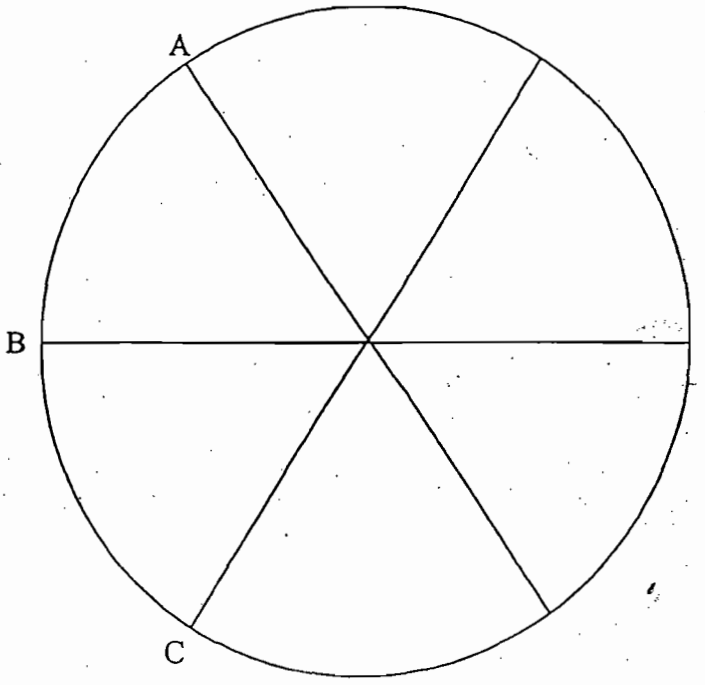
Notes:

Approved for Release

NOZZLE INSPECTION
CRITERIA CHECKLIST

Nozzle ID: GN2-1

Date: 3/26/12



A: 0.184

B: 0.183

C: 0.184

Average: 0.184

Comments:

PROBE AND PITOT TUBE INSPECTION CRITERIA CHECKLIST

Probe #: 7F

Date: 3/23/12

Figure

A. x≥1.9 cm

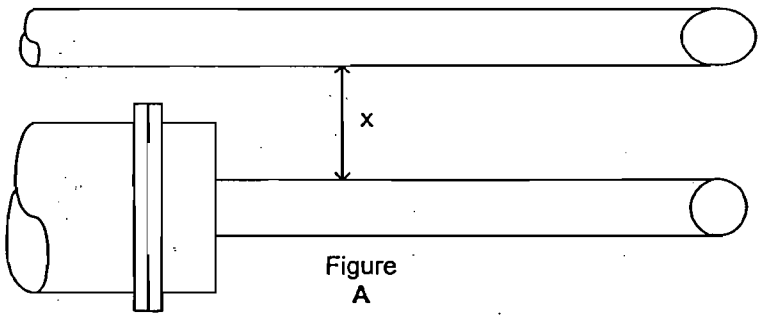


Figure A

A. Yes No

B1. z ≥1.9 cm
w ≥7.62 cm

or

B2. Z ≥5.08 cm

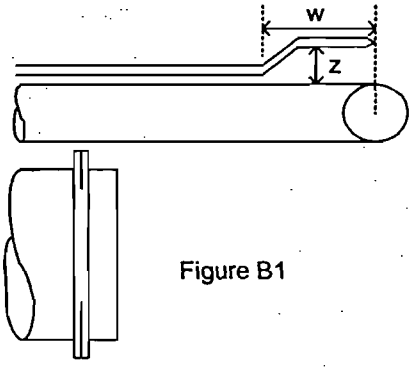


Figure B1

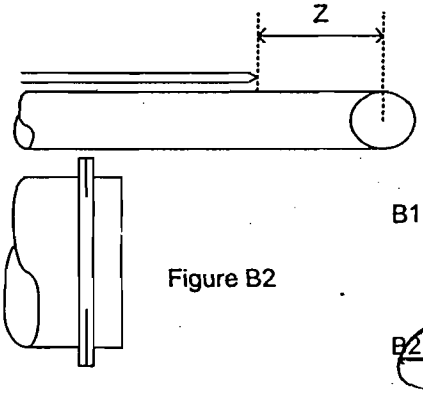


Figure B2

B1. Yes No

or

B2. Yes No

C. Y≥7.62 cm

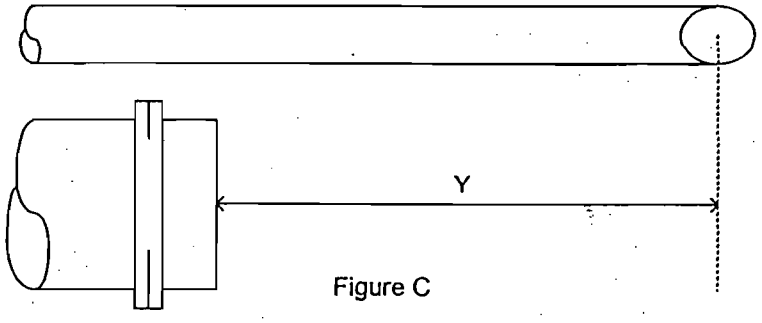


Figure C

Yes No

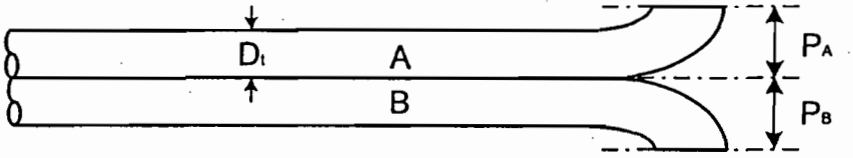
Pitot Tube Correction Factor: 0.84

PITOT TUBE INSPECTION CRITERIA CHECKLIST

Tube #: 3F

Date: 3/21/19

$3/16" \leq D_t \leq 3/8"$



(Yes) No

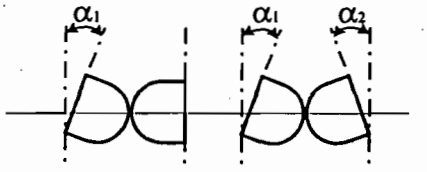
$P_A = P_B$

(Yes) No

$1.05D_t \leq P_{A,B} \leq 1.5D_t$

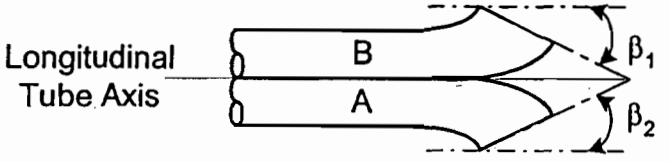
(Yes) No

α_1 and $\alpha_2 < 10^o$



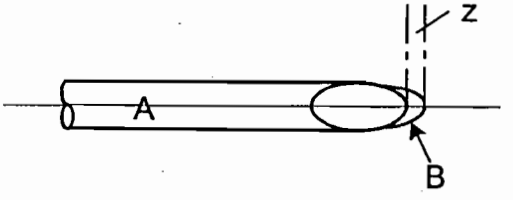
(Yes) No

β_1 and $\beta_2 < 5^o$



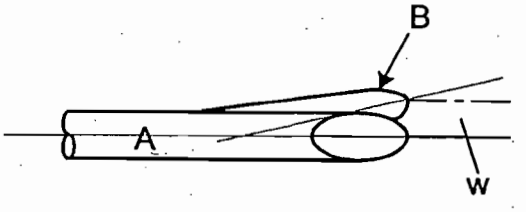
(Yes) No

$z < 0.32$ cm



(Yes) No

$w < 0.08$ cm



(Yes) No

Pitot Tube Correction Factor: 0.84

CALIBRATION SUMMARY

Company: Brevard Energy
Location: Cocoa, FL
Source Designation: ICE#5 (EU008)
Date: 3/26/12
Operator(s): MB

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	198.3	ppm
	CO	980.4	ppm
	CO_2	22.83	%
	O_2	20.95	%
	VOC	85.46	ppm
	NO_2	49.17	ppm

Time		Procedure	Response	Exp. Value	Notes
		Post Stratification Calibration			
		mid	—	—	—
		zero	—	-	—
		mid	—	-	—
		zero	—	-	—
		mid	—	—	—
		zero	—	—	—
		NOx Converter Test			
		From: 826			To: 835
		NOx Converter Post-Calibration			
847	NOx Dyn	mid	78.79	78.37	Must be closest to ~~high~~ NOx high value
859		zero	0.52	0.53	51.066
		Analyzer Calibration Error pre-test (Instrument)			
809	NOx INST	high	199.02	198.3	Must be 100 -20% of stack concentration
815		mid	78.37	79.32	Must be closest to stack concentration 40%
821		zero	0.53	0.0	
800	CO Inst	high	980.23	980.4	
803		mid	782.61	784.3	80%
810		zero	0.18	0.0	
753	CO_2 INST	high	22.87	22.83	
756		mid	13.67	13.70	60%
811		zero	0.04	0.0	
743	O_2 Inst	high	21.03	20.95	
748		mid	8.34	8.38	40%
755		zero	0.01	0.0	
		System Bias Calibration pre-test (dynamic calibration)			start stop Net
903	NOx SB	upscale	77.16	78.37	85920 90115 115
908		downscale	0.53	0.53	90425 90610 105
908	CO SB	upscale	782.35	782.61	90425 90528 63
918		downscale	0.25	0.18	90910 91005 65
919	CO_2 SB	upscale	13.52	13.67	90910 91020 70
931		downscale	0.09	0.04	91940 92055 75
925	O_2 SB	upscale	8.37	8.34	91940 92115 95
930		downscale	0.01	0.01	92555 92735 100
946	VOC	high	83.83	85.46	93350 93555 185 *
1005		mid	49.74	50.38	
1000		low	33.10	33.66	
954		zero	0.21	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

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CALIBRATION SUMMARY

Company: Brevard Energy
Location: Cocoa, FL
Source Designation: ICEFS (EU008)
Date: 3/26/12
Operator(s): MB

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
	See Page 2		

	Time	Procedure		Response	Exp. Value	Notes
Test 1	Post Test 1		System Bias Calibration (dynamic calibration)			
	1228	NOx SB	upscale	77.88	78.37	
	1222		downscale	0.51	0.53	NOx - 69.862
	1233	CO SB	upscale	788.73	782.61	CO - 641.78
Start Time: 1055	1223		downscale	2.55	0.18	CO_2 - 11.399
	1239	CO_2 SB	upscale	13.57	13.67	O_2 - 7.729
	1233		downscale	0.06	0.04	VOC - 33.483
	1244	O_2 SB	upscale	8.34	8.34	
	1229		downscale	0.01	0.01	
Stop Time: 1155	1223	VOC SB	mid	34.50	33.10	
	1218		zero	0.21	0.21	
	—	—	mid	—	—	— —
	—	—	zero	—	—	— —
Test 2	Post Test 2		System Bias Calibration (dynamic calibration)			
	1500	NOx SB	upscale	77.51	78.37	NOx - 70.548
	1451		downscale	0.55	0.53	CO - 643.115
	1457	CO SB	upscale	789.84	782.61	CO_2 - 11.616
Start Time: 1315	1439		downscale	3.14	0.18	O_2 - 7.73
	1453	CO_2 SB	upscale	1356	13.67	VOC - 33.636
	1443		downscale	0.08	0.04	
	1448	O_2 SB	upscale	8.34	8.34	
	1441		downscale	0.01	0.01	
Stop Time: 1415	1435	VOC	mid	32.68	34.50	
	1430		zero	0.42	0.21	
	—		mid	—	—	— —
	—		zero	—	—	— —
Test 3	Post Test 3		System Bias Calibration (dynamic calibration)			
	1704	NOx SB	upscale	77.59	78.37	
	1701		downscale	0.57	0.53	NOx - 78.005
	1701	CO SB	upscale	787.83	782.61	CO - 652.077
Start Time: 1522	1652		downscale	2.00	0.18	CO_2 - 11.589
	1658	CO_2 SB	upscale	13.61	13.67	O_2 - 7.701
	1651		downscale	0.08	0.04	VOC - 33.75
	1651	O_2 SB	upscale	8.33	8.34	
	1645		downscale	0.01	0.01	
Stop Time: 1622	1640	VOC SB	mid	33.92	32.68	
	1633		zero	0.43	0.42	
	—	—	mid	—	—	
	—	—	zero	—	—	

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%)

$(SB_f - SBi)$ (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: Brevard Energy
Location: Cocoa, FL
Source Designation: ICEH5 (EU008)
Date: 3/23/12
Operator(s): MB

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	%

Time	Procedure		Response	Exp. Value	Notes
	M205 Divider Certification				
1312	O_2 Inst	100%	21.07	20.95	
1317		60%	12.59	12.57	
1324		40%	8.39	8.38	
1327		0%	0.01	0.00	
1332		100%	21.11	20.95	
1337		60%	12.61	12.57	
1342		40%	8.39	8.38	
1345		0%	0.01	0.0	
1351		100%	21.12	20.95	
1357		60%	12.60	12.57	
1402		40%	8.38	8.38	
1406		0%	0.01	0.00	
1409	O_2 Inst	mid	12.56	12.55	Must be within 10% of one of the above cuts
1413		zero	0.01	0.0	
1418		mid	12.61	12.55	
1422		zero	0.01	0.0	
1426		mid	12.62	12.55	
1430		zero	0.01	0.0	
	Analyzer Calibration Error-Instrument				
		high			Must be 100 -20% of stack concentration
		mid			Must be closest to stack concentration
		zero			
		high			
		mid			
		zero			
		high			
		mid			
		zero			
		high			
		mid			
		zero			
Response Times (sec)	System Bias / Pre-Stratification				
		upscale			Must be closest to stack concentration
		downscale			
		upscale			
		downscale			Stratification probe lengths (in)
		upscale			Point 1 (16.7%) -
		downscale			Point 2 (50.0%) -
		upscale			Point 3 (83.3%) -
		downscale			

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

APPENDIX C

LABORATORY DATA

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4/19/2012
Mr. David Derenzo
Derenzo & Associates
39395 Schoolcraft Road

Livonia MI 48150

Project Name: Brevard Energy
Project #: 1201047
Workorder #: 1204106

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

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WORK ORDER #: 1204106

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 #**	1201047 Brevard Energy
DATE RECEIVED:	04/05/2012	**CONTACT:**	Ausha Scott
DATE COMPLETED:	04/19/2012		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	BEC-1	Modified TO-15	8.0 "Hg	5 psi
02A	BEC-2	Modified TO-15	3.5 "Hg	5 psi
03A	BEC-3	Modified TO-15	2.5 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
04B	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
05B	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA
06B	LCS	Modified TO-15	NA	NA
06BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Linda J. Truman 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

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

LABORATORY NARRATIVE
EPA Method TO-15
Derenzo & Associates
Workorder# 1204106

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: BEC-1

Lab ID#: 1204106-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	250	58	1200
Freon 114	12	39	82	270
Vinyl Chloride	12	140	30	350
Chloroethane	47	120	120	310
Freon 11	12	28	66	150
cis-1,2-Dichloroethene	12	340	47	1300
1,2-Dichloroethane	12	120	48	490
Trichloroethene	12	93	63	500
1,2-Dichloropropane	12	35	54	160
Tetrachloroethene	12	110	80	780
Chlorobenzene	12	42	54	190
1,4-Dichlorobenzene	12	33	71	200
Dichlorofluoromethane	47	66	200	280
Chlorodifluoromethane	47	1500	170	5400

Client Sample ID: BEC-2

Lab ID#: 1204106-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	39	240	190	1200
Vinyl Chloride	39	130	100	330
cis-1,2-Dichloroethene	39	270	150	1100
1,2-Dichloroethane	39	93	160	380
Trichloroethene	39	82	210	440
Tetrachloroethene	39	110	260	720
Chlorodifluoromethane	160	1500	550	5400

Client Sample ID: BEC-3

Lab ID#: 1204106-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	37	230	180	1200
Vinyl Chloride	37	120	95	320

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

Client Sample ID: BEC-3

Lab ID#: 1204106-03A

cis-1,2-Dichloroethene	37	270	150	1100
1,2-Dichloroethane	37	100	150	410
Tetrachloroethene	37	120	250	800
Chlorobenzene	37	45	170	200
Chlorodifluoromethane	150	1400	530	5100

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Client Sample ID: BEC-1

Lab ID#: 1204106-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040535**	**Date of Collection:**	**3/26/12 11:50:00 AM**
Dil. Factor:	**23.6**	**Date of Analysis:**	**4/6/12 12:10 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	12	250	58	1200
Freon 114	12	39	82	270
Chloromethane	120	Not Detected	240	Not Detected
Vinyl Chloride	12	140	30	350
Chloroethane	47	120	120	310
Freon 11	12	28	66	150
1,1-Dichloroethene	12	Not Detected	47	Not Detected
Freon 113	12	Not Detected	90	Not Detected
Methylene Chloride	120	Not Detected	410	Not Detected
1,1-Dichloroethane	12	Not Detected	48	Not Detected
cis-1,2-Dichloroethene	12	340	47	1300
Chloroform	12	Not Detected	58	Not Detected
1,1,1-Trichloroethane	12	Not Detected	64	Not Detected
Carbon Tetrachloride	12	Not Detected	74	Not Detected
1,2-Dichloroethane	12	120	48	490
Trichloroethene	12	93	63	500
1,2-Dichloropropane	12	35	54	160
cis-1,3-Dichloropropene	12	Not Detected	54	Not Detected
trans-1,3-Dichloropropene	12	Not Detected	54	Not Detected
1,1,2-Trichloroethane	12	Not Detected	64	Not Detected
Tetrachloroethene	12	110	80	780
Chlorobenzene	12	42	54	190
1,1,2,2-Tetrachloroethane	12	Not Detected	81	Not Detected
1,3-Dichlorobenzene	12	Not Detected	71	Not Detected
1,4-Dichlorobenzene	12	33	71	200
alpha-Chlorotoluene	12	Not Detected	61	Not Detected
1,2-Dichlorobenzene	12	Not Detected	71	Not Detected
1,2,4-Trichlorobenzene	47	Not Detected	350	Not Detected
Hexachlorobutadiene	47	Not Detected	500	Not Detected
trans-1,2-Dichloroethene	12	Not Detected	47	Not Detected
Bromodichloromethane	12	Not Detected	79	Not Detected
Dibromochloromethane	12	Not Detected	100	Not Detected
Dichlorofluoromethane	47	66	200	280
Chlorodifluoromethane	47	1500	170	5400

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: BEC-2

Lab ID#: 1204106-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040618**	**Date of Collection: 3/26/12 2:10:00 PM**	
Dil. Factor:	**77.9**	**Date of Analysis: 4/7/12 08:49 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	39	240	190	1200
Freon 114	39	Not Detected	270	Not Detected
Chloromethane	390	Not Detected	800	Not Detected
Vinyl Chloride	39	130	100	330
Chloroethane	160	Not Detected	410	Not Detected
Freon 11	39	Not Detected	220	Not Detected
1,1-Dichloroethene	39	Not Detected	150	Not Detected
Freon 113	39	Not Detected	300	Not Detected
Methylene Chloride	390	Not Detected	1400	Not Detected
1,1-Dichloroethane	39	Not Detected	160	Not Detected
cis-1,2-Dichloroethene	39	270	150	1100
Chloroform	39	Not Detected	190	Not Detected
1,1,1-Trichloroethane	39	Not Detected	210	Not Detected
Carbon Tetrachloride	39	Not Detected	240	Not Detected
1,2-Dichloroethane	39	93	160	380
Trichloroethene	39	82	210	440
1,2-Dichloropropane	39	Not Detected	180	Not Detected
cis-1,3-Dichloropropene	39	Not Detected	180	Not Detected
trans-1,3-Dichloropropene	39	Not Detected	180	Not Detected
1,1,2-Trichloroethane	39	Not Detected	210	Not Detected
Tetrachloroethene	39	110	260	720
Chlorobenzene	39	Not Detected	180	Not Detected
1,1,2,2-Tetrachloroethane	39	Not Detected	270	Not Detected
1,3-Dichlorobenzene	39	Not Detected	230	Not Detected
1,4-Dichlorobenzene	39	Not Detected	230	Not Detected
alpha-Chlorotoluene	39	Not Detected	200	Not Detected
1,2-Dichlorobenzene	39	Not Detected	230	Not Detected
1,2,4-Trichlorobenzene	160	Not Detected	1200	Not Detected
Hexachlorobutadiene	160	Not Detected	1700	Not Detected
trans-1,2-Dichloroethene	39	Not Detected	150	Not Detected
Bromodichloromethane	39	Not Detected	260	Not Detected
Dibromochloromethane	39	Not Detected	330	Not Detected
Dichlorofluoromethane	160	Not Detected	660	Not Detected
Chlorodifluoromethane	160	1500	550	5400

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: BEC-3

Lab ID#: 1204106-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040619**	**Date of Collection: 3/26/12 4:15:00 PM**	
Dil. Factor:	**74.6**	**Date of Analysis: 4/7/12 09:21 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	37	230	180	1200
Freon 114	37	Not Detected	260	Not Detected
Chloromethane	370	Not Detected	770	Not Detected
Vinyl Chloride	37	120	95	320
Chloroethane	150	Not Detected	390	Not Detected
Freon 11	37	Not Detected	210	Not Detected
1,1-Dichloroethene	37	Not Detected	150	Not Detected
Freon 113	37	Not Detected	280	Not Detected
Methylene Chloride	370	Not Detected	1300	Not Detected
1,1-Dichloroethane	37	Not Detected	150	Not Detected
cis-1,2-Dichloroethene	37	270	150	1100
Chloroform	37	Not Detected	180	Not Detected
1,1,1-Trichloroethane	37	Not Detected	200	Not Detected
Carbon Tetrachloride	37	Not Detected	230	Not Detected
1,2-Dichloroethane	37	100	150	410
Trichloroethene	37	Not Detected	200	Not Detected
1,2-Dichloropropane	37	Not Detected	170	Not Detected
cis-1,3-Dichloropropene	37	Not Detected	170	Not Detected
trans-1,3-Dichloropropene	37	Not Detected	170	Not Detected
1,1,2-Trichloroethane	37	Not Detected	200	Not Detected
Tetrachloroethene	37	120	250	800
Chlorobenzene	37	45	170	200
1,1,2,2-Tetrachloroethane	37	Not Detected	260	Not Detected
1,3-Dichlorobenzene	37	Not Detected	220	Not Detected
1,4-Dichlorobenzene	37	Not Detected	220	Not Detected
alpha-Chlorotoluene	37	Not Detected	190	Not Detected
1,2-Dichlorobenzene	37	Not Detected	220	Not Detected
1,2,4-Trichlorobenzene	150	Not Detected	1100	Not Detected
Hexachlorobutadiene	150	Not Detected	1600	Not Detected
trans-1,2-Dichloroethene	37	Not Detected	150	Not Detected
Bromodichloromethane	37	Not Detected	250	Not Detected
Dibromochloromethane	37	Not Detected	320	Not Detected
Dichlorofluoromethane	150	Not Detected	630	Not Detected
Chlorodifluoromethane	150	1400	530	5100

Container Type: 6 Liter Summa Canister

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

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Client Sample ID: Lab Blank

Lab ID#: 1204106-04A

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: Lab Blank

Lab ID#: 1204106-04B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040612d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/6/12 09:06 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	104	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	99	70-130

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1204106-05A

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

eurofins | Air Toxics

Client Sample ID: CCV

Lab ID#: 1204106-05B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/6/12 04:30 PM**	

Compound	%Recovery
Freon 12	99
Freon 114	96
Chloromethane	104
Vinyl Chloride	93
Chloroethane	103
Freon 11	91
1,1-Dichloroethene	90
Freon 113	98
Methylene Chloride	96
1,1-Dichloroethane	96
cis-1,2-Dichloroethene	94
Chloroform	97
1,1,1-Trichloroethane	101
Carbon Tetrachloride	103
1,2-Dichloroethane	104
Trichloroethene	100
1,2-Dichloropropane	101
cis-1,3-Dichloropropene	100
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	100
Tetrachloroethene	103
Chlorobenzene	101
1,1,2,2-Tetrachloroethane	100
1,3-Dichlorobenzene	103
1,4-Dichlorobenzene	98
alpha-Chlorotoluene	102
1,2-Dichlorobenzene	100
1,2,4-Trichlorobenzene	98
Hexachlorobutadiene	101
trans-1,2-Dichloroethene	94
Bromodichloromethane	105
Dibromochloromethane	105
Dichlorofluoromethane	109
Chlorodifluoromethane	111

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130
Toluene-d8	104	70-130
4-Bromofluorobenzene	105	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1204106-06A

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#: 1204106-06AA

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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Client Sample ID: LCS

Lab ID#: 1204106-06B

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040605**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/6/12 05:04 PM**	

Compound	%Recovery
Freon 12	118
Freon 114	113
Chloromethane	126
Vinyl Chloride	111
Chloroethane	110
Freon 11	115
1,1-Dichloroethene	112
Freon 113	118
Methylene Chloride	111
1,1-Dichloroethane	111
cis-1,2-Dichloroethene	111
Chloroform	115
1,1,1-Trichloroethane	119
Carbon Tetrachloride	122
1,2-Dichloroethane	119
Trichloroethene	116
1,2-Dichloropropane	114
cis-1,3-Dichloropropene	115
trans-1,3-Dichloropropene	113
1,1,2-Trichloroethane	110
Tetrachloroethene	110
Chlorobenzene	111
1,1,2,2-Tetrachloroethane	112
1,3-Dichlorobenzene	114
1,4-Dichlorobenzene	107
alpha-Chlorotoluene	113
1,2-Dichlorobenzene	112
1,2,4-Trichlorobenzene	108
Hexachlorobutadiene	109
trans-1,2-Dichloroethene	119
Bromodichloromethane	121
Dibromochloromethane	114
Dichlorofluoromethane	Not Spiked
Chlorodifluoromethane	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	104	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1204106-06BB

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/6/12 05:21 PM**	

Compound	%Recovery
Freon 12	110
Freon 114	107
Chloromethane	118
Vinyl Chloride	106
Chloroethane	103
Freon 11	108
1,1-Dichloroethene	108
Freon 113	109
Methylene Chloride	105
1,1-Dichloroethane	106
cis-1,2-Dichloroethene	105
Chloroform	109
1,1,1-Trichloroethane	115
Carbon Tetrachloride	120
1,2-Dichloroethane	119
Trichloroethene	114
1,2-Dichloropropane	112
cis-1,3-Dichloropropene	111
trans-1,3-Dichloropropene	114
1,1,2-Trichloroethane	113
Tetrachloroethene	112
Chlorobenzene	113
1,1,2,2-Tetrachloroethane	115
1,3-Dichlorobenzene	116
1,4-Dichlorobenzene	109
alpha-Chlorotoluene	113
1,2-Dichlorobenzene	114
1,2,4-Trichlorobenzene	114
Hexachlorobutadiene	112
trans-1,2-Dichloroethene	115
Bromodichloromethane	116
Dibromochloromethane	115
Dichlorofluoromethane	Not Spiked
Chlorodifluoromethane	Not Spiked

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	105	70-130
4-Bromofluorobenzene	104	70-130

April 11, 2012

Mike Brack
DERENZO & ASSOCIATES, INC.
39395 Schoolcraft Road
Livonia, MI 48150-

Bureau Veritas Work Order No. 12040175

Reference: 1201047

Dear Mike Brack:

Bureau Veritas North America, Inc. received 4 samples on April 03, 2012 for the analyses presented in the following report.

Enclosed is a copy of the Chain-of-Custody record, acknowledging receipt of these samples. Please note that any unused portion of the samples will be discarded 30 days after the date of this report, unless you have requested otherwise.

This material is confidential and is intended solely for the person to whom it is addressed. If this is received in error, please contact the number provided below.

We appreciate the opportunity to assist you. If you have any questions concerning this report, please contact a Client Services Representative at (800) 806-5887.

Sincerely,

Scott Caillouette

Client Services Representative
Electronic signature authorized through password protection

Bureau Veritas North America, Inc.
Health, Safety, and Environmental Services
22345 Roethel Drive
Novi, MI 48375

Main: (248) 344.1770
Fax: (248) 344.2655
www.us.bureauveritas.com

CASE NARRATIVE

Date: *11-Apr-12*

CLIENT: DERENZO & ASSOCIATES, INC.

Project: 1201047

Work Order No 12040175

The results of this report relate only to the samples listed in the body of this report.

Unless otherwise noted below, the following statements apply: 1) all samples were received in acceptable condition, 2) all quality control results associated with this sample set were within acceptable limits and/or do not adversely affect the reported results, and 3) the industrial hygiene results have not been blank corrected.

ANALYTICAL RESULTS

Date: *11-Apr-12*

Client: DERENZO & ASSOCIATES, INC.

Work Order No: 12040175

Project: 1201047

Client Sample ID: BEH-1 CONT#3

Matrix: AIR

Lab ID: 12040175-001A

Collection Date: 3/23/2012

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
EPA 26							
Hydrochloric Acid	2,400	470		µg	1	4/9/2012	RAS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).

J - Analyte detected below the Reporting Limit

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

T - Tentatively Identified Compound (TIC)

ANALYTICAL RESULTS

Date: *11-Apr-12*

Client: DERENZO & ASSOCIATES, INC.

Work Order No: 12040175

Project: 1201047

Client Sample ID: BEH-2 CONT#3

Matrix: AIR

Lab ID: 12040175-002A

Collection Date: 3/23/2012

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
EPA 26							
Hydrochloric Acid	2,300	470		µg	1	4/9/2012	RAS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).

J - Analyte detected below the Reporting Limit

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

T - Tentatively Identified Compound (TIC)

ANALYTICAL RESULTS

Date: *11-Apr-12*

Client: DERENZO & ASSOCIATES, INC.

Work Order No: 12040175

Project: 1201047

Client Sample ID: BEH-3 CONT#3

Matrix: AIR

Lab ID: 12040175-003A

Collection Date: 3/23/2012

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
EPA 26							
Hydrochloric Acid	2,300	470		µg	1	4/9/2012	RAS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).

J - Analyte detected below the Reporting Limit

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

T - Tentatively Identified Compound (TIC)

ANALYTICAL RESULTS

Date: *11-Apr-12*

Client: DERENZO & ASSOCIATES, INC.

Work Order No: 12040175

Project: 1201047

Client Sample ID: BEH-4 CONT#6

Matrix: AIR

Lab ID: 12040175-004A

Collection Date: 3/23/2012

Analyses	Result	Reporting Limit	Qual	Units	DF	Date Analyzed	Analyst
EPA 26							
Hydrochloric Acid	ND	470		µg	1	4/9/2012	RAS

Qualifiers:

ND - Not Detected at the Reporting Limit (RL).

J - Analyte detected below the Reporting Limit

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

T - Tentatively Identified Compound (TIC)

REQUEST FOR LABORATORY ANALYTICAL SERVICES

Bureau Veritas North America, Inc.

Detroit Lab	Atlanta Lab	Chicago Lab
22345 Roethel Drive	3380 Chastain Meadows Pky., Suite 300	95 Oakwood Road
Novi, MI 48375	Kennesaw, GA 30144	Lake Zurich, IL 60047
(800) 806-5837	(800) 252-9919	(888) 576-7522
(248) 344-1770	(770) 499-7500	(847) 726-3320
FAX (248) 344-2855	FAX (770) 499-7511	FAX (847) 726-3323

RUSH ANALYSIS
CONTACT LAB IN ADVANCE
Need Results by: Normal TAT
Charges Authorized? ☐ Yes ☒ No
(If yes, Initial here) _____
☑ Email Results MBRACK@DGLGRP.COM ☐ Fax

For Bureau Veritas Use Only
Bureau Veritas Lab Project No.: 1204075

REPORT RESULTS TO
Name: MIKE BRACK
Company: DEGENZO & ASSOCIATES
Mailing Address: 39395 SCHOOLCRAFT
City, State, Zip: LIVONIA MI 48150
Telephone No.: 734 464 3880 FAX No.: 734 464 4368
Client Job No.: 1201047
Dept.:

BILLING/INVOICE INFORMATION
☑ PO #: 1506 ☐ Call for Credit Card Information ☐ Direct Bill
Name: DONNA FOVICH
Company: DEGENZO & ASSOCIATES
Address: 39395 SCHOOLCRAFT
City, State, Zip: LIVONIA, MI 48150

Special instructions and/or specific regulatory requirements: (method, limit of detection, etc.)
USCPA METHOD 26A
INITIAL VOLUME 200 ML

* Explanation of Preservative

Soils: Which state are these from? _____

Waters: ☐ Drinking Water ☐ Groundwater ☐ Wastewater

ANALYSIS REQUESTED
(Enter an 'X' in the box below to indicate request. Enter a 'P' if Preservative added.)

CLIENT SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	MATRIX/ MEDIA	AIR VOLUME (specify units)	Number of Containers	HCL										FOR LAB USE ONLY
BGH-1 CONT #3	3/23/12		AIR #1504		1	X										
BEH-2 CONT #3	"		"		1	X										
BGH-3 CONT #3	"		"		1	X										
BGH-4 CONT #6	"		"		1	X										

CHAIN OF CUSTODY

Collected by: Michael Brack (print) — Collector's Signature: [signature]
Relinquished by: Michael Brack — Date/Time: 4/3/12 1200
Relinquished by: — Date/Time:
Method of Shipment:
Authorized by: [signature] Date
(Client Signature MUST Accompany Request)

Received by: [signature] — Date/Time: 330
Received by: [signature] — Date/Time: 4-3-12
Received at Lab by: [signature] — Date/Time: 4/3 419
Sample Condition Upon Receipt: ☑ Acceptable ☐ Other (explain)

Page 1 of 1

Columbia Analytical Services
Now part of the ALS Group
2655 Park Center Drive, Suite A, Simi Valley, CA 93065 | 805.526.7161 | www.caslab.com

LABORATORY REPORT

April 10, 2012

Mike Brack
Derenzo and Associates, Inc.
39395 Schoolcraft Rd.
Livonia, MI 48150

RE: Brevard Energy / 1201047

Dear Mike:

Enclosed are the results of the samples submitted to our laboratory on March 27, 2012. For your reference, these analyses have been assigned our service request number P1201174.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.caslab.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

Columbia Analytical Services, Inc. is certified by the California Department of Health Services, NELAP Laboratory Certificate No. 02115CA; Arizona Department of Health Services, Certificate No. AZ0694; Florida Department of Health, NELAP Certification E871020; New Jersey Department of Environmental Protection, NELAP Laboratory Certification ID #CA009; New York State Department of Health, NELAP NY Lab ID No: 11221; Oregon Environmental Laboratory Accreditation Program, NELAP ID: CA20007; The American Industrial Hygiene Association, Laboratory #101661; United States Department of Defense Environmental Laboratory Accreditation Program (DoD-ELAP), Certificate No. L11-203; Pennsylvania Registration No. 68-03307; TX Commission of Environmental Quality, NELAP ID T104704413-11-2; Minnesota Department of Health, NELAP Certificate No. 362188; Washington State Department of Ecology, ELAP Lab ID: C946, State of Utah Department of Health, NELAP Certificate No. CA015272011-1; Los Angeles Department of Building and Safety, Approval No: TA00001. Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact me for information corresponding to a particular certification.

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

Respectfully submitted,

Columbia Analytical Services, Inc.

Sue Anderson
Project Manager

Client: Derenzo and Associates, Inc. CAS Project No: P1201174
Project: Brevard Energy / 1201047

CASE NARRATIVE

The samples were received intact under chain of custody on March 27, 2012 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

BTU and CHONS Analysis

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

C2 through C6 Hydrocarbon Analysis

The samples were analyzed according to modified EPA Method TO-3 for C2 through >C6 hydrocarbons using a gas chromatograph equipped with a flame ionization detector (FID).

Fixed Gases Analysis

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

Hydrogen Sulfide Analysis

The samples were also analyzed for hydrogen sulfide per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD).

Sulfur Analysis

The samples were also analyzed for twenty sulfur compounds per ASTM D 5504-08 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan.

DETAIL SUMMARY REPORT

Client: Derenzo and Associates, Inc.
Project ID: Brevard Energy / 1201047
Service Request: P1201174

Date Received: 3/27/2012
Time Received: 09:35

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	TO-3 Modified - C1C6+ Bag	3C Modified - Fxd Gases Bag	ASTM D5504-01 - H2S Bag	ASTM D5504-01 - Sulfur Bag
BEB-1	P1201174-001	Air	3/26/2012	11:52	X	X	X	X
BEB-2	P1201174-002	Air	3/26/2012	14:14	X	X	X	X
BEB-3	P1201174-003	Air	3/26/2012	16:20	X	X	X	X

Air - Chain of Custody Record & Analytical Service Request

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

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

CAS Project No. P120174

Company Name & Address (Reporting Information)
Derenzo & Assoc.
39395 Schoolcraft Rd.
Livonia, MI 48150

Project Name: Brevard Energy

Project Number: 1201047

Project Manager: Michael Brack

P.O. # / Billing Information: FLD-16

Phone: 734-464-3880 Fax: 734-464-4368

Email Address for Result Reporting: mbrack@derenzo.com

Sampler (Print & Sign): Dan Wilson

CAS Contact

Analysis Method and/or Analytes

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Sample Type (Air/Tube/Solid)	Canister ID (Bar Code # - AC, SC, etc.)	Flow Controller (Bar Code - FC #)	Sample Volume	ASTM D-5504 (Sulfur)	ASTM D3588-98 (Btu/Ultimate)			Comments e.g. Actual Preservative or specific instructions
BEB-1	1	3/26/12	11:52	Air	—	—	0.75 L	X	X			Condi'l Gas
BEB-2	2	"	14:14	"	—	—	"	X	X			" "
BEB-3	3	"	16:20	"	—	—	"	X	X			" "
			All times EASTERN									

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

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 3/26/12	Time:	Received by: (Signature)	Date: 3/27/12	Time: 0815
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank

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Sample Acceptance Check Form

Client: Derenzo and Associates, Inc. Work order: P1201174

Project: Brevard Energy / 1201047

Sample(s) received on: 3/27/12 Date opened: 3/27/12 by: MZAMORA

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

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

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1201174-001.01	1.0 L Tedlar Bag					
P1201174-002.01	1.0 L Tedlar Bag					
P1201174-003.01	1.0 L Tedlar Bag					

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

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-1**
Client Project ID: **Brevard Energy / 1201047**

CAS Project ID: P1201174
CAS Sample ID: P1201174-001

Test Code: ASTM D3588-98
Analyst: Wade Henton
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/26/12
Date Received: 3/27/12

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.11**	< 0.01	
Oxygen + Argon	**0.91**	**1.03**	
Nitrogen	**9.90**	**9.87**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.74**	**28.97**	
Carbon Dioxide	**38.29**	**59.99**	
Hydrogen Sulfide	**0.02**	**0.02**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.81**	**38.14**
Hydrogen	**52.08**	**7.31**
Oxygen + Argon	**20.05**	**44.66**
Nitrogen	**5.06**	**9.87**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9698**
Specific Volume	ft3/lb	**13.51**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**515.9**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**464.5**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**505.5**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**455.1**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,970.1**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,276.1**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9971**

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-2** CAS Project ID: P1201174
Client Project ID: **Brevard Energy / 1201047** CAS Sample ID: P1201174-002

Test Code: ASTM D3588-98
Analyst: Wade Henton Date Collected: 3/26/12
Sampling Media: 1.0 L Tedlar Bag Date Received: 3/27/12
Test Notes:

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.12**	< 0.01	
Oxygen + Argon	**1.04**	**1.18**	
Nitrogen	**10.33**	**10.31**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.47**	**28.83**	
Carbon Dioxide	**37.98**	**59.54**	
Hydrogen Sulfide	**0.02**	**0.03**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.73**	**37.92**
Hydrogen	**51.96**	**7.27**
Oxygen + Argon	**20.01**	**44.48**
Nitrogen	**5.30**	**10.31**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9694**
Specific Volume	ft3/lb	**13.52**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**513.2**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**462.1**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**502.8**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**452.8**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,936.8**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,246.1**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9972**

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-3** CAS Project ID: P1201174
Client Project ID: **Brevard Energy / 1201047** CAS Sample ID: P1201174-003

Test Code: ASTM D3588-98
Analyst: Wade Henton Date Collected: 3/26/12
Sampling Media: 1.0 L Tedlar Bag Date Received: 3/27/12
Test Notes:

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.12**	< 0.01	
Oxygen + Argon	**1.16**	**1.32**	
Nitrogen	**10.77**	**10.73**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.10**	**28.60**	
Carbon Dioxide	**37.80**	**59.21**	
Hydrogen Sulfide	**0.02**	**0.03**	
Ethane	< 0.01	< 0.01	
Propane	< 0.01	< 0.01	
Butanes	< 0.01	< 0.01	
Pentanes	< 0.01	< 0.01	
Hexanes	< 0.01	< 0.01	
> Hexanes	**0.02**	**0.08**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.66**	**37.65**
Hydrogen	**51.75**	**7.22**
Oxygen + Argon	**20.05**	**44.37**
Nitrogen	**5.54**	**10.74**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9701**
Specific Volume	ft3/lb	**13.51**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**509.5**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**458.8**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**499.2**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**449.5**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,881.4**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,196.3**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9972**

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-1**
Client Project ID: **Brevard Energy / 1201047**

CAS Project ID: P1201174
CAS Sample ID: P1201174-001

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Lauryn Keeler
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/26/12
Time Collected: 11:52
Date Received: 3/27/12
Date Analyzed: 3/27/12
Time Analyzed: 11:18
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**260,000**	70	**190,000**	50	
463-58-1	Carbonyl Sulfide	**690**	120	**280**	50	
74-93-1	Methyl Mercaptan	**12,000**	98	**5,900**	50	
75-08-1	Ethyl Mercaptan	**550**	130	**220**	50	
75-18-3	Dimethyl Sulfide	**20,000**	130	**7,900**	50	
75-15-0	Carbon Disulfide	**140**	78	**46**	25	
75-33-2	Isopropyl Mercaptan	**2,500**	160	**810**	50	
75-66-1	tert-Butyl Mercaptan	**620**	180	**170**	50	
107-03-9	n-Propyl Mercaptan	**350**	160	**110**	50	
624-89-5	Ethyl Methyl Sulfide	ND	160	ND	50	
110-02-1	Thiophene	**3,300**	170	**950**	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	ND	96	ND	25	
616-44-4	3-Methylthiophene	**270**	200	**68**	50	
110-01-0	Tetrahydrothiophene	**180**	180	**51**	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	**280**	230	**61**	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

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

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-2**
Client Project ID: **Brevard Energy / 1201047**

CAS Project ID: P1201174
CAS Sample ID: P1201174-002

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Lauryn Keeler
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/26/12
Time Collected: 14:14
Date Received: 3/27/12
Date Analyzed: 3/27/12
Time Analyzed: 11:38
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**290,000**	70	**210,000**	50	
463-58-1	Carbonyl Sulfide	**740**	120	**300**	50	
74-93-1	Methyl Mercaptan	**12,000**	98	**6,200**	50	
75-08-1	Ethyl Mercaptan	**560**	130	**220**	50	
75-18-3	Dimethyl Sulfide	**21,000**	130	**8,300**	50	
75-15-0	Carbon Disulfide	**160**	78	**51**	25	
75-33-2	Isopropyl Mercaptan	**2,700**	160	**860**	50	
75-66-1	tert-Butyl Mercaptan	**610**	180	**170**	50	
107-03-9	n-Propyl Mercaptan	**370**	160	**120**	50	
624-89-5	Ethyl Methyl Sulfide	ND	160	ND	50	
110-02-1	Thiophene	**3,300**	170	**970**	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	ND	96	ND	25	
616-44-4	3-Methylthiophene	**320**	200	**79**	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	ND	230	ND	50	
872-55-9	2-Ethylthiophene	**350**	230	**76**	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

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

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **BEB-3**
Client Project ID: **Brevard Energy / 1201047**

CAS Project ID: P1201174
CAS Sample ID: P1201174-003

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Lauryn Keeler
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/26/12
Time Collected: 16:20
Date Received: 3/27/12
Date Analyzed: 3/27/12
Time Analyzed: 11:59
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**290,000**	70	**210,000**	50	
463-58-1	Carbonyl Sulfide	**780**	120	**320**	50	
74-93-1	Methyl Mercaptan	**13,000**	98	**6,400**	50	
75-08-1	Ethyl Mercaptan	**590**	130	**230**	50	
75-18-3	Dimethyl Sulfide	**22,000**	130	**8,600**	50	
75-15-0	Carbon Disulfide	**120**	78	**38**	25	
75-33-2	Isopropyl Mercaptan	**2,800**	160	**900**	50	
75-66-1	tert-Butyl Mercaptan	**700**	180	**190**	50	
107-03-9	n-Propyl Mercaptan	**430**	160	**140**	50	
624-89-5	Ethyl Methyl Sulfide	ND	160	ND	50	
110-02-1	Thiophene	**3,300**	170	**970**	50	
513-44-0	Isobutyl Mercaptan	ND	180	ND	50	
352-93-2	Diethyl Sulfide	ND	180	ND	50	
109-79-5	n-Butyl Mercaptan	ND	180	ND	50	
624-92-0	Dimethyl Disulfide	ND	96	ND	25	
616-44-4	3-Methylthiophene	**340**	200	**84**	50	
110-01-0	Tetrahydrothiophene	ND	180	ND	50	
638-02-8	2,5-Dimethylthiophene	**260**	230	**57**	50	
872-55-9	2-Ethylthiophene	**350**	230	**77**	50	
110-81-6	Diethyl Disulfide	ND	120	ND	25	

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

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RESULTS OF ANALYSIS

Client: **Derenzo and Associates, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Brevard Energy / 1201047**

CAS Project ID: P1201174
CAS Sample ID: P120327-MB

Test Code: ASTM D 5504-08
Instrument ID: Agilent 7890A/GC22/SCD
Analyst: Lauryn Keeler
Sampling Media: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 3/27/12
Time Analyzed: 09:05
Volume(s) Analyzed: 1.0 ml(s)

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

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

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):

$$Qstd = Q \frac{(Tstd)(Ps)}{(Ts)(Pstd)}$$

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/0.96) * bHp/0.7457kW

Equation 7a – Hydrogen Chloride Concentration: (gr/dscf)

HClC (gr/dscf) = (mg*0.01543)/Vm

Equation 7b – Hydrogen Chloride Emission Rate: (lb/hr)

HClER (lb/hr) = HClC*0.00858*Qstd

Equation 7c – Hydrogen Chloride Emission Rate: (lb/MMscf)

HClER (lb/MMscf) = HClER(lb/hr) / MMscf/hr fuel consumption

Equation 8a – Sulfur Dioxide Emission Rate: (lb/MMscf)

TRS (ppm) * Molecular Weight SO_2 / 385.3

Equation 8b – Sulfur Dioxide Emission Rate: (lb/hr)

(lb/MMscf/1000000) * Fc * HIR

Equation 8c – Fuel Specific F Factor (Fc) : (scf/MMBtu)

%C/wt * 1000000 * 0.321 * GCV

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 (unit less)
Fc	=	Fuel specific F Factor (scf/MMBtu)
GCV	=	Gross Calorific Value
HIR	=	Heat Input Rate (MMBtu/hr)
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)
Scf/MMBtu	=	standard cubic feet per million British thermal unit
Tm	=	Absolute temperature at meter (^oR)
TRS (ppm)	=	Total Reduced Sulfur – parts per million
Ts	=	Absolute temperature of duct gas (^oR)
Tstd	=	Standard temperature (528^oR)

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 (unit less)
%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)
%C/wt	=	Percent Carbon by weight
ΔH	=	Pressure drop across orifice ("H2O)
ΔP	=	Pressure drop across pitot tube ("H2O)

APPENDIX E

PROCESS OPERATING DATA

Brevard Energy 3/26/12

Time	Gen kW	Gen Fuel Flow	Plant Fuel Flow	Plant kW
10:55	1617	600	3280	9280
11:10	1605	594	3309	9356
11:25	1616	587	3334	9287
11:40	1673	610	3312	9314
11:55	1651	612	3340	9384
Average	1632.4	600.6	3315	9324.2
1:15	1665	596	3338	9433
1:30	1660	600	3333	9454
1:45	1648	595	3336	9335
2:00	1639	603	3348	9427
2:15	1637	607	3325	9374
Average	1649.8	600.2	3336	9404.6
3:22	1622	597	3328	9298
3:37	1657	605	3339	9345
3:52	1641	601	3300	9322
4:07	1670	608	3318	9319
4:22	1630	598	3311	9380
Average	1644	601.8	3319.2	9332.8

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, Alt 078 and 26A was configured as described below.

Sample probe - Stainless steel single opening probe located at predetermined sampling locations within the exhaust stack cross-section.

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.

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 - A thermo-electric 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 is considered acceptable

3.0 Isokinetic Sampling System and Procedures for HCl

Hydrogen chloride concentrations and emission rates are determined by isokinetically drawing stack gas from the source through a filter and a 0.1 Normality of Sulfuric acid (0.1 N H_2SO_4) absorbing solution. The filter collects particulate matter including halide salts but is not routinely recovered or analyzed. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively.

A preliminary traverse of the duct was performed to determine duct velocity head and temperature distributions, as well as duct static pressure. Preliminary Method 3 and 4 runs were performed to determine duct moisture and fixed gas content. Based on this information, a sample nozzle of appropriate inside diameter was selected, and the impinger train charged as described below. Traverse points were marked on the probe. Sample time per traverse point was calculated based on the total anticipated sampling time.

A "goose-neck" nozzle constructed of borosilicate glass was connected via stainless steel Swagelok® fitting to a borosilicate glass probe liner within a stainless steel probe. Attached to the sample probe was a Stausscheibe (Type S) pitot tube and type K thermocouple which was used to measure duct velocity head pressure and temperature. The probe liner was attached to a glass filter holder containing a quartz filter. The back half of the filter holder was connected via connecting glassware, with temperature monitoring probe, to the impinger train.

The impinger train consisted of a set of 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. The train was constructed and charged as follows:

standard Greenberg-Smith (G-S) impinger containing 100 ml of 0.1 N H_2SO_4;
standard G-S impinger containing 100 ml of 0.1 N H_2SO_4;
modified G-S impinger empty;
modified G-S impinger containing approximately 200 - 300 grams of pre-dried silica gel and glass fiber.

The 0.1 N NaOH impingers required by USEPA Method 26A were replaced with an empty knockout impinger, as chloride concentrations are not required for this compliance emissions testing event.

The sampling train was followed in series by an umbilical line, dry gas meter and calibrated orifice connected to an inclined manometer. Type-K thermocouples were used to measure the stack, impinger outlet, and dry gas meter inlet and outlet temperatures. A carbon vane pump was used to provide the necessary vacuum for the sampling train.

The sample train was assembled as completely as possible in the staging area and transported to the sampling site. Openings were sealed with aluminum foil to prevent potential contamination of the

sample train prior to final assembly. Once in the sampling area, each train was assembled and each apparatus was leak checked. Upon successful completion of the leak check, the initial dry gas meter reading was recorded. The engine exhaust sampling locations were selected based on the availability of straight duct, which meet the requirements of USEPA Method 1.

Prior to performing the HCl sampling, preliminary flowrate measurements were obtained for the proper operation of the metering console. The preliminary traverse velocity pressure values were used during the isokinetic testing rather than concurrent measurements of the velocity pressures. This approach was necessary to eliminate high biased flow rate measurements encountered when concurrent measurements are conducted. The high bias is caused by the high static pressure encountered at the sampling locations within the ductwork because of the close proximity to the muffler.

The dry gas meter temperatures were recorded on the data sheets. The isokinetic-sampling rate in terms of pressure drop across the calibrated orifice were calculated and recorded on the data sheets. The pump and timer was turned on, and the sample rate adjusted to correspond to the calculated isokinetic rate.

Once the sample rate is set, the following data was recorded:

- Dry gas meter inlet and outlet temperatures
- Sample vacuum
- Probe temperature
- Impinger outlet temperature
- Filter holder outlet temperature
- Orifice differential pressure
- Sample volume (dry gas meter readings)

At the end of the sample time for the first point, the probe was moved to the next point; sampling and recording of data was repeated. Upon completion of sampling (each traverse), the probe, and nozzle was removed from the port. The sampling train assembly was placed into the next traverse port and the previously described sampling procedures were repeated.

When the sample run was complete, the final, dry gas meter reading was recorded. The probe and filter assembly were removed from the sampling port and allowed to cool. A post-test leak check was performed on the sampling train at a vacuum at least as great as that of the highest sample vacuum measured during each sample run. The final leak rate was recorded on the data sheets. The sample train was sealed from contamination and transported to the staging area for recovery.

Recovery consisted of the measurement of the liquid in the acid impingers to +1 ml by using a graduated cylinder or by weighing it to +0.5 g by using a balance. The impinger contents were quantitatively transferred to a leak-free sample storage container. A rinse of the impingers and connecting glassware including the back portion of the filter holder (and flexible tubing, if used) was conducted with water and was added to the storage container. The container was sealed, shaken to mix, and labeled. The fluid level was marked so that if any sample is lost during transport, a correction proportional to the lost volume can be applied.

The Alkaline impinger (or empty knockout impinger) catch was measured and recorded for the determination of the stack gas moisture content.

APPENDIX G

RAW INSTRUMENTAL ANALYZER RESPONSE DATA

Brevard Energy - March 23, 2012 CEM Data

Date	Hour	O2	Hour	O2
3/23/2012	13:05	0.01	13:48	20.48
3/23/2012	13:06	0.01	13:49	20.98
3/23/2012	13:07	0.01	13:50	21.09
3/23/2012	13:08	0.01	13:51	21.12
3/23/2012	13:09	10.96	13:52	21.12
3/23/2012	13:10	20.55	13:53	14.5
3/23/2012	13:11	20.97	13:54	12.76
3/23/2012	13:12	21.07	13:55	12.64
3/23/2012	13:13	14.84	13:56	12.61
3/23/2012	13:14	12.75	13:57	12.6
3/23/2012	13:15	12.63	13:58	12.37
3/23/2012	13:16	12.6	13:59	8.75
3/23/2012	13:17	12.59	14:00	8.44
3/23/2012	13:18	11.97	14:01	8.4
3/23/2012	13:19	8.61	14:02	8.38
3/23/2012	13:20	8.42	14:03	4.78
3/23/2012	13:21	8.4	14:04	0.34
3/23/2012	13:22	8.39	14:05	0.04
3/23/2012	13:23	8.38	14:06	0.01
3/23/2012	13:24	8.39	14:07	5.71
3/23/2012	13:25	3	14:08	12.28
3/23/2012	13:26	0.25	14:09	12.56
3/23/2012	13:27	0.01	14:10	11.43
3/23/2012	13:28	2.78	14:11	0.94
3/23/2012	13:29	19.93	14:12	0.2
3/23/2012	13:30	20.89	14:13	0.01
3/23/2012	13:31	21.06	14:14	0.01
3/23/2012	13:32	21.11	14:15	0.05
3/23/2012	13:33	18.41	14:16	10.4
3/23/2012	13:34	12.92	14:17	12.44
3/23/2012	13:35	12.68	14:18	12.61
3/23/2012	13:36	12.62	14:19	11.66
3/23/2012	13:37	12.61	14:20	1.03
3/23/2012	13:38	10.6	14:21	0.21
3/23/2012	13:39	8.51	14:22	0.01
3/23/2012	13:40	8.42	14:23	0.04
3/23/2012	13:41	8.4	14:24	10.29
3/23/2012	13:42	8.39	14:25	12.45
3/23/2012	13:43	2.21	14:26	12.62
3/23/2012	13:44	0.21	14:27	10.5
3/23/2012	13:45	0.01	14:28	0.72
3/23/2012	13:46	0.01	14:29	0.18
3/23/2012	13:47	8.4	14:30	0.01

Test ID	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
1	1055-1155	33.48	69.86	7.92	62.22	641.78	11.40	7.73
2	1315-1415	33.64	70.55	9.06	61.79	643.11	11.62	7.73
3	1522-1622	33.75	78.00	11.03	68.39	652.08	11.59	7.70

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	7:30	6.34	0.09	0.37	0.48	52.67	0.17	0.33
3/26/2012	7:31	0.02	0.07	0.36	0.45	52.55	0.17	0.05
3/26/2012	7:32	0.02	0.06	0.36	0.45	52.75	0.17	0.01
3/26/2012	7:33	0.02	0.05	0.35	0.45	52.76	0.17	0.08
3/26/2012	7:34	0.02	0.21	0.36	0.45	52.98	0.17	17.24
3/26/2012	7:35	0.01	0.05	0.35	0.44	52.77	0.17	20.58
3/26/2012	7:36	0.01	0.05	0.36	0.45	52.92	0.17	20.83
3/26/2012	7:37	0.01	0.06	0.35	0.45	21.91	0.07	20.95
3/26/2012	7:38	0.01	0.06	0.35	0.45	0.32	0	21.01
3/26/2012	7:39	0.01	0.06	0.36	0.46	0.39	0	21.02
3/26/2012	7:40	0.01	0.07	0.36	0.46	0.28	0	21.02
3/26/2012	7:41	0.01	0.06	0.35	0.45	0.38	0	21.03
3/26/2012	7:42	0.01	0.05	0.36	0.45	0.3	0	21.03
3/26/2012	7:43	0.01	0.06	0.35	0.46	0.36	0	21.03
3/26/2012	7:44	0.01	0.06	0.36	0.45	0.31	0	16.5
3/26/2012	7:45	0.01	0.06	0.35	0.45	0.23	0	8.76
3/26/2012	7:46	0.01	0.06	0.35	0.46	0.33	0	8.44
3/26/2012	7:47	0.01	0.06	0.35	0.45	0.22	0	8.36
3/26/2012	7:48	0.01	0.06	0.35	0.45	0.33	0	8.34
3/26/2012	7:49	0.01	0.06	0.35	0.45	1.1	9.17	6.15
3/26/2012	7:50	0.02	0.23	0.36	0.45	3.56	25.99	0.45
3/26/2012	7:51	0.02	0.07	0.36	0.46	3.23	23.24	0.09
3/26/2012	7:52	0.02	0.06	0.36	0.46	3.65	22.86	0.01
3/26/2012	7:53	0.02	0.07	0.36	0.45	3.94	22.87	0.01
3/26/2012	7:54	0.01	0.06	0.36	0.45	2.06	19.62	0.01
3/26/2012	7:55	0.01	0.04	0.35	0.44	0.35	13.7	0.01
3/26/2012	7:56	0.01	0.04	0.35	0.44	0.25	13.67	0.01
3/26/2012	7:57	0.01	0.05	0.35	0.44	0.34	13.66	0.01
3/26/2012	7:58	0.01	0.13	0.35	0.44	807.82	4.22	0.06
3/26/2012	7:59	0.01	0.03	0.35	0.43	979.89	0.21	0.01
3/26/2012	8:00	0.01	0.03	0.34	0.44	980.23	0.17	0.01
3/26/2012	8:01	0.01	0.04	0.34	0.44	883.58	0.15	0.01
3/26/2012	8:02	0.01	0.04	0.34	0.44	783.18	0.13	0.01
3/26/2012	8:03	0.01	0.03	0.34	0.44	782.61	0.11	0.01
3/26/2012	8:04	0.01	0.12	0.34	0.31	716	0.1	0.02
3/26/2012	8:05	0.01	44.75	39.28	5.7	20.57	0.08	0.07
3/26/2012	8:06	0.01	188.81	179.27	9.57	0.55	0.07	0.01
3/26/2012	8:07	0.01	190.93	186.42	4.68	0.27	0.06	0.01
3/26/2012	8:08	0.01	195.79	193.32	2.53	0.25	0.06	0.01
3/26/2012	8:09	0.01	199.02	198.09	1.07	0.31	0.05	0.01
3/26/2012	8:10	0.01	198.89	198.09	0.93	0.18	0.04	0.01
3/26/2012	8:11	0.01	148.33	158.06	0.68	0.27	0.04	0.01
3/26/2012	8:12	0.01	78.89	77.79	1.39	0.22	0.04	0.01
3/26/2012	8:13	0.01	78.46	77.43	1.23	0.26	0.03	0.01
3/26/2012	8:14	0.01	78.17	77.43	0.92	0.26	0.03	0.01
3/26/2012	8:15	0.01	78.37	76.76	1.8	0.23	0.03	0.01
3/26/2012	8:16	0.01	16.47	21.76	-1.29	0.26	0.03	0.01
3/26/2012	8:17	0.01	0.83	0.83	0.43	0.19	0.02	0.01
3/26/2012	8:18	0.01	0.53	0.39	0.43	0.29	0.02	0.01
3/26/2012	8:19	0.01	0.53	0.34	0.43	0.17	0.02	0.01
3/26/2012	8:20	0.01	0.53	0.34	0.43	0.28	0.02	0.01
3/26/2012	8:21	0.01	0.53	0.34	0.43	0.17	0.02	0.01
3/26/2012	8:22	0.01	0.53	0.34	0.44	0.25	0.01	0.01
3/26/2012	8:23	0.01	0.53	0.34	0.1	0.26	0.01	0.18
3/26/2012	8:24	0.01	23.24	1.68	21.59	0.2	0.01	0.31
3/26/2012	8:25	0.01	49.24	2.35	47.06	0.3	0.01	0.29

3/26/2012	8:26	0.01	50.17	2.35	47.89	0.17	0.01	0.29
3/26/2012	8:27	0.01	50.62	2.34	48.48	0.31	0.01	0.29
3/26/2012	8:28	0.01	50.75	2.35	48.72	0.2	0.01	0.29
3/26/2012	8:29	0.01	51.12	2.34	49.01	0.25	0.01	0.29

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	8:30	0.01	51.12	2.35	49.02	0.2	0.01	0.29
3/26/2012	8:31	0.01	51.12	2.35	49.48	0.22	0.01	0.29
3/26/2012	8:32	0.01	51.12	2.35	49.52	0.25	0.01	0.29
3/26/2012	8:33	0.01	51.41	2.35	49.52	0.2	0.01	0.29
3/26/2012	8:34	0.01	51.62	2.14	49.52	0.27	0.01	0.29
3/26/2012	8:35	0.01	51.61	1.85	49.52	0.15	0.01	0.29
3/26/2012	8:36	0.01	51.62	1.85	49.81	0.32	0.01	0.29
3/26/2012	8:37	0.01	51.61	1.84	50.02	0.2	0.01	0.3
3/26/2012	8:38	0.01	44.61	2.3	42.55	0.29	0.01	0.06
3/26/2012	8:39	0.01	1.75	0.76	1.23	0.27	0.01	0.01
3/26/2012	8:40	0.01	1.03	0.35	0.8	0.23	0.01	0.01
3/26/2012	8:41	0.01	0.74	0.35	0.44	0.26	0.01	0.01
3/26/2012	8:42	0.01	0.54	0.35	0.44	0.21	0.01	0.01
3/26/2012	8:43	0.01	0.54	0.34	0.44	0.29	0.01	0.01
3/26/2012	8:44	0.01	0.53	0.34	0.44	0.19	0.01	0.01
3/26/2012	8:45	0.01	30.07	18.55	11.76	0.24	0.01	0.01
3/26/2012	8:46	0	78.52	73.18	5.47	0.21	0.01	0.01
3/26/2012	8:47	0.01	78.79	76.82	2.26	0.26	0.01	0.01
3/26/2012	8:48	0.01	67.75	72.35	-1.11	25.06	0.07	6.08
3/26/2012	8:49	3.84	9.55	5.63	4.64	0.24	0.01	0.44
3/26/2012	8:50	6.23	1.65	1.13	0.72	0.26	0.01	0.13
3/26/2012	8:51	1.08	1.07	0.84	0.44	0.19	0.01	0.01
3/26/2012	8:52	0.57	1.6	1.44	0.4	0.27	0.01	0.01
3/26/2012	8:53	0.41	1.3	1.15	0.38	0.17	0.01	0.01
3/26/2012	8:54	0.41	1.02	0.84	0.43	0.24	0.01	0.01
3/26/2012	8:55	0.41	1.02	0.83	0.43	0.23	0.01	0.01
3/26/2012	8:56	0.24	0.97	0.84	0.43	0.22	0.01	0.01
3/26/2012	8:57	0.21	0.82	0.83	0.43	0.24	0.01	0.01
3/26/2012	8:58	0.21	0.64	0.84	0.43	0.22	0.01	0.01
3/26/2012	8:59	0.12	0.52	0.62	0.43	0.27	0.01	0.01
3/26/2012	9:00	0.01	13.47	7.94	6.76	0.18	0.01	0.01
3/26/2012	9:01	0.15	75.12	71.13	4.03	0.31	0.01	0.01
3/26/2012	9:02	0.21	77.26	76.94	0.63	0.2	0.01	0.01
3/26/2012	9:03	0.2	77.16	77.01	0.44	0.27	0.01	0.01
3/26/2012	9:04	0.21	77.16	77.1	0.44	0.21	0.01	0.01
3/26/2012	9:05	0.21	69.43	72.62	-1.22	583.42	0.01	0.01
3/26/2012	9:06	0.21	7.81	3.38	4.78	779.96	0.01	0.01
3/26/2012	9:07	0.21	0.64	0.7	0.44	781.4	0.01	0.01
3/26/2012	9:08	0.02	0.53	0.35	0.44	782.35	0.01	0.01
3/26/2012	9:09	0.01	0.53	0.34	0.43	714.55	0.36	0.21
3/26/2012	9:10	0.01	0.52	0.35	0.43	28.05	12.23	0.2
3/26/2012	9:11	0.12	0.52	0.35	0.43	0.72	13.38	0.01
3/26/2012	9:12	0.21	0.52	0.35	0.43	0.38	13.44	0.01
3/26/2012	9:13	0.21	0.52	0.35	0.43	0.27	13.47	0.01
3/26/2012	9:14	0.2	0.52	0.35	0.43	0.32	13.49	0.01
3/26/2012	9:15	0.21	0.52	0.35	0.43	0.33	13.5	0.01
3/26/2012	9:16	0.21	0.53	0.35	0.44	0.29	13.51	0.01
3/26/2012	9:17	0.21	0.52	0.35	0.43	0.35	13.52	0.01
3/26/2012	9:18	0.2	0.51	0.35	0.43	0.25	13.52	0.01
3/26/2012	9:19	0.2	0.51	0.34	0.42	0.35	13.52	0.01
3/26/2012	9:20	0.2	0.51	0.34	0.43	0.23	8	2.49
3/26/2012	9:21	0.2	0.52	0.34	0.43	0.33	0.29	8.01
3/26/2012	9:22	0.2	0.45	0.34	0.43	0.25	0.2	8.27
3/26/2012	9:23	0.07	0.44	0.35	0.43	0.28	0.16	8.34
3/26/2012	9:24	0	0.34	0.35	0.43	0.28	0.14	8.36
3/26/2012	9:25	0.2	0.45	0.35	0.43	0.25	0.12	8.37
3/26/2012	9:26	0.15	0.17	0.35	0.43	0.31	0.1	7.6
3/26/2012	9:27	0	0.03	0.34	0.43	0.21	0.09	0.71
3/26/2012	9:28	0	0.1	0.34	0.43	0.28	0.08	0.21
3/26/2012	9:29	0	0.01	0.35	0.43	0.2	0.07	0.04

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	9:30	0	0.01	0.34	0.43	0.26	0.06	0.01
3/26/2012	9:31	0	0.02	0.35	0.43	0.2	0.05	0.01
3/26/2012	9:32	0	0.03	0.35	0.43	0.22	0.05	0.01
3/26/2012	9:33	0	0.02	0.35	0.43	0.34	0.04	0.01
3/26/2012	9:34	0	0.02	0.35	0.43	0.2	0.04	4.57
3/26/2012	9:35	0	0.44	0.35	0.27	0.37	0.04	20.29
3/26/2012	9:36	7.58	0.03	0.35	0.44	0.28	0.04	21.07
3/26/2012	9:37	75.81	0.02	0.35	0.44	0.34	0.03	21.25
3/26/2012	9:38	75.81	0.03	0.35	0.44	0.37	0.03	21.29
3/26/2012	9:39	75.81	0.03	0.36	0.44	0.29	0.03	21.3
3/26/2012	9:40	75.95	0.03	0.35	0.44	0.39	0.03	21.3
3/26/2012	9:41	76.01	0.03	0.35	0.44	0.29	0.03	21.28
3/26/2012	9:42	82.61	0.03	0.36	0.44	0.4	0.02	21.28
3/26/2012	9:43	83.26	0.03	0.36	0.44	0.31	0.02	21.28
3/26/2012	9:44	83.03	0.03	0.36	0.44	0.36	0.02	21.28
3/26/2012	9:45	83.59	0.03	0.36	0.44	0.36	0.02	21.28
3/26/2012	9:46	83.83	0.03	0.36	0.44	0.33	0.02	21.28
3/26/2012	9:47	83.43	0.04	0.36	0.45	0.39	0.02	21.28
3/26/2012	9:48	83.56	0.04	0.36	0.45	0.29	0.02	21.28
3/26/2012	9:49	83.83	0.04	0.36	0.45	0.38	0.02	21.09
3/26/2012	9:50	33.01	0.04	0.36	0.45	0.3	0.02	20.78
3/26/2012	9:51	1.41	0.04	0.36	0.45	0.36	0.02	20.79
3/26/2012	9:52	0.31	0.04	0.37	0.21	0.33	0.02	20.85
3/26/2012	9:53	0.21	0.05	0.36	0.11	0.33	0.02	20.8
3/26/2012	9:54	0.21	0.04	0.36	0.45	0.39	0.02	20.77
3/26/2012	9:55	0.21	0.04	0.36	0.45	0.31	0.02	20.87
3/26/2012	9:56	0.21	0.04	0.36	0.29	0.39	0.02	20.97
3/26/2012	9:57	27.45	0.04	0.36	0.45	0.32	0.02	20.97
3/26/2012	9:58	32.92	0.04	0.37	0.46	0.37	0.02	20.98
3/26/2012	9:59	33.1	0.04	0.37	0.45	0.35	0.02	20.98
3/26/2012	10:00	33.1	0.04	0.36	0.45	0.34	0.02	20.98
3/26/2012	10:01	33.09	0.04	0.36	0.45	0.39	0.01	20.99
3/26/2012	10:02	32.95	0.04	0.37	0.45	0.3	0.01	21.06
3/26/2012	10:03	33.74	0.04	0.37	0.45	0.59	0.01	21.11
3/26/2012	10:04	49.74	0.04	0.37	0.45	0.54	0.01	21.12
3/26/2012	10:05	49.74	0.04	0.37	0.45	0.5	0.01	21.13
3/26/2012	10:06	49.74	0.04	0.37	0.45	0.42	0.01	21.13
3/26/2012	10:07	49.61	0.04	0.37	0.45	0.3	0.01	21.14
3/26/2012	10:08	49.54	0.21	0.37	0.37	20.09	0.19	21.08
3/26/2012	10:09	4.96	11.14	3.62	7.71	592.97	9.97	11.04
3/26/2012	10:10	13.15	61.48	17.89	43.94	639.62	11.44	8.04
3/26/2012	10:11	42.12	68.08	20.48	47.87	638.11	11.45	7.87
3/26/2012	10:12	42.23	71.67	24.07	47.95	640.93	11.53	7.76
3/26/2012	10:13	42.32	71.84	18.98	53.13	641.34	11.54	7.75
3/26/2012	10:14	40.93	67.83	18.15	50.04	636.56	11.5	7.79
3/26/2012	10:15	35.91	66.58	15.81	50.96	640.52	11.52	7.78
3/26/2012	10:16	35.39	70.17	15.06	55.47	643.26	11.59	7.73
3/26/2012	10:17	34.9	70.26	13.06	57.39	640.39	11.54	7.77
3/26/2012	10:18	33.63	70.5	12.89	57.89	638.88	11.53	7.77
3/26/2012	10:19	32.9	69.5	10.97	58.69	636.88	11.53	7.79
3/26/2012	10:20	33.08	68.39	11.29	57.49	641.62	11.56	7.75
3/26/2012	10:21	32.96	68.22	10.89	57.6	636.72	11.51	7.79
3/26/2012	10:22	32.5	66.9	9.79	57.48	637.46	11.55	7.77
3/26/2012	10:23	32.94	67.69	10.15	57.82	642	11.58	7.74
3/26/2012	10:24	33.3	69.77	9.74	60.31	640.53	11.53	7.76
3/26/2012	10:25	33.64	68.67	9.6	59.27	640.79	11.55	7.75
3/26/2012	10:26	33.64	69.62	9.15	60.66	651.59	11.56	7.74
3/26/2012	10:27	33.3	74.54	11.79	63.11	654.02	11.61	7.69
3/26/2012	10:28	33.39	70.21	8.81	61.61	641.26	11.51	7.78
3/26/2012	10:29	33.5	69.84	8.47	61.72	645.67	11.54	7.76

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	10:30	33.19	72.61	8.88	64.02	641.48	11.55	7.74
3/26/2012	10:31	33.15	71.62	8.4	63.5	638.11	11.49	7.79
3/26/2012	10:32	33.91	68.7	8.13	60.84	639.49	11.53	7.78
3/26/2012	10:33	33.59	71.22	8.38	63.03	636.1	11.52	7.77
3/26/2012	10:34	33.1	68.19	7.9	60.5	642.93	11.51	7.78
3/26/2012	10:35	33.38	70.54	8.72	62.11	642.19	11.51	7.77
3/26/2012	10:36	33.5	69.66	7.98	62.12	637.34	11.49	7.79
3/26/2012	10:37	32.7	69.24	7.86	61.56	641.74	11.53	7.77
3/26/2012	10:38	32.82	69.6	8.07	61.74	638.71	11.48	7.77
3/26/2012	10:39	33.1	69.7	7.54	62.53	642.3	11.47	7.78
3/26/2012	10:40	33.22	69.26	7.7	61.84	635.47	11.49	7.79
3/26/2012	10:41	33.3	67.84	7.28	60.83	642.08	11.46	7.78
3/26/2012	10:42	34.95	68.27	7.76	60.82	641.8	11.49	7.77
3/26/2012	10:43	34.71	69.28	7.58	62.16	636.19	11.48	7.78
3/26/2012	10:44	33.3	65.25	6.82	58.56	642.18	11.47	7.78
3/26/2012	10:45	33.94	68.91	7.28	61.98	635.04	11.47	7.77
3/26/2012	10:46	34.5	66.56	6.73	60.13	636.54	11.44	7.78
3/26/2012	10:47	32.83	67.92	6.82	61.42	638.82	11.45	7.77
3/26/2012	10:48	32.71	68.27	6.77	61.83	645.27	11.52	7.71
3/26/2012	10:49	34.1	71.53	6.96	64.84	647.03	11.5	7.7
3/26/2012	10:50	33.83	71.25	7.23	64.4	639.78	11.47	7.73
3/26/2012	10:51	33.5	67.85	6.72	61.45	635.99	11.44	7.76
3/26/2012	10:52	33.8	66.57	6.99	59.87	631.09	11.43	7.76
3/26/2012	10:53	33.9	65.25	6.7	58.85	640.21	11.46	7.76
3/26/2012	10:54	33.91	69.36	7.21	62.53	640.1	11.45	7.76
3/26/2012	10:55	33.53	69.37	7.5	62.06	639.71	11.44	7.75
3/26/2012	10:56	32.9	68.55	7.15	61.74	641.11	11.46	7.73
3/26/2012	10:57	33.17	67.77	7.74	60.23	641.26	11.47	7.72
3/26/2012	10:58	33.3	69.47	7.35	62.25	643.06	11.43	7.74
3/26/2012	10:59	34.09	72.59	7.6	65.1	639.53	11.45	7.73
3/26/2012	11:00	34.05	68.87	7.68	61.32	643.9	11.48	7.7
3/26/2012	11:01	33.9	71.91	7.4	64.98	641.73	11.43	7.73
3/26/2012	11:02	32.85	67.55	7.82	59.95	638.12	11.42	7.74
3/26/2012	11:03	32.1	67.78	7.34	60.79	635.23	11.42	7.74
3/26/2012	11:04	33.36	67.39	7.45	60.18	638.87	11.45	7.73
3/26/2012	11:05	33.5	68.94	7.51	61.75	647.25	11.47	7.71
3/26/2012	11:06	33.5	70.72	7.68	63.46	642.41	11.45	7.72
3/26/2012	11:07	32.98	69.24	7.64	61.66	635.62	11.43	7.74
3/26/2012	11:08	32.49	67.27	6.92	60.56	638.31	11.41	7.75
3/26/2012	11:09	32.49	67.07	7.28	60.01	637.32	11.42	7.74
3/26/2012	11:10	32.52	68.59	7.3	61.49	644.18	11.43	7.71
3/26/2012	11:11	32.7	80.85	10.62	70.41	716.38	11.63	7.53
3/26/2012	11:12	33.31	86.38	13.5	73.22	638.86	11.35	7.74
3/26/2012	11:13	34.1	68.83	7.45	61.64	638.54	11.41	7.74
3/26/2012	11:14	33.81	70.02	8.09	62.14	650.22	11.51	7.65
3/26/2012	11:15	33.71	73.54	7.88	65.94	647.39	11.42	7.72
3/26/2012	11:16	34.1	71	7.87	63.33	635.8	11.39	7.75
3/26/2012	11:17	33.82	66.82	7.44	59.74	638.42	11.39	7.75
3/26/2012	11:18	33.3	67.63	6.85	61.06	629.83	11.38	7.76
3/26/2012	11:19	33.82	62.76	6.96	56.08	629.13	11.3	7.81
3/26/2012	11:20	34.1	65.6	6.65	59.29	637.39	11.43	7.72
3/26/2012	11:21	33.72	65.65	6.99	58.95	641.66	11.41	7.71
3/26/2012	11:22	33.59	67.94	7.05	61	634.58	11.33	7.78
3/26/2012	11:23	33.3	67.37	6.85	60.97	637.31	11.42	7.72
3/26/2012	11:24	33.75	65.5	7.01	58.78	636.15	11.39	7.73
3/26/2012	11:25	34.1	67.08	7.01	60.52	644.99	11.4	7.73
3/26/2012	11:26	33.93	71.55	7.53	64.31	642.64	11.39	7.73
3/26/2012	11:27	33.94	70.76	7.54	63.43	642.01	11.39	7.72
3/26/2012	11:28	34.1	71.19	7.07	64.41	635.28	11.35	7.73
3/26/2012	11:29	34.1	69.98	7.43	62.84	628.17	11.09	8.09

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	11:30	34.1	68.83	7.26	61.81	641.19	11.37	7.75
3/26/2012	11:31	33.62	71.13	8.23	63.24	639.43	11.37	7.74
3/26/2012	11:32	33.48	68.77	7.71	61.28	630.03	11.3	7.78
3/26/2012	11:33	33.3	64.15	7.79	56.98	633.75	11.36	7.77
3/26/2012	11:34	33.62	65.74	8.05	58.07	638.14	11.41	7.72
3/26/2012	11:35	34.1	69.08	8.18	61.36	644.91	11.36	7.73
3/26/2012	11:36	33.24	70.05	8.99	61.17	642.35	11.38	7.73
3/26/2012	11:37	32.91	70.11	8.41	61.9	641.35	11.41	7.71
3/26/2012	11:38	33.5	72.59	8.91	64.13	650.4	11.42	7.69
3/26/2012	11:39	33.69	74.07	8.92	65.52	639.41	11.35	7.75
3/26/2012	11:40	34.1	69.32	8.1	61.62	639.09	11.38	7.74
3/26/2012	11:41	33.59	70.47	8.52	62.16	634.97	11.35	7.75
3/26/2012	11:42	33.3	66.76	8.06	58.9	640.79	11.35	7.74
3/26/2012	11:43	32.93	70.89	8.56	62.66	640.36	11.37	7.73
3/26/2012	11:44	32.9	69.81	8.44	61.62	639.59	11.36	7.74
3/26/2012	11:45	32.9	70.68	7.69	63.21	639.57	11.38	7.72
3/26/2012	11:46	33.56	70.89	8.19	63	642.47	11.37	7.72
3/26/2012	11:47	34.11	71.43	8.07	63.75	645.07	11.4	7.7
3/26/2012	11:48	33.25	71.43	8.48	63.29	646.77	11.43	7.68
3/26/2012	11:49	33.13	74.03	8.53	65.84	648.55	11.41	7.68
3/26/2012	11:50	33.31	73.03	8.32	64.93	652.3	11.43	7.67
3/26/2012	11:51	33.59	73.04	9.07	64.59	646.98	11.4	7.67
3/26/2012	11:52	33.91	71.49	8.32	63.38	645.14	11.35	7.72
3/26/2012	11:53	33.44	71.2	8.9	62.38	643.81	11.43	7.67
3/26/2012	11:54	33.32	68.44	8.11	60.63	646.99	11.39	7.69
3/26/2012	11:55	33.51	70.61	8.36	62.5	642.82	11.37	7.7
3/26/2012	11:56	33.43	69.27	8.44	61.13	637.5	11.37	7.7
3/26/2012	11:57	33.3	63.18	7.36	56.03	100.31	2.66	16.2
3/26/2012	11:58	33.3	14.03	2.26	12.2	4.11	0.28	20.37
3/26/2012	11:59	5.49	7.11	1.39	5.79	3.65	0.24	20.58
3/26/2012	12:00	1.68	4.84	1.42	3.62	3.67	0.21	20.64
3/26/2012	12:01	1.02	3.59	1.4	2.48	3.42	0.19	20.67
3/26/2012	12:02	0.82	3.04	1.38	2.03	3.3	0.17	20.67
3/26/2012	12:03	0.62	2.18	1.03	1.73	2.97	0.16	20.68
3/26/2012	12:04	0.61	2	0.87	1.49	3.08	0.15	20.68
3/26/2012	12:05	0.61	1.53	0.49	1.23	2.77	0.14	20.69
3/26/2012	12:06	0.61	1.48	0.38	0.95	2.66	0.13	20.7
3/26/2012	12:07	0.61	1.05	0.38	0.95	2.7	0.12	20.7
3/26/2012	12:08	0.62	1.05	0.38	0.96	2.19	0.11	20.71
3/26/2012	12:09	0.48	1.05	0.38	0.96	2.17	0.11	20.7
3/26/2012	12:10	0.42	1.05	0.38	0.96	2.43	0.1	20.71
3/26/2012	12:11	-999	-999	-999	-999	-999	-999	-999
3/26/2012	12:12	-999	-999	-999	-999	-999	-999	-999
3/26/2012	12:13	-999	-999	-999	-999	-999	-999	-999
3/26/2012	12:14	0.28	1.03	0.33	0.39	2.66	0.09	20.71
3/26/2012	12:15	0.21	0.9	0.34	0.4	2.69	0.09	20.72
3/26/2012	12:16	0.22	0.54	0.35	0.41	2.84	0.08	20.71
3/26/2012	12:17	0.22	0.62	0.34	0.41	3.02	0.08	20.71
3/26/2012	12:18	0.21	0.53	0.34	0.41	2.7	0.08	20.7
3/26/2012	12:19	0.21	0.51	0.33	0.4	2.79	0.08	20.71
3/26/2012	12:20	0.2	0.67	0.33	0.49	2.66	0.07	20.88
3/26/2012	12:21	26.34	0.51	0.34	0.4	2.44	0.07	20.9
3/26/2012	12:22	34.31	0.51	0.34	0.4	2.65	0.07	20.92
3/26/2012	12:23	34.5	0.5	0.34	0.4	2.55	0.07	20.91
3/26/2012	12:24	34.42	0.58	0.34	0.44	8.25	0.16	17.36
3/26/2012	12:25	34.3	43.93	28.16	16.02	2.76	0.07	1.28
3/26/2012	12:26	11	74.96	71.6	3.52	2.8	0.07	0.39
3/26/2012	12:27	0.21	76.61	74.93	1.91	3.01	0.07	0.15
3/26/2012	12:28	0.21	77.88	75.44	2.63	3.03	0.06	0.03
3/26/2012	12:29	0.21	77.66	75.45	2.43	2.58	0.06	0.01

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	12:30	0.07	77.7	75.48	2.47	140.77	0.06	0.01
3/26/2012	12:31	0.04	45.97	39.66	6.95	781.21	0.06	0.01
3/26/2012	12:32	0.22	1.32	0.87	0.68	788.03	0.06	0.01
3/26/2012	12:33	0.14	1.04	0.41	0.44	788.73	0.06	0.01
3/26/2012	12:34	0.02	0.86	0.38	0.47	234.12	8.18	0.01
3/26/2012	12:35	0.14	0.54	0.37	0.45	3.39	13.18	0.01
3/26/2012	12:36	0.22	0.56	0.38	0.45	2.54	13.24	0.01
3/26/2012	12:37	0.03	0.56	0.39	0.47	2.28	13.35	0.01
3/26/2012	12:38	0.07	0.56	0.38	0.46	2.23	13.55	0.01
3/26/2012	12:39	0.22	0.55	0.38	0.45	2.05	13.57	0.01
3/26/2012	12:40	0.11	0.55	0.38	0.46	2.18	9.51	1.58
3/26/2012	12:41	0.01	0.54	0.37	0.44	2.13	0.32	7.88
3/26/2012	12:42	0.02	0.55	0.39	0.47	2.21	0.21	8.24
3/26/2012	12:43	0.01	0.54	0.38	0.46	2.52	0.17	8.32
3/26/2012	12:44	0.02	0.55	0.38	0.46	2.6	0.15	8.34
3/26/2012	12:45	0.02	0.55	0.38	0.46	10.88	0.17	8.35
3/26/2012	12:46	0.02	10.99	3.71	7.4	573.68	9.6	7.91
3/26/2012	12:47	25.97	59.49	16.42	43.35	648.1	11.63	7.69
3/26/2012	12:48	33.26	68.27	13.69	54.94	645.01	11.58	7.73
3/26/2012	12:49	32.71	68.32	12.95	55.57	643.52	11.6	7.73
3/26/2012	12:50	33.24	69.73	12.9	57.15	642.36	11.65	7.7
3/26/2012	12:51	34.11	68.94	11.15	57.95	642.45	11.63	7.72
3/26/2012	12:52	33.69	68.27	12.23	56.24	646.77	11.65	7.7
3/26/2012	12:53	33.51	70.48	11.52	59.16	630.39	11.61	7.69
3/26/2012	12:54	34.11	56.45	10.02	46.76	69.92	2.06	17.13
3/26/2012	12:55	24.48	12.9	1.84	11.4	4.83	0.28	20.64
3/26/2012	12:56	2.03	6.82	1.17	5.98	3.1	0.22	20.85
3/26/2012	12:57	1.42	4.48	0.88	3.84	3.01	0.2	20.91
3/26/2012	12:58	1.02	3.06	0.88	2.68	4.17	0.2	20.91
3/26/2012	12:59	2.31	2.36	0.6	2.01	3.04	0.17	20.93
3/26/2012	13:00	2.08	1.85	0.39	1.5	3.04	0.16	20.93
3/26/2012	13:01	0.82	1.56	0.39	1.41	2.75	0.15	20.93
3/26/2012	13:02	0.82	1.26	0.39	0.97	104.15	1.28	20.39
3/26/2012	13:03	0.82	15.47	5.71	10.05	634.54	11.21	9.11
3/26/2012	13:04	27.85	56.58	12.57	44.3	649.91	11.62	7.87
3/26/2012	13:05	33.8	66.64	12.03	55.05	645.55	11.61	7.74
3/26/2012	13:06	33.11	67.63	11.2	56.68	637.03	11.51	7.79
3/26/2012	13:07	32.93	66.79	11.27	55.99	634.62	11.62	7.72
3/26/2012	13:08	32.71	65.98	9.43	56.95	645.46	11.69	7.67
3/26/2012	13:09	33.61	70.75	10.79	60.25	642.18	11.62	7.71
3/26/2012	13:10	33.83	70.71	10.28	60.71	646.4	11.62	7.73
3/26/2012	13:11	32.31	70.81	11.45	59.73	642.33	11.7	7.68
3/26/2012	13:12	32.87	69.41	11.65	58.13	651.43	11.69	7.68
3/26/2012	13:13	33.91	73.23	11.07	62.32	644.6	11.65	7.7
3/26/2012	13:14	33.25	69.93	11.32	58.91	643.78	11.68	7.7
3/26/2012	13:15	32.91	71.19	10.46	61.05	646.06	11.7	7.68
3/26/2012	13:16	33.3	68.57	10.49	58.45	644.12	11.66	7.7
3/26/2012	13:17	33.37	68.86	10.78	58.22	645.57	11.67	7.71
3/26/2012	13:18	33.51	70.47	9.79	60.83	646.38	11.68	7.7
3/26/2012	13:19	33.04	71.37	9.72	61.82	645.48	11.67	7.71
3/26/2012	13:20	32.71	71.92	9.56	62.63	644.57	11.7	7.69
3/26/2012	13:21	33.59	71.26	10.03	61.58	646.66	11.69	7.69
3/26/2012	13:22	33.83	73.25	10.24	63.23	644.62	11.66	7.72
3/26/2012	13:23	34.31	70.13	10.2	60.27	643.34	11.67	7.72
3/26/2012	13:24	33.91	69.03	10.2	58.97	640.37	11.63	7.74
3/26/2012	13:25	33.51	71.16	9.31	62.02	635.54	11.64	7.74
3/26/2012	13:26	34.16	68.44	9.84	58.94	641.22	11.69	7.7
3/26/2012	13:27	34.27	70.88	9.61	61.72	644.26	11.66	7.7
3/26/2012	13:28	33.92	70.23	9.58	61.03	641.43	11.63	7.75
3/26/2012	13:29	33.92	69.9	9.57	60.45	650.19	11.71	7.68

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	13:30	33.92	73.27	9.09	64.63	649.85	11.7	7.68
3/26/2012	13:31	34.35	73.1	9.88	63.51	655.82	11.67	7.68
3/26/2012	13:32	34.49	72.83	9.68	63.34	643.29	11.66	7.71
3/26/2012	13:33	33.72	71.6	8.67	63.14	640.9	11.62	7.74
3/26/2012	13:34	33.65	68.97	8.99	60.33	642.59	11.64	7.74
3/26/2012	13:35	33.51	71.83	8.47	63.52	650.84	11.69	7.69
3/26/2012	13:36	33.38	73.71	9.43	64.63	648.94	11.64	7.71
3/26/2012	13:37	33.31	73.87	9.02	65.16	642.2	11.6	7.75
3/26/2012	13:38	33.69	70.15	8.4	62.21	638.2	11.6	7.76
3/26/2012	13:39	33.92	71.3	7.91	63.66	641.39	11.64	7.72
3/26/2012	13:40	34.52	69.94	7.74	62.42	636.75	11.57	7.76
3/26/2012	13:41	33.38	66.86	7.8	59.27	638.38	11.6	7.76
3/26/2012	13:42	32.51	68.15	7.43	61.07	639.4	11.64	7.72
3/26/2012	13:43	33.73	68.25	8.14	60.58	642.5	11.63	7.71
3/26/2012	13:44	33.78	69.9	7.45	62.68	638.98	11.56	7.77
3/26/2012	13:45	33.11	68.95	7.39	61.71	637.9	11.6	7.75
3/26/2012	13:46	33.6	68.63	7.87	61.2	654.05	11.71	7.66
3/26/2012	13:47	34.11	74.61	7.92	67.09	644.54	11.59	7.72
3/26/2012	13:48	33.02	71.54	8.07	63.74	636.68	11.49	7.86
3/26/2012	13:49	32.86	72.52	8.97	63.84	644.42	11.65	7.7
3/26/2012	13:50	34.52	70.5	9.6	61.17	643.39	11.55	7.74
3/26/2012	13:51	33.8	69.99	10.26	60.2	640.24	11.57	7.74
3/26/2012	13:52	32.71	69.44	9.32	60.26	631.5	11.62	7.72
3/26/2012	13:53	33.7	65.75	9.64	56.39	641.31	11.57	7.76
3/26/2012	13:54	34.12	68.83	10.22	58.97	640.37	11.57	7.74
3/26/2012	13:55	33.92	67.49	10.41	57.37	645.68	11.6	7.73
3/26/2012	13:56	33.66	70.01	10.82	59.39	641.03	11.6	7.72
3/26/2012	13:57	33.11	69.64	10.24	59.77	642.89	11.58	7.74
3/26/2012	13:58	33.73	69.94	9.92	60.37	641.44	11.58	7.74
3/26/2012	13:59	34.12	70.73	9.65	61.22	644.8	11.59	7.74
3/26/2012	14:00	33.56	71.75	9.66	62.36	643.68	11.6	7.73
3/26/2012	14:01	33.38	70.46	9.4	61.27	649.8	11.57	7.73
3/26/2012	14:02	32.92	75.14	9.35	66.16	641.93	11.59	7.73
3/26/2012	14:03	33.66	72.85	9.06	64.08	646.03	11.61	7.7
3/26/2012	14:04	34.32	72.97	8.57	64.69	651.74	11.62	7.69
3/26/2012	14:05	33.64	72.81	9.58	63.52	639.03	11.53	7.75
3/26/2012	14:06	33.52	72.91	8.45	64.82	642.17	11.55	7.75
3/26/2012	14:07	33.52	68.13	8.13	60.46	629.41	11.54	7.77
3/26/2012	14:08	33.61	66.4	8.06	58.71	637.38	11.55	7.75
3/26/2012	14:09	33.72	68.13	7.57	61.01	638.23	11.55	7.75
3/26/2012	14:10	33.41	69.6	8.23	61.76	645.8	11.59	7.72
3/26/2012	14:11	33.35	70.58	8.06	62.82	647.11	11.58	7.72
3/26/2012	14:12	33.92	71.92	8.08	64.37	645.76	11.58	7.72
3/26/2012	14:13	33.76	71.34	7.84	63.88	641.66	11.59	7.72
3/26/2012	14:14	33.52	69.88	7.15	62.86	645	11.6	7.71
3/26/2012	14:15	33.79	69.62	7.74	62.24	645.2	11.56	7.73
3/26/2012	14:16	33.92	69.94	7.71	62.61	646.83	11.6	7.7
3/26/2012	14:17	33.52	70.25	7.27	63.36	643.09	11.6	7.71
3/26/2012	14:18	33.51	69.56	7.05	62.78	646.74	11.59	7.7
3/26/2012	14:19	35.28	66.82	10.58	56.33	172.97	3.65	14.85
3/26/2012	14:20	42.34	13.92	3.39	10.82	4.73	0.29	20.35
3/26/2012	14:21	21.88	7.33	1.22	6.32	4.09	0.24	20.6
3/26/2012	14:22	1.42	4.65	0.88	4.05	3.37	0.22	20.66
3/26/2012	14:23	0.94	3.48	0.89	2.88	3.35	0.19	20.68
3/26/2012	14:24	0.8	2.81	0.88	2.31	3.38	0.18	20.68
3/26/2012	14:25	0.62	2.07	0.39	1.89	3.46	0.16	20.68
3/26/2012	14:26	0.62	1.73	0.39	1.47	3.22	0.15	20.68
3/26/2012	14:27	0.62	1.55	0.39	1.46	3.33	0.14	20.68
3/26/2012	14:28	0.48	1.56	0.39	1.13	3.44	0.13	20.68
3/26/2012	14:29	0.42	1.06	0.39	0.96	3.2	0.12	20.68

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	14:30	0.42	1.06	0.39	0.97	3.27	0.12	20.82
3/26/2012	14:31	10.52	1.06	0.39	0.97	3.63	0.12	20.88
3/26/2012	14:32	32.31	1.06	0.39	0.96	3.39	0.11	20.88
3/26/2012	14:33	32.31	1.06	0.39	0.97	3.68	0.11	20.88
3/26/2012	14:34	32.31	1.06	0.39	0.97	3.55	0.1	20.88
3/26/2012	14:35	32.68	1.06	0.39	0.96	3.4	0.1	20.88
3/26/2012	14:36	32.62	1.07	0.4	0.97	3.25	0.1	14.46
3/26/2012	14:37	32.31	1.06	0.39	0.81	3.2	0.1	0.96
3/26/2012	14:38	15.2	0.65	0.39	0.48	3.3	0.09	0.34
3/26/2012	14:39	0.22	0.56	0.4	0.48	3.14	0.09	0.12
3/26/2012	14:40	0.22	0.56	0.39	0.48	3.15	0.09	0.01
3/26/2012	14:41	0.22	0.57	0.39	0.48	3.52	0.09	0.01
3/26/2012	14:42	0.22	0.56	0.38	0.47	3.17	0.08	0.01
3/26/2012	14:43	0.22	0.57	0.39	0.48	3.59	0.08	5.16
3/26/2012	14:44	0.22	0.57	0.39	0.48	3.49	0.08	8.13
3/26/2012	14:45	0.22	0.57	0.39	0.48	3.65	0.08	8.28
3/26/2012	14:46	0.22	0.57	0.39	0.48	3.66	0.08	8.32
3/26/2012	14:47	0.23	0.57	0.4	0.48	3.77	0.08	8.33
3/26/2012	14:48	0.22	0.55	0.38	0.46	3.48	0.08	8.34
3/26/2012	14:49	0.22	0.56	0.39	0.47	2.99	5.73	5.5
3/26/2012	14:50	0.22	0.57	0.39	0.47	2.78	13.41	0.45
3/26/2012	14:51	0.22	0.55	0.39	0.47	3.01	13.5	0.15
3/26/2012	14:52	0.22	0.56	0.39	0.47	3.24	13.54	0.01
3/26/2012	14:53	0.22	0.56	0.39	0.47	3.07	13.56	0.01
3/26/2012	14:54	0.23	0.57	0.39	0.48	116.01	12.13	0.11
3/26/2012	14:55	0.23	0.57	0.39	0.47	775.44	0.67	0.02
3/26/2012	14:56	0.23	0.57	0.39	0.48	789.03	0.21	0.01
3/26/2012	14:57	0.23	0.57	0.39	0.47	789.84	0.18	0.01
3/26/2012	14:58	0.23	3.54	0.82	2.89	295.75	0.15	0.21
3/26/2012	14:59	0.23	63.71	59.29	5.38	5.33	0.14	0.01
3/26/2012	15:00	0.23	77.51	73.77	4.01	5.01	0.13	0.01
3/26/2012	15:01	0.23	76.95	74	3.21	5.16	0.14	0.01
3/26/2012	15:02	0.07	76.72	73.99	2.97	4.18	0.11	0.01
3/26/2012	15:03	0.02	76.71	74	2.79	152	2.01	0.71
3/26/2012	15:04	0.02	69.96	40.26	29.82	642.68	11.38	7.2
3/26/2012	15:05	15.55	65.55	13.08	52.76	643.09	11.58	7.65
3/26/2012	15:06	40.54	67.36	10.83	56.82	647.99	11.66	7.68
3/26/2012	15:07	41.8	71.21	11.06	60.34	649.8	11.64	7.71
3/26/2012	15:08	42.34	72.64	10.31	62.55	642.52	11.62	7.74
3/26/2012	15:09	37.96	69.35	10.66	58.91	643.94	11.63	7.74
3/26/2012	15:10	34.12	69.6	9.58	60.38	636.66	11.65	7.74
3/26/2012	15:11	33.27	66.32	9.79	56.9	640.72	11.64	7.75
3/26/2012	15:12	33.09	69.5	9.73	60.06	653.03	11.69	7.69
3/26/2012	15:13	32.92	73.15	9.53	63.83	645.85	11.65	7.73
3/26/2012	15:14	32.83	71.28	9.98	61.68	642.07	11.63	7.75
3/26/2012	15:15	32.72	68.69	9.18	59.79	639.95	11.65	7.75
3/26/2012	15:16	33.18	70.07	9.23	61.23	647.98	11.7	7.7
3/26/2012	15:17	33.33	73.22	9.28	64.15	641.73	11.64	7.74
3/26/2012	15:18	33.52	67.49	8.68	59.07	635.67	11.56	7.79
3/26/2012	15:19	33.06	64.31	8.52	55.96	637.81	11.63	7.76
3/26/2012	15:20	32.32	68.21	8.35	59.99	644.83	11.71	7.69
3/26/2012	15:21	33.82	69.24	8.61	60.85	644.8	11.63	7.73
3/26/2012	15:22	34.52	70.8	8.46	62.64	637.28	11.59	7.76
3/26/2012	15:23	32.35	69.27	8.55	61.04	641.02	11.68	7.7
3/26/2012	15:24	32.86	68.8	8.52	60.63	644.86	11.65	7.71
3/26/2012	15:25	34.12	69.88	8.22	61.96	647.46	11.61	7.74
3/26/2012	15:26	33.52	72.01	8.8	63.59	637.65	11.63	7.74
3/26/2012	15:27	33.12	68.27	7.43	61.07	637.77	11.59	7.78
3/26/2012	15:28	35.1	68.34	7.97	60.67	643.43	11.62	7.75
3/26/2012	15:29	35.19	71.98	8.52	63.82	640.63	11.65	7.72

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	15:30	34.72	70.32	7.69	62.98	641.41	11.63	7.74
3/26/2012	15:31	34.41	69.84	8.07	62.07	642.34	11.61	7.74
3/26/2012	15:32	34.12	71.12	7.46	63.87	644.1	11.63	7.73
3/26/2012	15:33	34.45	71.22	8.11	63.43	650.62	11.66	7.69
3/26/2012	15:34	34.38	74.57	8.13	66.83	644.99	11.62	7.71
3/26/2012	15:35	33.51	72.84	7.63	65.43	645.35	11.62	7.71
3/26/2012	15:36	33.52	71.86	7.69	64.39	642.49	11.64	7.7
3/26/2012	15:37	33.52	73.17	7.2	66.26	647.54	11.61	7.71
3/26/2012	15:38	33.97	73.46	7.91	65.97	648.64	11.62	7.71
3/26/2012	15:39	34.05	72.29	7.38	65.13	640.66	11.57	7.76
3/26/2012	15:40	32.72	69.74	6.96	62.91	638.95	11.6	7.74
3/26/2012	15:41	32.93	69.28	7.11	62.38	641.26	11.59	7.74
3/26/2012	15:42	33.32	68.43	6.79	61.93	821.77	11.86	7.58
3/26/2012	15:43	32.92	329.34	198.13	199.18	1050.06	12.6	6.66
3/26/2012	15:44	32.72	212.82	63.14	150.04	658.05	11.58	7.62
3/26/2012	15:45	33.49	92.73	9.73	83.3	639.51	11.55	7.73
3/26/2012	15:46	33.74	75.12	7.74	67.82	640.86	11.62	7.7
3/26/2012	15:47	34.32	74.74	7.01	68.07	650.3	11.63	7.67
3/26/2012	15:48	33.85	76.07	7.58	68.88	639.51	11.52	7.76
3/26/2012	15:49	33.52	72.33	6.66	65.93	634.14	11.53	7.76
3/26/2012	15:50	33.16	70.09	6.79	63.63	642.64	11.61	7.69
3/26/2012	15:51	33.36	71.22	6.64	64.96	649.75	11.59	7.7
3/26/2012	15:52	34.32	75.06	6.84	68.57	641.81	11.53	7.73
3/26/2012	15:53	33.72	69.04	6.82	62.46	637.32	11.54	7.73
3/26/2012	15:54	33.11	70.49	6.27	64.54	636.26	11.56	7.72
3/26/2012	15:55	33.61	68.62	6.34	62.54	638.33	11.52	7.74
3/26/2012	15:56	33.77	69.41	6.44	63.15	635.03	11.51	7.75
3/26/2012	15:57	34.12	67.67	5.87	62.04	633	11.44	7.84
3/26/2012	15:58	34.12	68.6	6.44	62.6	642.4	11.51	7.76
3/26/2012	15:59	34.12	72.04	6.45	65.93	643.96	11.5	7.75
3/26/2012	16:00	33.68	73.33	6.74	66.85	634.84	11.55	7.71
3/26/2012	16:01	33.54	65.82	5.9	60.34	632.58	11.52	7.74
3/26/2012	16:02	34.12	66.16	5.65	60.64	639.11	11.51	7.74
3/26/2012	16:03	34.19	69.84	6	64.14	640.49	11.56	7.74
3/26/2012	16:04	34.32	70.67	5.95	65.18	648.11	11.59	7.68
3/26/2012	16:05	33.93	72.54	6.36	66.47	643.08	11.53	7.71
3/26/2012	16:06	33.72	72.54	6.03	66.89	637.72	11.49	7.74
3/26/2012	16:07	33.34	68.37	6.19	62.47	641.37	11.54	7.71
3/26/2012	16:08	33.59	69.04	5.99	63.31	638.46	11.54	7.72
3/26/2012	16:09	34.32	68.12	5.69	62.72	636.28	11.51	7.73
3/26/2012	16:10	33.75	67.95	6.07	62.22	643.74	11.55	7.71
3/26/2012	16:11	33.32	71	5.74	65.64	644.62	11.58	7.68
3/26/2012	16:12	34.19	73.16	6.4	67.02	651.41	11.56	7.68
3/26/2012	16:13	34.02	74.84	6.65	68.51	651.94	11.54	7.7
3/26/2012	16:14	32.72	74	6.49	67.72	645.72	11.55	7.69
3/26/2012	16:15	33.1	71.71	6.99	65.01	641.86	11.51	7.71
3/26/2012	16:16	33.52	70.41	6.45	64.3	642.3	11.48	7.74
3/26/2012	16:17	33.68	71.25	6.49	65.18	638.06	11.52	7.71
3/26/2012	16:18	33.74	68.83	5.9	63.19	639.79	11.52	7.72
3/26/2012	16:19	33.92	71.72	6.12	65.88	651.42	11.55	7.68
3/26/2012	16:20	34	72.85	6.83	66.54	643.03	11.5	7.7
3/26/2012	16:21	34.12	75.08	6.32	69.01	651	11.54	7.68
3/26/2012	16:22	33.54	76.18	6.6	69.95	646.61	11.56	7.66
3/26/2012	16:23	33.32	73.84	6.2	67.93	641.88	11.5	7.71
3/26/2012	16:24	33.52	73.11	6.1	67.3	640.71	11.48	7.72
3/26/2012	16:25	33.52	69.4	5.93	63.59	238.43	5.1	13.39
3/26/2012	16:26	33.52	21.09	2.66	18.72	5.89	0.3	20.25
3/26/2012	16:27	13.19	7.92	1.17	7.05	4.98	0.25	20.54
3/26/2012	16:28	1.43	5.12	0.89	4.5	4.37	0.22	20.62
3/26/2012	16:29	0.87	3.72	0.89	3.2	4.25	0.19	20.65

Date	Hour	NMHC	NOX	NO	NO2	CO	CO2	O2
3/26/2012	16:30	0.78	2.77	0.64	2.51	4.12	0.18	20.68
3/26/2012	16:31	0.63	2.27	0.72	1.92	4.03	0.16	20.66
3/26/2012	16:32	0.52	2.03	0.43	1.59	3.87	0.15	20.66
3/26/2012	16:33	0.43	1.79	0.4	1.47	3.69	0.14	20.71
3/26/2012	16:34	22.42	1.6	0.4	1.48	3.87	0.13	20.86
3/26/2012	16:35	26.39	1.48	0.4	1.14	3.56	0.12	20.87
3/26/2012	16:36	26.9	1.27	0.4	1.01	3.51	0.12	20.87
3/26/2012	16:37	28.42	1.07	0.4	0.97	3.62	0.12	20.88
3/26/2012	16:38	33.92	1.07	0.4	0.97	3.51	0.11	20.88
3/26/2012	16:39	33.92	1.07	0.39	0.96	3.28	0.11	20.88
3/26/2012	16:40	33.92	0.95	0.8	0.44	49.54	0.86	15.95
3/26/2012	16:41	45.9	2.16	2.23	0.14	2.77	0.11	1.14
3/26/2012	16:42	42.14	1.43	0.39	1.24	2.85	0.1	0.37
3/26/2012	16:43	0.43	1.07	0.39	0.97	2.69	0.1	0.12
3/26/2012	16:44	0.34	1.06	0.39	0.97	2.58	0.09	0.02
3/26/2012	16:45	0.23	1.07	0.39	0.97	2.83	0.09	0.01
3/26/2012	16:46	0.23	1.06	0.39	0.96	2.66	0.09	0.01
3/26/2012	16:47	0.23	1.07	0.39	0.97	2.32	0.09	3.85
3/26/2012	16:48	0.23	0.76	0.39	0.75	2.55	0.08	8.09
3/26/2012	16:49	0.22	0.56	0.39	0.47	2.28	0.08	8.27
3/26/2012	16:50	0.23	0.57	0.39	0.48	2.54	0.08	8.33
3/26/2012	16:51	0.23	0.57	0.39	0.47	2.27	0.08	8.33
3/26/2012	16:52	0.22	0.56	0.39	0.47	2	1.4	7.93
3/26/2012	16:53	0.22	0.56	0.39	0.47	2.28	12.92	0.94
3/26/2012	16:54	0.22	0.55	0.38	0.46	2.18	13.35	0.23
3/26/2012	16:55	0.22	0.56	0.39	0.47	2.21	13.54	0.03
3/26/2012	16:56	0.22	0.56	0.39	0.47	2.3	13.57	0.01
3/26/2012	16:57	0.22	0.56	0.39	0.47	2.18	13.59	0.01
3/26/2012	16:58	0.23	0.57	0.39	0.47	3.4	13.61	0.01
3/26/2012	16:59	9.74	0.57	0.39	0.48	606.9	4.04	0.04
3/26/2012	17:00	58.79	0.58	0.39	0.48	786.94	0.25	0.01
3/26/2012	17:01	31.46	0.57	0.39	0.47	787.83	0.2	0.01
3/26/2012	17:02	0.23	0.57	0.39	0.47	688.36	0.17	0.15
3/26/2012	17:03	0.23	27.69	22.76	5.22	17.79	0.15	0.08
3/26/2012	17:04	0.35	77.59	72.69	5.07	4.31	0.14	0.01
3/26/2012	17:05	1.78	77.39	74.51	3.16	3.49	0.13	0.01
3/26/2012	17:06	0.24	76.98	74.45	2.82	3.06	0.12	0.27
3/26/2012	17:07	0.24	71.91	68.61	3.61	3.88	0.14	11.18
3/26/2012	17:08	0.2	10.11	3.41	7.1	4.64	0.16	20.31